The Free Market and Freeriders: Freeridership in DSM Bidding Programs

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Bidding programs provide a unique environment for the acquisition of demand-side resources. Using third parties to identify and recruit customers may result in low freeridership as third parties address market barriers that limit customer participation in DSM rebate programs. On the other hand, due to short program lead times, customers responding to requests for proposals may tend to be freeriders, since the only projects they can prepare for the bid are those already under consideration.

A large bidding program conducted by a Rocky Mountain state utility includes a significant number of customer and third-party bidders. This provides an opportunity to explore the different motivations for participation experienced by customer bidders, third parties, and the clients of third-party participants. To conduct the research we used in-person and telephone interviews with bidders, their clients, and customer bidders' trade ally contacts.

These data are being used to refine the estimates of net savings for the program. Using the interview data, we develop a matrix including each project and the associated measures at the project site. We then assign probabilities of freeridership (whether non-freerider, incremental freerider, deferred freerider, or pure freerider) to each site and each measure installed at each site. We also estimate the probability of the project being completed within different time periods without the program. Using a clearly defined decision rule, the model can then be used to adjust program impacts.

Introduction

Bidding programs provide a unique environment for the acquisition of demand-side resources. It is not clear how or if the bidding process attracts different levels of free-ridership in the commercial/industrial sector, On one hand, it seems plausible that third parties (Energy Service Companies (ESCos)) are less likely to attract freeriders given that once they prepare bids they have a number of years to recruit customers and implement projects. Short program lead times, on the other hand, may increase the freeridership rate among customers responding to requests for proposals, since the only projects they can prepare for the bid are those already under consideration.

A large bidding program conducted by a Rocky Mountain state utility includes a significant number of customer and third-party bidders. An impact evaluation of the bidding program offers an opportunity to explore the different motivations for participation of customer bidders, third parties, and the clients of third-party participants. Using in-person and telephone interviews with bidders, their clients, and trade ally contacts, the evaluation includes questions designed to allow the evaluators to assign a "level of freeridership" to each project by measure and to use these designations in adjusting the program savings measured from the impact assessment to determine net program savings.

Public Service Company of Colorado (PSCo) offered its first 50 MW bidding program in late 1990, when only a few small pilot rebate programs had been offered in PSCO's service territory. The program was the first large scale DSM program ever offered by PSCo, and there were no other rebate programs available. The program was an open auction process (i.e., bidders could submit proposals based on any demand side technologies). Bidders were given less than four months to submit their proposals, which were required to include kW reduction goals, feasibility analysis of each proposed technology, bid prices, and marketing plans for ESCo bidders. In their proposals, customer bidders have up to three years to

identify their customers. Unlike some other utilities that published their avoided costs when offering a bidding program, PSCo published a reference price, $240/kW, which was below the actual average avoided cost. The reference price was determined by a pilot bidding program PSCo conducted before this current program.

PSCo received 127 proposed projects representing 130 MW of customer demand reductions. After reviewing the proposals, PSCo awarded 54 projects, equivalent to 53 MW of demand reductions. Among the 54 measures, there were 35 customer bids (24 MW) and 19 ESCo bids (30 MW). DSM technologies accepted by the program included lighting, heating conversion from electric to natural gas or steam, industrial process, snow making, and energy management systems. The average weighted bid price is $264/kW.

The program is occurring over a three-year period. The evaluation is in the second year and can now present some evidence to support or refute these assumptions.

Freeridership in the Context of a Bidding Program

Utilities generally expect freeridership to be lower in bidding programs than in rebate programs. Implementation of the bidding program by the utility, however can affect the proportion of freeriders. This bidding program was an open auction program,[1] was offered at a time when the utility had no other rebate programs available, strongly encouraged customer bidder participation, and, unlike many other utilities, this utility published a reference price that was below the utility's avoided cost.

There were two types of bidding program participants, customer bidders and third party bidders, i.e. energy services companies (ESCos). Customer bidders were responsible for all aspects of the bid from the engineering analyses to the financial proposal. ESCo bidders were responsible for a bid that included a marketing plan for recruiting clients. Their clients, who are utility customers, did not have to initiate the work, prepare proposals, or confront any risk. The ESCos generally use the incentive to reduce the project costs for their clients.

The nature of the decision making process in customer bidder organizations may increase the likelihood of customer freeriders. This is because the bidding program time frame is usually too short for most customers to put a project together, get it approved by management, and submit a proposal.

