

Understanding the Impact of Consumer Awareness of Utility Regulatory Framework on Energy Efficiency Program Participation

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ABSTRACT

It is not often that we come across an advertisement that asks us to spend less. As consumers, we are accustomed to being pressured into using, buying, and spending more. So, when a utility advertises a program to reduce electricity consumption, a reasonable reaction is “where’s the catch?” The underlying assumption is that utilities achieve higher profits when they sell more electricity. However, this is not the case in a growing number of states. State regulators have been changing incentive structures to remove disincentives for utilities to develop, promote, and execute energy efficiency programs.

This research explores the relationship between customer awareness of the utility regulatory framework and their likelihood to participate in such energy efficiency programs. The key research question is: Is a lack of awareness of the utility regulation framework a significant barrier to participation in utility-driven energy efficiency programs? The key hypothesis tested is: Residential customers who are aware of utility regulatory framework are more likely to participate in utility-driven energy efficiency programs than similar customers who are not aware.

Utility customers who were aware of the regulatory framework had 29% lower levels of distrust, 11% higher levels of trust, 38% higher recollection rate for energy efficiency advertising, and, ultimately, a participation rate 22% higher than customers who were not aware. Higher participation was observed in each of the three states included in the analysis.

Introduction

Energy Efficiency Program Marketing

Electricity is generally universal, reliable, and cheap. These are positive outcomes of the regulatory environment that oversees electricity generators and distributors across a variety of utility configurations. However, it also means that most people don’t have to think very much about their electricity – where it comes from, how it gets to them, what are the environmental and social impacts of generation and distribution. Lesic et al. (2018) concluded that consumer understanding of their energy use is weak; consumers tend to over-estimate energy consumption of appliances that use less energy and underestimate for appliances that use more energy. A common strategy to decrease energy use is to curtail usage (e.g., turn off the lights), but little thought is given to how well a home is insulated or how efficient existing high-energy consuming appliances are (Lesic et al. 2018). A general lack of interest combined with a low level of understanding makes energy efficiency (EE) program marketing challenging. Education must be a key component of any consumer EE program.

It is generally left up to the individual EE program administrators to define how they want to communicate program benefits and encourage enrollment in their programs. Marketing EE programs has a set of challenges that is relatively unique. Cole, McDonald, Wen and Kramer (2018) measured the perceived benefits of home energy efficiency and found that the top three

benefits identified are: 1) reduction in energy costs, 2) a good return on investment, and 3) increased comfort of the home. They found some variability in the ranking of benefits according to US region, but the environmental benefits were only identified in the top-three among residents of the West.

While it appears that there is a limited opportunity to use environmental messaging to drive home EE program participation, some have found that it can even be a deterrent. Communicating environmental benefits of energy efficiency has resulted in lower adoption of EE measures among politically conservative individuals (Gromet, Kunreuther, and Larrick 2013). Consequently, much of the EE marketing that can be seen today avoids or minimizes mention of environmental benefit and focuses more on lower utility bills as the key potential benefit that participants will experience. This message, while avoiding the potentially politicized messaging about the environment, has a credibility issue. It runs directly contrary to how most residential customers view their electric utility.

On the other end of the spectrum, households with pro-environmental behavior are more likely to participate in EE programs (Gamtessa and Guliani 2019), but even when marketing environmentally friendly products to individuals who express an elevated level of receptiveness to environmental messaging, credibility of the advertisement remains an important driver of purchase intention (Tucker, Rifon, Lee, and Reece 2012). When looking across the spectrum of all customers in the US, we see that less than a third of customers (29%) trusted their electric utility to inform them about actions to optimize electricity consumption and only 34% were aware of EE programs offered by their utility (Accenture 2010). Utility communications about energy efficiency run into a credibility gap on both ends of the spectrum.

