Business Partners Impact Evaluation Report - Motors

Prepared for

The New York State
Energy Research and Development Authority

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NYSERDA
February 2011

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ACKNOWLEDGEMENTS

This report was prepared with input from Jennifer Meissner, Tracey DeSimone, Alison Neligan and Ruth Horton.

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Section 1: INTRODUCTION

The **New York Energy $mart**SM programs are funded by an electric distribution System Benefits Charge (SBC) paid by customers of Central Hudson Gas and Electric Corporation, Consolidated Edison Company of New York, Inc., New York State Electric and Gas Corporation, National Grid, Orange and Rockland Utilities, and Rochester Gas and Electric Corporation. The programs are available to all electric distribution customers that pay into the SBC. The New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation established in 1975, began administering the SBC funds in 1998 through NYSERDA's **New York Energy $mart**SM Program.

This report covers the impact evaluation of the motors component of the Business Partners program. The first phase of the Business Partners impact evaluation was a screening survey to determine where motors were replaced and develop a sample frame for an on-site survey. Based on the results of the screening survey, the Impact Evaluation Team concluded that continuing with the other steps of the impact evaluation is not worthwhile given the small magnitude of the potential gross savings.

The remainder of the report includes four sections. This introduction provides a brief description of the program. The next section describes the impact evaluation approach. The third section details the results of the screening survey, and the final section is the conclusion. The survey instrument is attached as Appendix A.

1.1 PROGRAM DESCRIPTION

The Business Partners Program is designed to promote the purchase and installation of energy efficient products and services through working with trade allies (Partners). The Program is also aimed at promoting the availability of the most energy efficient products on the market. Part of the goal is to train allies on the most efficient equipment (a strong market transformation effort is tied to the program). **New York Energy $mart**SM business partners allies include building and systems contractors, distributors, vendors, designers and energy service providers. Through the program, business partners gain access to special training, tools, guidelines, and performance incentives. NYSERDA works with its business partners to help them differentiate their businesses in a highly competitive marketplace, while assuring appropriate quality. This is done by creating a brand identity that conveys the theme that mid-market businesses are vital to the growth of the energy efficiency industry as well as to the State's economy. The Business Partners Program is an integration of three prior programs: Motors Systems, Commercial Lighting, and Building Performance and HVAC.

Only the motors component was selected for impact evaluation in 2009/2010. Formerly known as the Premium-Efficiency Motors Program, this component focused on working with suppliers and providers of motors and motor repair services to promote sales of NEMA Premium® motors, quality motor repairs, and motor management services. Motor management activities included motor assessments (proper sizing), planning for future repair and replacement, and consideration of drives. The implementation contractor for this component is Applied Proactive Technologies. The Program has worked with vendors to present the case for a motor management program to their customers, to conduct motor assessments, and to facilitate implementation of motor management plans and policies whenever possible. An important aspect of the program is to conduct inventories which provide the customer with an understanding of their motor population and a set plan in how to make determinations regarding motor replacements, along with changing the relationship between the Partner and their customer to a trusted advisor. Partners learn how to incorporate the customer's lifecycle costs into developing a motor management plan through use of the MotorMaster+ software and to advise their customers regarding all eligible incentives. While there is no specific tool that provides a lifecycle cost analysis for drives,

participating vendors are encouraged to recommend the installation of variable speed drives (VSDs) on applications that will have the greatest impact on savings.

The five-year SBC goal of the motors component of the program was to enroll 100 Business Partners, assist in the performance of 85 inventories, and identification of 7.9 million kWh of energy savings. At the time of this evaluation, NYSERDA had 91 enrolled Partners, performed 109 inventories, and identified 9.2 million kWh of potential energy savings.

Each of the program components activities is designed to improve the awareness and familiarity with targeted technologies and services. By partnering with businesses, market infrastructure is strengthened leading to increased product and service availability and increased demand.

Section 2: EVALUATION APPROACH

2.1 PURPOSE OF IMPACT EVALUATION

This impact evaluation was designed to determine the gross energy savings for the motor replacements occurring as a result of Business Partners activities, to estimate the free-ridership and spillover and assess the overlapping savings between Business Partners and other NYSERDA programs. The evaluation efforts focused on savings occurring during the 2007 and 2008 program years. This report covers the results of the initial screening survey of participating end users who received a motors inventory from a Business Partners' vendor. (The survey instrument is included in this report as Appendix A.)

2.2 GENERAL APPROACH

The Business Partners Program initiated the motor inventory component in 2005 and the impact evaluation was focused on estimating savings for installations made during 2007 and 2008. Given the program's strategy of using vendors to promote efficiency through providing motor inventories to the end users, the researchable questions are largely tied to the use of the inventories.

- How are these inventories used by the customer?
- How many of the recommendations on the inventories are actually implemented?
- What is the energy savings impact of conducting motor inventories?

