

# **R&D Demonstration Survey Report**

---

Final Report

Prepared for

**New York State Energy  
Research and Development Authority**

Larry Pakenas, Project Manager

Prepared by

Megdal & Associates, LLC

Groton, Massachusetts 01450-1874

Lori Lewis, Ph.D and Juliet E. Nelson, Ph.D

With Team Members:

Kathryn Parlin, West Hill Energy & Computing, Inc.

John Hutts, GDS Associates, Inc.

September 2012



## **NOTICE**

---

This report was prepared by Megdal & Associates, LLC. in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (NYSERDA) (hereafter the “Sponsor”). The opinions expressed in this report do not necessarily reflect those of the Sponsor or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, the Sponsor, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. The Sponsor, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.



# TABLE OF CONTENTS

---

<b>NOTICE</b> .....	<b>I</b>
<b>TABLE OF CONTENTS</b> .....	<b>III</b>
<b>LIST OF TABLES</b> .....	<b>V</b>
<b>LIST OF FIGURES</b> .....	<b>VI</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>ES-1</b>
ES.1 Overview of NYSERDA'S Research and Development (R&D) Demonstrations.....	ES-1
ES.2 Evaluation Goals & Methods .....	ES-1
ES.3 Demonstration Impacts, NYSERDA Influence and Net Demonstration Impacts .....	ES-3
ES.4 Replications and Sales from Demonstrations, Their Impacts & Net Impacts .....	ES-5
ES.5 Preliminary Process Evaluation Results .....	ES-9
ES.6 Recommendations for Demonstration Efforts and Future Evaluations.....	ES-10
<b>Section 1: INTRODUCTION</b> .....	<b>1-1</b>
<b>Section 2: CONTEXT AND BACKGROUND</b> .....	<b>2-1</b>
2.1 Program Description and Background .....	2-1
2.2 Purpose of the R&D Demonstration Evaluation Survey .....	2-1
2.3 Definition of Demonstration Projects and Replications .....	2-2
<b>Section 3: METHODS AND ANALYSIS</b> .....	<b>3-1</b>
3.1 Survey Design and Implementation .....	3-1
3.2 Population and Survey Completions .....	3-2
3.3 Free Ridership and Net Effects .....	3-3
<b>Section 4: OVERVIEW OF NYSERDA DEMONSTRATION PROJECTS</b> .....	<b>4-1</b>
4.1 Experience with Demonstration Projects prior to NYSERDA Project.....	4-1
4.2 Success And Challenges .....	4-2
4.3 Technology Attributes and Competing Products.....	4-3
<b>Section 5: DEMONSTRATION IMPACTS, NYSERDA INFLUENCE AND NET IMPACTS</b> .....	<b>5-1</b>
5.1 NYSERDA Project Types and Program Components.....	5-1
5.2 Types of Impacts.....	5-2
5.3 Direct Gross Impacts of Demonstration Projects .....	5-3
5.4 NYSERDA Influence on the Demonstrations .....	5-6
5.5 Net Impacts of the R&D Demonstration Projects .....	5-9
<b>Section 6: REPLICATIONS &amp; SALES FROM THE DEMONSTRATIONS</b> .....	<b>6-1</b>
6.1 Number and Types of Replications .....	6-1
6.2 Reasons for Replication .....	6-4
6.3 NYSERDA Funding, Alternative Sources of Capital and Barriers to Replications.....	6-5

<b>Section 7: REPLICATION IMPACTS, DEMONSTRATION INFLUENCE AND NET IMPACTS .....</b>	<b>7-1</b>
7.1 Replication Gross Impacts .....	7-1
7.1.1 Estimating Replication Impacts.....	7-1
7.1.2 Integrating Responses from Multiple Sources .....	7-2
7.1.3 Range of Impacts for Demonstration Projects and Replications.....	7-3
7.1.4 Gross Impacts from Replications .....	7-4
7.2 Demonstration Influence on Replications .....	7-5
7.3 Net Impacts of the Replications .....	7-5
<b>Section 8: PRELIMINARY PROCESS ANALYSIS.....</b>	<b>8-1</b>
8.1 Program Awareness and Communication .....	8-1
8.2 Satisfaction with Program Assistance .....	8-2
8.3 Potential Improvements Recommended by Survey Respondents.....	8-3
<b>Section 9: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS .....</b>	<b>9-1</b>
9.1 Long-term Demonstration Project Impacts .....	9-1
9.2 Improved Project Tracking .....	9-1
9.3 Standardization of Impacts.....	9-2
9.4 Survey Wording and Definitions.....	9-2
9.5 Overlapping Savings.....	9-2
9.6 Estimating Impacts from Vendor and Integrator Surveys .....	9-3
9.7 Summary of Recommendations for Future Evaluations.....	9-3
<b>APPENDICES</b>	
Appendix A	Advance Letter and Telephone Survey Instruments .....
Appendix B	Survey Respondent Feedback on Product Demonstration Process .....
Appendix C	Survey Respondent Feedback on Replication Process.....

## LIST OF TABLES

Table ES-1. Summary of Net Energy Impacts from Demonstration Projects by Project Type.....	ES-4
Table ES-2. Summary of Net Installed Capacity Impacts from Demonstration Projects by Project Type .....	ES-5
Table ES-3. Summary of Net Waste Treated from Demonstration Projects by Project Type .....	ES-5
Table ES-4. Reasons for Replications.....	ES-6
Table ES-5. Scope of Replications in Comparison to NYSERDA Demonstration Project .....	ES-7
Table ES-6. Estimated Net Energy Savings from Replications.....	ES-8
Table ES-7. Estimated Net Installed Capacity from Replications .....	ES-8
Table ES-8. Summary of Net Savings .....	ES-9
Table 3-1. Summary of Response Rates .....	3-2
Table 4-1. Number of Times the Technology was Demonstrated Prior to NYSERDA-Supported Project .....	4-1
Table 4-2. Scope of NYSERDA Demonstration Project in Comparison to Previous Demonstrations ....	4-2
Table 4-3. Success of the NYSERDA Demonstration Project .....	4-2
Table 4-4. Challenges in Implementing the NYSERDA Demonstration Project .....	4-3
Table 4-5. Attributes of Demonstrated Technologies.....	4-3
Table 4-6. Demonstration Projects with Competing Products.....	4-4
Table 5-1. Demonstration Survey Respondents by NYSERDA Primary Project Type.....	5-1
Table 5-2. Demonstration Survey Respondents by NYSERDA Program Component.....	5-1
Table 5-3. Demonstration Surveys by Type of Primary Impact .....	5-3
Table 5-4. Summary of Gross Energy Impacts from Demonstration Projects by Project Type.....	5-4
Table 5-5. Summary of Gross Installed Capacity Impacts from Demonstration Projects by Project Type .....	5-4
Table 5-6. Summary of Waste Reduction from Demonstration Projects by Project Type.....	5-5
Table 5-7. Overview of Projects with Estimated Savings .....	5-5
Table 5-8. NYSERDA Influence on Development of Project in NYS .....	5-6
Table 5-9. When Firms Learned About R&D Program.....	5-6
Table 5-10. Importance of NYSERDA's Financial Assistance .....	5-7
Table 5-11. Importance of NYSERDA's Technical Assistance.....	5-7
Table 5-12. Non-NYSERDA Funding and Assistance.....	5-8
Table 5-13. Outside Funding by Source.....	5-8
Table 5-14. Summary of Net Energy Impacts from Demonstration Projects by Project Type .....	5-9
Table 5-15. Summary of Net Installed Capacity Impacts from Demonstration Projects by Project Type .....	5-9
Table 5-16. Summary of Net Waste Treated from Demonstration Projects by Project Type .....	5-10
Table 6-1. Percent of Projects Replicated .....	6-2
Table 6-2. Comparison of NYSERDA-Supported Demonstrations to Replications by Application and Market.....	6-2
Table 6-3. Replications in New York State in a Similar Market and for a Similar Application by Type of Project.....	6-3
Table 6-4. Replications in New York State by Program Area.....	6-4
Table 6-5. Reasons for Replications .....	6-4
Table 6-6. Expectations for Future Replications .....	6-6
Table 6-7. Barriers to Project Replication.....	6-6
Table 7-1. Scope of Replications in Comparison to NYSERDA Demonstration Project .....	7-2
Table 7-2. Demonstration Projects and Replications with Energy, Capacity or Waste Impacts.....	7-3
Table 7-3. Estimated Energy Savings from Replications .....	7-4
Table 7-4. Estimated Installed kW Capacity from Replications.....	7-5

Table 7-5. Influence of NYSERDA Demonstration Projects on Replications in New York State .....	7-5
Table 7-6. Estimated Net Energy Savings from Replications .....	7-6
Table 7-7. Estimated Net Installed kW Capacity from Replications .....	7-7
Table 8-1. Sources of NYSERDA Program Awareness.....	8-1
Table 8-2. Respondent Satisfaction with NYSERDA Communication Effort .....	8-2
Table 8-3. Respondent Feedback on Program Characteristics .....	8-3
Table 9-1. Summary of Net Savings .....	9-1

**LIST OF FIGURES**

---

Figure 5-1. Survey Respondents by NYSERDA Program Component .....	5-2
---	-----



## **EXECUTIVE SUMMARY**

---

### **ES.1 OVERVIEW OF NYSERDA'S RESEARCH AND DEVELOPMENT (R&D) DEMONSTRATIONS**

The New York State Energy Research and Development Authority's (NYSERDA) Research & Development (R&D) Program employs a number of different strategies that are designed to encourage the adoption of energy efficient and environmentally sound technologies. While the individual R&D programs are targeted toward specific markets and technologies, the approaches used to achieve the program objectives cut across all of the markets.

A key approach used within the R&D Program is the support and strategic use of demonstration projects. Through demonstration projects, participants have an opportunity to showcase new technologies or new applications of existing technologies and develop the expertise that is critical to promote these innovative products or processes in the market. Demonstration projects cover a wide range of types of projects, including environmental protection, waste management, energy product development, and renewable energy technologies.

This broad array of projects makes reporting and estimating impacts for the NYSEDA demonstration projects complicated by a number of factors. The range of project types and types of impacts is extensive. While most energy efficiency programs are measured in terms of the energy (kWh) and demand (kW) savings achieved, the demonstration projects have impacts ranging from reducing pollutants to minimizing the waste stream to lowering production costs.

In addition, the primary objective of NYSEDA's R&D demonstration effort is to achieve replications. The demonstration projects seek to provide evidence for innovative technologies and process improvements to provide the foundation for creating replications. The largest impacts from demonstration projects are generated by the replication of these technologies and process improvements to a variety of applications. Since the goal is replications, projects can be divided into two broad categories: demonstrations that require NYSEDA's investment to achieve replications (comprising net program impacts) and demonstrations that could occur without support from NYSEDA and also result in replications (free riders).

### **ES.2 EVALUATION GOALS & METHODS**

A primary impact evaluation goal for this study was collecting information on replications. Demonstration projects are designed to try out a new technology or apply an existing technology to a new application with the goal of moving the technology closer to production or to a higher market share. The goal of this process is the replication of the demonstration, suggesting that the technology is achieving further support. Throughout the report and the surveys, the definitions of these terms are as described below.

- 'Demonstration project' is the demonstration of a new technology, process or the application of an existing technology in a commercial setting designed to showcase its value and effectiveness.
- 'Replication' is defined as an additional installation of the technology or process demonstrated under the NYSEDA-supported project. The replication could be at the same NYSEDA demonstration site and/or at another site.

A telephone interview and data gathering from project records by R&D staff were the two sources of data for this evaluation. The survey was focused on the group of R&D participants who completed demonstration projects between 2004 and 2007. The survey instrument incorporated the objectives described below:

- identify and estimate the various types of impacts observed by program participants resulting from the demonstration projects (Section ES.3)
- identify and obtain participant estimates of the replication impacts that resulted from the NYSERDA-supported demonstrations (Tables ES-1 through ES-3)
- determine the reasons for and number of replications from the NYSERDA-supported demonstrations and the associated NYSERDA attribution (Section ES.4)
- assess the factors that create barriers to demonstration projects and the replications impacts (Sections ES.3 and ES.4)
- estimate net effects for demonstration and replication projects (Tables ES-6 and ES-7)
- collect initial process evaluation information regarding participant awareness of NYSERDA programs, program communication, adequacy of assistance provided, and the efficiency of the funding process (Section ES.5)

NYSERDA's R&D program staff meticulously reviewed all R&D projects (over 1,300 projects) to identify the demonstration projects. All program data for these projects had to be gathered from files kept by the project managers for each project.<sup>1</sup> In some cases, the files could not be found and the project manager was no longer available; these projects had to be dropped from the impact evaluation.

Since one of the primary goals of the evaluation was to identify the number of replications, the most recent demonstration projects were not included (those completing in the last two years). Projects older than six years were also not included given prior evaluation work found little information could be obtained from surveys of projects this old.<sup>2</sup> The time frame and constraints meant that NYSERDA's R&D staff provided the Impact Evaluation Team with a census dataset of 84 demonstration projects. Examination of this dataset found that 21 of the 84 demonstration projects, 25%, could not have replications due to the fact that they were feasibility studies, businesses that went bankrupt or had project failure.

This evaluation sought to interview the respondent who was best able to answer questions regarding the impacts of the project and replications from the R&D demonstrations. As is consistent with the R&D program design, projects could be designed and proposed by integrators, vendors, or site owners. This approach resulted in a situation where some projects had integrators but might not have a vendor directly associated with the project and others might have no integrator but be led by a vendor or a site owner. Only one of these three players for each project was solicited for the survey and the interviewees were prioritized by their likelihood of having the most information on replications. The evaluation team created three survey instruments to ensure that the wording of the questions was appropriate for each set of respondents, *i.e.*, integrators, vendors and site owners/contractors. These three survey instruments were designed to allow the responses to be compiled and analyzed together.

In general, integrators are likely to have the greatest potential for in-depth knowledge of replications, as they brought together market actors in order to create the demonstration. Vendors were targeted as the next knowledgeable about the market and the occurrence of replications. Thus, the first attempt was to contact the integrator, followed by the vendor. The lowest priority was given to interviewing the site

---

<sup>1</sup> Development of a database of R&D metrics is under development so all future R&D projects will have common data readily available for reporting, analysis and evaluation.

<sup>2</sup> Please refer to NYSERDA's *R&D Product Development Impact Evaluation*, prepared by Megdal & Associates, LLC. Project Number 7.3 December 2010.

owners or contractors. The site owners were expected to have less interest and knowledge regarding replications.

The initial sample frame for this study was a census of 63 demonstration projects that were completed between 2004 and 2007. Some of these projects began as early as 1991, but the contracts did not end until 2004 or later. The Impact Evaluation Team provided APPRISE (NYSERDA's survey contractor) with the available contact and program data, and APPRISE conducted manual lookups for contact information where necessary to complete the contact information.

Contact information was available or obtained for 56 projects. There was an extensive effort to minimize non-response bias by contacting and completing surveys for as many of the 56 projects as possible. This process yielded completed surveys for 43 projects,<sup>3</sup> a response rate of 77%, which compares favorably to surveys conducted for program participants in the C&I market.

### **ES.3 DEMONSTRATION IMPACTS, NYSERDA INFLUENCE AND NET DEMONSTRATION IMPACTS**

An initial part of the analysis was to assess the range of types of R&D projects reflected in the completed surveys. Findings from this analysis are described below.

- 40% of the surveyed projects were product demonstrations, 37% were process improvement demonstrations and 23% were power production demonstrations.
- Energy efficiency was the most common impact type, with 33% of the projects; power production was second at 23%.
- Types of impacts beyond these two major categories covered a wide range, including environmental quality, waste management, productivity, operations and maintenance (O&M), cost improvement, product quality/reliability improvement and water quality.
- Savings were quantified for 89% of projects with energy (kWh), installed capacity (kW) or waste treatment (gallons of waste) impacts. Thirty-five percent of projects did not have savings in any of these three categories, and the savings for these projects cannot be easily aggregated.