Barriers to Participation in Energy Efficiency Programs

There are numerous barriers that keep customers from participating in EE programs (Lazar 2016; Goldman et al. 2018):

- Customers don't know EE savings are possible
- Customers don't know how to implement EE savings
- Customers can't get financing for EE
- Contractors and builders aren't aware of the programs or aren't interested
- Specialized EE materials and equipment are not always available locally
- Misalignment of utility incentives (i.e. lack of decoupling)

To increase EE program participation, there is a clear need to communicate more about these programs and to communicate better. Utilities have the advantage of owning the relationship with customers, but a lack of credibility with their conservation messaging limits them.

Research Questions and Model

Model

This research focused on quantifying and understanding the relationships between customer awareness of the basics of utility regulation and customers' attitudes and actions related to their utilities. Conceptually, the model underpinning this analysis is that increased

regulatory awareness will decrease customers' distrust of their utility, which will allow them to view EE program advertisement and conservation messaging more credibly and positively. The increased effectiveness of these messages builds stronger EE program familiarity over time and will also be associated with higher EE program participation rates (Figure 1).

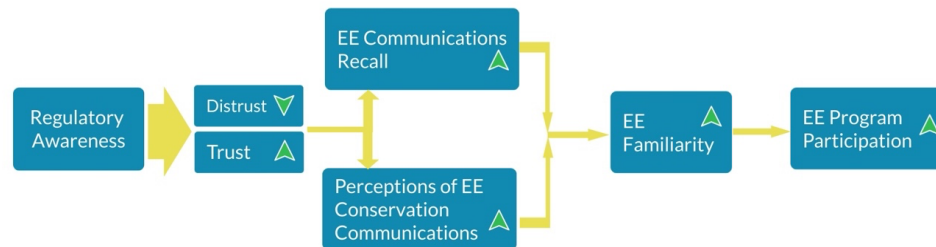


Figure 1. Model of path from regulatory awareness to EE program participation.

Regulatory Awareness influences customer trust and enables better penetration of EE communications and consequently improves EE familiarity and is associated with higher EE program participation.

About National Grid

National Grid consists of a series of legacy utility companies that offer gas and/or electric services across their service territories (Figure 2). In some areas National Grid is both the electric and gas utility, in some areas it only offers electricity, and in other areas it offers only gas. This is a function of the franchises owned by the legacy utilities acquired by National Grid over time. In New York, the service territories in New York City and Long Island are gas only. The areas in Upstate New York (generally the areas including and surrounding Albany, Syracuse, and Buffalo) are part of the Niagara Mohawk legacy company and offer a combination of electric and gas services. In Massachusetts, National Grid is a combination utility offering gas and electric service, while in Rhode Island, National Grid offers both gas and electric service and covers nearly 100% of the energy delivery market.

List of Programs Included

The energy efficiency program data included in this analysis were:

- Home energy audits: an energy specialist inspects a home to identify opportunities for increased energy efficiency. These are conducted at no-cost and can include direct installation of energy efficient lighting and faucet aerators. The audit will also detail other opportunities for energy savings through weatherization, insulation, or heating/cooling system modifications.
- Energy Star® products: rebates offered for energy efficient equipment and appliances
- Residential gas heating and water heating: Incentives offered to homeowners to help offset the costs of installing more energy efficient gas heating and water heating equipment
- Residential weatherization: services provided to homeowners to insulate homes

- Ecommerce: direct sales of specialized energy efficiency products directly from the utility with rebate already included in sales price (predominantly smart thermostats and related)
- HVAC: Central AC – Incentives offered to homeowners to help offset the costs of installing more energy efficient central air conditioning
- Low-income services: weatherization, insulation, and heating services offered at no-cost to qualifying low-income households
- Refrigerator recycling: buyback program for functional, yet inefficient older refrigerators and freezers

Survey Methodology

The Brand, Image, and Relationship tracker is a study that National Grid uses to understand customer perceptions of its brand, the effectiveness of its communications and general customer sentiment towards the company. Interviewing is done by a third-party agency on behalf of National Grid and respondents are informed that National Grid is the sponsor. Interviewing is conducted continuously for this study with an average of 750+ interviews conducted monthly. The resulting sample is representative of the overall customer base per jurisdiction when survey demographic data are compared with census data. For the purposes of this analysis, the focus was on data collected during a 24-month period from April 2015-March 2017. Including two full years of survey data helps minimize the effect of seasonality or current events biasing survey respondents. Interviewing was predominantly done online through a web questionnaire sent via email invitation, although some interviewing was done over the phone during the initial three months (April – June 2015).

