USING CUSTOMER INTELLIGENCE TO ENHANCE ENERGY EFFICIENCY PROGRAM EFFECTIVENESS

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ABSTRACT

Utility companies in the Northeast have been actively promoting energy efficiency programs for more than 30 years. Energy Efficiency Programs for Small Businesses \, which deploy rapidly, have been an integral component in ensuring utility companies achieve their annual goals. However, the expectations placed on energy efficiency program managers are changing quickly and the goals that have been achievable over the past decades are about to double and triple. A drastic change to the approach of delivering energy efficiency programs is needed if these new goals are to be met.

This paper describes in detail how advanced Customer Intelligence methods can revolutionize the way Small Business Energy Efficiency Programs are deployed. The reader will learn new approaches to aligning customers with programs, effectively communicating program details and improving program performance over time.

INTRODUCTION

Partnership

A three-way research initiative was conducted with NSTAR Electric and Gas, Detectent Inc., a company focused on assisting utilities to extract intelligence from their data systems, and NSTAR's Small Business Solutions partner, RISE Engineering, in an effort to determine whether or not using Customer Intelligence techniques could improve the audit and participation rates for the established small business program.

NSTAR is the largest Massachusetts-based, investor-owned electric and gas utility, with revenues of approximately $3.3 billion and assets totaling approximately $7.8 billion. NSTAR transmits and delivers electricity and gas to 1.4 million customers in more than 100 communities in Eastern Massachusetts. \ NSTAR has successfully managed small business energy efficiency programs for many years and currently uses 4 industry partners to meet their small commercial (<200KW) energy reduction goals. NSTAR initiated this research project in anticipation of significant increases to their annual energy efficiency goals. NSTAR chose their industry partner RISE Engineering for this research since they are their largest partner and have been tracking the performance of their marketing efforts for many years.

Program

NSTAR's Small Business Solutions program is available to businesses whose average monthly demand is 200 kW or less. The process starts with a free energy audit to identify energy saving opportunities. The program can also pay up to 70 percent of the total cost for retrofitting qualifying lighting and mechanical systems. Energy saving measures include:

- Upgrades to energy efficient lighting fixtures
- Electronic controls
- HVAC and refrigeration
- Efficiency upgrades to mechanical systems

The program is operated by NSTAR in conjunction with industry partners that perform all steps of the process within designated territories.

Objective

In 2006, it became evident to NSTAR that the expectations placed on their energy efficiency department, especially the commercial group, were going to increase significantly in the near future. There was even a large push from the Governor of Massachusetts to decouple the utilities' rates from their energy delivery to further enable aggressive energy-use reduction efforts. NSTAR had successful processes, procedures and partners in place to meet their current goals, but were concerned about their ability to meet doubled or tripled goals. In particular, there was concern that the throughput of the Small Business Solutions program could not be scaled up dramatically without increasing the cost to deliver.

The current process used by RISE Engineering to deliver energy reduction measures to NSTAR's customers is shown in Figure 1. The process involves sending a letter describing the program, following with a call, performing an on-site energy audit, delivering a quote and performing an equipment upgrade. The success rate for each step in the process is shown in the figure, with approximately 5% of those contacted leading to an energy efficiency project. Doubling the throughput of the program is easy, right? Just contact twice as many customers. Historically, it takes about 800 implementations for RISE to meet their current goal, which at a 5% conversion to project rate, translates to contacting 16,000 customers. RISE has been performing this service for NSTAR since 1999 so at this rate all of the 40,000 customers assigned to RISE are contacted every three years. Lighting technology improvements and increasing energy prices are helping to make this model sustainable at the current levels, but doubling the throughput without changing the approach seems unlikely.

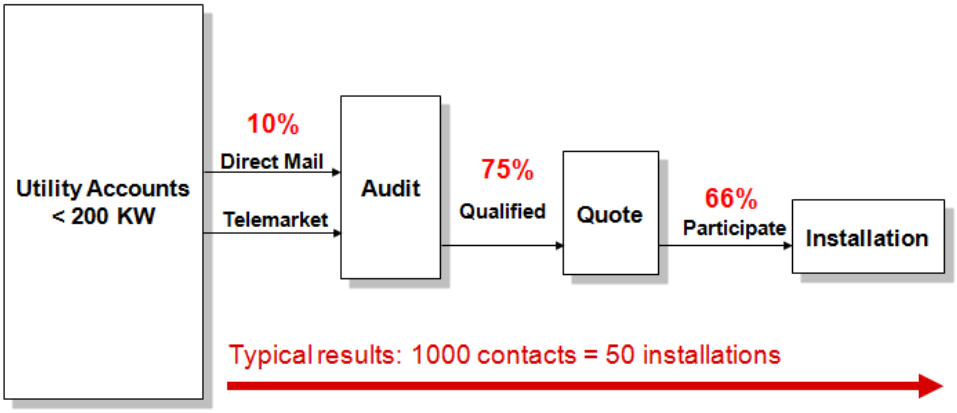

Figure 1: RISE Engineering Program Delivery Process

Figure 1 shows that there is a theoretical possibility of a 90% improvement in securing a positive response to an audit while only 50% (calculated as 66% of 75%) theoretical possibility of improvement in converting an audit to a project. To dramatically increase the throughput of the Small Business Solutions program, the focus had to be on increasing the response to audit rate. The primary and secondary goals of this research project were aimed at delivering higher program participation at lower cost. Primary Goal:

- Increase response rate from 10% to 20%

- Achieve 100 audits from 500 customer contacts, versus 100 audits from 1000 customer contacts

Secondary Goal:

- Increase qualification rate from 75% to 80%
- Increase participation rate from 66% to 75%
- Achieve 60 implementations from 100 audits, versus 50 implementations from 100 audits

A group of accounts in the Boston area that were between 20KW and 100KW were selected for this research effort since the customers in this geographical area had not been contacted about Energy Efficiency programs in over a year.