To answer these questions, the Business Partners impact evaluation was initially designed to have the following steps:

1. A screening survey of all end use participants to identify those who are using motor inventories and/or motor management plans and those who have replaced one or more motors since their initial motor inventory
2. A database review for motors installed and incentivized through other NYSERDA programs that may have been included in a prior motor inventory conducted as part of the Business Partners program
3. An on-site survey of 46 end user sites to verify inventory reports and self-reported implementation made as a result of the motor inventory. At these sites, a combination of run hour dataloggers and load monitoring meters were to be installed on a total of (100) motors.
4. Telephone surveys of decision-makers at each of the sites selected above, the motor vendors associated with these sites and formerly-participating vendors to investigate net energy savings effects (or a net-to-gross, NTG, ratio). The NTG survey was intended provide an indication of the degree to which participation in this program and/or the availability of a incentive influenced the participant to purchase one or more NEMA® Premium motors

The screening survey database review have been completed and the results suggest that further evaluation is not warranted due to the small magnitude of the potential savings that can be directly attributed to the inventories and is not already counted in NYSERDA's other incentive programs. Thus, the evaluation was concluded at the end of Step 2 noted above.

2.3 METHODS

This completed impact evaluation included two activities: the screening survey and the review of NYSERDA databases. The approach to each of these two tasks is described in more detail below.

2.3.1 Screening Survey

The purpose of the screening survey was to identify end users who installed efficient motors to be used as the sample frame for the on-site survey. All end users receiving inventories were to be contacted for the screening survey. A list of 109 inventories provided by the NYSERDA program staff was used to identify the end users and solicit participants for the survey.[1]

Since the motor inventory component of the program does not rely on direct incentives to its Partners or end users, and experience with the Technical Assistance program (another NYSERDA non-incentive commercial and industrial program) has indicated that participants may implement recommendations several years after receiving technical assessment report, it seemed reasonable to expect that inventories initially provided in 2005 may have resulted in installations in 2007 and 2008. Thus, the screening survey included end users with inventories from the inception of the implementation of the motor inventories.

In addition, the initial intent of the screening survey was to identify end users with motor installations to create the list of eligible participants for the on-site survey. At the time of the survey design, the installation rate among end users was unknown and the Impact Evaluation Team was concerned about whether there would be sufficient installations for the on-site survey. Consequently, the 2009 inventories were included as part of the evaluation population and the sample frame for the initial screening survey included all 109 inventories conducted from 2005 through August of 2009.

While the primary purpose of the survey was to determine whether efficient motors had been purchased and installed as a result of the inventory, a couple of additional questions were added to the survey instrument to obtain an initial sense of the scope of the program-related activities. The survey was implemented in March and April, 2010. Six attempts were made to call each end user at different times of the day. Since a census of the end users with motor inventories was contacted, there is no sampling precision and it was unnecessary to develop case weights for the survey analysis.

Since the population included inventories going back as far as 2005, the results of the screening survey incorporate at least short-term persistence of savings over time. In all of the analyses presented in this report, the percentage of inventories and motors is based on the respondents plus the closed facilities. The operating businesses that could not be reached for the survey are assumed to be similar to the survey respondents and the results from the survey are applied to those firms that did not complete the survey. Facilities known to be closed were included in the survey with no savings. While it is possible that the closed facilities could have installed motors before the plants were shut down, there are no longer savings that can be achieved at these sites.

- The response rate for the survey was quite high, with 82% of the end users responding to the survey and another 7% associated with closed facilities, for a total response rate of 89% as is shown in Table 2-1.
- Of the total 109 inventories and 9,658 motors included in the inventories, the survey was completed by 89 end users, representing 82% of the inventories and 72% of the motors.
- Eight (8) facilities representing 17% of the motors were found to be closed.
- The remaining 12 end users could not be reached. This group accounted for 11% of the inventories and 12% of the motors.

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[1] Due to issues with obtaining full access to the databases, it was subsequently determined that three inventories were inadvertently omitted from the sample, *i.e.*, that a total of 112 inventories were conducted. One of these end users was identified in the program database as having closed.

Table 2-1: Screening Survey Disposition

	# of Inventories	# of Motors	% of Inventories	% of Motors
All Inventories	109	9,658		
Completed survey	89	6,913	82%	72%
Plant closed	8	1,613	7%	17%
Unable to reach	12	1,132	11%	12%

Further analysis was conducted to assess the distribution of surveys by the year the inventory was conducted. This analysis is presented in
Table 2-2 and summarized below.

- Both inventories and completed surveys are heavily weighted toward the early years, with over 80% of the population and the survey related to inventories that were conducted in 2007 or earlier.
- The percentage of facilities known to be closed does not show a clear trend over time, with 21% of the 2005 and 14% of the 2008 inventories found to have been conducted in facilities that subsequently closed as compared to less than 5% of inventories performed in 2006, 2007 and 2009.
- The overall response rate by inventory year, incorporating both completed surveys and closed facilities, ranged from 87% to 100%. The response rate was fairly consistent regardless of the timing of the inventory, at 92% for inventories completed in 2005 and 90% for inventories completed in 2009.

Table 2-2: Distribution of Inventories and Completed Surveys by Year

Year	Total# of End Users with Inventories[1] (A)	Completed Surveys (B)	% of Inventories with Completed Surveys (C)	# of Closed Facilities (D)	% of End Users with Closed Facilities (E)	% of End Users with Completed Surveys or Closed Facilities (C+E)
2005	24	17	71%	5	21%	92%
2006	45	38	84%	1	2%	87%
2007	23	19	83%	1	4%	87%
2008	7	6	86%	1	14%	100%
2009	10	9	90%	0	0%	90%

[1] The total number of motors included in the inventories was 2,062 in 2005, 4,909 in 2006, 1,703 in 2007, 409 in 2008 and 575 in 2009.