Since R&D efforts are often trial and error, the survey included a question to ascertain whether the demonstration projects themselves were considered to be successful by the individuals who planned and implemented the projects. Survey respondents were requested to rate the success of the demonstration project supported by the NYSERDA R&D program on scale from zero to five where zero was not successful and five was very successful. Eighty-five percent of respondents rated the project at four or above on the zero to five scale, indicating that the success rate was quite high.

Respondents were also asked about the challenges they faced as they implemented the demonstration project to provide additional insight to program staff regarding the barriers to conducting demonstration projects and replications. This question elicited the following responses:

- 42% of respondents identified technological barriers
- 33% found regulatory barriers
- 21% had problems with lack of funding or the technology/application being cost prohibitive

---

<sup>3</sup> For these 43 projects, NYSERDA provided approximately \$12.3 million in incentives. This amount includes only a subset of projects and should not be used for calculating program cost effectiveness.

This information may be useful to program staff as they consider enhancements to program delivery.

The survey was also used to estimate net effects. This process involved questions designed to determine how many of the demonstration projects would have gone forward without NYSERDA’s financial or technical assistance. These projects are referred to as “free riders” of the program. The free ridership estimate was found to be 20% so that 80% of the gross impacts are expected to be due to the NYSERDA R&D effort.

Where sufficient data existed, savings were aggregated for energy (MWh/year), installed capacity (kW) and waste treatment (gallons of waste treated). In most cases, the program-reported savings for each project included either energy or installed capacity savings, but not both.

In aggregate, the demonstration projects achieved net savings of 152,656 MWh per year and 1,357 kW of installed capacity. In addition, 36,031 million gallons of waste were treated per year. Examples of other gross impacts achieved include the following:

- a transportation project was estimated to save 2,142 gallons of oil annually
- an estimated \$223,829 in energy savings (in 2006) was associated with water recycling at a paperboard recycling plant
- a wash water recycling system saved \$40,000 in labor cost each year
- a hydropower project generated 10,255 renewable energy credits
- a vegetable oil producer cut production costs from \$3.46 per gallon to \$2.49 per gallon (28% reduction)
- a carbide producer saved 4,880 boardfeet of tropical hardwood since 2005

These estimated savings are likely to underestimate the actual program savings for a couple of reasons. First, savings are based on combining program data with survey responses, and for many projects, the program data contained estimated savings for only one metric (such as energy or installed capacity or another site-specific indicator). In addition, survey responses were collected for 43 of the 56 projects completed within the time frame. Since the projects are so diverse, it was not possible to extrapolate from the survey data to the wider population.

**Table ES-1. Summary of Net Energy Impacts from Demonstration Projects by Project Type**

<b>Project Type</b>	<b>Number of Projects (n=43)</b>	<b>Projects with MWh Impact Metric</b>	<b>Projects with Estimated Savings (MWh/Year)</b>	<b>Total Gross Savings (MWh/Year)</b>	<b>Total Net Savings (MWh/Year) <sup>1</sup></b>
Power Production	10	9	9	12,116	9,711
Process Improvement	16	7	5	178,097	142,744
Product Demonstration	17	7	6	250	200
<b>Total<sup>1</sup></b>	<b>43</b>	<b>23</b>	<b>20</b>	<b>190,463</b>	<b>152,655</b>

<sup>1</sup> The net-to-gross ratio was 80.2%.

**Table ES-2. Summary of Net Installed Capacity Impacts from Demonstration Projects by Project Type**

Project Type	Number of Projects (n=43)	Projects with Installed kW Capacity Impact Metric	Projects with Estimated Installed Capacity (kW)	Total Gross Installed Capacity (kW)	Total Net Installed Capacity (kW) <sup>1</sup>
Power Production	10	4	3	117	94
Process Improvement	16	1	0	0	0
Product Demonstration	17	5	4	1,576	1,263
<b>Total</b>	<b>43</b>	<b>10</b>	<b>7</b>	<b>1,693</b>	<b>1,357</b>

<sup>1</sup> The net-to-gross ratio was 80.2%.

**Table ES-3. Summary of Net Waste Treated from Demonstration Projects by Project Type**

Project Type	Number of Projects (n=43)	Projects with Waste Treatment Impact Metric	Projects with Estimated Waste Treatment (x 1000 gallons)	Total Gross Waste Treated (x 1000 gallons)	Total Net Waste Treated (x 1000 gallons)
Power Production	10	1	1	635	509
Process Improvement	16	4	3	44,320	35,522
Product Demonstration	17	1	0	0	0
<b>Total</b>	<b>43</b>	<b>6</b>	<b>4</b>	<b>44,955</b>	<b>36,031</b>

<sup>1</sup> The net-to-gross ratio was 80.2%.

#### **ES.4 REPLICATIONS AND SALES FROM DEMONSTRATIONS, THEIR IMPACTS & NET IMPACTS**

The survey respondents reported that replications are common among the demonstration projects, as explained below.

- Of the 43 respondents, 32 (74%) reported that they have replicated the technology or process used in the NYSERDA demonstration project.
- A large majority (29) replicated the technology in a similar market or for a similar application and 10 respondents reported replicating the technology or process in a different market or application.
- Twenty-one respondents (49%) reported replicating the technology or process in New York State, suggesting that the NYSERDA program is achieving impacts both inside and outside the state.

Integrators and owners provided a range of reasons for being able to replicate the NYSERDA project in New York State. (See Table ES-4.) Available financing and the success of the demonstration combined account for almost half of the responses. Two of the respondents directly mentioned NYSERDA's involvement, with one mentioning the incentives and the other the importance of the project report.

**Table ES-4. Reasons for Replications**

Reasons for Replications	Number of Projects (n=18)	Percent of Projects	Adjusted Percent of Projects
Financing Available	4	22%	27%
Success of Demonstration	3	17%	20%
Technical Experience Gained	2	11%	13%
Willing Participants	2	11%	13%
Other	4	22%	27%
No Answer	3	17%	--
<b>Total<sup>1</sup></b>	<b>18</b>		

<sup>1</sup> These responses reflect the 18 integrator and site owner surveys with replications in New York State. This question was not included in the vendor surveys, which account for the remaining three projects with replications.

Almost half of the firms (45%) reported using NYSERDA funding to achieve project replications, with a smaller number (19%) relying on technical assistance from NYSERDA.<sup>4</sup> These responses suggest that involvement by NYSERDA was also a key component for many of the replications. The survey did not inquire about the details of NYSERDA program participation for the replications, which may be a useful line of inquiry in future evaluations. Other non-NYSERDA sources of assistance were provided by federal grants and/or subsidies, other state agencies, utility companies, private corporations, and building owners.

Impacts from replications were approximated by benchmarking the scope of the replications to the original demonstration projects. A series of questions was asked to determine whether the scope of the replication was smaller, the same, larger than, or not comparable to the original NYSERDA demonstration projects. One respondent explained that the magnitude of the savings associated with the replications were not comparable because the savings depended upon the efficiency of the equipment that was removed.<sup>5</sup>

Of the 21 projects with replications in New York State, sixteen respondents (76%) indicated how the replications compared to the original NYSERDA demonstration project. As shown in Table ES-5 below,

<sup>4</sup> Of the 18 surveys with integrators and site owners who reported replications in New York State, 16 provided information regarding NYSERDA funding and technical assistance. Seven reported using NYSERDA funding for replications and three stated that they benefited from NYSERDA's technical assistance.

<sup>5</sup> The "not comparable" response was added after the pretesting to provide an option in the case that the respondent insisted the replication was not comparable. While the survey instrument included a request for additional specification for these projects, this information was recorded for only one respondent in the final data set received from the survey implementer.

63% responded that the replication was the same or larger in scope as the original NYSERDA demonstration projects and 25% indicated that the replication(s) were not comparable. Notes from the projects that were identified as not comparable to the NYSERDA demonstration projects indicated that there were still substantial similarities in the types of savings that would be expected.

**Table ES-5. Scope of Replications in Comparison to NYSERDA Demonstration Project**

Scope of Replications	Number of Projects (n=21)	Percent of Projects	Adjusted Percent of Projects
Smaller than NYSERDA demonstration	2	10%	13%
Same as NYSERDA demonstration	7	33%	44%
Larger than NYSERDA demonstration	3	14%	19%
Not Comparable to NYSERDA demonstration	4	19%	25%
Don't Know/No Answer	5	24%	--

Vendors were seen as more likely to be knowledgeable about demonstration projects that went to commercialization and had sales, whereas integrators may have more information about individual replications. To address this issue, the survey instrument to vendors was modified to inquire about sales versus replications. However, less than one-third of the survey projects had vendors associated with them. Given that interviews with vendors were second in priority to integrators, a total of five interviews with vendors were conducted. The results of the vendor surveys show that the projects with subsequent sales had substantially larger impacts in comparison to the reported replications from the integrator surveys, suggesting that acquiring information from the vendors provides a more complete picture of the impacts associated with replications. With this in mind, impacts from replications are reported excluding and including sales reported by vendors.

As with the demonstration projects, net effects were also estimated for replications. The survey inquired about how many of the projects would have gone forward without the NYSERDA demonstration project. These replications or sales are referred to as “free riders”. The free ridership estimate for replications is 20.7%, *i.e.*, 79.3% of the gross impacts are attributable to the NYSERDA R&D assistance.

Savings were aggregated for the replications projects based on the savings from the demonstration projects and the assumption that the replications were generally of the same scope as the demonstration projects for kWh, MW and gallons of waste reduction. This approach is supported by the results of the analysis discussed earlier and shown in Table ES-4 above.

The replication projects achieved net savings of 96,527 MWh per year and 10,999 kW. Tables ES-6 and ES-7 provide detail on the number of projects by project type (power production, process improvement and product demonstration) that had replications, the number of replications excluding vendor estimates, the number with vendor sales, the gross impacts with and without vendor estimates, and the total net replication impacts. These impacts include the savings from replications that received NYSERDA funding.

**Table ES-6. Estimated Net Energy Savings from Replications**

Project Type	Number of Demonstrations on Projects with Replications & Estimated Impacts	Total Number of Replications Excluding Vendor Estimates	Total Number of Replications with Vendor Estimates	Total Gross Savings from Replications Excluding Vendor Estimates (MWh/year)	Total Gross Savings from Replications with Vendor Estimates (MWh/year)	Total Net Savings from Replications with Vendor Estimates (MWh/Year) <sup>1</sup>
Power Production	7	51	84	49,586	58,426	46,314
Process Improvement	3	19	19	58,164	58,164	46,107
Product Demonstration	2	14	44	--	5,180	4,106
<b>Total</b>	<b>12</b>	<b>84</b>	<b>147</b>	<b>107,750</b>	<b>121,770</b>	<b>96,527</b>

<sup>1</sup> The net-to-gross ratio was 79.3%.

**Table ES-7. Estimated Net Installed Capacity from Replications**

Project Type	Number of Demonstration Projects with Replications & Estimated Impacts	Total Number of Replications Excluding Vendor Estimates	Total Number of Replications with Vendor Estimates	Total Installed Capacity from Replications Excluding Vendor Estimates (kW)	Total Installed Capacity from Replications with Vendor Estimates (kW)	Total Net Installed Capacity from Replications with Vendor Estimates (kW) <sup>1</sup>
Power Production	3	31	56	51	10,051	7,967
Process Improvement	0	5	5	0	0	0
Product Demonstration	3	2	32	3,000	3,825	3,032
<b>Total</b>	<b>6</b>	<b>38</b>	<b>93</b>	<b>3,051</b>	<b>13,876</b>	<b>10,999</b>

<sup>1</sup> The net-to-gross ratio was 79.3%.

Combining the impacts of the demonstration projects with the replications produces the following results:

- demonstration projects net savings are 152,655 MWh per year, and the replications produced an additional 96,527 MWh per year (including vendor sales), for total net savings of 249,182 net annual MWh
- for kW, the impacts from the demonstration came to 1,380 net kW, and the replications accounts for 10,999 net kW including vendor sales; approximately 8,000 net kW are associated with the vendor sales from a single demonstration project



**Table ES-8. Summary of Net Savings**

Savings Type	Estimated Net Savings by Project Type			Total Estimated Net Savings
	Power Production	Process Improvement	Product Demonstration	
Program Net Savings (MWh)	9,711	142,744	200	152,655
Replication Net Savings (MWh)	46,314	46,107	4,106	96,527
<b><i>Total Net MWh Savings</i></b>	<b>56,025</b>	<b>188,851</b>	<b>4,306</b>	<b>249,182</b>
Program Net Savings (kW)	94	0	1,263	1,357
Replication Net Savings (kW)	7,967	0	3,032	10,999
<b><i>Total Net kW Savings</i></b>	<b>8,061</b>	<b>0</b>	<b>4,295</b>	<b>12,356</b>
<b><i>Total Net Waste Water Savings<sup>1</sup> (gallons)</i></b>	<b>509</b>	<b>35,522</b>	<b>0</b>	<b>36,031</b>

<sup>1</sup> No replications were completed for projects with estimated waste water treatment impacts.

Thus, the replications increased net program energy savings by about 62%. Estimates of installed capacity were increased by approximately eight times (800%), largely due to the high level of sales associated with one demonstration project.

Based on the surveys of integrators and site owners, almost half of the firms (45%) reported using NYSERDA funding to achieve project replications, with a smaller number (19%) relying on technical assistance from NYSERDA. These responses suggest that involvement by NYSERDA was a key component for many of the replications. Vendors were unable to provide this information as the survey was focused primarily on sales and the vendors would not be expected to know whether individuals were using NYSERDA funds to purchase the equipment.

## ES.5 PRELIMINARY PROCESS EVALUATION RESULTS

Overall satisfaction with NYSERDA's R&D demonstration efforts was extremely high with 98% either agreeing or strongly agreeing with the statement "I am satisfied with my participation in NYSERDA's R&D program for this demonstration project." (See Table 8-3 for the satisfaction and dissatisfaction ratings for each program component.) Nearly all of the survey respondents (95%) indicated that NYSERDA provides well qualified staff members.

The question with the lowest satisfaction ratings related to NYSERDA's efforts to increase market knowledge. Only 46% of the respondents agreed or strongly agreed with the following statement: "NYSERDA's effort to increase market knowledge greatly assists in obtaining replications from the R&D demonstration projects." Another 22% indicated that they disagreed or strongly disagreed with this statement.

While slightly less than two-thirds of respondents reported satisfaction with the adequacy of NYSERDA's funding process and turn-around time, these two categories also had among the highest dissatisfaction rates, with 24% finding the funding process inadequate and 21% agreeing that the turn-around time hampered the demonstration effort. The most common suggestions for improvement offered by survey respondents centered on these two aspects of the program.

## **ES.6 RECOMMENDATIONS FOR DEMONSTRATION EFFORTS AND FUTURE EVALUATIONS**

This initial impact evaluation provided a strong base for ongoing evaluation of the R&D demonstration projects. Recommendations for future evaluations are summarized below.

- Given that the replication impacts of the NYSERDA's R&D efforts are likely to occur over a long period, the Impact Evaluation Team recommends that NYSERDA continue to field demonstration surveys on a periodic basis, such as every two or three years.
- To avoid dropping projects from the sample frame, mechanisms should be developed to track projects that have been sold to new entities and/or are being used in new applications to allow for more complete assessment of the savings from demonstration projects. Such cases require contact information updates on a regular basis.
- The Impact Evaluation Team understands that NYSERDA has been working on a program tracking system with standardized fields and metrics and recommends that these efforts continue to allow a more comprehensive evaluation of impacts.
- Comments from survey respondents suggest that some had difficulty in understanding the terminology within the context of their demonstration projects, particularly the definition of "replication". The confusion is likely to stem from the wide range of types of projects covered by NYSERDA's demonstration initiatives. Future surveys should include a comprehensive review of the types of projects and consider expanded definitions that would be relevant to a variety of project scenarios and would make it easier for respondents to answer the questions with greater reliability. Fielding a detailed pre-test with follow up would assist in future survey design.
- Since both integrators and vendors have access to detailed information regarding distinct components of the demonstration projects, interviewing both integrators and vendors for the same projects would provide a more complete picture of the impacts of the demonstration projects; this approach may allow for separate estimates of the impacts of replications and additional sales of the technology, although care will need to be taken to assess the potential for overlap between the two sources of information.
- Prior to claiming savings for replications through the R&D demonstration efforts, the Impact Evaluation Team recommends that NYSERDA further research the potential overlap between R&D demonstration replications and projects claimed in NYSERDA R&D or other programs to ensure that savings are not double-counted.

