Targeting Small Businesses--The Search for 80/20 in the 20/80 World

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ABSTRACT

Small businesses are an elusive target for many commercial energy efficiency programs. This segment represents the inverse of the 80/20 Pareto principle – small businesses use a small percentage of energy but represent a large percentage of commercial accounts. A range of barriers prevents small businesses from engaging in energy efficiency. Their heterogeneity complicates the choice of targeting and messaging approaches. Yet, as energy efficiency programs mature, the potential of small businesses is an increasingly attractive savings opportunity. But how do we find customers with the greatest program potential and target them with most relevant offerings?

This paper draws upon a study completed for PSEG Long Island, which provides a strategy for identifying underserved small businesses with the greatest program potential. Using a variety of data sources and multiple analytical techniques, including recursive partitioning, we classified the population of small business customers into detailed and meaningful segments. We analyzed past participation, along with customer size and location relative to capacity constrained circuits, to identify customers with the most potential. For each of the target segments, we identified savings opportunities and employed geospatial analysis to further facilitate outreach and targeting.

Using data analytics to understand the relative value of customers can ensure program success and cost-effectiveness. The value of this study spans beyond the small business segment – the results are valuable for program implementers and marketing teams across the country as they plan for future program designs and engagement strategies.

Introduction and Research Questions

Since 2009 Long Island Power Authority (currently PSEG Long Island, a subsidiary of Public Service Enterprise Group Incorporated) has been administering The Efficiency Long Island and Renewable Energy Portfolios on Long Island with the goal of reducing peak demand, relieving capacity constraints, and advancing energy efficiency on the Island. Effective January 1, 2014, PSEG Long Island (PSEG-LI) began its 12-year contract assuming all day-to-day management and operations of the electric system, including planning, administration, design, and implementation of the Efficiency Long Island Portfolio and the Renewable Energy Portfolio.

PSEG-LI's portfolio spans residential and commercial sectors. On the commercial side, PSEG LI offers a robust selection of energy efficiency solutions spanning prescriptive and custom measures that range from lighting to HVAC to refrigeration to building shell. Since 2009, over 16,000 projects were completed by PSEG LI's commercial customers. While small business customers could participate in any commercial program offering, between 2012 and 2015, the commercial portfolio featured a Small Business Direct Install Lighting program tailored specifically to small businesses in capacity constrained circuits. To qualify, customer average monthly demand should not exceed 145 kW and a customer must be on a capacity-constrained

circuit as defined by LIPA. Capacity thresholds varied over the course of the program implementation. In 2015, the SBDI program was suspended. With the suspension of the program, it is unclear if the existing commercial programs are able to reach and engage small business customers. As such, PSEG LI needed to understand the population of small business customers, how well it services them through its suite of commercial energy efficiency programs, and program opportunities within this customer segment. To answer these questions, Opinion Dynamics analyzed PSEG LI's customer and usage data, historical commercial program participation data, and data from secondary sources. As part of the analysis, we profiled small business customers, explored their participation patterns, and analyzed opportunities for program intervention.

Data Sources and Analysis Steps

Opinion Dynamics analysis drew upon three main sources of data – past participation, commercial customer data, and business data from secondary sources, namely Dunn & Bradstreet.

Using the data sources, Opinion Dynamics completed extensive cleaning and matching of the data to arrive at the most complete master database. PSEG LI's rate code structure does not allow for the easy identification of small commercial customers. Therefore, the degree to which small businesses are participating in commercial programs is unknown. In collaboration with PSEG LI, Opinion Dynamics developed a definition of the small business customer segment that relied on a combination of rate codes, peak demand, and number of premises associated with a business (chain businesses).

Analysis steps included profiling the small business customer segment specifically, exploring past program participation patterns, and identifying small business customer segments most promising for program outreach and engagement. Our analysis included simple data analytics, such as frequency distributions and analysis of the means of central tendency along with more complex recursive partitioning analysis, indexing, and geospatial mapping.

Detailed Findings

The findings presented in this paper were key to PSEG LI's understanding of its small business segment engagement with the commercial program portfolio and formulating a strategy for increasing the segment's engagement with energy efficiency. The findings fall into the following topic areas:

- Understanding the size and the composition of the small business segment
- Understanding past participation trends and variation in participation across various small business customer subsegments
- Segmenting small business customers into meaningful and detailed subsegments and analyzing opportunities and barriers to energy efficiency program participation associated with each subsegment

Understanding Small Business Segment Size and Composition

Small business customers represent 82% of all accounts, yet they account for 29% of energy usage. Maximum peak demand for those customers is eight time less than for all other customers and annualized energy usage are nearly 11 times less than for all other customers. This segment represents the inverse of the 80/20 Pareto principle – they use a small percentage of energy but represent a large percentage of commercial accounts.