METHODOLOGY

The objective for this research effort was not to do more of the same, but to make as many incremental improvements to the RISE delivery process as possible, thus delivering more projects with the same effort, and cost. Figure 2 represents the cost/benefits relationship of a typical energy efficiency program. The straight line represents the likely benefit, say KWH reduction, which would be achievable if customers were randomly contacted. RISE does better than this linear relationship already by targeting the larger energy users first. But, we know from our earlier discussion that to double their current throughput, RISE would need to contact 32,000 of their 40,000 customers in the first year. What would happen next year?

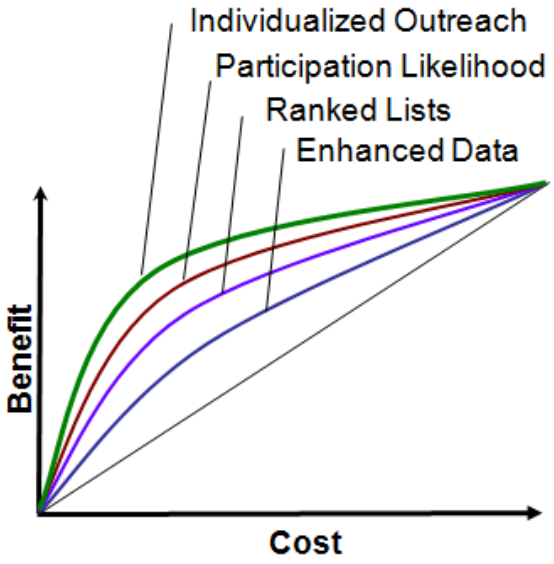

Figure 2: Cost-Benefit Relationship For Energy Efficiency Programs

Figure 2 also shows a series of other lines that represent the improvement in cost/benefit, or lift, that could be achieved by making incremental improvements to the delivery process. By using these delivery enhancements, the shape of the cost/benefit curve is lifted upward thus allowing much more benefit to be obtained for the same cost. In simplistic terms, this is achievable by contacting the right customers with the right message in the right order, instead of randomly reaching out to the group.

With the exception of Enhanced Data, which is the foundation of other improvements, these incremental improvements could be added in an a-la-carte manner based on the objectives of each program. Due to available time restrictions, it was decided for this research to use all lift enhancement methods at one time rather than adding one at a time. It was decided that the results for the research would be measured in the same way RISE has measured in the past; Audit, Qualified and Participated.

REASEARCH

The research effort focused on the four areas of program delivery improvement discussed above; data enhancement, segmentation and ranking, participation likelihood modeling and enhanced customer outreach. The overall process diagram can be seen in Figure 2.