This study lays a firm foundation for future evaluation efforts and addressing these issues should improve the reliability of the estimated impacts in the next round of evaluation.

## INTRODUCTION

---

NYSERDA's Research & Development (R&D) Program employs a number of different strategies that are designed to encourage the adoption of energy efficient and environmentally sound technologies. While the individual R&D programs are targeted toward specific markets and technologies, the approaches used to achieve the program objectives cut across all of the markets.

Demonstration projects are an example of this overarching framework of NYSERDA's R&D program. Through demonstration projects, participants have an opportunity to showcase new technologies or new applications of existing technologies and develop the expertise that is critical to promote these innovative products or processes in the market. Demonstration projects cover a wide range of types of projects, including environmental protection, waste management, energy product demonstration, and renewable energy technologies.

This study is based on a participant survey of completed demonstration projects and leverages the program information collected by NYSERDA to aid the interpretation of the survey responses. The participant survey was designed to gather additional information about the development, commercialization, and replication of new technologies promoted through NYSERDA's R&D demonstration projects. The survey was conducted on a census of all completed demonstration projects between 2004 and 2007.

Estimating impacts for the NYSERDA demonstration projects is complicated by a number of factors, as discussed briefly below.

- Demonstration projects span a wide variety of types of projects. The program defines three broad categories: power production, process improvements and product demonstration. Power production, which typically consists of renewable energy generation, is by far the most easily quantified, and the projects are somewhat similar in nature. In contrast, process improvements and product demonstration projects are more diverse and estimating energy savings for these types of projects can be complex.
- The range of types of impacts is quite extensive. While most energy efficiency programs are measured in terms of the energy (kWh) and demand (kW) savings achieved, the demonstration projects have impacts ranging from reducing pollutants to minimizing the waste stream of a process to lowering production costs.
- Direct estimates of savings were only available for some projects and some metrics. While typical energy efficiency projects report both energy and demand savings for installed measures, information gathered from project managers often contained only one metric for each project. At the time, savings metrics were not collected systematically for these projects, so data had to be extracted from reports to be used for the survey.<sup>6</sup>
- Impact metrics were sometimes provided in units that cannot be compared. One example is reporting in terms of the percentage of energy saved; in the absence of details regarding the baseline level of energy used, it is not possible to determine actual energy savings in terms that

---

<sup>6</sup> The fields containing the impact metrics were updated based on survey responses and also using other information available from NYSERDA project managers. In some cases, the impact notes field provided information that could be used to quantify additional metrics.

## *Introduction*

can be aggregated with other projects. Survey questions were designed to try to obtain more concrete information; however, most respondents were unable to provide the level of detail requested.

Consequently, our efforts to quantify overall program savings are likely to understate actual savings due to the range of types of projects and the information available.

The NYSERDA demonstration projects involve three distinct types of actors: integrators, technology vendors and site owners. The survey was designed to reach one of these actors for each project, starting with the integrator, then the vendor and lastly the owner when neither the integrator nor vendor could be reached. While this approach was designed to ensure that we would obtain the broadest information about potential replications for the demonstration projects, it also created some difficulties in combining responses that were not completely equivalent. For examples, vendors could be involved with sales of new products while most integrators and owners would more likely be involved with a smaller number of replications.

This evaluation represents the first direct evaluation of NYSERDA's demonstration projects. As such, there was no prior experience to build on and many aspects of the survey are experimental in nature. For the most part, the responses to the survey questions were substantially complete and the approach of asking direct questions yielded a great deal of information about the demonstration projects and how they are viewed by the parties who are most closely involved in them. The gross and net impacts are estimated from a combination of the reports maintained by NYSERDA and the survey responses.

The sections in the report are described briefly below.

- Context and Background section covers a brief description of the NYSERDA R&D programs and the context for conducting this evaluation.
- Methods and Analysis section describes the strategy for implementing the survey and the response rates.
- Overview of NYSERDA Demonstration Projects section covers the background part of the survey, including the questions about experience prior to participation in the NYSERDA program, successes and challenges and competing products.
- Demonstration Impacts, NYSERDA Influence and Net Impacts section describes the distribution of demonstration projects among NYSERDA's program types and provides estimates of gross and net impacts from the demonstration projects.
- Replications and Sales from the Demonstrations section describes the number and scope of replications.
- Replication Impacts, NYSERDA Influence and Net Impacts section provides estimates of gross and net impacts from the replications.
- Process Evaluation Results section discusses the preliminary process evaluation included in the survey.
- Recommendations for Future Evaluations section discusses the issues with the implementation of the evaluation and suggests approaches for future studies.

Section 2:

## **CONTEXT AND BACKGROUND**

---

This section provides a brief description of the program, a discussion of the design and purpose of the demonstration evaluation survey and a list of the conventions used throughout the rest of the report.

### **2.1 PROGRAM DESCRIPTION AND BACKGROUND**

NYSERDA's Research & Development (R&D) Program is designed to advance innovative technologies and process improvements and to bring reliable, efficient and clean energy technologies into the marketplace. The R&D programs focus heavily on developing and demonstrating technologies, and providing objective information on the performance, costs and environmental impacts of a variety of energy systems so that consumers and policy makers can make informed decisions.

NYSERDA's R&D activities are organized into seven overarching program areas: energy resources, transportation and power systems, energy and environmental markets, industry, buildings, transmission and distribution, and environmental research. Projects in each of these program areas address technologies and mechanisms that affect energy supply and meet the needs of end users. As a result, crosscutting areas such as environmental protection, waste management, energy product development, and renewable energy technologies are addressed in several programs.

NYSERDA's R&D program also seeks to highlight the advancement of these innovative technologies and process improvements by documenting and estimating project replications. Such replications would be evidenced in the application of these technologies and process improvements to a variety of markets.

### **2.2 PURPOSE OF THE R&D DEMONSTRATION EVALUATION SURVEY**

The R&D demonstration survey was designed to assess NYSERDA's progress toward program goals by gathering additional information about the development, commercialization, and replication of new technologies promoted by demonstration products funded through NYSERDA's R&D programs. The survey was focused on the group of R&D participants who completed demonstration projects between 2004 and 2007.

The survey instrument incorporated the objectives described below:

- identify and estimate the various types of impacts observed by program participants resulting from the demonstration projects (Section 5.3)
- determine the reasons for and number of replications from the NYSERDA-supported demonstrations and the associated NYSERDA attribution (See Section 6.)
- identify and obtain participant estimates of the replication impacts that resulted from the NYSERDA-supported demonstrations (See Section 7.)
- assess the factors that contribute to the success of the demonstration projects and the replications impacts (Sections 4.2 and 6.2.)
- estimate net effects for demonstration and replication projects. (See Sections 5.3 and 7.3.)
- collect initial process evaluation information regarding participant awareness of NYSERDA programs, program communication, adequacy of assistance provided, and the efficiency of the funding process (See Section 8.)

Results from NYSERDA's R&D activities are expected to unfold over a long period of time. Since this survey was conducted, NYSERADA has improved its program tracking system, which will facilitate future evaluation efforts and allow for a more comprehensive estimate of savings. Fielding this survey on a periodic basis, possibly every two to three years, would continue to allow for the tracking of the replication metrics over time and provide a more solid and reliable basis for assessing NYSERDA's R&D programs in the context of the program goals. We understand that NYSERDA has developed a metrics database and is requesting savings data for demonstration projects on an annual basis, which should assist with the tracking process.

### **2.3 DEFINITION OF DEMONSTRATION PROJECTS AND REPLICATIONS**

Demonstration projects are designed to try out a new technology or apply an existing technology to a new application with the goal of moving the technology closer to production or to a higher market share. An integral part of this process may be the replication of the demonstration, suggesting that the technology is achieving further support. In this report, these terms are defined as follows:

- 'Demonstration project' is the demonstration of a new technology, process or application of an existing technology in a commercial setting designed to showcase its value and effectiveness.
- 'Replication' is defined as an additional installation of the technology or process demonstrated under the NYSERDA-supported project. The replication could be at the same NYSERDA demonstration site and/or at another site.

These definitions were provided to survey respondents to ensure a common understanding and encourage consistent responses.

## **METHODS AND ANALYSIS**

---

This section discusses the survey design process, the sampling method and the framework for the free ridership analysis.

### **3.1 SURVEY DESIGN AND IMPLEMENTATION**

The R&D demonstration survey instrument, developed by the M&A Impact Evaluation Team with assistance from NYSERDA evaluation and R&D staff, was designed to collect information that would support the impact evaluation of NYSERDA's R&D program. The surveys were used to gather information from companies that had completed NYSERDA-funded demonstration projects between 2004 and 2007. The primary goal of the evaluation was to obtain information regarding replications of the technology demonstrated in the NYSERDA-supported demonstration project. The survey responses were used to estimate the quantifiable impacts of the demonstration project and replications in conjunction with project-specific data provided by NYSERDA's R&D program staff.

The demonstration projects could be designed and proposed by integrators, vendors, or site owners. Thus, some projects had integrators but might not have a vendor directly associated with the project. Others might have no integrator but be led by a vendor or a site owner. The evaluation team sought to interview the respondent who was best able to answer questions regarding the impacts of the projects, including replications. Three survey instruments were developed, one for integrators, one for vendors and one for site owners/contractors. For each project, only one of the three actors was solicited for the survey and the interviewees were prioritized by their likelihood of having the most information on replications. Integrators are most likely to have the greatest knowledge of replications as they bring together market actors in order to create the demonstration, so the first attempt was to contact the integrator. If an integrator was not available, the vendor was targeted as they are the next most knowledgeable about the market and the occurrence of replications. If a vendor was not available, the site owner or contractor was interviewed.

Although these surveys were fielded separately, most of the questions in the three surveys were identical or extremely similar. For the vendor survey, it was necessary to modify the questions on replications to make them more appropriate; in addition to the original questions, another series regarding sales of the technology were added.

The survey also included a series of questions about the participant's experience and overall satisfaction with the R&D program. While most of the questions were phrased positively, two questions were reversed to suggest that NYSERDA's program activities were hampering the demonstration process. This approach was taken to assess the validity of the responses. More respondents consistently stated that they disagreed with the negative statements, supporting the validity of the positive responses. For clarity, the responses to this set of questions are phrased in the positive form in Section 8 and the Executive Summary.

The survey contractor, APPRISE, pretested the integrator survey instrument. A single pretest was conducted for the vendor and site owner/contractor surveys since the instruments were almost identical. Revisions to the initial integrator survey instrument were made by APPRISE, the Impact Evaluation Team, and NYSERDA evaluation and R&D staff. Given the unique circumstances surrounding each demonstration project, APPRISE policy analysts conducted the interviews and were given the flexibility to tailor questions as necessary.

### 3.2 POPULATION AND SURVEY COMPLETIONS

NYSERDA’s R&D program staff meticulously went through all R&D projects (over 1,300 projects) to identify the demonstration projects. At the time of this study, all “program data” for these projects were in individual files kept by the project managers for each project.<sup>7</sup> Consequently, if a project was identified as a demonstration project but the files could not be found and the project manager was no longer available, the project had to be dropped from the sample frame for the impact evaluation.

Given that one of the primary goals of the evaluation was to identify replications and lead time is required to implement replications, the most recent demonstration projects were removed from the sample frame. Projects completed more than six years ago were also excluded based on prior evaluation work which found that little information could be obtained from surveys of these older projects.<sup>8</sup>

As the end result of this exhaustive review process, NYSERDA’s R&D staff provided the Impact Evaluation Team with a list of 84 demonstration projects completed between 2004 and 2007. Further review indicated that 21 of the 84 demonstration projects, 25%, could not have replications due to the fact that they were feasibility studies, businesses that were no longer in operation, or projects that were terminated.

Thus, the sample frame for this study consisted of 63 demonstration projects. Some of these projects began as early as 1991, but the contracts did not end until 2004 or later. The Impact Evaluation team decided to field the survey as a census attempt rather than drawing a sample from the 63 eligible projects.

The Impact Evaluation Team provided APPRISE (NYSERDA’s survey contractor) with a data set segregated by three contact types (integrators, vendors, and site owners/contractors). Additional research was conducted by APPRISE to determine contact information as needed, yielding a total of 56 projects that could be solicited for the survey. There was an extensive effort to minimize non-response bias and obtain as many completed surveys as possible, resulting in survey results for 43 projects.<sup>9</sup>

Table 3-1 highlights the number of completed interviews and response rates for each of the three surveys. One vendor was determined to be ineligible after discussing the project with the respondent and following up with NYSERDA staff. The overall response rate for the surveys was 77%, which compares favorably to response rates for C&I program participants in other NYSERDA evaluations.

**Table 3-1. Summary of Response Rates**

Respondent Category	Population Size	Number of Projects with Contact Information	Completed Surveys	Response Rate
Integrator	44	39	31	79%
Vendor	6	5	4	80%
Site Owner	13	12	8	67%
<b>Totals</b>	<b>63</b>	<b>56</b>	<b>43</b>	<b>77%</b>

<sup>7</sup> The R&D metrics database was implemented after this survey was conducted so all future R&D projects will have common data readily available for reporting, analysis and evaluation.

<sup>8</sup> Please refer to NYSERDA’s *R&D Product Development Impact Evaluation*, prepared by Megdal & Associates, LLC. Project Number 7.3 December 2010.

<sup>9</sup> For these 43 projects, NYSERDA provided approximately \$12.3 million in incentives. This amount includes only a subset of projects and should not be used for calculating program cost effectiveness.



### 3.3 FREE RIDERSHIP AND NET EFFECTS

An important element in impact assessment is the separation of program-induced impacts from naturally occurring impacts. For most efficiency programs, this task is accomplished by subtracting the naturally-occurring impacts (free ridership) from the measured impacts and adding the impacts of actions occurring outside NYSERDA programs but due to the programs (spillover). Free ridership and spillover are often estimated as a percentage of the program savings. While the concept of free ridership translates well from energy efficiency programs to the R&D demonstration projects, estimating spillover for the demonstration projects does not fit as neatly into the structure developed for other types of energy efficiency programs.

NYSERDA's demonstration projects are designed to produce replications. Replications are a direct outcome of the funded projects and are equivalent to spillover impacts estimated for energy efficiency programs. In this evaluation, the impacts of replications were estimated through survey questions that compared the scope of the replication to the scope of the demonstration project. Thus, the "spillover" effect was directly estimated rather than quantified as a percentage of the savings from the demonstration projects.

Estimates of free ridership for the participating demonstration projects and for the replications were developed through the telephone surveys. Measurement error was minimized by using free ridership survey questions that had been used before in previous NYSERDA evaluations. The free ridership approach in this pilot evaluation of the R&D demonstration projects was a streamlined version of the strategy used for NYSERDA's efficiency program evaluations.

The greatest uncertainty in free ridership estimates is the respondents' ability to accurately recall and think through what they would have done in a hypothetical situation in which they did not participate in the program. The major source of error in this measurement is construct validity, *i.e.*, whether the survey is able to accurately measure the underlying construct of what would have occurred in the absence of the intervention. Use of prior survey experience for specific question wording and measuring free ridership in more than one way offers increased reliability for the free ridership estimates.