Table 1. PSEG LI Customer Segment Definition and Size

Customer Segment Definition	Number of Active Accounts (n=113,717)	Percent of Active Accounts (n=113,717)	Percent of Energy Usage (n=104,178)	Average Peak Demand (kW) (n=42,074; 11,6932)	Maximum Peak Demand (kW) (n=42,074; 11,695)	Average Annualized Energy Usage (kWh) (n=86,10; 18,072)
Small business customers	92,882	82%	29%	23.0	149.5	32,262
All other customers (excluding non-retrofittable accounts)	20,835	18%	71%	156.4	11,195	367,087

Small business segment on Long Island is largely composed of local, privately owned businesses without corporate structures – nearly three-quarters of small business customers (73%) have one premise, slightly over a quarter (27%) have between two and five premises, and 6% have over five premises.

Table 2. Number of Premises among Small Business Customers

Number of Premises Associated with a Business	% of Small Business Customers* (n=74,600)
1	67%
2	18%
3-5	9%
6-10	4%
11-20	2%

Note that customers are defined as unique combination of business name and premise for the purposes of this analysis

Office buildings, retail, food service, health services, and warehouse facilities are the top small business customer segments, cumulatively accounting for close to three-quarters (72%) of small business customers. They are also the segments that have a higher share of small businesses than non-small businesses, as seen in Table 3 below.

Table 3. Small Business Segment Size

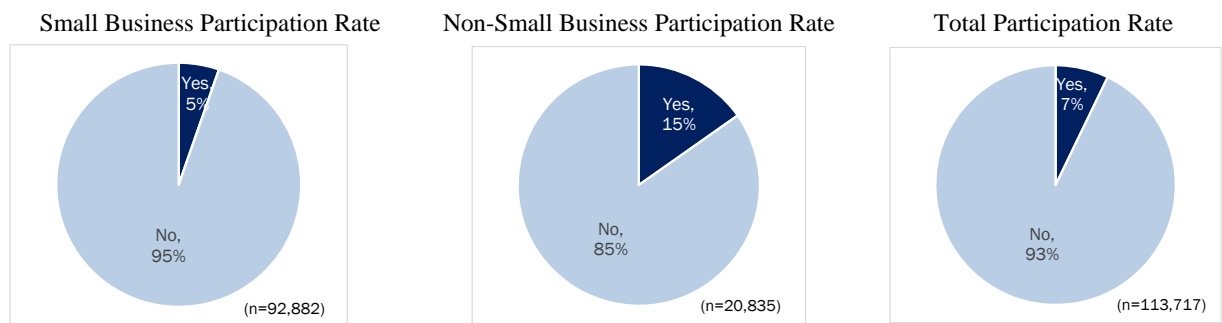| Business Segment	% of Small Business Customers* (n=74,600)	% of Non-Small Business Customers* (n=15,641)
Office Buildings	32%	25%
Retail	20%	8%
Food Service	8%	3%
Health Services	6%	3%
Warehouse	6%	3%
Industrial	5%	6%
Grocery/Convenience	5%	3%
Construction	5%	1%
Government	2%	15%
Communications	1%	19%
Education	2%	6%
Transportation	2%	4%
Entertainment/Recreation	2%	3%
Residential**	2%	1%
Unknown	2%	1%
Agricultural	1%	1%
Lodging/Hospitality	1%	1%
Total	**100%**	**100%**

Note that customers are defined as unique combination of business name and premise for the purposes of this analysis.
**Residential facilities segment includes large, medium, and small housing segments with commercial rate codes.*

Understanding Past Participation Trends and Variation in Participation by Subsegment

Small business customers are substantially underserved by PSEG LI's Commercial programs. Participation rate among small business customers is three times lower than among non-small business customers (5% vs. 15%). Overall participation rate across both small and non-small business customers is 7%.