All survey respondents were screened to ensure they are 18 or older and are familiar with their utility (National Grid). Quotas are set by region to ensure that there is adequate sample to review survey results by region, but these quotas are not designed to make the individual regions representative within the overall survey sample.

Questionnaire

The survey included questions about customer perceptions of National Grid, their satisfaction with interactions they have had with the company, their perceptions of brand attributes and communications, recollection of specific communications, demographics, as well as a series of true/false questions that relate to customer understanding of the regulatory environment the company operates in. The questionnaire also specifically includes a question asking about awareness of energy efficiency programs (“How familiar are you with energy savings or rebate programs from National Grid that help you with ways to use less gas or electricity?”) that is used to measure effectiveness of EE marketing efforts. To identify customer recollection of EE communications, the following question was used: “Have you seen, heard, or read any advertising from National Grid that talks about how energy upgrades can make your home better?” This question was offered along with “Yes/No/Not sure” answer options and was included in the questionnaire in April-October 2015. For the purposes of this analysis the question “How would you rate National Grid on... Usefulness of suggestions on ways you can reduce your energy usage and lower your monthly bill” was used to measure customer attitude towards EE communications. This question was asked on a 10-point scale with labels on one (“Unacceptable”), five (“Average”) and ten (“Outstanding”) and was included from November

2015 through March 2017. The demographic questions included in the questionnaire were: Education, Income, Age, and Homeownership.

Assessing Customer Awareness of the Regulatory Environment

To group the survey respondents by regulatory awareness, each respondent was scored based on the accuracy of their survey responses related to regulatory awareness. The questions were presented as statements and respondents were asked to confirm if the statement is True or False, or if they do not know. For each correct response, the respondent received a point, for each incorrect response, the respondent lost a point, and for each “not sure” response the respondent got zero points (Table 1). While there are many dimensions to the regulatory environment, the ones included in the questionnaire were those that were related to common customer inquiries.

Table 1. Scoring used to calculate regulatory awareness for each survey respondent.

For each of the following statements, please indicate whether you think the statement is true or false by checking the appropriate box.	TRUE	FALSE	Not Sure
National Grid bills include separate charges for the energy supplied and the energy delivered to your home.	1	-1	0
Supply charges are regulated by government agencies.	1	-1	0
The actual cost of purchasing energy is passed through to customers without any upcharges.	1	-1	0
Customers can choose the company that supplies their energy.	1	-1	0
National Grid can adjust energy supply fees to increase the company's profits.	-1	1	0
Delivery charges are regulated by government agencies.	1	-1	0
Customers can choose the company that delivers their energy.	-1	1	0
National Grid can adjust energy delivery fees to increase the company's profits.	-1	1	0

Scoring conducted on survey data. *Source:* National Grid, 2017.

Generally, the level of regulatory awareness was low. Nearly half (45%) of the survey respondents received a zero or a negative score (Figure 1). A score of three or higher represents top quartile of Regulatory Awareness and was used as the threshold for delineating between respondents who have regulatory awareness (only 25%) and those who do not.