The Business Partners Motors effort conducted many more inventories in 2005 and 2006 (a total of 69), than were done in 2008 and 2009, when only 17 inventories were completed. This analysis indicates that the survey results are heavily weighted toward the early inventories and thus should reflect the potential activity and installations in 2007 and 2008.

A copy of the survey instrument is attached as Appendix A.

2.3.2 Database Review

The purpose of the database review was to determine whether the end users who received inventories also installed efficient motors and received incentives through other NYSERDA programs. In this case, it is possible that the savings from the motors would be claimed in the other NYSERDA programs. This part of the evaluation was conducted by comparing the list of motor inventories to installed measures through other NYSERDA programs. Two NYSERDA data sets of program activity were used: the first contained all installations made through the New Construction Program and all of the program components that were later combined under Existing Facilities (PLRP, SEC and CIPP[2]) through March of 2008 and the second contained only the Existing Facilities data through the end of 2009.

Inventories were matched to the other NYSERDA program data sets by facility name, address and town. Only installations of premium efficiency motors in the other NYSERDA programs were considered. While the inventory process may have included a discussion of the application of variable speed drives (VSDs's) at the site, recommendations for specific VSD's were not recorded in the Business Partners tracking system and therefore savings cannot be claimed for any VSD installations at those sites.

The matching process is inexact. For example, facilities names and addresses may be entered differently between the inventory data set and the other NYSERDA programs, and thus there is no clear way to make a match even when it may exist. This approach of identifying direct matches is most likely to result in underestimating the full extent of the overlap between Business Partners and the other NYSERDA programs. In addition, it was not possible to determine whether NYSERDA incentives applied to specific motors recommended in the inventory.

In a number of cases, the facility name was found as a match but the address and/or town was not the same. This situation may occur, as indicated by one of the survey respondents, when the accounting division of the facility is in charge of processing the incentives and is located in a different facility than the one where the inventory was conducted. However, there is insufficient information to definitively state that the incentives were requested for a specific facility. In the analysis presented below, exact matches are reported separately from the company-name only matches.

2.3.3 Reliability of Results

This evaluation was initially intended to consist of multiple components, starting with a screening survey designed to construct the sample frame for the on-site surveys. However, the results of the screening survey indicate that the savings not claimed through other NYSERDA programs are low and it is not worthwhile to continue with the evaluation as planned. Due to this change in strategy, the evaluation outcomes are based on telephone verification of the installation of the motors. Savings were estimated on the basis of the NYSERDA program tracking data for survey respondents who received incentives, which is the equivalent of applying deemed savings as opposed to determining site specific savings through an on-site survey. Thus, the level of rigor of the estimated savings is low, as is appropriate for the small magnitude of the savings.

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[2] PLRP = Peak Load Reduction Program, SEC = Smart Equipment Choice Program, and CIPP = Commercial and Industrial Performance Program. SEC and CIPP were combined to make ECIPP (Enhanced Commercial Industrial Performance Program).

The estimated savings for the program are based on data collected through two distinct processes, as described below.

- The total number of motors installed and the number of motors incentivized was determined through the survey of end users receiving the motors inventory.
- The savings per motor and estimate of the savings occurring in each year were calculated from NYSERDA's program database for the survey respondents who received incentives for efficient motors.

The reliability of these individual data collection processes is discussed below.

Reliability of Telephone Survey Results

The number of motors replaced and incentivized was estimated through the telephone survey and the reliability of the survey-related outcomes is quite high. The major sources of uncertainty in a survey-based evaluation are sampling precision and bias. Due to the design of the evaluation, the effects of these potential sources of uncertainty were minimized. Sampling precision is not an issue since the screening survey was a census attempt. Possible sources of bias were considered and mitigated, as discussed further below.

There are a number of potential sources of bias in any survey. For this particular survey, non-response bias, self-reporting bias and influential observations are the most likely to skew the results. Non-response bias occurs when the non-respondents are substantially different from respondents, as may result from a systematic reason for non-response among a certain subset of program participants. It is particularly a matter of concern if there is a relationship between the reasons for non-response and the survey content. An example is facilities that are no longer in operation and thus cannot be reached for the survey and are also not achieving energy savings as the efficient equipment is no longer in use. In this evaluation, the response rate for this survey was quite high (89%), which includes facilities known to have gone out of business and counted with no savings or installations. Consequently, it seems unlikely that non-response bias had an impact on the results of this evaluation.

Self-reporting bias may occur when respondents are asked questions beyond their direct knowledge, the respondent's recall is faulty or the respondent is influenced by their understanding of the intent or perspective of the party conducting the survey (socially desirable responses). The screening survey was brief and the questions were straightforward and within the scope of knowledge of the respondents, which minimizes the potential impact of this type of bias.

A few participants were unable to provide direct estimates of the number of motors replaced and incentivized. In these cases, the data gaps were filled where possible based on the responses of the other participants, as is consistent with standard statistical methods of handling missing data. For example, five respondents were unable to provide the number of motors incentivized through other NYSERDA programs. However, the eleven respondents with complete answers indicated that they had received incentives for all replaced motors. Given the prevalence of this response, the Impact Evaluation Team assumed that the facilities with an unknown number of incentivized motors had also applied for and received incentives for all replaced motors.