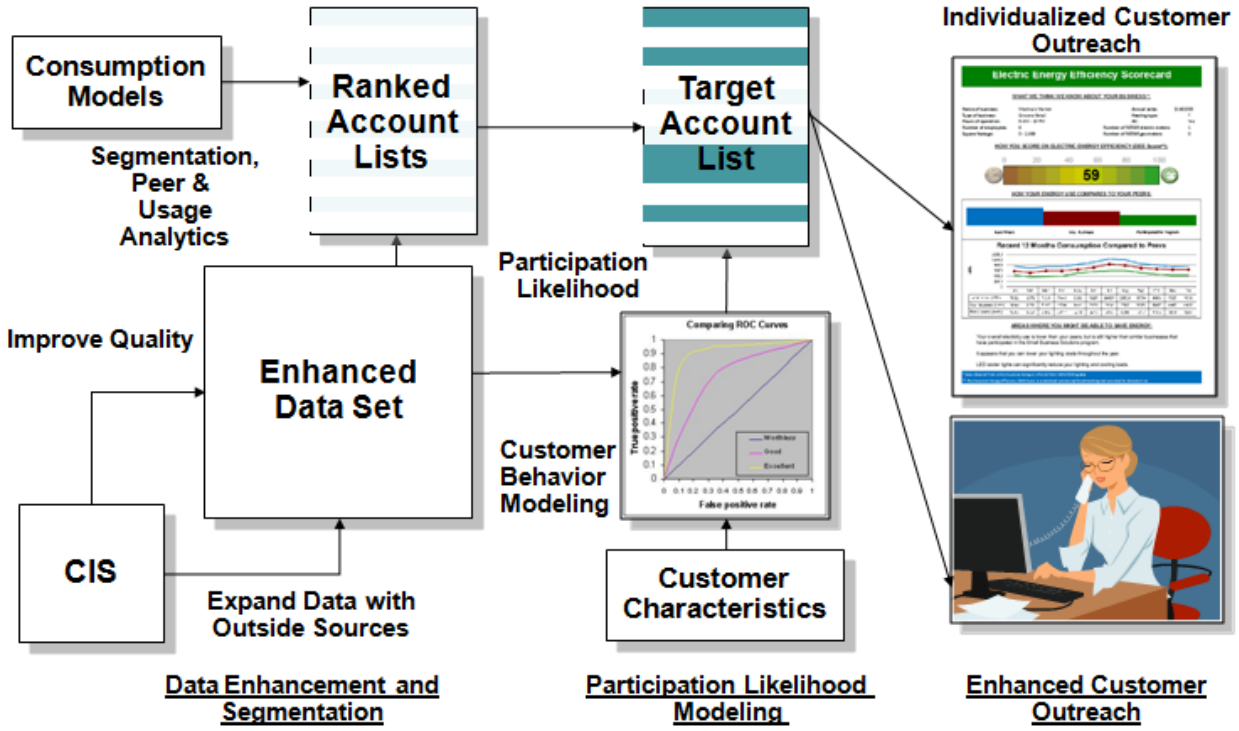

Figure 3: Enhanced Energy Efficiency Program Process

Data Enhancement

Data Enhancement is a critical step to enhancing commercial energy efficiency programs. It includes the integration of additional data, and the merging of all accounts that make up a business. There are many reasons that a business might have multiple accounts associated with it; i.e. expansion of space, additional service added, merged dual service utility, etc. Table 1 show a small section of a street in the Boston area. It can be seen that 2001 Massachusetts Ave and 2003 Massachusetts Ave are really the same business, even though they have different addresses and are billed as separate accounts. An automated tool was created by Detectent to merge related accounts by defining Parent-Child relationships that allow the accounts to be viewed separately but merged for analysis. A combination of account name, phone numbers, address and mailing address were used to ensure the correct matching of utility accounts. Additionally, partial name and adjacent address components ensure that similar but not exact accounts are still successfully matched. The result is that all businesses can be analyzed as complete entities rather than as partial consumers. Once all businesses in the utility database are properly represented, the billing system data can be enhanced with additional information that is used through the program enhancement process.

Name	Address	Phone	SIC	SIC Description
Moon Yun Cho	2001 Mass Ave		0	Dummy
Cho, Moon Yun	2003 Mass Ave	6174732000	5651	Family Clothing Stores
National Advertising Inc	2005 Mass Ave	8005261466	7312	Display Advertising
Ross Jr, E Winston	2005 Mass Ave		5812	Full Service Restaurant
Clark's Auto Care	2007 Mass Ave	6179261949	7538	General Automotive Repair

Table 1: Sample CIS Account Listing

Data Enhancement is accomplished through the integration of third party business listings with billing system data using sophisticated pattern matching algorithms developed by Detectent. Merging accounts in a utility database is difficult but at least the information is entered using the same guidelines and processes. Matching disparate sets of customer records from two different data sources is more difficult since the data is used for different purposes and is entered using different processes. Matching address alone is not sufficient to make decisions based on the added data fields. Therefore multiple data fields must be match to truly be confident. The challenge, especially for commercial accounts, is that the information stored in a utility billing system is collected for different reasons than business listings, which are assembled for on-line and print presentation of a business. Table 2 shows the same small section of a street from the billing system but with the corresponding business listing information below it.

Name	Address	Phone	SIC	SIC Description
Moon Yun Cho	2001 Mass Ave		0	Dummy
Cho, Moon Yun	2003 Mass Ave	6174732000	5651	Family Clothing Stores
National Advertising Inc	2005 Mass Ave	8005261466	7312	Display Advertising
Ross Jr, E Winston	2005 Mass Ave		5812	Full Service Restaurant
Clark's Auto Care	2007 Mass Ave	6179261949	7538	General Automotive Repair

CIS

Name	Address	Phone	SIC/Description	Primary Contact
Sunny Wigs	2001 Mass Ave	6174745268	5699 Wigs Toupees & Hairpieces	Sunny Cho
Mc Donald's	2005 Mass	6179261234	5812 Restaurants	Ross Winston

Name	Address	Phone	SIC/Description	Primary Contact
	Ave			
Clark Auto	2007 Mass Ave	6179261949	7549 Wrecker Service	Lewis Clark

Business Listing

Table 2: Sample CIS and Business Listing Account Listings

The two sets of business information in Table 2 clearly demonstrate the difficulty in performing Data Enhancement using third party business listings. None of the businesses could have been matched with exact name and address, and telephone numbers did not help much. It can be seen that commercial utility accounts are often opened in the primary contact's name. Assuming that the business listing SIC Codes are correct, this example also shows the inaccuracy of utility business codes. All of the information in both databases is compared by Detectent's database matching tools in order to get and accurate match. Each business listing is compared with each utility account to calculate many component match scores and a total score, with the highest scoring match assigned for Data Enhancement.

Once matched, the following data is available with each utility account for detailed analysis:

- Company name
- Street address
- Mailing address
- Phone number
- Fax Number
- Web address
- Primary contact
- Title of primary contact
- Gender of primary contact
- Primary SIC
- Secondary SIC
- Number of employees
- Annual sales
- Square footage
- Credit rating
- Corporate headquarters (Y/N)
- Number of years advertising in print/online YP
- Last year spending for print/online YP
- Number of personal computers at site

This account merging and data enhancement effort forms the foundation of enhanced Customer Intelligence which is utilized throughout the program delivery process. Businesses are analyzes as complete entities and additional data is linked to accounts that provide enhanced knowledge about a business. One of the major uses of this enhanced data is the correction of business codes.

The business codes, SIC or NAISC, are the primary way in which businesses are segmented. Unfortunately, these codes tend to be incorrectly assigned at most utilities. Business codes are assigned at the time of account application and are often left blank or set to a default value. Third party business listings on the other hand tend to contain very accurate business codes since

they are designed for the public to use to locate a business in print or online. The companies that sell these business listings guarantee the quality of their information and therefore spend a great deal of effort to confirm its validity. For analysis purposes, Detectent corrects the utility business codes based on the match business listings.

To further validate the quality of the business listings, Detectent contacted 650 businesses to confirm the business code, primary contact, primary contact title and number of employees. The results of this data validation effort are shown in Table 3.

Parameter	Business Code	Primary Contact Name	Primary Contact Title	No. of Employees
Accurate	96.8%	86.8%	93.5%	93.1%
Inaccurate	3.2%	13.2%	6.5%	6.9%

Table 3: Business Listing Data Validation Results

The most important finding in this validation effort was the high accuracy of the business codes (96.8%). This code is the key to properly grouping businesses throughout the delivery process. As mentioned above, this business listing code was used in place of the utility codes since the quality was better. It is not surprising that the primary contact name changed more than any other parameter. The fact that the number of employees only needed correcting 6.9% of the time was very encouraging as this is a key parameter in Detectent's analytics. Of the employee counts that did change, the average change was only about 10%.