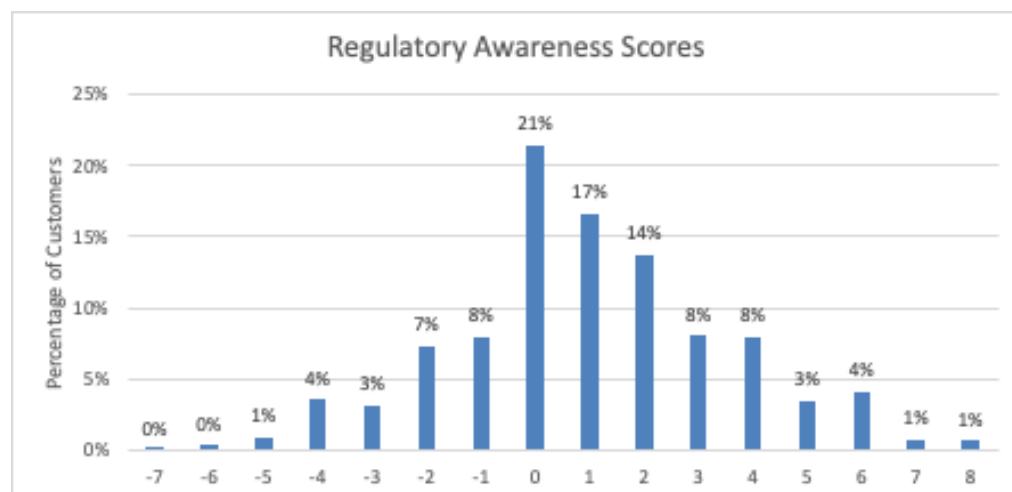


Figure 1. Distribution of survey respondents by regulatory awareness score.

Regulatory awareness scores calculated from survey responses. *Source:* National Grid, 2017

Analyzing Datasets

Program participation data were provided for the utility customers who participated in the survey and participated in an EE program any time between January 2012 through April 2020. This included program participation data from dates prior to the survey, as well as dates after the survey. Of the 18,169 customers who participated in the survey from April 2015 through March 2017, program participation data were available for 4,263 customers representing almost one quarter of the survey respondents. Of these, 2,436 had participated in an EE program prior to responding to the survey, and 1,822 participated in an EE program after responding to the survey.

Each record in both datasets included a unique account number. Using these, EE participation data were added to the survey dataset. To ensure sample independence, during the merging process duplicate records in each dataset were removed, giving preference to the earliest record. So, if a survey participant responded more than once in the 24-month period, only the first interview was included in the analysis. Similarly, if a customer participated in multiple EE programs, the earliest program participation date was used for the analysis.

Two methods were used to assess the linkage between regulatory awareness and EE program participation:

- The survey confirmed that customers who had already participated in an EE program prior to the survey have higher levels of regulatory awareness
- Those who expressed higher levels of regulatory understanding in the survey were more likely to subsequently participate in an EE program.

Unless otherwise noted, no weighting was applied to the survey data. If data analysis required weighting survey data, it is disclosed in the results section.

Significance testing was done for each pair of scores using t-tests to identify statistical significance at the 95% confidence level.

Results

Impact of Regulatory Awareness on Customer Perceptions

For the purposes of this analysis, we looked at levels of trust, but also distrust. Customers who had higher levels of regulatory awareness had lower levels of distrust and somewhat higher levels of trust (Figure 2). The question in the survey was “How much do you trust National Grid to provide you the advice you need to make good energy decisions?” This question was offered on a ten-point scale with one labeled “Do Not Trust Advice at All” and ten labeled “Trust Advice Completely”. For the purposes of this analysis, distrust was measured by a rating of four or lower, while trust was measured with a rating of 6 or higher.

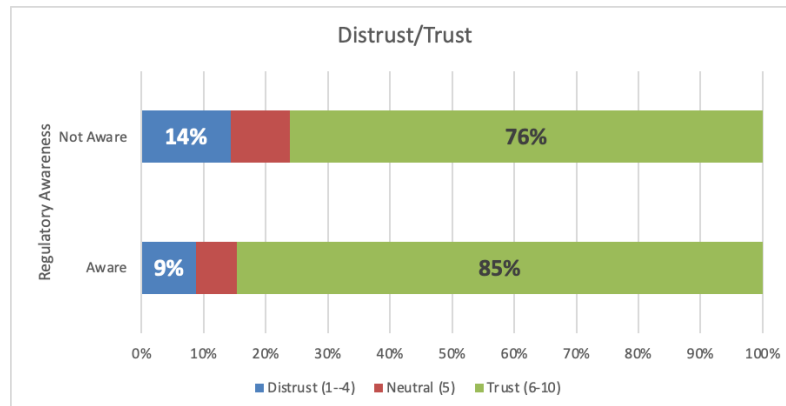


Figure 2. Distrust and trust by regulatory awareness.