Another possible source of bias occurs when one or a few respondents have undue influence on the results. For example, when a sample is selected, the inclusion of a particularly large project with unusual characteristics could skew the results. Since the entire population of motor inventories was included in the sample frame and the response rate was quite high, no respondent should have an undue influence on the results. In other words, while a respondent may represent a high percentage of the total motors

inventoried or replaced, that respondent is represented in the survey as appropriate to their relationship to the population.

While the evaluation results should provide reliable results regarding the number of replaced motors for the population of motor inventories conducted prior to August, 2009, caution should be taken when extending those results beyond this population. One of the projects was a large facility with an inventory of over 600 motors (more than twice the number of the next largest facility). The company representative stated that over 100 motors were replaced and was uncertain about the number of incentives received since the incentives are processed through a different division. For the purposes of the survey, the Impact Evaluation Team interpreted this response as 100 replaced motors and assumed that incentives were received for all of the replaced motors (based on the other survey responses). Thus, this single end user represents a large part of the replaced and incentivized motors. In terms of the inventories conducted through August 2009, this end user is appropriately represented since the sample frame included the entire population. However, should these results be extended to a different population, this statement may no longer be accurate.

Reliability of Savings Estimates

Savings per motors and the distribution of the savings by year could not be measured directly from the telephone survey and were estimated from the NYSERDA program database for respondents who received incentives. This approach introduced the potential for measurement error into the savings estimates. The underlying presumption behind this approach is that the non-incentivized motors were installed in the same time frame and have the same operational characteristics as the incentivized motors. In the absence of expensive on-site visits and/or other primary data collection, it is not possible to assess the accuracy of this presumption.

Using the NYSERDA program activity as a proxy for the Business Partners motors replacements that occurred independently of NYSERDA's incentive programs is roughly the equivalent of applying deemed savings in that it is not directly based on the site specific conditions for the replaced motors. Thus, the reliability of the estimated number of motors installed in 2007 and 2008 and the estimated savings is lower than the overall estimates of motors replaced and incentivized.

Section 3: SURVEY RESULTS

This section describes the results from the initial screening survey. The first section covers the recall and use of the surveys. The second section covers motor replacements and the third section the respondents' reports of the incentives received through other NYSERDA programs.

3.1 RECALL AND USE OF INVENTORY

The results of the survey showed a high level of recall. Some of the findings from this part of the survey are provided in Table 3-1 and discussed below.

- 86 end users (89%), representing 77% of the motors, recalled receiving the inventory.
- 77 end users (79%), representing 73% of the motors, reported that they still had the inventory.
- 45 end users (46%), representing 54% of the motors, stated that they either are currently using the inventory or used it in the past.
- Of these 45 end users, 39 are currently using the inventory and 6 used it when it was received but are not currently relying on the inventory.

Table 3-1: Inventory Recall and Use

	# of Inventories	Total # of Inventoried Motors	% of Inventories	% of Inventoried Motors
Recall Inventory	86	6,593	89%	77%
Have inventory	77	6,195	79%	73%
Inventory used	45	4,627	46%	54%
Inventory still in use	39	3,993	40%	47%
Inventory not currently in use but used when initially received	6	634	7%	9%

3.2 MOTOR REPLACEMENTS

Survey respondents were also asked to report the number of motors that were replaced "as a direct result of the inventory." These results are summarized in Table 3-2.

- Of the 97 facilities in the survey, 24 respondents (25%) reported that motors were replaced with premium efficient models as a direct result of the inventory. These 24 facilities represent 3,486 inventoried motors (41%).
- Of the 24 facilities with replacements, 21 were able to estimate the number of motors replaced. These end users reported that 319 replacement motors were installed, representing about 10% of the total number of inventoried motors in these facilities.
- Three respondents reported that motors had been replaced with premium efficient ones, but were unable to provide an estimate of the number of replacements.
- Assuming that the three respondents who could not estimate the number of replacement motors are similar to the 21 who were able to, about 350 efficient motors were installed as a direct result of the inventories from 2005 through 2009. These replacement motors account for about 4% of

all of the motors inventoried through the program. Expanding to the entire population of inventories conducted through August 2009, about 400 efficient motors were installed.

Table 3-2: Motors Replaced as Direct Result of Inventory

	# of Inventories	Total # of Inventoried Motors	Total # of Motors Replaced	% of Inventories	% of Motors Replaced in Facilities with Replacements
All facilities with replacement(s) as direct result of inventory	24	3,486		25%	
Facilities that reported the number of motors replaced	21	3,212	319	22%	10%

3.3 NYSERDA INCENTIVES

Respondents were asked about NYSERDA incentives received for the motors replaced as a direct result of the inventory. These results are presented in

Table 3-3 and discussed below.

- Of the 24 respondents with motor replacements, 16 (67%) reported that they had received incentives from NYSERDA for the efficient motors.
- Of the 16, eleven reported the number of motors incentivized by NYSERDA and the number of motors incentivized was the same as the number of efficient motors replaced, *i.e.*, incentives were received for all motors replaced.

The other five respondents were unable to provide the number of motors that received NYSERDA incentives for a variety of reasons. For example, one respondent for a large facility (with 100 replacement motors) stated that the incentives were handled through a different division and he did not have any information on the number of incentives received.