Data enhancement is the foundation for all the phases of enhanced program delivery. It allows for the proper segmentation of accounts by ensuring the proper business type and sizing. It provides much of the information required to predict program participation. And, it supports getting the right message to the right person when using individualized customer outreach.

.Segmentation and Ranking

Properly aligning accounts with the correct programs is a critical step in program implantation. Segmentation can be as simple as grouping businesses by business code or can be as complicated as data mining for energy use behavior characteristics.

The process of segmenting accounts for this research effort was pretty straightforward since the NSTAR Small Business Solution program targets all commercial businesses with demand less than 200KW. The group of accounts for this effort was selected in an area of Boston and contained business with more than 20KW and less than 100KW demand.

Ranking can also range from very simple, based on KHW use, or very complicated for programs like air conditioning upgrades. An AC upgrade program might rank accounts based on the summer increase in energy use adjusted for weather and scaled by building square footage of other business operating parameters.

The primary target for RISE Engineering during this research effort was lighting technology and lighting control upgrades therefore the ranking was fairly simple. Accounts in the target group were ranked simply by KWH use.

Participation Likelihood Modeling

Data enhancement, segmentation and ranking are not foreign concept to energy efficiency program implementation teams. These are tools used in some form for program deployment across the country. Detectent has developed advanced tools and techniques to enhance these steps but the concepts are not revolutionary. However, the ability to predict who will participate in a commercial energy efficiency program using advanced analytics is truly game changing. The concept is to use outcomes from prior activity to teach a machine learning system the customer behavior that will indicate the likelihood that a different customer will participate in a program in the future.

The analytic tools developed during this step are very sophisticated but would not have been effective without the availability of historic data provided by RISE Engineering. RISE has been collecting the outcomes of their program implementation efforts since 1999. In that time, they have implemented over 6000 projects for NSTAR alone. This data includes who was contacted, whether they agreed to a free on-site audit, if they would benefit from a project and whether they decided to complete a project. Additionally the dates, estimates, estimated savings and installation details are recorded. This information, primarily the customers' decision, is the core information that is needed to predict what customers will do in the future. This information alone does not provide enough information about the customer for even sophisticated analytical tools to make good predictions. There is a wealth of information available about individual consumers or household spending habits, but this information is not typically available about businesses, especially smaller ones. Therefore, the RISE data was enhanced with information about the customer that was added during Data Enhancement, derived from NSTAR's historic energy use data and collected via the internet. The complete data set assembled for this Participation Likelihood Modeling effort is shown in Table 4.

1.	YellowPagesYears	Number of years advertising in print/online YP
2.	YellowPagesSpending	Last year spending for print/online YP
3.	NumberOfPCs	Number of personal computers at site
4.	HeadQuarters	Corporate headquarters (Y/N)
5.	AuthorityLevel	Authority level of primary contact
6.	Title	Title of primary contact
7.	NumberOfSquareFeet	Number of square feet at site
8.	CreditRating	Credit rating
9.	AnnualSales	Annual sales
10.	NumberOfEmployees	Number of employees
11.	Income2005	Average income of households in zip code
12.	ElectricityMax	Maximum monthly KWH in past two years
13.	ElectricityMin	Minimum monthly KWH in past two years
14.	ElectricityBase	Average monthly KWH in spring/fall

15.	ElectricitySummer	Average monthly KWH in summer
16.	DemandMax	Maximum monthly KW in past two years
17.	DemandAvg	Average monthly KW in past two years
18.	PctElectricHeating	Percent increase in KWH for heating
19.	ElectricHeating	Electric heating (Y/N)
20.	PctElectricCooling	Percent increase in KWH for cooling
21.	ElectricCooling	Electric cooling (Y/N)
22.	PctGasHeating	Percent increase in CCF for heating
23.	GasHeating	Gas heating (Y/N)
24.	ElectricityWinter	Average monthly KWH in winter
25.	AuthorityGender	Gender of primary contact
26.	YellowPagesBusinessCode	Confirmed business code
27.	IncomePct	Percent increase in income in zip code in 5 years
28.	ElectricityMaxPerEmployee	Maximum KWH per employee
29.	ElectricityBasePerEmployee	Base KWH per employee
30.	ElectricitySummerPerEmployee	Summer KWH per employee
31.	ElectricityWinterPerEmployee	Winter KWH per employee
32.	DemandMaxPerEmployee	Maximum KW per employee
33.	DemandAvgPerEmployee	Average KW per employee
34.	ElectricityMaxPerSales	Maximum KWH per Sales $
35.	ElectricityBasePerSales	Base KWH per Sales $
36.	ElectricitySummerPerSales	Summer KWH per Sales $
37.	ElectricityWinterPerSales	Winter KWH per Sales $
38.	DemandMaxPerSales	Maximum KW per Sales $
39.	DemandAvgPerSales	Average KW per Sales $
40.	TurnOnDate	Months since turn on date

Table 4: Parameters Used for Participation Likelihood Modeling

This data set was assembled both for all the accounts where prior outcomes are known and for all accounts where the prediction of participation likelihood is desired. Good machine learning methods do not require that all the data in the modeling set have direct influence on the outcome,

but research has shown that selecting the proper data set can have a significant effect on the success of the predictions. The data set shown in Table 4 was the result of a correlation analysis of known outcomes.

Detectent had previously developed a set of Multivariate Modeling (MVM) tools designed for data mining and inference of continuous parameters. Classification, or Yes/No prediction of parameters, using multivariate methods imposes requirements that Detectent had not previously deployed. Changed were made to MVM to allow it to predict classes of parameters as well as continuous parameters.