Regulatory awareness, Distrust, and Trust calculated from survey data. *Source:* National Grid, 2017.

While both measures come from the same question, it is important to look at them separately. Within this context, it is important to recognize that regulatory awareness is not so much a driver of trust, as its absence can be a barrier to trust. Among respondents who had regulatory awareness, the distrust rate was 8.8%, while among respondents who did not have regulatory awareness this is 14.3% - a difference of 40%. This difference is statistically significant ($t= 10.38$, $p= 0.05$, $n_{\text{Aware}}=4,249$, $n_{\text{Not Aware}}=12,837$). Among respondents who had regulatory awareness, the trust rate was 84.7%, while among respondents who did not have regulatory awareness had a significantly lower trust rate of 76.1%, ($t= 12.73$, $p= 0.05$, $n_{\text{Aware}}=4,249$, $n_{\text{Not Aware}}=12,837$).

The same pattern was seen in each of the jurisdictions included in this analysis.

Communications Recollection

Customers were asked “Have you seen, heard, or read any advertising from National Grid that talks about how energy upgrades can make your home better?” Customers who had higher levels of regulatory awareness had a 48% recollection rate, while other customers had a recollection rate of 35%. This difference represents 38% higher recollection of utility EE communications attributable to regulatory awareness. The difference in recollection levels was significant ($t= 8.89$, $p= 0.05$, $n_{\text{Aware}}=1,417$, $n_{\text{Not Aware}}=4,680$) and was consistent across all the jurisdictions included in the analysis.

EE Familiarity

Customers were asked “How familiar are you with energy savings or rebate programs from National Grid that help you with ways to use less gas or electricity?” Customers who had higher levels of regulatory awareness had an EE Familiarity rate of 52%, compared with other customers who had 38%. This represented a difference of 32% higher levels of EE Familiarity attributable to regulatory awareness. The difference was statistically significant ($t= 14.4$, $p= 0.05$, $n_{\text{Aware}}=3,757$, $n_{\text{Not Aware}}=11,989$).

Communications Effectiveness

Customers were asked to rate “usefulness of suggestions on ways you can reduce your energy usage and lower your monthly bills.” Among customers who had regulatory awareness, 64% provided a positive rating. While other customers provided a 52% positive rating. This difference represented a 23% higher positivity rate attributable to regulatory awareness. This difference was statistically significant ($t= 11.63$, $p= 0.05$, $n_{\text{Aware}}=2,844$, $n_{\text{Not Aware}}=7,952$). A similar pattern was seen across all jurisdictions and meets the threshold for statistical significance in each one.

Regulatory Awareness and EE Program Participation

Aside from looking at the attitudinal data about customer perceptions of EE communications, another way to confirm a linkage between regulatory awareness and EE program participation is to look at the regulatory awareness levels of customers who have already participated in an EE program compared to customers who have not. Did survey respondents who participated in an EE program prior to the survey have higher levels of regulatory awareness? Among respondents who participated in an EE program prior to the survey, 30.5% had regulatory awareness, while this number was 23.9% among those who did not participate in an EE program prior to the survey (Figure 3). This difference is statistically significant ($t= 6.67$, $p= 0.05$, $n_{\text{PriorEEParticipation}}=2,423$, $n_{\text{NoPriorEEParticipation}}=15,746$). The pattern was consistent among all jurisdictions and provides further evidence of a linkage between Regulatory Awareness and EE Participation.