The single question for direct inquiry into free ridership was as follows:

*Q27. What is the likelihood that your firm would have been able to get this demonstration project developed in New York without NYSERDA's financial or technical assistance? Please provide a lower and upper bound, and then your best estimate.*

*1 = Lower bound \_\_\_ %      2 = Upper bound \_\_\_      3 = Best estimate \_\_\_%*

Additional questions regarding NYSERDA's influence were used to test for consistency in responses with the direct query. The survey instruments are provided as Appendix B. The three influence questions for the demonstration impacts were as follows:

*Q23. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's financial assistance was in your decision to pursue this project?*

*Q24. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's technical assistance was in your decision to pursue this project?*

*Q28. Please briefly describe how the assistance you received from NYSERDA influenced your ability to get this demonstration project developed in New York.*

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to 28, the trained interviewee will fill in a “0 to 5” score indicating the extent to which the program influenced the ability to get this demonstration project developed in New York. “0” indicates that the program had no influence; “5” indicates that the program was the primary reason that this demonstration project was developed in New York.]*

*(No program influence)*

*(Program was primary influence)*

0

1

2

3

4

5

A preliminary free ridership estimate was obtained from Q27. Two influence indicators were created from the three questions (Q23, Q24, Q28), as described below:

1. the maximum score relating to the importance of the NYSERDA program offerings of financial and technical assistance (higher of Q23 and Q24)
2. the assessment of the interviewer (Q28)

The two influence indicators were then averaged. If the direct query (Q27) response was consistent with the averaged influence scores, then the direct query response was used as the free ridership estimate for that project. If the direct query response differed from the averaged influence indicators, then free ridership for the project was estimated at the median value between the two influence indicators.

A similar approach was undertaken to estimate the free ridership for replications. The preliminary free ridership estimates came from their response to Q45, which is the same as Q27 revised to refer to replications of the demonstration project. For replications, there was only one influence question (Q44). The derivation of the free ridership for the replications was similar to the free ridership algorithm for in-program impacts.

Section 4:

## **OVERVIEW OF NYSERDA DEMONSTRATION PROJECTS**

---

This section provides an initial overview of demonstration projects with completed surveys in terms of familiarity with developing demonstration projects, the types of impacts achieved from the demonstration projects and the successes and challenges as perceived by the implementers of the projects.

### **4.1 EXPERIENCE WITH DEMONSTRATION PROJECTS PRIOR TO NYSERDA PROJECT**

The initial set of questions covered familiarity with demonstrating the specific technology and a comparison of prior demonstration projects of the same technology (if any) to the NYSERDA-supported project. For the majority (63%) of respondents, the NYSERDA project was the first demonstration project for the technology, as shown in Table 4-1. Sixteen (16) of the forty-three (43) surveyed projects (37%) involved a technology that had been the subject of a demonstration project prior to the firm's participation in the NYSERDA R&D program. Out of the 14 projects with prior demonstrations and complete responses, half were demonstrated once or twice prior to the NYSERDA project and about 20% had been demonstrated many times (ten times or more).

**Table 4-1. Number of Times the Technology was Demonstrated Prior to NYSERDA-Supported Project**

<b>Number of Times the Technology was Demonstrated Prior to Firm's Participation in NYSERDA R&amp;D Program</b>	<b>Number of Projects (n=43)</b>	<b>Percent of Projects</b>
Not at all	27	63%
Technology was previously demonstrated	16	37%
1 or 2 times	7	
3 to 9	4	
10 to 20	3	
Don't know how many times previously demonstrated	2	

As seen in Table 4-2 survey respondents provided additional information regarding the differences between the NYSERDA projects and the previous demonstrations. About 16% of the projects had prior demonstrations that were essentially similar to the NYSERDA project, 25% reported the NYSERDA demonstration was larger in scale and 6% indicated the NSYERDA project was smaller.

Among the nine respondents in the "other" category who described the difference in their NYSERDA demonstration project compared to previous demonstrations, five essentially elaborated on differences that could have been classified as "different application/ type of facility." The four other responses are described below.

- One stated their NYSERDA demo project had a different objective: whereas the previous demonstration was proof-of-concept, their NYSERDA demo project "was focused on using less energy and [improving] performance."
- Another respondent stated that they "had a large and important installer training component in the NYSERDA program, not in the previous programs."

- One program participant cited NYSERDA’s assistance provided rebate incentives for the sale of their product.
- One respondent simply observed that the participants were different.

**Table 4-2. Scope of NYSERDA Demonstration Project in Comparison to Previous Demonstrations**

Response	Number of Projects <sup>1</sup> (n=16)	Percent
No difference	3	19%
Smaller in scale than previous demonstrations	1	6%
Larger in scale than previous demonstrations	4	25%
Different inputs	5	31%
Different application/type of facility	7	44%
Other	9	56%

<sup>1</sup> Multiple responses were allowed. The responses reflect the 16 projects with prior demonstration projects and percentages are calculated based on these 16 projects.

## 4.2 SUCCESS AND CHALLENGES

Since R&D efforts are often trial and error, the survey included a question to ascertain whether the demonstration projects themselves were considered successful by the individuals who planned and implemented the projects. Survey respondents were asked to rate the success of the demonstration project supported by the NYSERDA R&D program on scale from zero to five where zero was not successful and five was very successful. As shown in Table 4-3, eighty-five percent of respondents rated the project at four or above on the zero to five, indicating that the success rate was quite high. The average value for all respondents was 4.3. No respondents rated the NYSERDA project as completely unsuccessful.

**Table 4-3. Success of the NYSERDA Demonstration Project**

	Not Successful					Highly Successful	Don't Know/ Refused
	0	1	2	3	4	5	
Number of Projects	--	--	1	5	17	18	2
Percent of Projects	0%	0%	2%	12%	41%	44%	--

The survey also investigated the challenges encountered in the process of implementing the demonstration project. Technological and regulatory issues were the most common responses at 42% and 33%, respectively, as presented in Table 4-4. Other top challenges were lack of funding at 21% and lack of acceptance at 19%.

**Table 4-4. Challenges in Implementing the NYSERDA Demonstration Project**

Challenge	Number of Projects <sup>1</sup> (n=43 )	Percent
Technological issues	18	42%
Regulatory impediments	11	26%
Lack of funding or cost prohibitive	9	21%
Lack of client or public participation and acceptance	8	19%
Collaborator/vendor issues	6	14%
Lack of qualified personnel or expertise	3	7%
Lack of interest among potential end users	2	5%
Timing was not right	2	5%
Implementation issues	2	5%
Could not find an appropriate site	1	2%
Refused	1	2%

<sup>1</sup> Multiple responses were allowed. The responses reflect the 43 completed surveys and the percents are based on all 43 surveys.

### 4.3 TECHNOLOGY ATTRIBUTES AND COMPETING PRODUCTS

Respondents were asked to identify most important attributes of the demonstration project. As shown in Table 4-5, responses to the question reflect a wide range of perspectives. Multiple responses were allowed, and a number of respondents availed themselves of this option. The most commonly cited attribute was saving energy at 21%, followed by reducing the waste stream at 19%, with improving productivity and quality/reliability/safety tied at 14%.

**Table 4-5. Attributes of Demonstrated Technologies**

Benefit	Number of Projects (n=43)	Percent of Projects <sup>1</sup>
Saves energy	9	21%
Reduced waste stream	8	19%
Improved productivity	6	14%
Quality/reliability/safety	6	14%
Reduced emissions	5	12%
More efficient generation	4	9%
Renewable	3	7%
New revenue source	3	7%

<b>Benefit</b>	<b>Number of Projects (n=43)</b>	<b>Percent of Projects<sup>1</sup></b>
Lower production costs	2	5%
Remote accessibility	2	5%
Ease of installation	2	5%
Ability to make substitutions	2	5%
Real-time monitoring	2	5%

<sup>1</sup> Multiple responses were allowed. The responses reflect the 43 completed surveys and percents are based on all 43 surveys.

Table 4-6 shows the responses from integrators and vendors when asked to list the two products, currently on the market, that most directly compete with the technology that was demonstrated in the project. While many of the responses did not specifically identify products, the responses provide a general sense of how the survey respondents perceive the competition.

**Table 4-6. Demonstration Projects with Competing Products**

<b>Response</b>	<b>Number of Projects<sup>1</sup> (n = 35)</b>	<b>Percent of Projects</b>	<b>Adjusted Percent of Projects</b>
Product(s) or technology mentioned or referenced <sup>2</sup>	24	69%	83%
No product or technology competes	5	14%	17%
Don't Know/No Answer	6	17%	--

<sup>1</sup> Thirty-five represents the number of integrators and vendors surveyed; this question was not asked of the site owners.

<sup>2</sup> Some respondents mentioned one or more specific products that compete; some mentioned the existence of products with no specific names and others made a general reference to a technology.

## DEMONSTRATION IMPACTS, NYSERDA INFLUENCE AND NET IMPACTS

This section describes the respondents to the demonstration survey in the context of the NYSERDA program components, relying on data provided by NYSERDA in combination with survey responses. It also includes a discussion of the direct gross impacts of the demonstration projects and NYSERDA's influence on the development of the projects, as well as identifying the impacts of the program interventions beyond what would have happened in the absence of this program (net impacts).

### 5.1 NYSERDA PROJECT TYPES AND PROGRAM COMPONENTS

As discussed earlier, the demonstration component of the survey spans numerous R&D program components. The NYSERDA program data identified each of the demonstration projects by project type and program component. This initial analysis is based on the information provided by NYSERDA.

NYSERDA has divided the R&D program activities into three major project types. The number of survey respondents associated with each project type is given in Table 5-1. All three project types are well-represented among the survey respondents. Of the 43 respondents, 17 were product demonstrations, 16 were process improvement projects and 10 were power production (i.e., on-site electricity generation).

**Table 5-1. Demonstration Survey Respondents by NYSERDA Primary Project Type**

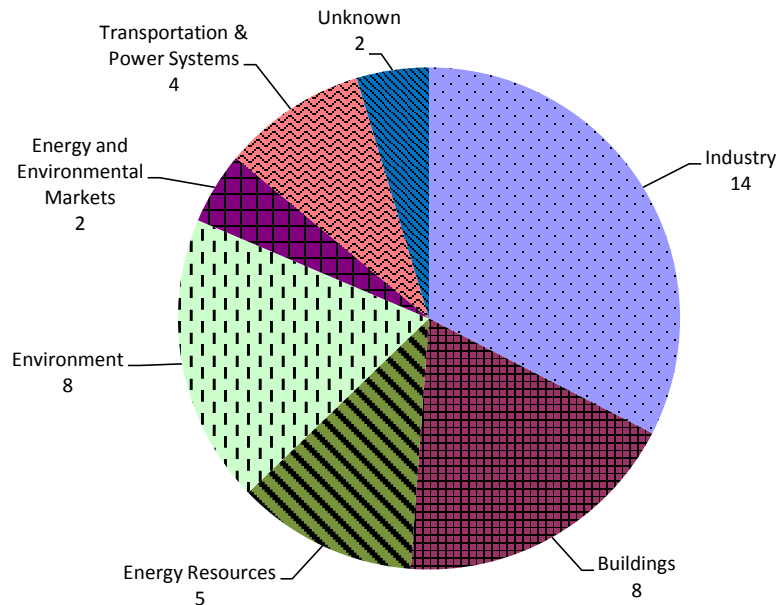
NYSERDA Project Type	Number of Projects (n=43)	Percent of Projects
Product Demonstration	17	40%
Process Improvement	16	37%
Power Production	10	23%

The demonstration surveys also cover a wide range of NYSERDA R&D program components, such as industry, environment, buildings, and transportation. (See Table 5-2 below.) Process improvements are generally related to industrial manufacturing. Product demonstration projects include industrial manufacturing, buildings and transportation.

**Table 5-2. Demonstration Survey Respondents by NYSERDA Program Component**

Program Component	Number of Projects (n=43)	Percent of Projects
Industry	14	33%
Environment	8	19%
Buildings	8	19%
Energy Resources	5	12%
Transportation & Power Systems	4	9%
Energy and Environmental Markets	2	5%
Unknown	2	5%

**Figure 5-1. Survey Respondents by NYSERDA Program Component**



## 5.2 TYPES OF IMPACTS

The survey was designed to leverage information available from NYSERDA regarding the demonstration projects to the extent possible. Survey respondents were asked to confirm the type of primary impact for the demonstration project recorded by NYSERDA. Only four respondents provided a different response than found in NYSERDA's files.<sup>10</sup>

Table 5-3 shows the distribution of primary impact types among the surveyed demonstration projects. In combination, energy efficiency and power production account for about 58% of all projects in the survey. The other 42% are distributed among the seven remaining categories, illustrating the wide range of types of projects that participant in NYSERDA's R&D programs.

---

<sup>10</sup> Two respondents did not know if the NYSERDA primary impact was correct. In these cases, the NYSERDA primary impact was assumed to be accurate.



**Table 5-3. Demonstration Surveys by Type of Primary Impact**

Type of Impact	Number of Projects (n=43)	Percent of Projects
Energy Efficiency	15	35%
Power Production	10	23%
Environmental Quality	4	9%
Waste Management	4	9%
Other	4	9%
Productivity	3	7%
O & M Cost Improvement	1	2%
Product Quality/ Reliability Improvement	1	2%
Water Quality	1	2%

### 5.3 DIRECT GROSS IMPACTS OF DEMONSTRATION PROJECTS

As is consistent with the broad range of types of projects, the impacts of the demonstration projects are measured by a variety of methods. Impacts from energy efficiency programs are measured in kWh, kW and/or MMBtu during the first year and over the life of the measure. For the R&D demonstration projects, the variety of measurements makes it difficult to quantify the program impacts in one or two simple metrics.

Interviewees were asked whether estimated magnitude of their project's impact on file prior to the survey was correct. For the most part, the respondents confirmed NYSERDA's program data.<sup>11</sup> We also attempted to acquire additional information for six project with impacts expressed as a percentage reduction in use by inquiring about the basis for the percentage and requesting a direct estimate of impacts. Three of the six projects yielded survey responses. Two of these respondents did not have additional information to offer, so the question resulted in an impact estimate for only one of the six projects.

Shown in Table 5-4, Table 5-5, and Table 5-6 are the impacts for the metrics that can be aggregated, *i.e.*, the annual MWh energy savings, total installed kW capacity and gallons of waste treated. Both primary and secondary impacts are included. The contents of each column are described below.

- Column one has the project type (power production, product demonstration or process improvement).
- Column two gives the total number of projects for the specified project type.

---

<sup>11</sup> Three respondents selected "higher" or "lower," however two of those respondents declined to provide specific information on how much higher or lower. The one project with updated information after the survey measured its impact in terms of productivity (dollars of labor savings), a category that was not used by other projects.

- Column three contains the total number of projects for the project type that has the metric listed as a primary or secondary impact.
- Column four holds the number of projects with the metric that have quantified impacts from NYSERDA's data (and updated by the survey responses as needed).
- Column five aggregates the savings for the projects with quantified impacts

For example, of the ten power production projects, nine of these projects had quantified energy (MWh) savings for total savings of 12,116 MWh per year, and three projects had quantified installed kW, adding to 117 kW. In this case, two projects had both installed kW and energy savings, and for the remaining projects, only one metric or the other was recorded in NYSERDA's database. In addition, one power production project (an anaerobic digester) also had an estimate for the treated waste. Every power production project had quantified impacts in at least one metric category.

**Table 5-4. Summary of Gross Energy Impacts from Demonstration Projects by Project Type**

Project Type	Number of Projects	Projects with MWh Impact Metric	Projects with Estimated Savings (MWh/year)	Total Savings (MWh/year)
Power Production	10	9	9	12,116
Process Improvement	16	7	5	178,097
Product Demonstration	17	7	6	250
<b>Total</b>	<b>43</b>	<b>23</b>	<b>20</b>	<b>190,463</b>

Primary impacts for another five projects were reported by the program in terms of energy efficiency; all expressed savings in terms of percent saved, and those percentages ranged from 4% to 90%. However, in the absence of detailed information about their baseline energy use, those percentages could not be extrapolated to estimate absolute impacts.

**Table 5-5. Summary of Gross Installed Capacity Impacts from Demonstration Projects by Project Type**

Project Type	Number of Projects (n=43)	Projects with Installed kW Capacity Impact Metric	Projects with Estimated Installed Capacity (kW)	Total Installed Capacity (kW)
Power Production	10	4	3	117
Process Improvement	16	1	0	0
Product Demonstration	17	5	4	1,576
<b>Total</b>	<b>43</b>	<b>10</b>	<b>7</b>	<b>1,693</b>

**Table 5-6. Summary of Waste Reduction from Demonstration Projects by Project Type**

Project Type	Number of Projects	Projects with Waste Reduction Impact Metric	Projects with Estimated Waste Treated (1000 Gallons/year)	Total Waste Treated (1000 Gallons/year)
Power Production	10	1	1	635
Process Improvement	16	4	3	44,320
Product Demonstration	17	1	0	0
<b>Total Gallons of Waste</b>	<b>43</b>	<b>6</b>	<b>4</b>	<b>44,955</b>

There are a number of potential sources of uncertainty in the savings estimates. First, the estimates are self-reported by the participants. In addition, many projects have impacts that are not directly quantified. As mentioned earlier in this section, sometimes the program savings data was provided as a percent of energy consumption with insufficient information to make an estimate of total savings. In other cases, the type of impact was identified, but impacts were not quantified or alternative metrics were provided.