The teaching set of parameters with known outcomes was loaded into MVM and many test runs were executing using an array of different tuning parameter. The ability of the tool to properly predict participation in the program was impressive since there is no direct information about the decision patterns of the decision makers. The ability of a modeling tool to predict outcomes is typically measured by a tool called a Receiver Operating Curve (ROC), where the area under the curve measures the quality of the model. The ROC for the best configuration of Detectent's modified MVM tool is shown in Figure 4.

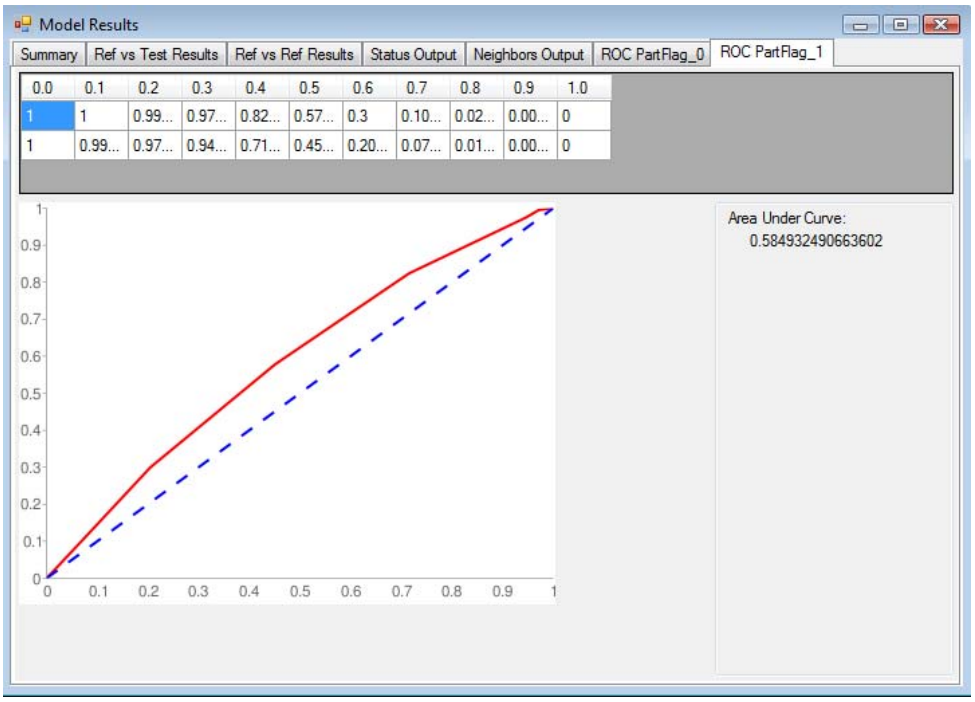

Figure 4: Modified MVM ROC Diagram

The curve is generated by plotting correct predictions versus incorrect prediction for the half of the teaching data set that is made up of an even number of outcomes. The dotted blue line represents the random prediction of outcomes since that would result in a 50:50 change of correct prediction. The red curve, and the Area Under Curve number (0.5849), indicates that the predictions from MVM are better than random. This also indicated that the effectiveness of the program can be improved if accounts are contacted in the correct order.

To validate that using Detectent's MVM tools truly provides good predictions, the same data was used to perform prediction using commercially available analytics tools. Microsoft's Analytical Services were configured on top of Detectent's SQL server system that contained the modeling

data. The main difference between traditional tools and Detectent's MVM tool is that MVM is designed to dynamically select a subset of all the data to use for its prediction. Traditional tools use all the training data to calculate a set of coefficient, and then use the coefficients to predict outcomes. Models were configured using three different algorithms; Logistic Regression, Clustering and Decision Trees. The Clustering algorithm delivered the best results but did not perform nearly as well as MVM due to the poor quality of the complete data set. The ROC diagram for the clustering algorithm is shown in Figure 5.