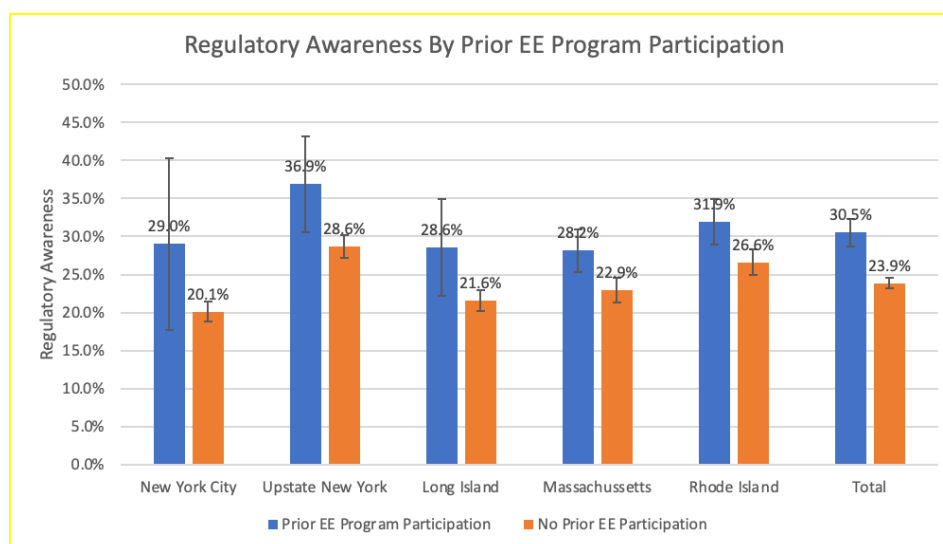


Figure 3. Regulatory awareness by prior EE program participation by jurisdiction.

Error bars represent 95% confidence level. Regulatory awareness calculated from survey data and cross-referenced with program participation data for period prior to survey (January 2012- February 2017).
Source: National Grid, 2017.

Yet another way to look at this linkage is to examine EE program participation rates post-survey. When looking at the participation rate of the respondents who participated in their first EE program after they completed the survey, among those who had a higher regulatory

awareness score (3 or higher) the participation rate was 14.4%, while the participation rate for those who did not have regulatory awareness was 10.7% (Figure 4). The difference was significant ($t= 5.75$, $p= 0.05$, $n_{\text{Aware}}=3,757$, $n_{\text{Not Aware}}=11,989$) and this finding supports the hypothesis that higher regulatory awareness was associated with higher levels of EE program participation. It also supports the hypothesis that regulatory awareness is associated with an increase of participation of at least 20%.

Across all jurisdictions there was a higher level of participation among those respondents who had higher regulatory awareness compared to those who had lower regulatory awareness (Figure 9). However, the difference in scores was not consistent. The greatest difference is in Upstate New York (4.4 percentage points, $t= 3.45$, $p= 0.05$, $n_{\text{Aware}}=978$, $n_{\text{Not Aware}}=2,437$), and New York City was the only other jurisdiction to individually reach the threshold of statistical significance ($t= 2.23$, $p= 0.05$, $n_{\text{Aware}}=717$, $n_{\text{Not Aware}}=2,851$).

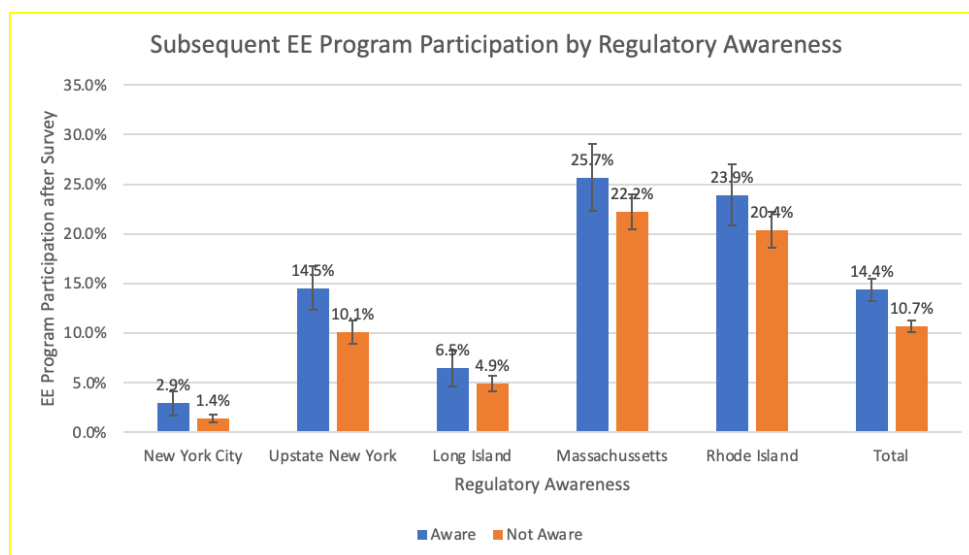


Figure 4. Post-survey EE participation by regulatory awareness by jurisdiction.