Table 5-7 shows the number of projects in each category and the number of projects with quantified savings. This analysis indicates that 86% of projects (24 of 28) had quantified impacts of energy (MWh) savings, installed capacity (kW) or waste treated (gallons of waste) impacts. Thus, the total program estimated savings for MWh, kW and gallons of waste are fairly complete.

**Table 5-7. Overview of Projects with Estimated Savings**

Type of Project	Number of Projects	Projects with Energy, Capacity or Waste Impacts		
		Number of Projects	Projects with Estimated Impacts	% of Projects with Estimated Impacts
Power Production	10	10	10	100%
Process Improvement	16	9	7	78%
Product Demonstration	17	9	7	78%
<b>Total</b>	<b>43</b>	<b>28</b>	<b>24</b>	<b>86%</b>

In contrast, 35% of projects (15, or 43 minus 28, out of 43) did not have savings in any of these three categories; the savings for these projects cannot be aggregated. These fifteen projects were measured only by one or more alternative metrics; in addition, three other projects had an alternative metric in addition to one of the three standardized impacts. Some of the alternative impacts from these other eighteen projects are listed below:

- a transportation projects was estimated to save 2,142 gallons of oil annually
- an estimated \$223,829 in energy cost savings (in 2006) was associated with water recycling at a paperboard recycling plant
- a wash water recycling system saved \$40,000 in labor cost each year
- a hydropower project generated 10,255 renewable energy credits
- a vegetable oil producer got production costs from \$3.46 per gallon to \$2.49 per gallon

- a carbide producer saved 4,880 boardfeet of tropical hardwood since 2005

#### 5.4 NYSERDA INFLUENCE ON THE DEMONSTRATIONS

The survey included a number of questions to ascertain NYSERDA's influence on the demonstration projects. The results suggest that NYSERDA's efforts have been influential in ensuring that participants are able to complete these demonstration projects in New York. Seventy percent of the respondents attributed their demonstration project completions to the assistance they received from the program. Table 5-8 illustrates the scores based on the responses to the series of questions, for a scale of influence where zero indicates no program influence and five credits the program as the primary reason for demonstration project completion. The composite score over all respondents was 4.6.

**Table 5-8. NYSERDA Influence on Development of Project in NYS**

	No NYSERDA Influence						NYSERDA Primary Reason Project Developed in NYS	Don't Know/Refused
	0	1	2	3	4	5		
Number of Projects (n=43)	0	1	0	2	9	28	3	
Percent of Projects	0%	2%	0%	5%	21%	65%	7%	
Adjusted Percent of Projects	0%	3%	0%	5%	23%	70%	--	

Nearly all of the respondents (93%) were aware of the program prior to planning their projects, as shown in Table 5-9. The remaining 7% learned about the program during the planning process.

**Table 5-9. When Firms Learned About R&D Program**

Response	Number of Projects (n=43)	Percent of Projects	Adjusted Percent of Projects
Prior to Planning	39	91%	93%
During Planning	3	7%	7%
After Finalizing Plans	0	0%	0%
Don't Know / Refused	1	2%	--
<b>Total</b>	<b>43</b>		

Table 5-10 shows that the firms found NYSERDA's financial assistance to be an important component in their decisions to conduct the demonstrations. With a composite score of 4.6 and 87% of the firms rating NYSERDA's financial assistance as four or five on the zero to five scale, these responses suggest that NYSERDA's incentives provide a positive influence on the development of project demonstrations in New York.

**Table 5-10. Importance of NYSERDA's Financial Assistance**

	Not Important					Very Important	Don't Know/Refused
	0	1	2	3	4	5	
Number of Projects (n=43)	0	1	1	3	3	33	2
Percent of Projects	0%	2%	2%	7%	7%	77%	5%
<b>Adjusted Percent of Projects</b>	0%	2%	2%	7%	7%	80%	--

On the other hand, NYSERDA's technical assistance was not as critical. As seen in Table 5-11, only 14% of the firms indicated that technical assistance was crucial part of their decision to pursue the product demonstrations. The composite score for all answers was 2.2.

**Table 5-11. Importance of NYSERDA's Technical Assistance**

	Not Important					Very Important	Don't Know/Refused
	0	1	2	3	4	5	
Number of Projects (n=43)	8	5	6	14	3	2	5
Percent of Projects	19%	12%	14%	33%	7%	5%	12%
<b>Adjusted Percent of Projects</b>	21%	13%	16%	37%	8%	5%	

In addition to direct influence and importance questioning, the survey also identified whether firms had accessed funding or assistance from sources other than NYSERDA. This analysis indicates that a total of 15 projects received outside funding (5 with funding only and 10 with both funding and non-financial assistance) and 21 received non-financial assistance (11 with non-financial assistance and 10 with both funding and non-financial assistance), as shown in Table 5-12.

**Table 5-12. Non-NYSERDA Funding and Assistance**

Assistance Type	Number of Projects <sup>1</sup> (n=41)	Percent of Projects <sup>2</sup>	Adjusted Percent of Projects <sup>2</sup>
Funding Only	5	12%	13%
Non-Financial Assistance Only	11	27%	28%
Both Funding and Non-Financial Assistance	10	24%	25%
No Additional Funding/Assistance	14	34%	35%
Don't Know	1	2%	
<b>Total</b>	<b>41</b>		

<sup>1</sup> This question was not asked of two survey respondents.

<sup>2</sup> Percentages do not add to 100% due to rounding.

All of the 15 firms with outside funding were able to identify the source of the funding and ten of the respondents provide the magnitude of funding for at least one source, indicating that over \$20 million in outside funding was obtained for the demonstration projects. As seen in Table 5-13, more than two-thirds of the outside funding was obtained from the Department of Energy, while another quarter of the assistance was provided by either state or (other) federal agencies.

**Table 5-13. Outside Funding by Source**

Funding Source	Number of Projects Using Funding Source (n=43)	Number of Projects with Estimate of Amount of Funding	Total Outside Funding Reported	Percent of Total Funding
Non-profit/Charity	1	1	\$10,000	0%
Department of Energy	2	1	\$14,000,000	67%
Utility Company	5	3	\$1,470,000	7%
NYS Agency	4	4	\$2,450,000	12%
Institution	2	1	\$40,000	0%
Corporate	3	0	--	0%
Other Federal Funding	2	2	\$2,510,000	12%
Other	1	1	\$450,000	2%
<b>Total Number of Projects<sup>1</sup></b>	<b>15</b>		<b>\$20,930,000</b>	<b>100%</b>

<sup>1</sup> Multiple responses were allowed; there were a total of 20 responses corresponding to 15 unique projects. The percentage of total funding are calculated based on the total amount of funding.

Participants were also asked about non-financial assistance received for the demonstration projects. Almost half (49%) of respondents reported receiving non-financial assistance from site owners, suppliers, other firms and other entities.

## 5.5 NET IMPACTS OF THE R&D DEMONSTRATION PROJECTS

Free riders are defined as demonstrations that could occur without support from NYSERDA. The free ridership estimate across the projects (a simple average of the project free ridership estimates) is 19.85% and the net-to-gross ratio is 80.2% (1 minus the free-ridership estimate).<sup>12</sup> This result indicates a strong program-induced effect for these demonstration projects.

Net savings are calculated by multiplying gross savings by the net-to-gross factor. Table 5-14 through Table 5-16 show that demonstration projects achieved net impacts of 152,655 MWh per year saved, 1,357 kW renewable capacity installed, and 36 million gallons of reduction in treated waste per year.

**Table 5-14. Summary of Net Energy Impacts from Demonstration Projects by Project Type**

Project Type	Number of Projects (n=43)	Projects with Energy Impact Metric	Projects with Estimated Savings (MWh/year)	Total Gross Savings (MWh/year)	Total Net Savings (MWh/year) <sup>1</sup>
Power Production	10	9	9	12,116	9,711
Process Improvement	16	7	5	178,097	142,744
Product Demonstration	17	7	6	250	200
<b>Total<sup>1</sup></b>	<b>43</b>	<b>23</b>	<b>20</b>	<b>190,463</b>	<b>152,655</b>

<sup>1</sup> The net-to-gross ratio is 80.2%.

**Table 5-15. Summary of Net Installed Capacity Impacts from Demonstration Projects by Project Type**

Project Type	Number of Projects (n=43)	Projects with Installed Capacity Impact Metric	Projects with Estimated Installed Capacity (kW)	Total Gross Installed Capacity (kW)	Total Net Installed Capacity (kW) <sup>1</sup>
Power Production	10	4	3	117	94
Process Improvement	16	1	0	0	0
Product Demonstration	17	5	4	1,576	1,263
<b>Total kW</b>	<b>43</b>	<b>10</b>	<b>7</b>	<b>1,693</b>	<b>1,357</b>

<sup>1</sup> The net-to-gross ratio is 80.2%.

---

<sup>12</sup> The method used to calculate the free ridership is described in Section 3.3.

**Table 5-16. Summary of Net Waste Treated from Demonstration Projects by Project Type**

<b>Project Type</b>	<b>Number of Projects (n=43)</b>	<b>Projects with Waste Treatment Impact Metric</b>	<b>Projects with Estimated Waste Treatment</b>	<b>Total Gross Waste Treated (x 1000 Gallons/year)</b>	<b>Total Net Waste Treated (x 1000 Gallons/year)<sup>1</sup></b>
Power Production	10	1	1	635	509
Process Improvement	16	4	3	44,320	35,522
Product Demonstration	17	1	0	0	0
<b>Total Gallons of Waste</b>	<b>43</b>	<b>6</b>	<b>4</b>	<b>44,955</b>	<b>36,031</b>

<sup>1</sup>The net-to-gross ratio is 80.2%



## **REPLICATIONS & SALES FROM THE DEMONSTRATIONS**

---

A primary goal of demonstration projects is to achieve replications. This evaluation defines 'demonstration project' as the demonstration of a new technology, process or application of an existing technology in a commercial setting designed to showcase its value and effectiveness. The term 'replication' is defined as an additional installation of the technology or process demonstrated under the NYSERDA-supported project. The replication could be at the same NYSERDA demonstration site or at another site.

This survey was the first evaluation targeting the overall portfolio of R&D demonstration projects and, as such, there was no prior experience regarding the type of information that can be collected and the wording of the questions. The results of this survey indicate many respondents had difficulty applying the concept of replication to their specific NYSERDA demonstration project. In some cases, the respondent was aware that other parties had replicated the technology but did not know the specifics; consequently, they were able to estimate the total number of replications but unable to answer the more detailed questions. Thus, it is possible that the survey results as reported below may underestimate replications.

This section covers the survey questions regarding the type and number of demonstration projects that were replicated and the reasons why these replications were possible. It also includes the number of replications and subsequent sales (where applicable), as well as the use of NYSERDA and other funding sources for the replications. Finally, this section explores why some demonstration projects were not replicated.

### **6.1 NUMBER AND TYPES OF REPLICATIONS**

Respondents were asked about the percentage of their demonstration projects that are replicated at least once by the respondent or another party. As shown in Table 6-1, over 40% of the respondents stated that all of their demonstration projects are replicated at least once; 25% replicated less than half of their demonstration projects. This question was couched in general terms, *i.e.*, it was not tied to specific projects, applications or locations, and consequently the number of projects with replications does not match to the more detailed questions that follow.

**Table 6-1. Percent of Projects Replicated**

<b>% of All Projects Replicated</b>	<b>Number of Projects (n=43)</b>	<b>Percent of Projects</b>	<b>Adjusted Percent of Projects</b>
5 to 25%	4	9%	12%
26 to 50%	3	7%	9%
51 to 75%	4	9%	12%
76 to 99%	5	12%	15%
All projects are replicated	12	28%	36%
NYSERDA is only demo project	5	12%	15%
Don't Know	10	23%	--
<b>Total</b>	<b>43</b>		

Respondents were asked whether their firm or another firm replicated the NYSEERDA demonstration project in a similar market or applications. As shown in Table 6-2, 32 (74%) of the 43 respondents reported that they have replicated the technology or process used in the NYSEERDA demonstration project. Twenty-two firms replicated the technology in a similar application only and seven firms replicated the technology in both similar and different applications, for a total of 29 firms that conducted replications in a similar market. Three firms reported conducting replications in different markets only.

**Table 6-2. Comparison of NYSEERDA-Supported Demonstrations to Replications by Application and Market**

<b>Replication Market and Application</b>	<b>Number of Projects (n=43)</b>	<b>Percent of All Projects (n=43)</b>	<b>Percent of Replicated Projects (n=32)</b>
Similar Market and Application Only	22	51%	69%
Different Market or Application Only	3	7%	9%
Both Similar and Different Markets and Applications	7	16%	22%
No Replications	6	14%	
Don't Know/No Answer <sup>1</sup>	5	12%	
<b>Total</b>	<b>43</b>		

<sup>1</sup> Three respondents replied "Don't Know" or refused to answer, both questions. Two responded "No" to replications in similar markets and applications and "Don't Know" or refused to answer for different markets or applications.

Table 6-3 shows the number of projects with replications by type of project (i.e., power production, process improvement, or product demonstration). Power production projects were most likely to be replicated. Of the 29 projects with replications in a similar market or similar application, 21 projects (72%) resulted in replications in New York State).

**Table 6-3. Replications in New York State in a Similar Market and for a Similar Application by Type of Project**

Type of Project	Number of Project (n=43)	Number of Projects with NYS Replications	% of Projects Replicated	Total Number of Replications <sup>13</sup>
Power Production	10	8	80%	84
Process Improvement	16	8	50%	21
Product Demonstration	17	5	29%	46
<b>Total</b>	<b>43</b>	<b>21</b>	<b>49%</b>	<b>151</b>

NYSERDA's R&D demonstration projects covered a range of R&D program areas, as shown in Table 6-4. The columns in this table are defined as follows:

1. NYSERDA program area
2. Number of projects surveyed by program area (total of 43)
3. Number of projects with replications in New York by program area (total of 21)
4. Percent of projects that had replications by program area (column 3 divided by column 2)
5. Number of replications completed in New York State
6. Average number of replications per project for projects with replications in New York (column 5 divided by column 3)

This analysis suggests that replications are far more common in certain program areas. The highest rate of replications occurred in the following program areas: Energy Resources, Buildings, and Energy & Environmental Markets. The lowest rate of replications occurred in Transportation and Industry program areas. The number of replications per demonstration project with replications also varies widely by program area, with Energy Resources and Buildings having the highest number of replications per project at 14.0 and 12.8, followed by Energy & Environmental Markets and Environment with 8.0 and 5.8, respectively.<sup>14</sup>

---

<sup>13</sup> Information provided by vendors covered sales of the product and were not directly related to the number of replications. For example, with one lighting demonstration the reported number of replications from the interview was 17,500 fixtures. When the product sales number was substantially higher than would be expected to reflect the number of demonstration projects, we substituted the greatest number of replications (25) achieved among the other projects to obtain a conservative estimate of number of replications. The estimated energy savings for the replications reported in the following chapter are based on the per unit savings for these products.

<sup>14</sup> *Ibid.*

**Table 6-4. Replications in New York State by Program Area**

Program Area	Number of Projects (n=43)	Projects with Replications in NYS	% Projects Replicated in NYS	# of Replications	Average # of Replications per Project with Replications
Industry	14	5	36%	13	2.6
Energy & Environmental Markets	2	1	50%	8	8.0
Environment	8	5	63%	17	3.4
Energy Resources	5	4	80%	56	14.0
Buildings	8	4	50%	51	12.8
Transportation & Power Systems	4	1	25%	1	1.0
Unknown	2	1	50%	5	5.0
<b>Total</b>	<b>43</b>	<b>21</b>	<b>--</b>	<b>151</b>	<b>7.2</b>

## 6.2 REASONS FOR REPLICATION

Integrators and owners provided a range of reasons for being able to replicate the NYSERDA project in New York State. As shown in Table 6-5, available financing and the success of the demonstration combined account for almost half of the responses. Two of the respondents directly mentioned NYSERDA's involvement, with one mentioning the incentives and the other the importance of the NYSERDA report.