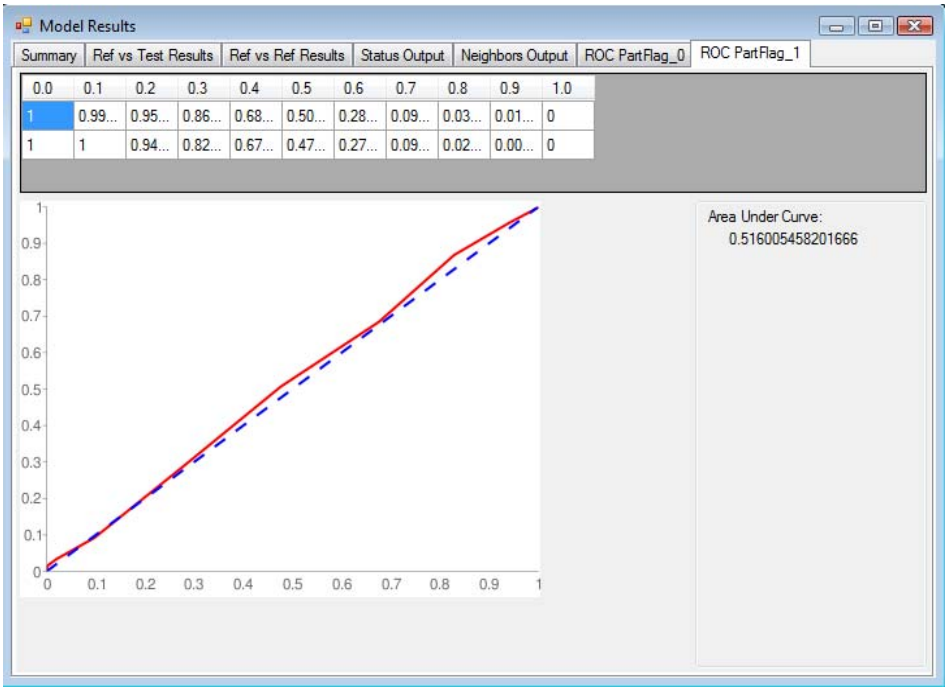

Figure 5: Clustering Algorithm ROC Diagram

Since the lift provides by participation likelihood modeling has the potential to greatly affect overall program delivery performance, Detectent decided to experiment with automatically cleansing the teaching data prior to using it for predicting outcomes. Data cleansing is made possible by the fact that the outcome of all the teaching set businesses are known. An algorithm was developed that analyzed the choices made by the MVM toolset, determined if the selected reference businesses predicted the correct outcome and which specific businesses had the greatest influence on the outcome. All of this information was then used to eliminate the businesses from the teaching set that had a negative influence on the outcome of the group. Detectent has since filed for a patent for this new method, referred to as Partial Membership Analysis (PMA). The application of this data cleansing method provided significant improvement (0.6227) over even the best performance of the MVM toolset.

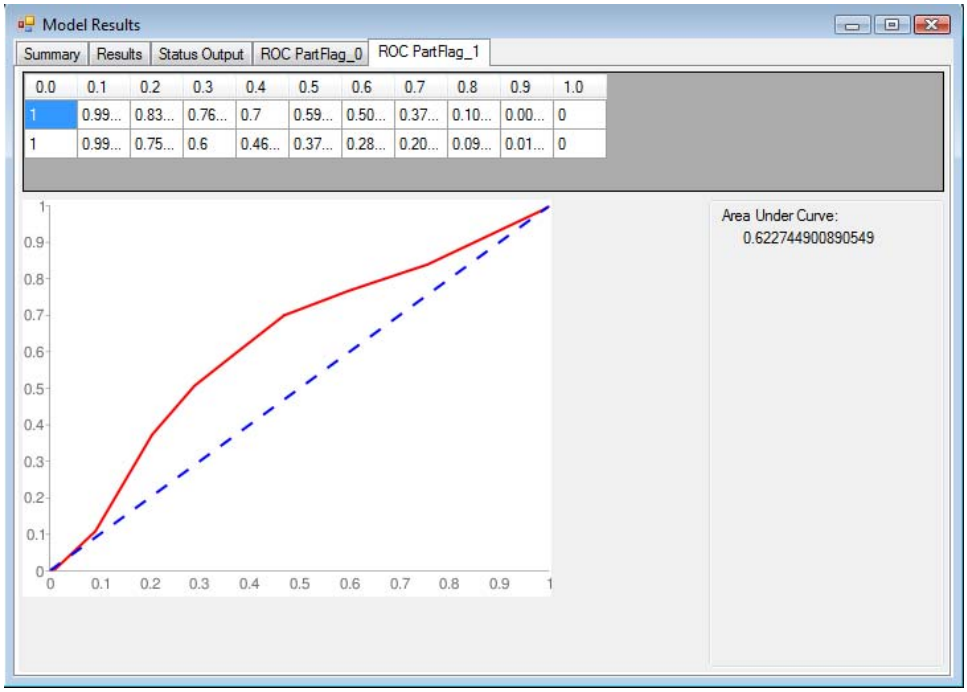

Figure 6: PMA ROC Diagram

The entire process of participation likelihood modeling is intended to identify which businesses should be contacted and which should not. The optimal target list is created by starting with the Segmented and Ranked list and overlaying the participation likelihood score. Businesses above the acceptable threshold remain on the ranked list while those below are delayed or eliminated. The optimal target list started with the largest commercial accounts that were likely to participate, and works to the smaller accounts that are likely to participate.

Individualized Customer Outreach

RISE Engineering has always done a superb job of mailing and calling in reference to the Small Business Solutions program. They mail a letter describing their relationship with NSTAR and the benefits of the program, an NSTAR program flyer and a response card. These mailings are sent in groups of approximately 50 so that all of the businesses can be contacted shortly after the arrival of the envelope.

Direct marketing books and articles were reviewed to identify areas where RISE's already effective customer outreach methods could be improved. The overwhelming theme from the review was that outreach campaigns can be positively impacted through personalization and peer comparison. Adding personal information about the recipient of a mailing has been proven to catch their eye, and initiate further reading. From as far back as grade school we have known that peer pressure, or comparison, has a significant affect on the way people act. In the area of energy efficiency, studies have shown that peer influence has more of an impact on participation than financial incentives or even environmental consciousness.

Detectent designed a report that contained information about the individual business, a comparison of their energy use to their peers and energy savings recommendations. The idea was to enhance the mailing piece sent to businesses so that they would read the Small Business Solutions program information and either complete the response card or accept the follow-up

call. An important change in the outreach process for this research was that the mailer was not addresses to the account name as in the past, but to the primary contact.

This report, the Electric Energy Efficiency Scorecard, is shown in Figure 7. The scorecard is broken into three sections "What We Think We Know About Your Business", "How You Score On Electric Energy Efficiency" "How Your Energy Use Compares to Your Peers" and "Areas Where You Might Be Able To Save Energy".