Figure 1. Participation Rate Comparison

Small Business Participation Rate — Yes, 5%; No, 95% (n=92,882)
Non-Small Business Participation Rate — Yes, 15%; No, 85% (n=20,835)
Total Participation Rate — Yes, 7%; No, 93% (n=113,717)

Historical energy savings also differ considerably between small business and non-small business customers. Average peak demand savings achieved historically by small business customers are one-third of that achieved by non-small business customers (2.73kW vs. 8.28kW), while energy savings are less than one-third (8,787kWh vs. 32,351 kWh) (Table 4). This difference in energy and peak demand savings can largely be explained by the smaller size of the small business customer facilities and, therefore, limited savings opportunities.

Table 4. Per-Account Historical Energy and Peak Demand Savings

Savings Type	Small Business Customers (n=4,940)	Non-Small Business Customers (n=3,171)	All Customers (n=8,111)
Average per-account peak kW savings	2.73	8.28	5.39
Average per-account kWh savings	8,787	32,351	20,079

Small business customer participation in the various program components differs considerably from the non-small business customers. Small business customers are considerably more likely to participate in the prescriptive program component than non-small business customers (53% vs. 35%). Non-small business customer participation in the custom component of the program is much higher, which is not surprising because custom projects tend to be bigger customized projects with unique equipment specifications.

Table 5. Distribution of Past Participation by Program Component

Program Component	Small Business Customers (n=4,940)	Non-Small Business Customers (n=3,171)	All Customers (n=8,111)
Prescriptive	53%	35%	46%
Existing Retrofit	48%	68%	56%
Custom	4%	20%	10%

Historical adoption of program measures is also different for small business customers as compared to non-small business customers. Past savings among small business customers are more heavily reliant on lighting measures (88% of peak demand savings) as compared to the non-small business customers (75% of peak demand savings). Adoption of LED lighting specifically is also much more prominent among small business customers than among non-small business customers (40% vs. 20% of peak demand savings) (Table 6).

Table 6. Distribution of Historical kW Savings by Measure Type

Measure Type	Small Business Customers (n=4,940)	Non-Small Business Customers (n=3,171)	All Customers (n=8,111)
Subtotal Lighting	*88%*	*75%*	*79%*
Lighting - LEDs	40%	20%	25%
Lighting - Fixtures	29%	25%	26%
Lighting - Linear	11%	18%	17%

Measure Type	Small Business Customers (n=4,940)	Non-Small Business Customers (n=3,171)	All Customers (n=8,111)
Lighting - Controls	6%	9%	8%
Lighting - Other	2%	3%	3%
Subtotal Non-Lighting	*12%*	*25%*	*21%*
HVAC	7%	10%	9%
Envelope	3%	3%	3%
Combination	1%	6%	5%
Compressed Air	0%	1%	1%
Insulation	0%	0%	0%
Motors	0%	1%	1%
Refrigeration	0%	2%	2%
Other/Unknown	0%	1%	0%
Total	**100%**	**100%**	**100%**

Analysis of small business customer participation rates by township shows differences, with some townships, such as Shelter Island, East Hampton, Southampton, Rockaway Peninsula, Southold, Riverhead, and Brookhaven featuring lower than average participation rates (Figure 2).

Figure 2. Small Business Segment Participation by Township
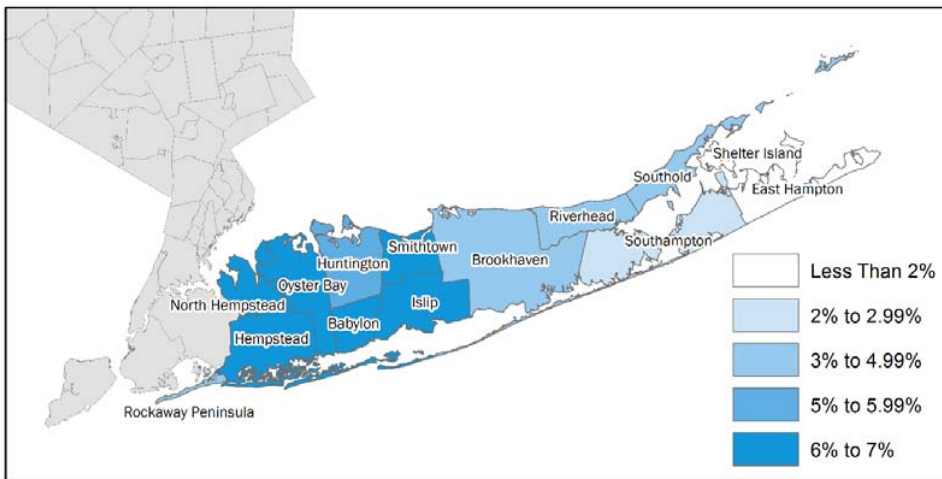
An important part of our analysis was comparing participation rates across business segments and subsegments. For the purposed of our analysis, we performed thorough cleaning of businesses into 17 unique key segments and 136 unique key subsegments. Comparing business segment participation rates to the overall participation rate of 7% for the commercial sector[1] reveals that 13 out of 17 segments, including lodging/hospitality, communications, health services, agricultural, office buildings, transportation, and construction segments have lower than