**Table 6-5. Reasons for Replications**

Reasons for Replications	Number of Projects (n=18)	Percent of Projects	Adjusted Percent of Projects
Financing Available	4	22%	27%
Success of Demonstration	3	17%	20%
Technical Experience Gained	2	11%	13%
Willing Participants	2	11%	13%
Other	4	22%	27%
No Answer	3	17%	--
<b>Total<sup>1</sup></b>	<b>18</b>		

<sup>1</sup> These responses reflect the 18 integrator and site owner surveys with replications in New York State. This question was not included in the vendor surveys, which account for the remaining three projects with replications.

The survey also explored how the replications differed from the NYSERDA demonstration projects. Some of the open-ended responses are given below.

- Different vendor
- Different design reactor that was cheaper to operate
- Much larger scale projects, e.g., a New York replication was about 10 times as large and a replication in Canada was about 1000 times as large
- Specific hydraulic conditions at each site
- Different kind of site, e.g., on a tidal estuary in Maine requiring all different equipment except for the turbine
- Different industry, e.g., the products that were being cleaned were different
- No NYSERDA involvement
- Different applications; e.g., water re-use, drinking water, waste water treatment, food industries

### **6.3 NYSERDA FUNDING, ALTERNATIVE SOURCES OF CAPITAL AND BARRIERS TO REPLICATIONS**

The survey results from integrators and site owners showed that almost half of the firms (45%) reported using NYSERDA funding to achieve project replications, with a smaller number (19%) relying on technical assistance from NYSERDA.<sup>15</sup> Vendors provided responses on sales of the product rather than direct information about replications and NYSERDA funding of replications, so there is no data available regarding NYSERDA funding or involvement in replications for these projects.<sup>16</sup>

These responses suggest that involvement by NYSERDA was a key component for many of the replications. The survey did not inquire about the details of NYSERDA program participation for the replications, which may be a useful line of inquiry in future evaluations. Other non-NYSERDA sources of assistance were provided by federal grants and/or subsidies, other state agencies, utility companies, private corporations, and building owners.

To understand the barriers to replications, the 22 respondents who had not yet replicated the NYSERDA demonstration project in New York State were asked about their plans for future replications. As shown in Table 6-6, half of the group that provided valid responses indicated that they were still expecting to replicate the demonstration project and the other half do not expect to be able to conduct a replication.

---

<sup>15</sup> Of the 18 surveys with integrators and site owners who reported replications in New York State, 16 provided information regarding NYSERDA funding and technical assistance. Seven reported using NYSERDA funding for replications and three stated that they benefited from NYSERDA's technical assistance. None of the vendors responded to this question.

<sup>16</sup> The vendor survey included the same questions on replications as the integrator survey and also a shorter series of questions about sales of the product. All of the vendors elected to complete the questions about sales rather than about replications of the project.

**Table 6-6. Expectations for Future Replications**

Expect Future Replications	Number of Projects <sup>1</sup> (n=22)	Percent of Projects	Adjusted Percent of Projects
Yes	8	36%	50%
No	8	36%	50%
Don't Know or No Answer	3	14%	
Not Asked	3	14%	
Total Projects without Replications in NYS	<b>22</b>	<b>100%</b>	

<sup>1</sup> This question was inadvertently skipped for three respondents without replications in NYS.

Respondents were asked to identify the barriers to obtaining or completing a project replication. Table 6-7 highlights their feedback, which suggests that lack of resources posed the greatest challenge.

**Table 6-7. Barriers to Project Replication**

Reason	Number of Projects <sup>1</sup> (n=22)	Percent of Projects	Adjusted Percent of Projects
Lack of Resources	5	23%	31%
Lack of Consumer Interest	3	14%	19%
Production Costs	2	9%	13%
Insufficient/ Unavailable Equipment	2	9%	13%
Replication not requested/needed	2	9%	13%
Administrative Issues	1	5%	6%
Location Issues	1	5%	6%
Unsuccessful Product	1	5%	6%
Replicated by others instead	1	5%	6%
Specialization incompatibilities	1	5%	6%
Not meant for commercialization	1	5%	6%
Don't Know/No Answer/Refused	6	27%	

<sup>1</sup> Multiple responses were allowed. Percents are based on the 22 projects without replications.

Although some firms noted current plans for future replication projects; other firms cited reasons why plans for future replications are currently on hold. Some of the reasons for delaying the replications are listed below:

- the current state of the economy
- need for further evidence that the current technology is progressing

- feasibility issues
- need for additional partners for future projects
- change in firm's specialization





Section 7:

## **REPLICATION IMPACTS, DEMONSTRATION INFLUENCE AND NET IMPACTS**

---

This section covers the impacts from replications, describes the extent to which the success of these replications is influenced by the original product demonstrations, and compares the demonstration project and the replication project gross impact levels. It concludes with an assessment of the influence of each demonstration project on its replications and the estimated net replication impacts.

### **7.1 REPLICATION GROSS IMPACTS**

The estimate of gross impacts has two components: first, determining the number of replications, and second, estimating the savings associated with the replications. The number of replications is discussed in the previous section and summarized in Table 6-3. Quantifying the impacts of the replications was complicated by a number of factors:

1. determining a reasonably accurate method of estimating the impacts from the replications
2. evaluating the applicability of the survey data obtained from multiple sources (integrators, owners, vendors)
3. the variety of types of impacts, as discussed in Section 5.3

Each of these issues is explored below.

#### **7.1.1 Estimating Replication Impacts**

Since it was not possible to request detailed impact information on every replication in a half hour telephone interview, savings for replications could not be estimated to the level of detail conducted for the initial NYSERDA demonstration projects. It is also more likely that interviewees would know there was a replication but might not be able to provide an exact number for its impacts. Under these circumstances, the approach was to try to benchmark the scope of the replications to the original demonstration projects. A series of questions was asked to determine whether the scope of the replication was smaller, the same, larger than, or not comparable to the original NYSERDA demonstration projects.

Of the 21 projects with replications in New York State, sixteen (76%) were able to provide an indication of how the replications compared to the original NYSERDA demonstration project. As shown in Table 7-1, 63% responded that the replication was the same or larger in scope than the original NYSERDA demonstration projects, 13% indicated that the replication was smaller in scope and 25% indicated that the replication(s) were not comparable.

**Table 7-1. Scope of Replications in Comparison to NYSERDA Demonstration Project**

Scope of Replications	Total (n=21)	Percent of Total	Adjusted Percent of Total
Smaller than NYSERDA demonstration	2	10%	13%
Same as NYSERDA demonstration	7	33%	44%
Larger than NYSERDA demonstration	3	14%	19%
Not Comparable to NYSERDA demonstration	4	19%	25%
Don't Know/No Answer	5	24%	--

While the survey included a question to try to ascertain why the impacts of the replications could not be compared to the original project, most respondents were not able to provide an answer. One respondent for a project involving an innovative lighting product noted that the savings depend on the equipment that is replaced. A representative from another firm explained that the original NYSERDA demonstration projects offered the incentives to customers to purchase photovoltaic products, and as such, there was no single 'demonstration.'

### 7.1.2 Integrating Responses from Multiple Sources

As discussed in Section 3.1, Survey Design and Implementation, one survey was conducted for each project, and the initial effort was made to contact the integrator. If the integrator could not be reached, then the vendor was contacted for projects with associated vendors<sup>17</sup>, and the site owner was the lowest priority. Each of these actors played a different role in the project and have access to details on various components of the projects. Vendors were seen as more likely to be knowledgeable about product demonstration that went to commercialization and had sales, whereas integrators may have more information about individual replications.

Consequently, the survey instrument administered to vendors was modified to inquire about sales versus replications. Thus, the available information is not completely consistent between the types of survey respondents, *i.e.*, integrators and site owners as opposed to vendors. Of the five interviews conducted with vendors, one vendor was contacted after the integrator survey to obtain additional information about replications. Four of the five vendors interviewed reported there were related sales that followed the program demonstration project.

Demonstrations that lead to commercialization and significant sales can have very large impacts relating to the NYSERDA-supported demonstration project. An example is one lighting demonstration reported by the vendor to have sales in New York State of 17,500 fixtures. Since the information in NYSERDA's program data lists a range of per fixture savings for this project, it is possible to estimate total savings. There was also sufficient information for two of the three other projects with sales data to estimate impacts. The impacts from the replications are substantially larger than for the demonstration project.

---

<sup>17</sup> Less than one-third of the survey projects had vendors associated with them.

### 7.1.3 Range of Impacts for Demonstration Projects and Replications

As noted earlier, the impacts from the original NYSERDA projects were highly varied and difficult to aggregate, and these same issues apply to the estimation of gross impacts from replications. Impacts from the demonstration projects were estimated for electric energy (MWh) savings, installed capacity (kW) and gallons of waste treated, as presented in Section 5.3, Direct Gross Impacts of Demonstration Projects. The strategy used for demonstration projects was also used for the replications.

Table 7-2 shows by projects types, estimated savings and replications. The columns in the table are described below:

1. project type
2. number of surveyed NYSERDA demonstration projects with energy, capacity or waste impacts
3. number of surveyed NYSERDA demonstration projects with energy, capacity or waste impacts that had replications
4. number of replications for the projects listed in Column three
5. number of surveyed NYSERDA demonstration projects with energy, capacity or waste impacts and replications
6. number of replications with estimated impacts associated with the NYSERDA demonstration projects listed in Column four

This analysis suggests that savings can be quantified for most of the projects with replications, as discussed below.

- Fifteen (15) projects had estimated impacts in the NYSERDA program data.<sup>18</sup>
- One hundred twenty-eight (128) replications, or 85%, of the 151 replications of demonstration projects with energy, capacity or waste impacts, had savings that could be quantified.

**Table 7-2. Demonstration Projects and Replications with Energy, Capacity or Waste Impacts**

<b>Project Type (1)</b>	<b>Number of Demonstration Projects (2)</b>	<b>Number of Demonstration Projects with Replications (3)</b>	<b>Number of Replications (4)</b>	<b>Number of Projects with Estimated Savings and Replications (5)</b>	<b>Number of Replications for Projects with Estimated Savings (6)</b>
Power Production	10	8	84	8	84
Process Improvement	8	8	21	4	12
Product Demonstration	10	5	46	3	32
<b>Total</b>	<b>28</b>	<b>21</b>	<b>151</b>	<b>15</b>	<b>128</b>

Note: See preceding text (Section 7.1.3) for column title descriptions.

<sup>18</sup> Nineteen (19) of the 21 NYSERDA demonstration projects with replications had potential energy, capacity or waste impacts.

### 7.1.4 Gross Impacts from Replications

Savings for the replications were based on the assumption that replications were, on average, of a similar scope to the demonstration projects. This assumption is supported by the analysis discussed in Section 7.1.1, specifically the following findings:

- 63% of the respondents stated that the impacts from the replication were either the same or larger than the original
- only 13% indicated that replications were smaller in scope
- projects where the respondent stated the replications are not comparable to the NYSERDA project, the explanations provided by the respondent suggest that there are still likely to be substantial savings of the primary and secondary impact types identified for the NYSERDA demonstration project

Impacts were estimated under two scenarios. The first one excludes estimates of replication impacts from vendors' sales, and the second includes these estimated impacts. Both scenarios are presented because the results of the vendor surveys show that the projects with subsequent sales had substantially larger impacts in comparison to the reported replications from the integrator surveys. These impacts include the savings from replications that received NYSERDA funding.

This analysis indicates that the impacts from the replications are substantial at 107,750 and 121,770 annual MWh of energy savings with and without the vendor sales, respectively. For installed kW capacity, including the vendor sales increased the replication impacts by more than four fold. These impacts are mostly associated with one demonstration project involving the installation of 100 kW of residential photovoltaic systems, in which the vendor reported subsequent sales of 10,000 kW in New York State, or 100 times the size of the demonstration project.<sup>19</sup>

**Table 7-3. Estimated Energy Savings from Replications**

Project Type	Number of NYSERDA Demonstration Projects with Replications	Number of Demonstration Projects with Replications & Estimated Impacts	Number of Replications Excluding Vendor Estimates	Number of Replications with Vendor Estimates	Savings from Replications Excluding Vendor Estimates (MWh/year)	Savings from Replications with Vendor Estimates (MWh/year)
Power Production	8	7	51	84	49,586	58,426
Process Improvement	6	3	19	19	58,164	58,164
Product Demonstration	4	2	14	44	--	5,180
<b>Total</b>	<b>18</b>	<b>12</b>	<b>84</b>	<b>147</b>	<b>107,750</b>	<b>121,770</b>

<sup>19</sup> This project was part of the SBC Residential Photovoltaic Deployment Initiative and involved rebates for the installation of PV systems in many residential homes.

**Table 7-4. Estimated Installed kW Capacity from Replications**

Project Type	Number of NYSERDA Demonstration Projects with Replications	Number of Demonstrations on Projects with Replications & Estimated Impacts	Number of Replications Excluding Vendor Estimates	Number of Replications with Vendor Estimates	Installed Capacity from Replications Excluding Vendor Estimates (kW)	Installed Capacity from Replications with Vendor Estimates (kW)
Power Production	4	3	31	56	51	10,051
Process Improvement	1	0	5	5	0	0
Product Demonstration	3	3	2	32	3,000	3,825
<b>Total</b>	<b>8</b>	<b>6</b>	<b>38</b>	<b>93</b>	<b>3,051</b>	<b>13,876</b>

## 7.2 DEMONSTRATION INFLUENCE ON REPLICATIONS

The telephone surveys also incorporated a series of questions to assess the influence of the NYSERDA-supported demonstrations on a firm’s ability to conduct the replication projects in New York State. The twenty-one respondents with replications were asked to describe how NYSERDA’s assistance with the demonstration project influenced their ability to conduct the replications in New York State. The interviewer then assessed the level of NYSERDA influence on a zero to five scale. Almost three-quarter of the respondents (74%) to this question were scored at four or five, and the composite score was 4.1. Only one respondent scored NYSERDA’s influence as less than 50%. From this set of questions, it is apparent that the experience with the NYSERDA demonstration project had a strong impact on a firm’s ability to conduct replications.

**Table 7-5. Influence of NYSERDA Demonstration Projects on Replications in New York State**

	Not Important					Very Important	
Score	0	1	2	3	4	5	Don’t Know/ No Answer
Number of Projects (n=21)	0	0	1	4	6	8	2
Percent of Projects	0%	0%	5%	19%	29%	38%	10%
<b>Adjusted Percent of Projects</b>	0%	0%	5%	21%	32%	42%	--

## 7.3 NET IMPACTS OF THE REPLICATIONS

Estimating the net impact of replications, as opposed to the gross impact, involves reducing the gross impact by the amount attributable to free riders. In this context, free ridership is represented by replications that would have occurred without the NYSERDA-supported demonstration project. The free

ridership estimate across the projects (a simple average of the project free ridership estimates) for replications is 20.7%, resulting in a net-to-gross ratio of 79.3%.<sup>20</sup> This outcome indicates the strong effect of the demonstration projects on the replications. Applying this percentage to the gross savings tables provides the net savings estimates as shown in Table 7-6 and Table 7-7.<sup>21</sup> The replication projects achieved net impacts of 96,527 MWh per year saved and 10,999 kW of installed capacity.