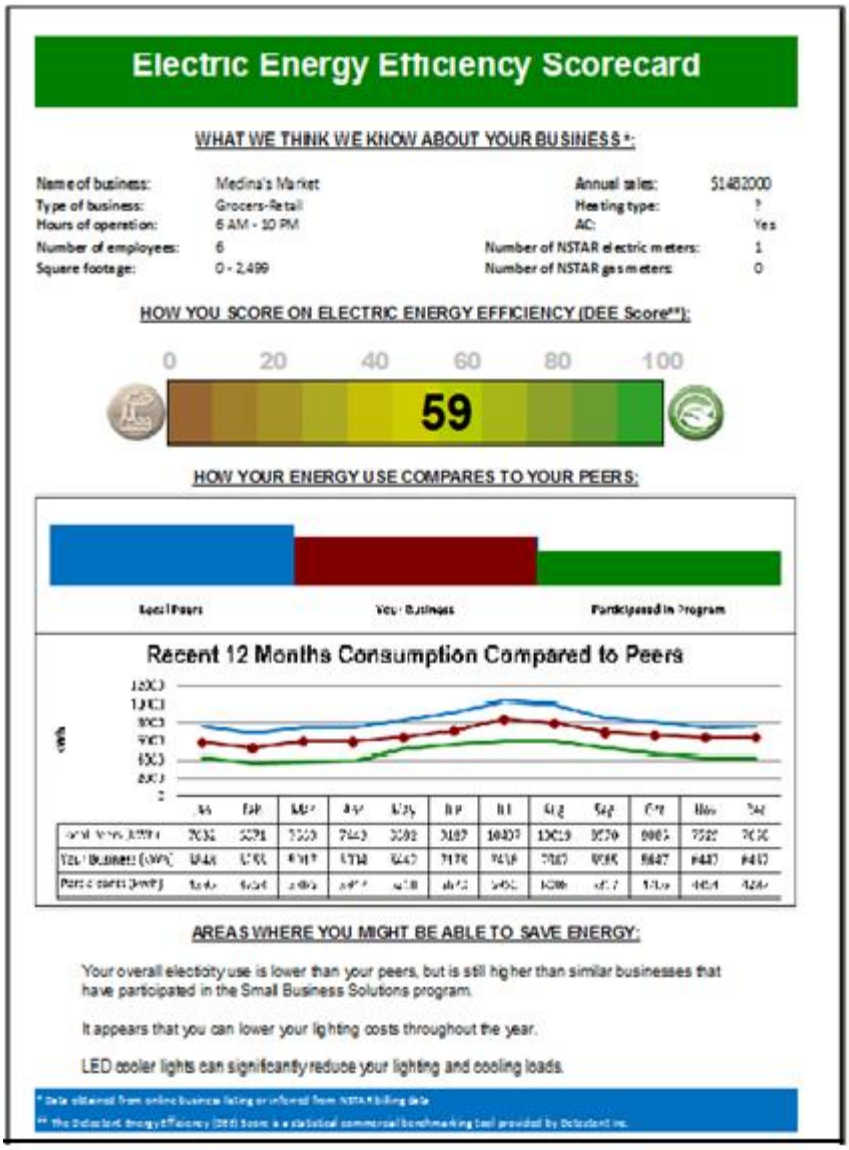

Figure 7: Electric Energy Efficiency Scorecard

The "What We Think We Know About Your Business" section contains information that was added during the Data Enhancement phase as well as data that was extracted and inferred from NSTAR data. The specific data elements that were presented on the scorecard are:

- Name of business
- Type of business
- Hours of operation
- Number of employees
- Square footage
- Annual sales
- Heating type
- AC or not
- Number of electric meters
- Number of gas meters

It is important to note that the scorecards are based on the energy use of a business and not of a single meter. For many reasons there may be more than one meter supplying a single business operation. As described above, Detectent automatically merges related meters and accounts for performing analysis, including energy benchmarking. It is also important to note the section heading "What We Think We Know About Your Business" does not assume that all this information is correct. It lets that business contact know that we have done our best to provide them with an accurate report based on the information available to us.

The “How You Score on Electric Energy Efficiency” was an entire research project in itself. The EPA Portfolio Manager tool was studied in depth as it has become a standard for benchmarking commercial buildings. Portfolio Manager uses business specific information similar to that displayed on the top of the scorecard, historic consumption information and a database of reference buildings. Detectent had all of this information except the EPA reference data which is obtained by performing 6000 interviews per year. Detectent does however store a complete set of data for over 40 million businesses nationwide. This vast repository of business data became the basis of the peer comparisons used on the Electric Energy Efficiency Scorecard. The huge advantage of this approach is since all the data is housed in Detectent’s warehouse system; an individualized scorecard can be created for each business. The EPA Portfolio Manager is designed for interested businesses to go online and use the tool to get a benchmark report. The Detectent scorecard can be automatically created and delivered to each and every business on the optimal target list. The numerical benchmark score is called the Detectent Energy Efficiency (DEE) score.

The “How Your Energy Use Compares to Your Peers” is an extension of the benchmark DEE score in that it compares the trailing average monthly energy use of the businesses used in the benchmarking process. This detail provides a comparison of how the business in question uses energy throughout the year rather than as an aggregate point. For example it may indicate that the energy use of the business is in line with peers in the winter but has a much higher summer cooling load. This situation may be explainable based on differences in this business, but it may also indicate that the air conditioning system is inefficient or needs maintenance. This section of the scorecard also presents the annual energy use of similar businesses that have already participated in the Small Business Solutions program. Each energy efficiency project at each business is different but this gives the business contact confidence that participating in the program will make them stand out from their peers.

The final section of the Electric Energy Efficiency Scorecard is “Areas Where You Might Be Able to Save Energy”. This section displays observations and recommendation based on the business type and energy use patterns. It is not intended to replace an onsite audit but gives general information that might entice the decision maker to get more information about the program.

The primary goal of this research effort was to increase the number of audits that are scheduled per customer outreach group. The new Individualized Customer Outreach approach significantly improved the interaction with the customers during the outreach phase of the program. The process began with sending the new mailing to the optimal target list. In the past the mailings were sent to the account name at the service or mailing address from the utility database. Often this mailing never reached the decision maker at the business. The approach used for this research was mailing an individualized letter and scorecard to the validated primary contact at the true business address from the enhanced data. The next step was the follow-up call. The enhanced customer data provides telephone numbers that are listed so that the business can be contacted by customers. These numbers proved to be much more accurate than the telephone numbers in the utility database since these were often disconnected, changed, cell phones or business offices. RISE Engineering did not know much about the customer when a call was made so the first questions asked were centered around finding out the type of business and who the primary contact was. The calls were very different using enhanced data and the Electric Energy Efficiency Scorecard. From the minute a follow-up call was initiated, RISE Engineering

was able to discuss the details of the business, their energy use and potential savings that the program can offer.