In contrast, the nature of the ESCo/client relationship may reduce the likelihood of pure freeriders. We assume the ESCos are continuously marketing energy efficiency measures within a utility service territory. Those utility customers who would have taken conservation actions without the program are likely to be easily reached before the bidding program is introduced. Once the ESCo is in the bidding program, they also have more time than customers to design and complete projects. Although ESCos face the same time constraints as customer bidders at the proposal stage, in most programs ESCos have additional time to locate their clients and reach their kW goals. In this program, ESCos have three years to achieve their goals.

Given these factors, we generated three hypotheses about freeridership in the context of a bidding program:

- All bidding programs require bidders to prepare and submit proposals. In most cases, the amount of information required to demonstrate project feasibility is significant. It seems reasonable to assume that the effort required to submit the proposal may present a barrier to potential bidders who are uncertain about their project. However, it is less likely to present a barrier to freeriders who have a project already under consideration.

- Utilities believe that since bidding programs are competitive, customer freeriders are less likely to be attracted to the program. Essentially, since freeriders are already planning to do the project, the risk of not being selected is too large to be worth the time and effort to prepare a proposal.

  Customer bidders, however, may not perceive the program as truly competitive. Customers may view bidding programs primarily as a utility marketing program that provides money and support for energy projects. Our experience shows that some customers never believed their bids could be rejected. This is because the utilities' customers have always been in the buyer's position. Under a bidding program, however, the utility is the buyer and the customer is the seller. Many customers do not understand the new relationship that occurs in a bidding program.

- The competitive nature of a bidding program permits the utility to impose price discrimination on bidders. The utility only awards contracts to the lowest priced bids. Competitive pricing, however, may increase the likelihood of freeriders. In a bidding program, a non-freerider sets their bid price based on a realistic benefit-cost analyses. The bidder will be unwilling to go below the price required to make a project financially viable. However, a freerider can set their bid price according to a gaming model. The bidder, whether a customer planning to implement a specific program, or a third party already intending to market

energy services in the utility service territory, will be willing to lower their bid price if they perceive this as necessary to win the competition. The bidder only needs to cover the costs of meeting program requirements. Even with a low bid price, the freerider will be better off since the project or marketing effort was already considered financially viable.

The first two hypotheses suggest that customer bidders are more likely to be freeriders than ESCo bidders. The third hypotheses, however, suggests that the very nature of bidding programs could encourage freeriders, both customers and ESCos. The need to estimate net program savings and a desire to determine which of these hypotheses were true, led to a comprehensive investigation of freeridership in this program.

Methodology

The 50 MW bidding program primarily involves single-site application. Therefore the impact evaluation relies on a case-study approach. To address net savings we also selected a case study of program participation issues.

The primary objective of the effort is to provide the utility with estimates of measure-specific and overall levels of freeridership in its bidding program. To accomplish this objective, we conducted on-site and telephone interviews with representatives of completed projects during an eighteen month period. These contacts included customers, contractors, and ESCo representatives.

The Sample

Two types of bids were submitted to the utility: ESCo and customer bids. Each bidder had to submit a separate bid for each measure type to be installed as part of the program. Each type of bid also represents two potential categories of survey participants, resulting in four categories.

A. ESCo Projects (19 measure bid)
   1. ESCo representatives = 11
   2. Customers = 384

B. Customer Projects (35 measures bid)
   1. Customers = 19
   2. Trade Allies = 19[2]

For the evaluation, the 54 bid projects were categorized using a two-step process. In the first step we identified measures that are expected to make a "significant" contribution to total kW demand reductions.[3] Those projects judged as making a significant contribution are evaluated in detail, including in-person interviews with the project representative at the facility, as well as participating contractors and trade allies involved in the project. For measures deemed *not* significant by this screening, telephone interviews are used to explore the bidder's participation and decision-making process.

The sampling plan is presented in Table 1. Interviews are done quarterly with projects at or near completion.

The Interviews

Freeriders have been defined as program participants who would have taken the identical energy conservation actions without the DSM program (Hirst, Sabo, 1991). As Saxonis (1991) points out, it is insufficient to distinguish only between freeriders and non-freeriders; there are several classifications of freeridership:

- Pure freerider: a participant taking an energy conservation action identical to the program, regardless of the program's existence;

Table 1. Survey Plan

	Customer Bids		ESCo Bids	
Type of Survey	**Customers**	**Contractors**	**ESCo Employees**	**ESCo Customers**
Phone	7	19	11	Commercial 50 Residential 50*
Site Visit	12			Commercial 50 Residential 50*

* The utility completed the residential surveys in-house; these data are not included in this analysis.