**Table 7-6. Estimated Net Energy Savings from Replications**

<b>Project Type</b>	<b>Number of Demonstration Projects with Replications and Estimated Impacts</b>	<b>Number of Replications Excluding Vendor Estimates</b>	<b>Number of Replications with Vendor Estimates</b>	<b>Gross Savings from Replications Excluding Vendor Estimates (MWh/year)</b>	<b>Gross Savings from Replications with Vendor Estimates (MWh/year)</b>	<b>Net Savings from Replications with Vendor Estimates (MWh/year)<sup>1</sup></b>
Power Production	7	51	84	49,586	58,426	46,314
Process Improvement	3	19	19	58,164	58,164	46,107
Product Demonstration	2	14	44	--	5,180	4,106
<b>Total</b>	<b>12</b>	<b>84</b>	<b>147</b>	<b>107,750</b>	<b>121,770</b>	<b>96,527</b>

<sup>1</sup> The net-to-gross ratio was 79.3%.

<sup>20</sup> The net-to-gross ratio is 1 minus the free ridership.

<sup>21</sup> The method used to calculate the free ridership is described in Section 3.3.

**Table 7-7. Estimated Net Installed kW Capacity from Replications**

<b>Project Type</b>	<b>Number of Demonstration Projects with Replications &amp; Estimated Impacts</b>	<b>Number of Replications Excluding Vendor Estimates</b>	<b>Number of Replications with Vendor Estimates</b>	<b>Installed Capacity from Replications Excluding Vendor Estimates (kW)</b>	<b>Installed Capacity from Replications with Vendor Estimates (kW)</b>	<b>Net Installed Capacity from Replications with Vendor Estimates (kW)<sup>1</sup></b>
Power Production	3	31	56	51	10,051	7,967
Process Improvement	0	5	5	0	0	0
Product Demonstration	3	2	32	3,000	3,825	3,032
<b>Total</b>	<b>6</b>	<b>38</b>	<b>93</b>	<b>3,051</b>	<b>13,876</b>	<b>10,999</b>

<sup>1</sup> The net-to-gross ratio was 79.3%.





Section 8:

## **PRELIMINARY PROCESS ANALYSIS**

---

The Impact Evaluation Team captured valuable insight into NYSERDA’s R&D program processes. This section examines various key program indicators such as program awareness, communication, funding, and overall program satisfaction. Satisfaction levels were assessed both directly and indirectly. Indirect measures of satisfaction are characterized by turnaround time, staff qualification, encouragement of knowledge expansion, and project replication assistance.

### **8.1 PROGRAM AWARENESS AND COMMUNICATION**

The first question in the process evaluation section related to how the respondent learned about NYSERDA’s program offerings. For nearly a third (28%) of the responses, prior industry experience was cited as the most common source of familiarity with the NYSERDA program. This category includes NYSERDA presentations to industry groups and associations, NYSERDA involvement in prior efforts such as the Lighting Research Center, and other market actor involvement with NYSERDA. Word of mouth, specifically from other colleagues, accounted for nearly a quarter (23%) of the responses. Table 8-1 highlights the various sources of program awareness.

**Table 8-1. Sources of NYSERDA Program Awareness**

<b>Source of Program Awareness</b>	<b>Percent of Projects</b>
Prior Program Awareness	28%
Colleague	23%
Advertising	14%
Friend	12%
Prior Program Participation	7%
Participation in Other Program	5%
Program Representative	5%
Other NYSERDA Demonstration	5%
Don’t Know/Refused	2%

Note: One firm provided two responses

Respondents were also asked a series of questions associated with their experience and satisfaction with the NYSERDA R&D program. As shown in Table 8-2, integrators, owners and vendors all indicated a high degree of satisfaction with NYSERDA’s communication throughout the program process.

**Table 8-2. Respondent Satisfaction with NYSERDA Communication Effort**

Satisfied with Communication Effort	Number of Projects (n=43)	Percent of Projects	Adjusted Percent of Projects
Disagrees	0	0%	0%
Neither agree nor disagree	5	12%	12%
Agree	37	86%	88%
Don't know	1	2%	

Note: Two satisfaction questions were reversed to test the validity of the positive responses, and these have been re-worded as positive in the table to improve clarity for the reader.

## 8.2 SATISFACTION WITH PROGRAM ASSISTANCE

The survey included a series of questions designed to assess satisfaction with NYSERDA's program assistance. Respondents were requested to agree or disagree with a series of statements relating to specific program characteristics as described below:

- communicating with participants
- responding to requests for assistance (turn-around time)
- providing highly qualified staff
- assisting with project funding
- supporting projects through knowledge of the demonstration process
- providing assistance by promoting the knowledge gained from the demonstration projects
- promoting replications through efforts to increase knowledge of the market

The final question asked for an overall rating of satisfaction with the program.

Overall satisfaction with NYSERDA's R&D demonstration efforts was extremely high with 98% either agreeing or strongly agreeing. See Table 8-3 for the satisfaction and dissatisfaction ratings for each program component.<sup>22</sup> Nearly all of the firms (95%) agreed or strongly agreed with the statement that NYSERDA's staff is well qualified.

The lowest satisfaction rating related to NYSERDA's efforts to use the knowledge gained from demonstration projects to encourage replications. Only 46% of the respondents agreed or strongly agreed with the following statement: "NYSERDA's effort to increase market knowledge greatly assists in obtaining replications from the R&D demonstration projects." Furthermore, 22% of the respondents disagreed or strongly disagreed with the statement.

The highest dissatisfaction ratings were the adequacy of NYSERDA's funding process (24%), market knowledge to assist with replications (22%) and its turn-around time for assistance (21%). However,

---

<sup>22</sup> Two satisfaction questions were reversed to test the validity of the positive responses, and these have been re-worded as positive in the table to improve clarity for the reader.

most of the remaining respondents (representing almost two-thirds of all completed surveys) found the adequacy of the funding process and the turn-around time to be satisfactory. The most common suggestions for improvement made by the respondents centered on these two aspects of the program.

**Table 8-3. Respondent Feedback on Program Characteristics**

Program Characteristic	Agree or Strongly Agree		Disagree or Strongly Disagree
Overall Program Satisfaction	98%		2%
NYSERDA staff working with this program are well qualified	95%		0%
NYSERDA provides information that is highly supportive of the demonstration process	79%		5%
Turn-around time for assistance from NYSERDA does not significantly hamper demonstration efforts	64%		21%
The process of obtaining funding from NYSERDA is adequate	64%		24%
The assistance that NYSERDA provides to encourage knowledge gained from the demonstration is adequate	62%		14%
NYSERDA's effort to increase market knowledge greatly assists in obtaining replications	46%		22%

### 8.3 POTENTIAL IMPROVEMENTS RECOMMENDED BY SURVEY RESPONDENTS

The 43 telephone survey respondents were also asked to provide feedback regarding ways in which NYSERDA could improve their R&D program. This question was asked separately for both demonstration program and replications.

Thirty-one (31) respondents provided comments or suggestions regarding the demonstration projects.<sup>23</sup> Firms commonly cited the need to improve turn-around time on administrative processes as the area that needed greatest improvement during the initial demonstration phase. Some of the responses are listed below:

- streamline and improve criteria for application, selection, and funding processes (5 respondents)
- provide or facilitate development of industry and multi-actor partnerships (4 respondents)
- improve turn-around time (proposals and funding approvals) (4 respondents)
- increase outreach efforts and use of focus groups (3 respondents)
- publicize project or program outcomes (3 respondents)
- greater stakeholder engagement in projects (3 respondents)

<sup>23</sup> Six firms provided multiple recommendations.

### *Preliminary Process Analysis*

- minimize bureaucracy in project selection process (2 respondents)
- increase amount of funding and expand eligibility criteria for funding (2 respondents)
- provide more technical assistance for smaller companies (2 respondents)
- act more as a clearinghouse (2 respondents)
- provide more follow up assistance and encourage other projects to utilize a lessons-learned approach (1 respondent)
- solicit more input from smaller companies (1 respondent)
- have regular reviews of industries and spearhead promising technologies (1 respondent)

Twenty-seven (27) respondents provided comments or suggestions regarding the replications.<sup>24</sup> Respondents with replications are most concerned with the need for greater and more timely access to published project reports. This issue was cited nine times, suggesting that firms seek information that will help them improve their demonstration projects. The following list categorizes respondent-suggested improvements for the replication process:

- provide more accessible, well publicized, and timely project reports (9 respondents)
- provide or facilitate development of local and non-local industry and multi-actor partnerships and exchange of information (3 respondents)
- become more involved with industry groups and associations (2 respondents)
- simplify the application and contract process (2 respondents)
- more assistance with bureaucratic or administrative issues (2 respondents)
- more marketing and site identification assistance (2 respondents)
- more frequent RFP's (2 respondents)
- improve NYSERDA's awareness of the industries in New York (1 respondent)
- expand outreach to industries (1 respondent)
- improve turn-around time (1 respondent)
- provide workshops, greater access to product demonstrations, and lessons-learned opportunities for installers (1 respondent)
- greater involvement in each stage of the development process to identify additional project needs (1 respondent)
- select top performing projects and incentivize similar projects, using process (1 respondent)

---

<sup>24</sup> Four responses provided multiple responses.

## FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This evaluation investigated the impacts of the demonstration component of NYSERDA's R&D programs through surveys. While the data collected provide valuable insight into the firms participating in the program and their decisions to conduct these demonstrations and replications, it also highlights the challenges in fielding a survey in this market and obtaining accurate information. This survey effort has been invaluable in identifying program challenges and informing future evaluation improvements. Total net savings from program activities are summarized in the table below.

**Table 9-1. Summary of Net Savings**

Savings Type	Estimated Net Savings by Project Type			Total Estimated Net Savings
	Power Production	Process Improvement	Product Demonstration	
Program Net Savings (MWh)	9,711	142,744	200	152,655
Replication Net Savings (MWh)	46,314	46,107	4,106	96,527
<b>Total Net MWh Savings</b>	<b>56,025</b>	<b>188,851</b>	<b>4,306</b>	<b>249,182</b>
Program Net Savings (kW)	94	0	1,263	1,357
Replication Net Savings (kW)	7,967	0	3,032	10,999
<b>Total Net kW Savings</b>	<b>8,061</b>	<b>0</b>	<b>4,295</b>	<b>12,356</b>
<b>Total Net Waste Water Savings<sup>1</sup> (Gallons)</b>	<b>509</b>	<b>35,522</b>	<b>0</b>	<b>36,031</b>

<sup>1</sup> No replications were conducted for projects with estimated waste water treatment impacts.

The issues raised by this evaluation are briefly described, followed by a summary of the recommendations.

### 9.1 LONG-TERM DEMONSTRATION PROJECT IMPACTS

The main purpose of NYSERDA's R&D program is to promote replications and there can be a substantial time lag between the demonstration project and acceptance of the technology. It is entirely possible that even older projects will continue to generate benefits with new replications and variations on the technology several years into the future. Consequently, evaluation should be considered as a long-term endeavor with the potential for repeated contacts of older projects to assess the changes in savings.

Recommendation: the Impact Evaluation Team recommends that NYSERDA continue to field demonstration surveys on a periodic basis, such as every two or three years.

### 9.2 IMPROVED PROJECT TRACKING

R&D efforts often require a long lead time to achieve results, which complicates the project tracking. Technology-intensive firms often reinvent themselves, are sold, or go out of business. Similarly, product lines are sold to competitors, are dropped, or are used in different applications. Products or technologies used for innovative processes become obsolete. Companies also experience turnover through which sources of project information and contact information are lost. All of these events make project tracking a challenge and limits the availability of knowledgeable informants. Furthermore, in the previous impact evaluation of NYSERDA's R&D Product Development initiative, evaluators found that limited

information could be obtained from surveys of projects that are older than five years, suggesting that there are practical restrictions on the time frame for conducting surveys.<sup>25</sup>

During the preparation for this evaluation, products or systems were found to have been sold to a different company, to be no longer used, or to have evolved to new applications. In many cases, it was not possible to identify the new applications or firms with the technology due to the time lag between the demonstration and the evaluation; these projects were removed from the sample frame. Consequently, it is likely that the impacts reported in this evaluation are understated.<sup>26</sup>

Recommendation: Mechanisms should be developed to track projects that have been sold to new entities or are being used in new applications to allow for more complete assessment of the savings from demonstration projects. Such cases require contact information updates on a regular basis. This process may be combined with the current efforts to obtain regular updates for the metrics database. With regular contact, it may be possible to continue to track projects that are more than five years old.

### **9.3 STANDARDIZATION OF IMPACTS**

Evaluated impacts were based on program records and in many cases the metrics were incomplete. For example, many projects had only energy savings recorded when typically one would expect both energy and peak demand savings from the demonstrated technology. Due to the diversity of projects, one would expect that it is not possible to develop standardized metrics for all projects. However, having consistent definitions for some basic metrics would enhance future evaluation efforts.

Recommendation: The Impact Evaluation Team understands that NYSERDA has been working on a program tracking system with standardized fields and metrics and recommends that these efforts continue.

### **9.4 SURVEY WORDING AND DEFINITIONS**

While the surveys were able to ascertain whether a product was still in production, there was some concern over the definitions of a product demonstration and replication. Some respondents struggled to fit their concept of their work into the definitions of these terms provided in the survey, resulting in incomplete survey data for some questions. For example, one respondent indicated that the impacts of the replication were not comparable to the original demonstration project due to differences in the conditions at the site. These issues largely arose due to the wide variety of types of projects grouped under the "demonstration project" umbrella.

Recommendation: Prior to conducting the next survey, a comprehensive review of the types of projects covered should be conducted and more consideration given to expanded definitions, especially of the term 'replication', that would be relevant to a variety of project scenarios, making it easier for respondents to answer the questions with greater reliability. Fielding a detailed pre-test with follow up would assist in future survey design.

### **9.5 OVERLAPPING SAVINGS**

Based on the surveys of integrators and site owners, almost half of the firms (45%) reported using NYSERDA funding to achieve project replications, with a smaller number (19%) relying on technical

---

<sup>25</sup> Please refer to NYSERDA's *R&D Product Development Impact Evaluation*, prepared by Megdal & Associates, LLC. Project Number 7.3 December 2010.

<sup>26</sup> The Impact Evaluation Team understands that NYSERDA has constructed a metrics database and is currently requested annual updates from participants. This process may create synergies with the tracking process.

assistance from NYSERDA. These responses suggest that involvement by NYSERDA was a key component for many of the replications. The survey did not inquire about the details of NYSERDA program participation for the replications, thus it is not possible to assess the overlap between the R&D demonstration projects and savings claimed through other NYSERDA program efforts. The lack of detailed information about the replications limits the feasibility of conducting an overlap study to assess whether savings may be claimed for some replications.

Recommendation: Prior to claiming savings for replications through the R&D demonstration efforts, the Impact Evaluation Team recommends that NYSERDA further research this issue to ensure that savings are not double-counted.

## **9.6 ESTIMATING IMPACTS FROM VENDOR AND INTEGRATOR SURVEYS**

The results of the vendor surveys show that the projects with subsequent sales had substantially larger impacts in comparison to the reported replications from the integrator surveys, suggesting that acquiring information from the vendors provides a more detailed assessment of the sales associated with replications. While interviewing vendors where possible is useful to assess the impacts of the demonstration projects in the larger market, it is also clear that vendors do not have complete information about all aspects of the project. In addition, only about a third of the projects in the sample frame had vendors associated with them, which limits the potential for pursuing this approach in future evaluations.

Recommendation: If evaluation funds are sufficient, interviewing both integrators and vendors for the same projects would provide a more complete picture of the impacts of the demonstration projects. This approach may allow for separate estimates of the impacts of replications and additional sales of the technology, although care will need to be taken to assess the potential for overlap between the two sources of information.

## **9.7 SUMMARY OF RECOMMENDATIONS FOR FUTURE EVALUATIONS**

This initial impact evaluation provided a strong base for ongoing evaluation of the R&D demonstration projects. Recommendations made above are summarized here for convenience.

- Given that the replication impacts of the NYSERDA's R&D efforts are likely to occur over a long period, the Impact Evaluation Team recommends that NYSERDA continue to field demonstration surveys on a periodic basis, such as every two or three years.
- To avoid dropping projects from the sample frame, mechanisms should be developed to track projects that have been sold to new entities and/or are being used in new applications to allow for more complete assessment of the savings from demonstration projects. Such cases require contact information updates on a regular basis.
- The Impact Evaluation Team understands that NYSERDA has been working on a program tracking system with standardized fields and metrics and recommends that these efforts continue to allow a more comprehensive evaluation of impacts.
- Based on the comments from survey respondents, future surveys should include expanded definitions, especially of the term 'replication', that would be relevant to a variety of project scenarios and would make it easier for respondents to answer the questions with greater reliability. Possibly fielding a detailed pre-test with follow up would assist in future survey design.
- Prior to claiming savings for replications through the R&D demonstration efforts, the Impact Evaluation Team recommends that NYSERDA further research the potential overlap between

*Findings, Conclusions, and Recommendations*

R&D demonstration replications and projects claimed in other NYSERDA programs to ensure that savings are not double-counted.