Assuming that all of the replaced motors received incentives, as is consistent with the respondents who were able to report on the number of motors incentivized, this analysis suggests that 227 of the estimated 350 replaced motors (65%) were incentivized through a NYSERDA program and 123 were not. When these estimates are expanded from the survey results to the entire population of inventories through August, 2009, the program resulted in approximately 400 motor replacements, with 255 that received NYSERDA incentives and 145 that were not incentivized.

Table 3-3: NYSERDA Incentives Received for Premium Efficient Motors

	# of Inventories	Total # of Inventoried Motors	Total # of Motors Replaced	Total # of Motors Incentived	% of Replaced Motors Receiving Incentives
All facilities reporting NYSERDA incentives	16	2,273	227		
Facilities that reported the number of motors incentivized	11	1,106	106	106	100%

Section 4: DATABASE REVIEW

The analysis also included a comparison of the motor inventories to the NYSERDA program databases to determine whether the incentives were recorded to determine the degree of overlap between the Business Partners' inventories and NYSERDA's direct incentive programs. In addition, the NYSERDA tracking system data was used to estimate the timing of the installations.

Given that the inventories spanned the period of 2005 through 2009, it is clear that only a portion of the installed motors reported through the screening survey were upgraded in 2007 and 2008. While the evaluation was designed to determine savings for 2007 and 2008, the overall structure of the initial screening survey provided information about the total number of motors replaced and incentivized since the time of the inventory rather than obtaining specific dates of when the motors were installed. This approach was taken for two reasons:

- the screening survey was only intended to be an initial contact to develop the sample frame for the on-site survey
- respondent recall may not be sufficient to determine the timing of the installations

In the absence of known installation dates for the inventoried motors, the NYSERDA program tracking data set was used to estimate the timing of the installations and the program impacts during 2007 and 2008.

Each of these aspects of the analysis is described in more detail below. The last subsection discusses the estimation of the savings per motor.

4.1 COMPARISON OF INSTALLATIONS OF MOTORS IN BUSINESS PARTNERS AND THOSE RECEIVING NYSERDA INCENTIVES THROUGH OTHER PROGRAMS

As described in Section 2.3.2, comparing the Business Partners data set of participating end users with the program database for NYSERDA's other programs is inexact since there is no consistent way to identify locations between the two data sets. For this reason, the results below are presented for facilities with exact matches between the two data sets (name and address) and those facilities where only the name matched (and not the address). The second criteria would address the possibility that the incentive processing may have been conducted through another branch of the firm and thus the address may not match the location of the facility with the inventory. Since the analysis is based on direct matches, this process is likely to underestimate the extent of the overlap. Also, the matching process was restricted to premium efficiency motors.[3]

Of the sixteen respondents who reported receiving incentives, fifteen were found in NYSERDA's program tracking data as having received an incentive for premium efficient motors. While the survey results included the number of motors replaced (when the respondent was able to provide that information), the number of motors incentivized was not included in the Business Partners program data provided by NYSERDA to the Impact Evaluation Team. Thus, it was not possible to make a direct comparison between the NYSERDA program data and the survey responses based on the reported

[3] While the inventory process may have included a discussion of the application of variable speed drives at the site, recommendations for specific VSD's were not recorded in the Business Partners tracking system.

number of motors installed. Further review indicated that ten of the fifteen firms in the NYSERDA program data received the incentives following the inventory or in the same year as the inventory.

Table 4-1: Respondents Reporting NYSERDA Incentives

	Survey Results	
NYSERDA Program Tracking Data	**# of Facilities Receiving NYSERDA Incentive**	**# of Facilities Receiving NYSERDA Incentive, Inventory Prior to Incentive or in Same Year as Incentive**
No match found	1	5
Exact match found (name and address)	11	9
Name matched, not address	4	1
Total Respondents Reporting Incentives	16	16

The NYSERDA program tracking data also included four survey respondents who replaced motors but did not report receiving NYSERDA incentives. One of the four had substantial savings (over 500 MWh) from premium motors recorded in the month prior to the inventory, suggesting that the installations were not related to the inventory. The other three facilities had small or no savings.

This analysis supports the results of the survey indicating that many inventory recipients took advantage of the incentives offered through NYSERDA's other programs.

4.2 TIMING OF INSTALLATIONS

The analysis is based on the premise that the pattern of installation among the survey respondents as a whole was similar to the pattern for the Business Partners end users who received incentives through another program. It was complicated by the need to combine the information from multiple sources. The data sources and relevant fields used in the analysis are described below.

- Business Partners inventory tracking system: the date of the inventory, the total number of motors inventories, and end user identification information
- Screening survey: the number of motors replaced as a direct result of the inventory and the number of motors receiving incentives through another NYSERDA program; some respondents were unable to quantify one or both of these numbers
- NYSERDA program tracking data: participant identification information, energy and summer kW savings for each measure

As mentioned above, the actual number of motors installed was not included in the program tracking data used for this component of the evaluation, and it was necessary to rely on the survey responses for this information. In addition, the survey respondents were not always able to provide this information; three respondents who received NYSERDA incentives were unable to state the actual number of the motors replaced or the number incentivized. Consequently, the percent of savings (available from the NYSERDA program database) was used to approximate the percent of motors installed, since this field was populated for all of the survey respondents included in this part of the analysis.

The NYSERDA program activity for the ten facilities with incentives following the inventory is summarized in Table 4-2. Of the 10 facilities, three received incentives in 2007 or 2008, accounting for 11.4 annual MWh of the total savings of 69.9 MWh (16%) and 1.94 summer peak kW savings of the total of 12.66 kW (15%), as reported in NYSERDA's program database.