- Incremental freerider: a participant influenced by program to take action above and beyond the scope of their original plans;

- Deferred freerider: a participant taking an action promoted by the program sooner than originally planned; and

- Non-freerider: a participant taking the desired actions as a direct result of the program.[4]

Given this understanding, our approach to identifying freeriders relies on interviews that can provide a complete story of the reasons the firm installed the measures and chose to install them through the utility's bidding program.

To obtain this depth of information, we posed the following questions to customer bidders:

- How was the decision to participate in the program made?

  Had installation been considered before?

  Had installation of the measure been budgeted before?

- When did the firm first consider the measure?

  What was the efficiency level first considered?

  - Why was it not installed before?

These questions are used to determine whether the project was seriously under consideration and ready to be installed prior to the program release; if so, then we would be suspicious that the project was a freerider. By probing for the reasons it was not installed, however, we anticipate that customers who need the financial boost of the utility incentive to sell it to management or customers who just wanted the incentive as "gravy" would identify themselves. Additional questions used to elicit this detail are:

- What was the effect of the program on timing for measure installation?

- What was the effect of the program on the choice of efficiency level?

- What was the impact of the utility incentive on the decision to participate in the program?

- Is other energy efficient equipment installed by the customer?

- What is the efficiency criterion for the equipment?

These questions provided a means for checking the logic of the first set of responses. In these questions, we explored the customers' perceptions of the program effect on their decision making and whether or not they would have done the project without the incentive.

The contractor questions provided further data for examining the process by which a customer chose to participate in the program and install the measure. If the customer and contractor had been considering the project for some time, that should become apparent. If the contractor only became involved at the time of implementation, that suggests that while the customer may have been considering the project before, they did not get serious until after the program was introduced. We asked the contractors the following questions:

- When did the customer first consider the project with the contractor?

  What equipment was considered first?

  Why not installed earlier than the program?

  What is the effect of the program on the timing of installation?

  - Why install the measures now?

  - What is the role of the utility incentive in decision to install?

We also asked ESCo representatives and their clients similar types of questions. For ESCos we wanted to know the following:

- Whether they had been talking with clients before the program began;

- What prevented clients from installing before now;

- Whether the program incentive is shared with their clients;

- If the incentive is shared, whether that affected the timing of the project.

We also asked the ESCo clients about their views on the projects. We wanted particularly to know when they had begun to talk with the ESCo. For clients, we explored the following issues:

- Whether the client had considered the project before talking with the ESCo;

- Why hey had not installed the project before;
- What impact the ESCo had on their decision to install;
- What efficiency level they had first considered installing;
- If that had changed and why.

Customers, contractors, ESCos and their clients were also asked directly to rank the probability of installation of the project at the same time, in 1 to 3 years, 4 to 5 years, or longer than 5 years in the absence of the utility program. Combined with the survey items that ask the respondent to describe the decision-making process the probability ranking allows another "check" on the customer's decision-making process and the role of the utility incentive.

Based on our discussions with each customer, contractor or ESCo representative, an assessment of freeridership was made.

Results

We have results for 37 of the 54 measures bid (69%). We developed a categorization scheme, based on the interview and survey responses regarding the "probability" of measure installation in the absence of the incentive program. Many of the respondents could be classified as "deferred freeriders"; that is, the incentive allowed them to install the measures earlier than planned. Some projects were found to be incremental freeriders, where a larger scope project was completed than had been planned. (See Appendix A for probability reports for a sample of eight projects).

Anticipating the assignment of net kW savings to each project, we developed a process that would allow us to estimate the savings associated with earlier or incremental installations based on the customer's assessment. Using the probability assessments and the data on decision making, we developed a decision model for assigning value of savings based on the scale of the project, the years of savings, and measure life. Table 2 summarizes the decision model for determining the number of years of annual savings that should be ascribed to each project by measure based on the assessment of when the measures would have been installed in the absence of the program. This will be the net savings adjustment.

In the net savings analysis, the adjustments (either by years of savings or percent of gross savings) will be applied to each measure. Thus gross annual savings for a measure with a 20 year measure life, is reduced to only 2 years or 5 years of savings if the project is deemed a deferred freerider where the measure would have been installed in 1-3 years or 4-5 years (respectively). In the case of incremental freeriders, the portion of the savings identified as having been planned before the program is classified as a freerider and equal to zero, while the incremental additional savings are fully counted.

The first 37 measures (of the 54 to be studied) showed some differences between ESCo and customer bidders, however, the significance of these differences remains to be fully determined when the final 17 measures are assessed. Table 3 displays the interim results. It appears that there is a greater likelihood that customers will submit projects that have been under consideration prior to the program's introduction. It also appears that the bidding program attracted a large number of deferred freeriders for ESCos and customers. A small number of measures appear to be program induced. Percentagewise, the customers are installing more program induced measures.