RESULTS

The research results were impressive. The audit rate from outreach campaigns has been approximately 10% over the last three years, with approximately half of the audits resulting in program participation. More specifically, of these 10%, 75% were deemed to be qualified for a quote after an onsite audit and 66% of those quoted actually participated in a project.

As stated above, the goals for this research project were:

Primary Goal:

- Increase response rate from 10% to 20%
- Achieve 100 audits from 500 customer contacts, versus 100 audits from 1000 customer contacts

Secondary Goal:

- Increase qualification rate from 75% to 80%
- Increase participation rate from 66% to 75%
- Achieve 60 implementations from 100 audits, versus 50 implementations from 100 audits

The four steps used for enhancing the Small Business Solutions program delivery approach were Data Enhancement, Segmentation and Ranking, Participation Likelihood Modeling and Individualized Customer Outreach. As seen in Figure 7, this new four step process resulted in a 30% audit rate and measurable increase in the participation of those audited. It was hoped that 100 audits could be scheduled from the first 500 mailings and follow-up calls. This 100 audit goal was achieved after the first 330 customers were contacted.

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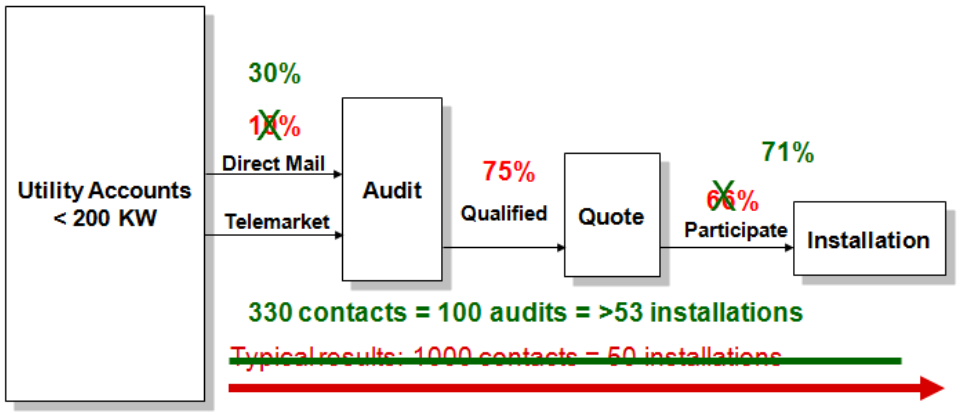

Figure 7: Research Results Improvements

Improvements were also made towards the secondary goals. The research approach did not improve the qualification rate of 75% which is not too surprising since there are many factors involved in being qualified, none of which were included in the analytical models. The rate of participation for those that received a quote did improve from 66% to 71%. This improvement

did not quite reach the secondary goal of 75% but this goal was arbitrarily set and inconsequential to the overall project objective. Detailed data was collected throughout the research effort so these secondary results are expected to increase in the future.

In summary, 53 installation projects were initiated from 330 customer mailings during this research project. This participation rate of 16% is a huge improvement over the 5% participation rate that has traditionally been achieved by a leader in the industry.

CONCLUSIONS

The techniques and approach developed and tested during this research project can have a significant effect on energy-use reduction in the Northeast United States and other regions. While the delivery of Small Business Programs is satisfactory today, with increasing demands and expectations, it almost certainly will not be in the future. The use of Customer Intelligence methods offers great hope for utilities and industry partners that want to expand existing programs of simply choose to gain the highest possible benefits for the lowest possible costs.

This research was made possible by Detectent's resources and experience in the area of Customer Intelligence and RISE Engineering's processes and vast database of energy efficiency program delivery data. The results however are easily replicated in other areas and for other programs. The knowledge of who will participate in a program is now captured in Customer Intelligence models and can be applied to a variety of customer outreach project.

ABOUT RISE ENGINEERING

RISE Engineering was established in 1977 and provides a full range of energy efficiency services. RISE provides services to most major New England utilities and their customers, and have provided energy efficiency services to over 220,0000 commercial and residential customers. RISE has been a partner in NSTAR's Small Business Program since 1999 and implements 600 to 1400 energy efficiency solutions per year as part of that program. RISE has continually collected data about their marketing, audit, quote and implementation activities.

ABOUT DETECTENT INC.

Detectent is the leading provider of Customer Intelligence services to utilities in the area of energy theft detection. Their work in this area involves the enhancement of data supplied by utilities and the sophisticated analysis of data patterns and energy use profiles. Detectent's warehouse of commercial customer information contains more than 30% of all the meters in the United States. NSTAR engaged Detectent in 2004 to perform energy theft detection analysis, and this service is still being delivered today. NSTAR's energy efficiency group was made aware of Detectent's analytical capabilities and invited them to participate in this research activity.

REFERENCES

The Relationship Between Variable Selection and Data
DM Allen - TECHNOMETRICS, 1974 - jstor.org
The Relationship Between Variable
Selection and Data Augmentation and a Method for Prediction David M. Allen

Sheree Clark, December/January 2007 - 7 Ways To Improve Direct Mail Response: Effectively addressing these seven success factors will improve your odds of success in any direct mail campaign. (http://www.dynamicgraphics.com/dgm/Article/28737)

The Complete Guide to Direct Marketing: Creating Breakthrough Programs That Really Work, by Chet Meisner, $24.95, Kaplan Business

Response: The Complete Guide to Profitable Direct Marketing, by Lois K. Geller, $35, Oxford University Press USA, www.amazon.com