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[1] We chose the overall participation rate of 7% instead of small business specific participation rate of 5% because we wanted to make sure that we draw comparisons with the overall PSEGLI population participation trends to see how they are different.

average participation rate. Participation rate ranges by subsegment within each segment, sometimes quite considerably. For example, while the overall participation rate of the office segment is low at 3%, office subsegments feature participation rates as low as 1% and as high as 14% (Table 7).

Table 7. Participation Rates and Average Demand Savings by Business Segment

Customer Segment	Participation Rate	Participation Rate Range among Subsegments within a Segment
Residential (n=1,842)	1%	0%-3%
Lodging/Hospitality (n=1,812)	1%	0%-4%
Communications (n=563)	2%	0%-2%
Unknown (n=1,652)	2%	2%
Health Services (n=6,019)	2%	2%-4%
Agricultural (n=1,139)	3%	0%-11%
Office Buildings (n=31,062)	3%	1%-14%
Transportation (n=2,178)	4%	0%-9%
Construction (n=4,134)	5%	0%-7%
Entertainment/Recreation (n=2,202)	5%	0%-5%
Government (n=1,602)	6%	0%-17%
Food Service (n=6,352)	6%	3%-7%
Education (n=2,154)	6%	1%-13%
Retail (n=17,107)	8%	3%-19%
Warehouse (n=4,977)	9%	3%-11%
Industrial (n=4,068)	9%	1%-15%
Grocery/Convenience (n=4,019)	13%	7%-24%
Total (n=92,882)	**5%**	**0%-24%**

To identify business segments and subsegments that are currently underserved by the Commercial programs and may be a promising target for the program, we relied on the analysis of the following factors associated with each segment and subsegment:

- Participation rates
- Historical energy and demand savings
- Customer size (in terms of energy use and peak demand)
- Size of the segment and subsegment (in terms of the number of businesses).

Data analysis included both quantitative and qualitative elements. Using the factors listed above, we developed an index that scored each subsegment in terms of their value for the program in terms of demand savings potential and segment size. We have also completed a recursive partitioning analysis that helped identify thresholds for the four parameters listed above. Recursive partitioning analysis is a statistical method that builds a "decision tree" that classifies the population of cases into subpopulations of interest using optimal classification criteria. For both analyses we

The indexing and recursive partitioning analysis both yielded a score for each of the 136 unique subsegments. Both analyses yielded relatively similar results in terms of each segment's and subsegment's value. Using the analysis results, we isolated a range of subsegments that present the greatest opportunity for future program targeting. We supplemented the quantitative analysis with a careful qualitative analysis to check the results for reasonableness, feasibility, and gaps.

Based on the results of the analysis, we classified small business customer subsegments into the following categories:

- Top priority targets – these are potentially the most productive customer subsegments.
- Secondary priority targets – there are promising customer segments and subsegments that for one or multiple reasons did not meet the top priority target thresholds.
- Low priority/non-priority segments – these are segments that have less potential for significant levels of program participation or savings.

Combined, top priority targets represent 6% of all small business accounts. Secondary priority targets represent another 5%. This means that the analysis isolated 11% of all small business customers as potential program targets. While this seemingly represents a small share of the small business accounts and an even smaller share of all PSEG LI's commercial accounts, focusing on and custom-targeting this accounts is likely to result in higher participation rate and depth of savings.