Error bars represent 95% confidence level. Regulatory awareness calculated from survey data and cross referenced with EE program participation data for period after survey (April 2015-April 2020). *Source:* National Grid, 2017.

Accounting for Other Factors

The analysis also took into consideration demographic differences (income, age, homeownership, education) as well as the impact of EE marketing activities. Weighting was applied to the survey data to correct for these influences and in both cases, EE participation rates were higher among those who had regulatory awareness and these differences met the threshold for statistical significance. More detail of this analysis is available in the full thesis.

Conclusion

The results from this analysis provide evidence of the relationships outlined in the hypotheses: the relationships between regulatory understanding and customer likelihood to remember EE advertising, their likelihood to view this advertising positively, and ultimately their likelihood to participate in an EE program (Figure 5). This evidence provides support to the proposed conceptual model path from regulatory awareness to increased EE program participation and is further bolstered by evidence of a relationship between regulatory understanding and customer distrust/trust and EE familiarity.

The analysis provided multi-dimensional evidence of the relationship between regulatory understanding and EE program participation. This relationship was noted both by higher levels of regulatory awareness among pre-survey EE program participants, but also by higher levels of post-survey EE program participation among those who had regulatory awareness. When controlling for the effects of marketing and demographics, the relationship remained statistically significant.¹

The analysis also confirmed the relationship between regulatory awareness and the intermediate customer perceptions on the proposed conceptual model at the beginning of this paper (Figure 1). Regulatory awareness was associated with 39% lower distrust, 11% higher trust, 38% higher EE communication recall, 24% higher positive perceptions of conservation messaging, 32% higher EE Familiarity and ultimately a 22% higher EE participation rate. All of these relationships were also observed at each of the individual jurisdictional levels.

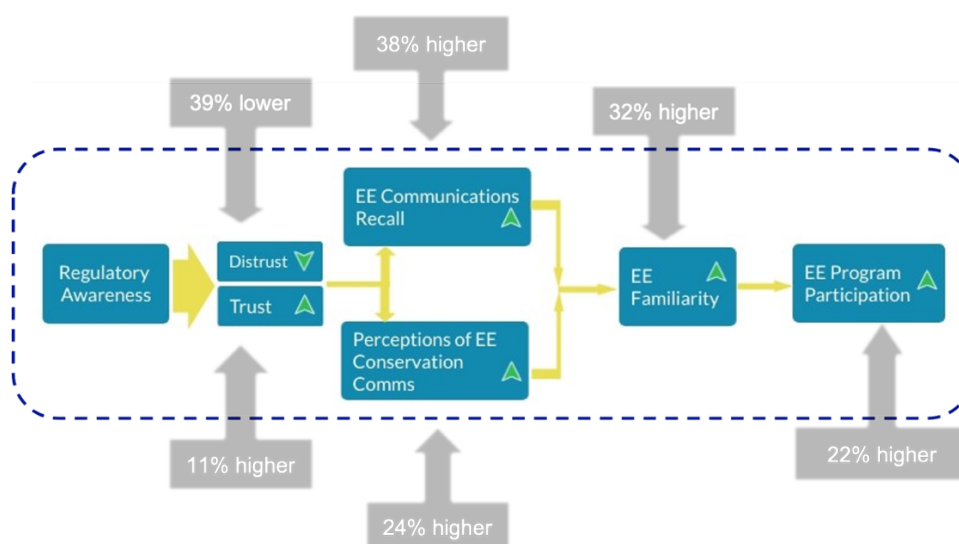


Figure 5. Path from regulatory awareness to EE participation with observed outcomes.