Table 2. Decision Model for Estimating Savings Due to Program for Freeriders

Would Have Done in 1-3 Years (Probability)	Would Have Done in 4-5 Years (Probability)	Longer Than 5 Years (Probability)
High = 2 years savings	High = 5 years savings	High = savings equals 80% of measure life
N/A	N/A	Medium = savings equals 100% of measure life
N/A	N/A	Low = savings equals 100% of measure life

Table 3. Interim Results of Freerider Estimates

Bidder	Number of Measures	Freerider	Deferred Freerider	Incremental Freerider	Program Induced
ESCo	22	1 (5%)	14 (63%)	3 (14%)	4 (18%)
Customer	15	2 (13%)	8 (53%)	1 (7%)	4 (27%)
Total	37	3 (8%)	22 (59%)	4 (11%)	8 (22%)

This is primarily occurring where customers install one measure that had been planned and then do additional measures because of the program incentive.

Typical freerider estimates for commercial/industrial rebate programs for multiple end-uses range 5-70%.[5] The interim results for the bidding program suggest a free-ridership rate close to 80%. However, only 8% are pure freeriders. The net savings for the program therefore will be significantly greater than 20% because the total value of net savings accruing to deferred and incremental free-riders will be calculated to include the proportion of savings that were program induced.

Conclusions

In conclusion the results of the freeridership study of the 50 MW bidding program, demonstrate that a substantial number of participants are either deferred or incremental freeriders (70%). Given this large number, it is reasonable for the utility to attempt to determine what proportion of the gross savings for these customers should be ascribed to the program. The methodology used to understand decision making for the bidders allowed us to differentiate types of freeriders and to develop a decision model for assigning savings to each project based on their category, freerider, deferred freerider, incremental freerider, or program induced.

The results further demonstrate, that bidding programs attract bidders who have been considering implementing energy efficiency projects. It also appears, that customer bidders are only slightly more likely to propose pure freerider projects than ESCo bidders.

Summary

Utilities are increasingly considering the option to rely on bidding programs to provide demand side management resources. One issue that has rarely been addressed in bidding programs is whether these programs encourage participation by freeriders. The interim results of this study, suggest that contrary to utility expectations, freeridership rates tend to be at least as high as those associated with rebate programs.

Endnotes

1. Open auction means that projects were not restricted by sector or technology. In this program fuel switching was permitted.

2. In a limited number of cases there are two vendors involved in a project, and both are contacted.

3. The kW reductions ranged from --- to ---. Those greater than --- were judged to be significant, while those less than ---- were judged to be less significant.

4. William Saxonis. "Freeriders and Other Factors That Affect Net Program Impacts. " *Evaluation of Utility DSM Programs. Oak* Ridge National Laboratory. (ORNL/CON-336). Oak Ridge, Tennessee. December, 1991.

5. William Saxonis. "Freeriders and Other Factors That Affect Net Program Impacts." *Evaluation of Utility DSM Programs. Oak* Ridge National Laboratory. (ORNL/CON-336), Oak Ridge, Tennessee. December, 1991. p. 125. It is important to recognize that these estimates use various methodologies and assume a freerider is "pure" freerider. There is no differentiation of deferred or incremental freeriders.

Appendix A. Freeridership -- Level and Impact by Project and Measure

Project Number	Type of Project	Would have done at same time	Would have done in 1-3 years (Probability)	Would have done in 4-5 years (Probability)	Longer than 5 years	Program Induced: Non-Freerider	Incremental Freerider	Deferred Freerider	Pure Freerider	Net kW Savings
1	**Lighting**									
	Lamps & Ballasts	No	Medium	High	N/A			X		5 years
2	Steam	No	Low	Medium	TBD			X		100%
3	Heat Conversion	No	Low	Low	TBD			X		100%
4	**Heat Conversion**									
	Partial Bldg.	No	High	High	N/A		X			2 years
	Full Bldg.	No	Low	Low	TBD			X		100%
8	**Lighting**									
	Lamps	No	High	N/A	N/A		X			2 years
	Lamps & Ballasts	No	Low	Medium	High			X		80%
9	**Lighting**									
	Lamps	No	Medium	High	N/A		X			5 years
	Lamps & Ballasts	No	Low	Medium	High			X		80%
13	**Lighting**									
	Lamps	No	High	N/A	N/A		X			2 years
	Lamps & Ballasts	No	Medium	High	N/A			X		5 years
14	Lighting	No	High	N/A	N/A			X		2 years