Figure 3. Size of the Target Categories
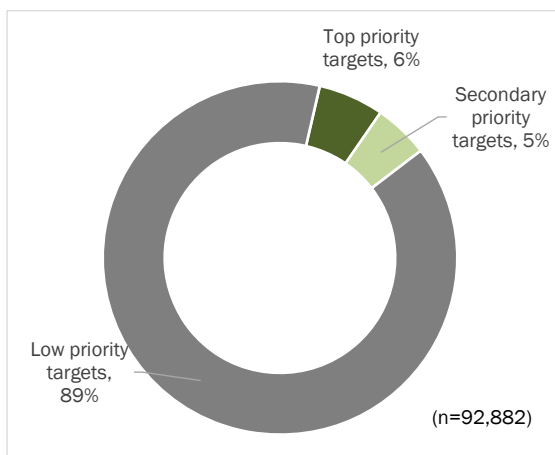
We identified a total of 11 top priority target subsegments and 15 secondary priority target subsegments of varying sizes. Not all of the priority subsegments have below average participation rates. For example, we identified the Retail – Furniture subsegment and Education – Daycare subsegments as secondary priority targets. Despite higher than average participation rates within these subsegments (11% and 9% respectively), the relatively large size of the subsegment, both in terms of absolute number of accounts as well as energy usage and peak demand, and high previously achieved energy and demand savings suggest that the remaining potential for savings within this subsegment is quite high.

For each of the top priority subsegments, Opinion Dynamics developed individualized case studies that provided detail on the subsegment, location of the subsegment's customers and how the customer location related to the capacity constrained circuits that PSEG LI needs to target, their size and usage, historical program activity, and an analysis of barriers and opportunities from

other sources of primary and secondary research. An example of one of such case studies can be found in Figure 4 below). A highlight of the analysis includes an interactive GIS map with intuitive point and click capabilities that allowed PSEG LI to filter and layer various target subsegments to identify and define custom areas of targeting and focus.

Table 8. Target Segment Overview

Segment	Subsegment *Base sizes listed in this column are for participation rate, average per-account peak kW savings, and average per-account peak demand, respectively.*	Number of Non-Participating Active Accounts	Participation Rate	Average Per-Account kW Savings	Average Non-Participant Per-Account Peak kW
Top target segments					
Lodging/Hospitality	Hotels and Motels *(n=1,122, n=3,n=267)*	1,119	<1%	15.47	31.8
Lodging/Hospitality	Sporting Camps *(n=139, n=1, n=49)*	138	1%	15.62	30.4
Lodging/Hospitality	Other *(n=488, n=19, n=160)*	472	4%	8.52	27.2
Health Services	Nursing *(n=41, n=1, n=24)*	40	2%	43.19	37.4
Health Services	Other *(n=520, n=16, n=226)*	507	3%	10.84	24.5
Entertainment/Recreation	Movies *(n=96, n=2, n=41)*	94	2%	8.68	40.7
Entertainment/Recreation	Recreational Sports *(n=2,-64, n=99, n=993)*	1,977	5%	7.84	25.3
Industrial	Utility Related *(n=331, n=3, n=137)*	330	1%	15.45	30.1
Industrial	Food *(n=245, n=13, n=152)*	233	5%	8.91	29.0
Industrial	Other *(n=274, n=13, n=127)*	262	5%	9.50	28.7
Education	Religious *(n=418,n=12, n=80)*	407	3%	17.33	24.2
Secondary target segments					
Government	Justice *(n=73, n=1, n=33)*	72	1%	5.32	30.5
Government	Public Finance *(n=356, n=8, n=79)*	348	2%	3.28	28.2
Government	Human Resources Administration *(n=32, N/A, n=19)*	32	0%	N/A	39.4
Government	Executive or Legislative *(n=367, n=13, n=151)*	354	4%	7.56	25.6
Government	Other *(n=98, N/A, n=3)*	98	0%	N/A	40.8
Transportation	Water Transport *(n=629, n=11, n=173)*	619	2%	3.56	24.2
Transportation	Railroad *(n=17, N/A, n=7)*	17	0%	N/A	29.9
Retail	Furniture *(n=956, n=106, n=459)*	862	11%	8.71	21.7
Retail	Electronics *(n=144, n=5, n=37)*	140	3%	13.91	21.9
Retail	Personal Services *(n=794, n=46, n=383)*	752	6%	5.12	24.5
Industrial	Other *(n=161, n=9, n=57)*	158	6%	7.77	26.8
Education	Day Care *(n=276, n=24, n=135)*	252	9%	6.93	31.8)
Warehouse	Other *(n=34, n=1, n=6)*	34	3%	19.21	25.3
Health Services	Laboratory *(n=187, n=7, n=105)*	182	4%	15.90	19.3
Entertainment/Recreation	Other *(n=42, N/A, n=6)*	42	0%	N/A	28.0

Figure 4. Example of a Target Segment Case Study

Opinion Dynamics closely investigated and completed a separate analysis of the office segment and respectful subsegments within the segment. With nearly a third of small business customers (32%), it is by far PSEG LI's largest small business segment. Participation rates across office building size and office subsegments are consistently low averaging at 3%. While this signals an opportunity for program intervention, the analysis of ownership and decision-making structures may signal something different.