Table 4-2: Distribution of Savings for Incentivized Motors by Year

Year of Incentive	# of Facilities Receiving NYSERDA Incentives	Estimated # of Motors Receiving NYSERDA Incentives[1]	Annual kWh Saved	Summer kW Saved	kWh Saved as % of Total	Summer kW Saved as % of Total
2006	4	112	46,339	8.08	66%	64%
2007	2	52	6,919	1.17	10%	9%
2008	1	N/A[2]	4,525	0.77	6%	6%
2009	3	21	12,139	2.64	17%	21%
Totals	10	185	69,922	12.66		

[1] This column contains either the number of incentivized motors provided by the survey respondent or the total number of motors replaced, if the survey respondent could not provide an estimate of the number of motors incentivized. See Section 3.3 for a more complete discussion.

[2] This respondent indicated that motors had been replaced as a result of the inventory and incentives were received, but could not quantify the number of motors.

A comparison of Table 2-2 and Table 4-2 shows that 2009 inventories were more prevalent among the facilities with incentives than among the total population. To address this issue, the analysis was weighted to match to the population. However, the percentage of savings in 2007 and 2008 was largely unaffected by this modification in the approach. This analysis suggests that the bulk of the savings occurred in 2006, which is also the year with the highest number of inventories performed (45 of the 109 inventories).

The next step was to investigate the timing between the inventory and the payment of the incentives. This analysis indicates that 60% of the facilities received incentives in the same year as the inventory was conducted. One possible effect of the incentive programs is to accelerate the installation of the motors being replaced due to the motor inventories. This would make it more likely for replaced motors to be incentivized in the same year of the inventory than those replacements that do not obtain an incentive. These motor upgrades within the same year accounted for 81% of the savings from the incentivized measures. The results of this review are presented in Table 4-3.

Table 4-3: Time Lag between Inventory and Incentives

Lag Between Inventory and Incentive (Years)	# of Facilities Receiving NYSERDA Incentives	% of Total Facilities	Annual kWh Savings from NYSEDA Program Database	% of Annual kWh Savings
0	6	60%	56,476	81%
1	2	20%	6,354	9%
2	1	10%	4,525	6%
3	1	10%	2,569	4%
Totals	10		69,922	

Applying these results to the number of motors installed during each inventory year leads to the conclusion that about 25% of the motors were installed during 2007 and 2008. Assuming that this trend also pertains to the non-incentivized motors resulting from the inventories, about 32 efficient motors were installed through Business Partners and not claimed in other NYSERDA programs, as identified through the survey. Expanding this survey estimate to the population increases this estimate to 36 efficient motors.

4.3 ESTIMATING PER MOTOR SAVINGS

Per motor savings were estimated by combining the NYSERDA program data with the survey data. As mentioned above, the NYSERDA program data contains the annual kWh and summer kW peak savings but does not include the number of motors receiving the rebated, making it impossible to determine the per motor savings from this source alone. However, the number of motors incentivized was provided by the survey respondents. By combining the two sources of information, it was possible to estimate per motor savings. From Table 4-2, the total savings for the 185 incentivized motors are 69,922 annual kWh and 12.66 summer kW, resulting in average savings per motor of 378 annual kW and 0.068 summer kW.

Section 5: CONCLUSIONS

The purpose of this evaluation was to determine the gross and net energy savings during 2007 and 2008 for the motors component of NYSERDA's Business Partners program. However, the evaluation was terminated after the initial screening survey due to the low level of activity found among participating end users.

While the results of the initial screening survey suggest that the inventories were effective in terms of respondent recall and use of the inventories, the actual number of motors installed at the participating end users' facilities as a result of the inventory and not claimed under another NYSERDA program was quite low. Some key findings are presented below.

- 86 end users (89%) representing 77% of the motors recalled receiving the inventory.
- 45 end users (46%) representing 54% of the motors stated that they either are currently using the inventory or used it in the past.
- Among all the facilities with motor replacements, about 10% of the total number of inventoried motors (from 2006 through 2009) were replaced with premium motors.
- About 4% of all motors inventoried through the program were replaced with premium efficient motors.
- Of the respondents with motor replacements, 67% reported that they had received incentives from NYSERDA for the efficient motors.
- An estimated 65% of the new premium efficient motors received incentives through a NYSERDA program. Thus, almost two-thirds of gross savings obtained from the Motors component were claimed under other NYSERDA programs.
- Based on the incentivized motors, about 60% of the facilities replaced motors in the same year as the inventory, accounting for 81% of the savings.
- About 16% of the kWh savings claimed for Business Partners participants in the other NYSERDA programs occurred from incentives processed during program years 2007 and 2008.

The evaluation results are based on telephone verification of replaced motors and estimated savings calculated from NYSERDA's program database for the end user survey respondents who received incentives for premium efficient motors. As discussed at length in Section 2.3.3, only the first two components of the evaluation were implemented and the approach to estimating the savings does not meet the level of rigor described in the original evaluation plan. Savings were calculated based on available information and are intended to provide a rough estimate of the savings associated with measures that were not previously claimed in other NYSERDA programs.