EE participation rate weighted by demographics was used for this graph. Regulatory awareness and other attitudinal measures calculated from survey data and cross referenced with EE program participation data for period after survey (April 2015-April 2020). *Source:* National Grid, 2017.

¹ Details of this analysis are available in the full thesis.

Findings Relevant to EE Marketing

This research also suggests that EE program marketers should consider regulatory awareness when designing their marketing efforts. Reviewing existing communications through the lens of believability is a relatively low-cost way to potentially increase the effectiveness of these communications. These communications are important not only to drive higher levels of participation in EE programs, but also to simply drive higher levels of conservation behavior. While marketers will traditionally want to focus on communicating the benefits of these programs, they may want to include a reference to the regulatory framework in their communications to make them more credible.

They may also want to market programs in a way that leverages existing regulatory awareness in the customer base. One possibility would be to look at bundling EE programs so that customers who participate in one program are invited to participate in other programs too. Another option would be to incentivize referrals.

These findings are also relevant when defining EE marketing budgets. Many EE programs have defined marketing budgets that are dedicated to individual programs, and these are often defined in the early stages of program development. This analysis suggests that increased regulatory awareness may drive increased participation across different programs. It may be worthwhile to view these individual program budgets more holistically to account for a common benefit generated by communications that address the need for greater customer awareness.

This research also suggests that other regulatory interventions could achieve higher levels of customer participation with greater awareness of the relevant regulatory framework. Supplier choice is an example. As discussed in the introduction, it has been many years since decoupling was introduced in Massachusetts, Rhode Island, and New York, yet this analysis shows that a significant percentage of the ratepayers are not familiar with the basics of the decoupled energy market. With the introduction of supplier choice, customers can choose to switch their energy provider. However, it is unclear how customers could pursue their interests in this market if many of them are not even aware that they are already participants in this market. This can also leave unknowing ratepayers vulnerable to deceptive marketing practices.

Regulatory awareness is associated with more positive perceptions of energy conservation communications. This association was consistently strong across the three states included in this analysis. Given the broad and consistent linkage across jurisdictions with different models of EE program administration, this finding could have applicability among a wide group of energy policy stakeholders in other states too. With greater usage data available to utilities through broader implementation of smart meter technology, conservation tips and communications will become more customized and sophisticated. Positioning these communications in a manner that is credible and believable will be an important contributor to their success in encouraging behaviors that will limit energy usage. Although behavioral EE program participation data were not available for this analysis, this research suggests that regulatory awareness may be associated with higher levels of energy savings through those types of programs too.

Recommendations for Utilities and Other EE Program Administrators

- Proactive customer education of the regulatory framework. Recognize that many customers may not be familiar with the rules that govern their relationship with their

utility. This is a barrier for EE program participation and may also impact utilities' ability to gain customer acceptance of other utility-offered services and products.

- Review existing EE communications through the lens of believability. While it is important to convince customers of the benefits of these programs, they are less likely to see these communications if they come from an entity they distrust.
- Review EE communications budgets to account for the cross-program benefit of regulatory awareness.
- Consider ways to leverage regulatory understanding among those who have already participated in an EE program. This could be done by targeted marketing to past participants or incentivizing past participants to recruit new participants.
- Develop more programs for renters.²
- Recognize that homeownership is a key moment when learning about regulatory framework and EE programs can be impactful.

Recommendations for Regulators

- Increase and maintain ratepayer awareness of their regulatory protections. Ratepayers need education if they are to be informed participants in the energy markets.
- When implementing regulatory change, consider a strategy for communicating this change to ratepayers and confirming that any planned educational outreach has indeed achieved the stated goals.
- Consider the customer perspective when developing a model for EE program administration. Will customers have one program administrator? Many program administrators? Are these familiar entities? How burdensome is it for customers to find EE program information? How credible will it be coming from a given source?

Acknowledgements

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² Participation rates for renters are significantly lower. More information on the analysis related to this is available in the full thesis.

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