The office segment is complex in terms of the decision-making groups and approaches to capital improvements. Property management companies own and/or operate a dominant share of the office space, especially Class A space. Frequently, property management company building engineers, and not the business tenants, make equipment replacement decisions. Large property management companies often have high efficiency standards in place that may limit intervention potential. In fact, our research of the commercial real estate market in other regions has found Class A office space, typically managed by large property management companies, features a higher share of energy efficient technologies than other office space classes. Furthermore, Class A office premises frequently have certifications related to efficiency and sustainability (e.g., ENERGY STAR or LEED).

Our analysis of PSEG LI's office segment data reveals that over half of small business accounts (62%) have a designator of "Building Operators," while 38% are "Non-Operators." Accounts with the "Building Operator" designator are present at 69% of all office premises, which is a likely indicator that those premises are professionally owned and/or managed and, as a result, may have different energy efficiency standards and decision-making processes.

Office premises with "Building Operator" accounts participate in the program at a much lower rate than at the premises without the designator (2% vs. 6%). The low participation rate of 2% at office premises with "Building Operator" accounts, along with relatively high per account energy usage and peak demand, as well as higher than average energy and demand savings among past participants suggests strong potential for program intervention among this segment. It is possible, however, that opportunities for energy efficient improvements at premises owned and/or operated by property management companies may be limited due to those properties being Class A office spaces and property management companies already adopting high efficiency improvements on their own. Additional research is needed to better understand and quantify the opportunities within this segment.

Table 9. Size and Past Participation Trends of Office Accounts

Office Premise Type	Percentage of Accounts (n=31,062)	Participation Rate (n=31,062)	Average Per-Account Peak kW Demand (n=5,103, n=2,993)	Average Per-Account kWh Usage (n=13,072, n=5,818)	Average Per-Account Peak kW Savings (n=519, n=456)	Average Per-Account kWh Savings (n=519, n=456)
Office premises with "Building Operator" accounts	74%	2%	27.5	32,341	7.2	21,580
Office premises without "Building Operator" accounts	26%	6%	24.8	35,410	6.8	20,307
Total	**100%**	**3%**	**26.5**	**33,287**	**7.0**	**20,985**

Property managers and building owners of both large and small portfolios of properties look for support from program administrators in different ways. Managers of large portfolios seek to standardize processes and maximize savings in all properties in the portfolio. They tend to have larger budgets and have already addressed the most of the "low hanging fruit" and need a partner to help with more complex solutions to meet their energy savings goals. Through the research in other areas of the country, we found that firms managing smaller portfolios or single buildings suggested that they would appreciate more regular contact from their utility about energy efficiency opportunities and available incentives. Managers of smaller portfolios and single buildings may not have the resources available to identify potential improvements and keep track of available incentives and generally look for more hand-holding.

Conclusions and Reflections

Small business customers in PSEG LI's service territory represent an inverse of the 80/20 Pareto principle – they represent a large share of accounts (82%) but a relatively small share of energy usage (29%). Small businesses customers are different in terms of business segments than non-small business customers, are comprised of predominantly single-premise businesses, and are considerably underserved through PSEG LI's Commercial energy efficiency program.

Analysis of participation rates by customer segment and subsegment, as well as by geographic location allowed us to identify small business customer segments that are underserved. Analysis of customer size and program participation trends allowed us to identify subsegments with the most potential for program targeting. Quantitative and qualitative analysis of participation rates, historical savings, and customer size allowed us to isolate a range of subsegments that present the greatest opportunity for future program targeting. Detailed analysis of each subsegment should provide sufficient information to PSEG Long Island to confirm if the segment is a good target for the program as well as devise an effective targeting and messaging strategy.

Targeting and engaging small business customers is not an easy task for any energy efficiency program. The use of customized targeted analyses and segmentation solutions is a way for utilities to better understand its small business base, profile them, and isolate subsegments of interest. This paper not only provides an analytical pathway and toolkit for utilities to undertake a similar targeting analysis, but provides a wealth of information on customer participation trends and behaviors that utilities can use as a starting point in defining and testing their hypotheses related to the small business segment.