The results from the two evaluation activities are integrated in Table 5-1. The total of 400 motors replaced by Business Partners end users as a direct result of the inventory resulted in approximately 145 efficient motor replacements independent of other NYSERDA programs and about 36 of these premium efficient motors were replaced during 2007 and 2008. Given the small magnitude of the gross savings from these motor replacements, further impact evaluation of the motors component of this program does not appear to be warranted.

Table 5-1: Integration of Results

	Estimates from Initial Screening Survey	Estimates Expanded to All Inventories through August, 2009
Estimated number of motors replaced with premium efficient motors from 2006 through 2009 through the Business Partners program	350 Motors	400 Motors
Estimated number of motors replaced without a NYSERDA incentive	125 Motors	145 Motors
Percent of savings from projects with NYSERDA incentives processed during 2007 and 2008	25%	25%
Estimated number of motors replaced through the program in 2007 and 2008 and not claimed in another NYSERDA program	32	36
Estimated gross savings per motor (from NYSERDA program database)[1]	378 kWh and 0.068 summer peak kW	
Estimated gross energy savings from the non-incentivized replacement motors installed during 2007 and 2008	**12,096 annual kWh**	**13,608 annual kWh**
Estimated summer peak kW savings from the non-incentivized replacement motors installed during 2007 and 2008	**2.176 summer peak kW**	**2.448 summer peak kW**
Estimated gross energy savings from the non-incentivized replacement motors installed from 2006 through 2009[2]	45,250 annual kWh	54,810 annual kWh
Estimated summer peak kW savings from the non-incentivized replacement motors installed from 2006 through 2009[2]	8.5 summer peak kW	9.86 summer peak kW

[1] Savings were estimated from the NYSERDA program database for those premium efficiency motors installed by the Business Partners end users who responded to the survey and received incentives through a NYSERDA program.

[2] The impact evaluation was designed to estimate program savings during 2007 and 2008. The analysis also provides estimated savings from 2006 through 2009 so those savings from non-incentives replacement motors (savings not claimed in other NYSERDA programs) are also presented here.

While the magnitude of the gross savings above and beyond the NYSERDA incentive programs is small, this result is not necessarily unexpected and may be a by-product of the design and implementation of the program. Immediate replacement of motors to achieve the energy savings is often difficult to implement due to the ancillary impacts, *e.g.*, having to shut down production while the equipment is replaced. Thus, motors are typically replaced upon failure and, consequently, the replacement of 10% of the motors in facilities with replacements and 4% overall for all motors inventoried needs to be interpreted in that context.

Another major contributor to the magnitude of the savings is simply the small number of inventories that were conducted. Also, the program is designed largely to capitalize on the synergies available through other NYSERDA programs, and thus finding that 65% of the replacement motors were incentivized through another NYSERDA program may well be seen as a positive outcome. One of the main goals of the program is to provide vendors with the tools to identify and assist end users in making motor management decisions and applying for incentives under NYSERDA's programs. The identification of VSDs is an important part of the motor management plan that was not included in this evaluation. However, since these savings are not recorded in the Business Partners database, it was not possible to estimate impacts through this evaluation effort.

In addition, this evaluation did not attempt to estimate the net-to-gross factor. Since the magnitude of the gross savings is so small, further efforts to estimate the net impacts did not seem to be warranted. In addition, spillover from the Business Partner activity in the motors market will most likely be captured in the Non-Participant Spillover study currently in process.

On the basis of the participant recall and use of the inventories, it is clear that this program design has the potential to provide substantial support and assistance to the other NYSERDA programs. However, the scope of the program would need to be expanded to achieve savings in addition to those claimed through the other programs. Since the planned changes in the federal standards for motors are likely to necessitate a reconsideration of the parameters of this program design, these evaluation results may be useful in determining the future direction of the program.

APPENDIX A.

SCREENING SURVEY

Site #_____

Company Name:_____

Company Address:_____

Phone:_____

Contact Name:_____

Motor Vendor:_____

Date of Inventory:_____

Number of Motors on Inventory:_____

Interviewer Initials:_____

Date of Interview:_____

Hello. This is _____ from **Towpath Energy Consulting.**

Is this/could I speak to Mr/Ms _____ **.**

[IF NOT AVAILABLE, ASK IF THERE IS ANOTHER EMPLOYEE LIKELY TO BE FAMILIAR WITH THE MOTORS AT THE FACILITY.]

1 YES – CONTINUE WITH RESPONDENT [**GO TO INTRO**]

2 NO – NEW RESPONDENT COMING TO PHONE

3 NO – RESPONDENT NOT AVAILABLE [**SCHEDULE CALLBACK**]

9 REFUSED [THANK AND TERMINATE]

Hello, my name is [interviewer name], and I am calling from **Towpath Energy Consulting** on behalf of the New York State Energy Research and Development Authority, also known as NYSERDA. NYSERDA is conducting a study to assess the use of motor inventories.

Our records show that you received a motor inventory conducted by _____ on _____**.** You may recall that _____ came to your facility, made a complete list of the motors in use and recommended efficient replacement options as appropriate. This call is a follow up to that motor inventory. Do you recall receiving the motor inventory?

_____ YES [CONTINUE]

_____ NO [ASK IF THERE IS ANOTHER EMPLOYEE LIKELY TO BE MORE FAMILIAR WITH THE MOTOR INVENTORY; IF STILL NO RECALL, THANK AND TERMINATE]

_____ Don't know [ASK IF THERE IS ANOTHER EMPLOYEE LIKELY TO BE MORE FAMILIAR WITH THE MOTOR INVENTORY; IF STILL NO RECALL, THANK AND TERMINATE]

[RECORD NAME OF NEW CONTACT AND ASK IF AVAILABLE; IF SO, REPEAT INTRODUCTION. OTHERWISE, RECORD NAME, PHONE AND CONTACT INFORMATION FOR ANOTHER ATTEMPT.]

2nd Contact Name:_____

Phone:_____

Contact Info – date/time to call etc.:_____

NYSERDA has contracted with **Towpath Energy Consulting** to perform this study. I would like to ask some questions about your experience receiving a motor inventory from a NYSERDA motor vendor. The information that you provide will remain confidential. Your information will be incorporated with that from other survey participants to provide an overall picture of the impact of the Motor Inventory Program that will be used to improve or enhance the current offering.

Q1. Just to confirm, our records show that you received a motor inventory conducted by [MOTOR VENDOR] on [DATE]. You may recall that [MOTOR VENDOR] came to your facility, made a complete list of the motors in use and recommended efficient replacement options as appropriate. Do you recall receiving the motor inventory?

_____ YES [CONTINUE]

_____ NO [ASK IF THERE IS ANOTHER EMPLOYEE LIKELY TO BE MORE FAMILIAR WITH THE MOTOR INVENTORY; IF STILL NO RECALL, THANK AND TERMINATE]

_____ Don't know [ASK IF THERE IS ANOTHER EMPLOYEE LIKELY TO BE MORE FAMILIAR WITH THE MOTOR INVENTORY; IF STILL NO RECALL, THANK AND TERMINATE]

[RECORD NAME OF NEW CONTACT AND ASK IF AVAILABLE; IF SO, REPEAT INTRODUCTION. OTHERWISE, RECORD NAME, PHONE AND CONTACT INFORMATION FOR ANOTHER ATTEMPT.]

Q2. Do you have five minutes now to answer a few questions about your motor inventory?

YES – AVAILABLE NOW [CONTINUE]

NOT AVAILABLE [ARRANGE CALLBACK]

NO – Can we arrange another time to talk? [SCHEDULE]

I will then plan to call back in a week or so. [TRY TO CONVERT, IF NOT - THANK AND TERMINATE]

DON'T KNOW/REFUSED [TRY TO CONVERT, IF NOT - THANK AND TERMINATE]

Q3. Thank you. First I would like to ask if you still have the inventory report?

YES

NO

Don't Know

Refused

[IF Q3 = NO OR DON'T KNOW OR REFUSED, SKIP TO Q6]

Q4. Are you currently using the inventory report?

YES

NO

Don't Know

Refused

[IF Q4 = NO OR DON'T KNOW, SKIP TO Q6]

Q5. How are you using the inventory report? [DO NOT READ]

a. Track equipment
b. Schedule replacements
c. Other (record answer)_____
d. Don't Know
e. Refuse

[IF Q5 ASKED, SKIP TO Q9.]

Q6. Did you find the inventory report useful at the time you received it?

YES

NO

Don't Know

Refused

Q7. Did you use the inventory report at any time since it was received in [YEAR OF INVENTORY]?

YES

NO

Don't Know

Refused

[IF Q7 = NO OR DON'T KNOW, SKIP TO Q13]

Q8. How did you use the inventory report at that time? [DO NOT READ]

a. Track equipment
b. Schedule replacements
c. Other ***(record answer)***_____
d. Don't Know
e. Refuse

Q9. Did you replace any motors as a direct result of the inventory?

(YES) ***(record number)***

(NO) _____

Don't Know

Refused

Q10. Have you received a incentive from NYSERDA for the purchase of one or more premium efficiency motors?

(YES) ***(record number)***

(NO)_____

Don't Know

Refused

[IF Q10 = YES, ASK Q11. OTHERWISE SKIP TO Q12.]

Q11. Were any of these incentives for purchases of premium efficiency motors made after you received the motor inventory?

(YES) ***(record number)***

(NO)_____

Don't Know

Refused

Q12. NYSERDA would like to conduct a site visit and meter 1 or 2 of your motors. Qualified engineers will install the metering equipment and leave it in place for 7 to 10 days. The metering equipment will then be removed and the data analyzed. This will not require any interruption in the operation of your equipment. While on site, we would also like to verify the inventory that was performed by confirming the information collected on a portion of the motors recorded. This information will assist NYSERDA in gaining a better understanding of the savings that can be achieved from the motor inventories.

In return for you cooperation, NYSERDA will provide you with a brief report on the operation of each of your metered motors at the end of the study.

Would you be willing to participate in such a study?

YES

NO

Don't Know

Refused

[IF Q12 = YES] A sample of 45 sites will be developed from the inventory participants. If your company is selected for the metering study, a representative of **Towpath Energy Consulting** will contact you to make an appointment to visit your company, install the metering equipment and conduct the brief

confirmation survey. Are you the person to be contacted? [RECORD NAME AND CONTACT INFORMATION]

[AFTER Q12, SKIP TO END.]

Q13. Why have you decided not to use the motor inventory? [DO NOT READ]

a. Already track our motors
b. Did not find it useful
c. Already replaced w/premium efficiency motors
d. Employee responsible for inventory left or moved to a different position
e. Other (record answer)__

Thank you for your time.