- Since both integrators and vendors have access to detailed information regarding distinct components of the demonstration projects, interviewing both integrators and vendors for the same projects would provide a more complete picture of the impacts of the demonstration projects. This approach may allow for separate estimates of the impacts of replications and additional sales of the technology, although care will need to be taken to assess the potential for overlap between the two sources of information.

This study lays firm foundation for future evaluation efforts and addressing these issues should improve the reliability of the estimated impacts in the next evaluation.



# **R&D Demonstration Survey Report**

## **Appendices**

---

Appendix A

**ADVANCE LETTER AND TELEPHONE SURVEY INSTRUMENTS**

PRINTED ON NYSERDA LETTERHEAD

[DATE]

[NAME & FIRM ADDRESS]

Dear [NAME]:

The New York State Energy Research and Development Authority (NYSERDA) has retained Megdal & Associates and APPRISE, Inc. to conduct an evaluation of projects NYSEDA has funded for the purpose of demonstrating specific technologies or applications. This important study will enable NYSEDA to better assess program accomplishments and improve programs that serve New York.

We wish to collect data about [NAME OF THE PROJECT] and the effect of NYSEDA funding on the ability to demonstrate the effectiveness of the [PRODUCT, PROCESS, OR GENERATION TYPE] in the context of this project as well as potential applications beyond this particular site.

We would like to schedule an interview with you. The interview will take about 20 to 40 minutes to complete, and someone from APPRISE will call you to conduct the interview or to schedule a time that is most convenient for you for the interview.

Megdal & Associates and APPRISE, Inc. are independent researchers. The results of the interviews will not be reported in any way that would reveal the identity of individuals or organizations.

Someone will be calling you in the next week or two to conduct this interview. Your participation is important to our evaluation effort. We know your time is valuable, and we sincerely appreciate your efforts to help us. If you have questions about the survey, please call Dr. Lori Megdal of Megdal & Associates at (978) 461-3978. If you would prefer to speak with a NYSEDA representative regarding this study, feel free to contact me at (518) 862-1090, extension 3291.

Sincerely,

*Signed originals mailed*

Tara Rainstrom  
Project Coordinator  
NYSEDA  
17 Columbia Circle  
Albany, NY 12203  
tlr@nyserda.org

**NYSERDA**  
**Demonstration Project Survey**

**INTEGRATORS**

Interview Date: [mm/dd/yyyy]

Interviewer name:

Interviewer phone:

Contract Number:

Project Description:

Best Contact:

NYSERDA Project Manager

Integrator Name:

Title:

Phone:

Email:

Project Role:

Vendor Name:

Title:

Phone:

Email:

Project Role:

Owner Name:

Title:

Phone:

Email:

Project Role:

Holder of Contract: Firm:

Program Area: [Buildings, Transportation, Energy Resources, etc.]

Project Type: [PRODUCT, PROCESS OR POWER PRODUCTION]

NYSERDA expenditure (\$) (Encumbered \$ for this project.)

Earliest contract signed date

Latest contract closed date

Impact locations

THE APPRISE POLICY ANALYST CONDUCTING THE INTERVIEW WILL WORK THROUGH THE INSTRUMENT USING THE SPECIFIC DATASET INPUT AND PROJECT DESCRIPTION TO REFINE QUESTION WORDING AS NECESSARY TO PROVIDE MORE CORRECT AND CLEAR LANGUAGE TO OBTAIN THE INFORMATION DESIRED FROM EACH QUESTION. GIVEN THE INFORMATION IN THE DATASET, THE SURVEY INSTRUMENT FOR THAT INTERVIEW WILL BE MARKED FOR THE APPROPRIATE HANDLING OF QUESTIONS AND SKIP PATTERNS REGARDING THE IMPACTS FROM THE DEMONSTRATION PROJECT ITSELF (QUESTIONS 8 THROUGH 14).

### Identify the Appropriate Contact

---

Hello, my name is [interviewer name], and I am calling from [company name] on behalf of the New York State Energy Research and Development Authority, also known as NYSERDA. NYSERDA is conducting a study to assess the impact of its funding on New York State companies and on the State's economy. This study will also assess the impact of its funding and technological support on [use "product", "process", or "generation" depending on participant] demonstrations conducted in New York State.

NYSERDA has contracted with [company name] to perform this study. I would like to ask some questions about your involvement in a completed NYSERDA demonstration project. We make every attempt to maintain this survey as confidential information within our evaluation and only use it within aggregate reporting that will protect your identity. The information you provide will be used to improve NYSERDA's research and development programs. NYSERDA is contacting all participants who completed demonstration projects within the last five years.

### SCREENING

Our records show that NYSERDA has provided \$ \_\_\_\_\_ in funding to [Contractor] for the demonstration project [project description]. [PROVIDING THIS INFO ALERTS PARTICIPANT THAT NYSERDA FUNDING OR TECHNICAL ASSISTANCE HAS BEEN PROVIDED AND THAT SOMEONE AT THE FIRM SHOULD BE QUALIFIED TO ANSWER QUESTIONS]

SCR-1. This survey will take about 20 to 30 minutes to complete. We would like to talk to the person who is most knowledgeable about the project. If not you, could you please direct me to, or provide me with the name of the person who is the most qualified to discuss this project?

- a. Caller [PROCEED TO SECTION 1: INITIAL DEMONSTRATION]
- b. Most qualified contact [CONTACT THIS PERSON, REPEAT INITIAL INTRODUCTION AND THE INTRODUCTION TO THE SCREENING SECTION, AND CONTINUE WITH THE FOLLOWING QUESTION]

SCR-2 Mr./Ms. [name] referred me to you to answer specific questions about this project [DESCRIBE PROJECT BRIEFLY as this is another person]. This survey will take about 20 to 30 minutes to complete. Can we discuss the project now, or can we schedule a time when I can call you back?

- a. Can discuss now [PROCEED TO SECTION 1: INITIAL DEMONSTRATION]
- b. Call back on \_\_\_\_\_ at time:
- c. [IF THIS PERSON IS NOT THE MOST QUALIFIED PERSON, LOOP BACK TO SCR-1]

**SECTION 1: NYSERDA DEMONSTRATION PROJECT**

---

1. Does this project represent the first time your firm was involved with a demonstration of this ["product", "process", "technology" or "type of generation" .....tailor to project?
- a) (1)  Yes
  - b) (2)  No
  - c) (3)  Don't know

[IF ANSWER TO Q1 IS NO, ASK Q2 and Q3. Otherwise, skip to Q4]

2. How many times has your firm demonstrated this ["product", "process", "technology" or "type of generation" .....tailor to project] prior to the [reference NYSERDA demo project]?
- a)  0
  - b)  Don't know

3. How did [reference NYSERDA demo project] differ from previous demonstrations of this ["product", "process", "technology" or "type of generation" .....tailor to project]? [ALLOW MULTIPLE RESPONSES]
- a)  No difference
  - b)  Smaller in scale than previous demonstrations
  - c)  Larger in scale than previous demonstrations
  - d)  Different inputs
  - e)  Different application/type of facility
  - f)  Other, specify
  - g)  Don't know

4. On a scale of 0 to 5, with 5 being highly successful and 0 being having no success, how would you rate the success of this demonstration project in terms of site owner acceptance of the ["product", "process", "technology" or "type of generation" .....tailor to integrator]?

(Not Successful)	(Highly Successful)
0	5
1	4
2	3

5. Can you identify specific challenges you faced when planning this project? [ASK UNPROMPTED FIRST, RECORD UNPROMPTED RESPONSES.]
- a)
  - b)
  - c)

[PROMPT - BE CAREFUL NOT TO BIAS OR INFLUENCE RESPONSE, SUGGEST CODE FOR ANSWERS PROVIDED ABOVE IF APPROPRIATE]

- d) (1)  Lack of funding or cost prohibitive
- e) (2)  Lack of qualified personnel or expertise
- f) (3)  Lack of interest among potential end users
- g) (4)  Could not find an appropriate site
- h) (5)  Timing was not right
- i) (6)  Regulatory impediments
- j) (7)  Technological issues

k) (6)  Other - specify

6. Which two products, currently on the market, most directly compete with the technology that was demonstrated in this project?

- a)
- b)
- c)
- d) None

7. What do you consider to be the most important attributes of this technology?

- a)
- b)
- c)

[PROMPT IF NEEDED - BE CAREFUL NOT TO BIAS OR INFLUENCE RESPONSE]

more efficient generation

improved productivity

saves energy

reduced emissions

reduced waste stream

lower production costs

lower capital cost

reduced labor overhead

other

[IF PROGRAM DATA INCLUDES PRIMARY IMPACT TYPE OR SECONDARY IMPACT TYPE ASK Q8-Q12. ELSE ASK Q8B AND Q8C, THEN SKIP TO Q13.]

8. NYSERDA program records indicate that this project had [Primary impact type] impacts and [Secondary impact type] impacts.

8A. Is that correct?

(1)  Yes [SKIP TO Q9]

(2)  No

(3)  Don't know [SKIP TO Q13]

8B. Which of the following best describe the type of primary impacts this project produced?

(1)  Power Production

(2)  energy efficiency

(3)  productivity

- (4)  waste management
- (5)  product quality/reliability improvement
- (6)  water recycling
- (7)  water quality
- (8)  O & M cost improvement
- (9)  Marketability
- (10)  environmental quality improvement
- (11)  Other *Specify*: \_\_\_\_\_

8C. Which of the following best describe the type of secondary impacts this project produced?

- a) (1)  Power Production
- b) (2)  energy efficiency
- c) (3)  productivity
- d) (4)  waste management
- e) (5)  product quality/reliability improvement
- f) (6)  water recycling
- g) (7)  water quality
- h) (8)  O & M cost improvement
- i) (9)  Marketability
- j) (10)  environmental quality improvement
- k) (11)  Other *Specify*: \_\_\_\_\_
- l) (12) None

[ ASK Q9 – Q12 IF Q8A = 1/YES AND IMPACT MAGNITUDE(S) IS(ARE) NOT MISSING]

NYSERDA's records indicate that this project produced [IF PRIMARY IMPACT IS POWER PRODUCTION] *saved* [IF PRIMARY IMPACT IS NOT POWER PRODUCTION]

[Primary Annual Impact]

[Primary Impact Magnitude]

[Primary Impact Units]

9. Are the actual impacts higher than this, approximately the same or lower than this?

- (1)  Higher
- (2)  Approximately the same [SKIP Q10]
- (3)  Lower
- (4)  Don't know [SKIP Q10]

10. Please estimate the percentage higher [IF Q9=1] lower [IF Q9=3] in comparison to the NYSERDA's projected impacts.

[ASK Q11 IF THE PRIMARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

11. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

[SKIP Q11 AND Q12 IF NO SECONDARY IMPACT MAGNITUDE PROVIDED]

NYSERDA's records also show impacts of [Secondary Annual Impact[ Magnitude] [Secondary Impact Units] [Secondary Impact

12. Are the actual impacts higher than this, approximately the same or lower than this?

- (1)  Higher
- (2)  Approximately the same [SKIP Q12]
- (3)  Lower
- (4)  Don't know [SKIP Q12]

13. Please estimate the percentage higher [IF Q11=1] lower [IF Q11=3] in comparison to NYSERDA's projected impacts.

[ASK Q14 IF THE SECONDARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

14. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

[ASK Q15 – Q18 IF Q8A = 2/No OR IMPACT MAGNITUDE IS MISSING, EITHER MISSING PRIMARY OR SECONDARY IMPACT MAGNITUDE]

15. Please provide an estimate or range of the primary impacts.

(Quantity – Annual Impact) (Unit of Measurement/ Magnitude) 999  Don't know

[ASK Q16 IF THE PRIMARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

16. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]



17. Please provide an estimate or range of the secondary impacts.

(Quantity – Annual Impact) (Unit of Measurement/ Magnitude) 999  Don't know

[ASK Q18 IF THE SECONDARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

18. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

19. Did you receive any valuable feedback from end-users from this demonstration site?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

[IF YES, ASK THEM TO ELABORATE]

20. Did you receive any valuable technical or marketing information from being involved with this demonstration site?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

[IF YES, ASK THEM TO ELABORATE]

21. Do you know if the technology vendor or manufacturer received any valuable technical or marketing information from being involved with this demonstration site?

- a) (1)  Yes
- b) (2)  No

[IF YES, ASK THEM TO ELABORATE]

## SECTION 2: NYSERDA INFLUENCE ON THIS NYSERDA DEMONSTRATION PROJECT

---

I would now like to discuss your interactions with NYSERDA concerning this demonstration project. [Project Description]

22. When did you learn about NYSERDA's R&D program?

- a) (1)  Before you began planning this project
- b) (2)  During the planning process but before the plans were finalized
- c) (3)  After the plans were finalized
- d) (4)  Don't know - ask who would be able to answer this question and record contact information.

23. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's financial assistance was in your decision to pursue this project?

(Not at all important) (Very important)

0 1 2 3 4 5

24. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's technical assistance was in your decision to pursue this project?

(Not at all important) (Very important)  
 0            1            2            3            4            5

25. Did sources other than NYSERDA provide funding or assistance on this demonstration project?

- a) (1)  Yes, funding \$ Identify source:
- b) (2)  Yes, assistance Identify source:
- c) (3)  No
- d) (4)  Don't know

[PROBE FOR BOTH FUNDING AND ASSISTANCE. MAY REQUIRE MULTIPLE RESPONSES. ]

26. Please briefly describe how the assistance you received from NYSERDA influenced your ability to get this demonstration project developed in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to 21, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get this demonstration project developed in New York. "0" indicates that the program had no influence; "5" indicates that the program was the primary reason that this demonstration project was developed in New York.]*

(No program influence) (Program was primary influence)  
 0            1            2            3            4            5

Now I'd like to try to quantify the impact of NYSERDA's assistance.

27. **[Likelihood]** What is the likelihood that your firm would have been able to get this demonstration project developed in New York without NYSERDA's financial or technical assistance? Please provide a lower and upper bound, and then your best estimate.

1 = Lower bound → \_\_\_ %      2 = Upper bound → \_\_\_ %      3 = Best estimate → \_\_\_ %

[ONLY ASK Q28 – Q29 IF Q27-3(BEST ESTIMATE)>=50%.]

28. Without NYSERDA's assistance would the magnitude of the [Primary impact type] for this demonstration project have been of the same size, smaller or larger?

- a) (1)  Same [SKIP Q28]
- b) (2)  Smaller
- c) (3)  Larger
- d) (4)  Don't know



[IF Q33=YES, ASK Q34. OTHERWISE, SKIP TO Q35.]

34. In what way was the replication different from the original NYSERDA demonstration project? [RECORD OPEN-ENDED RESPONSES.]

[CONTINUE IF Q32 = YES ; SKIP TO Q48 IF Q32 = NO OR DON'T KNOW.]

35. How many times has your firm or another firm replicated this demonstration project for a similar market and application in New York? [DO NOT ENTER "DON'T KNOW". QUESTION RESPONDENT TO GET AN ESTIMATE.]

[IF Q35 = 0, SKIP TO Q48]

36. From the time that the NYSERDA demonstration project was operational, how long did it take to complete your 1<sup>st</sup> replication in New York? From the NYSERDA demonstration project to the completion of your 2<sup>nd</sup> replication in New York? To the completion of your 3<sup>rd</sup> replication? [GET NUMBER OF YEARS AND/OR MONTHS]

- a) First replication
- b) Next replication
- c) Next replication

37. What are the primary reasons you were able to replicate the demonstration?

- a) (1)  Technical expertise gained
- b) (2)  Financing available
- c) (3)  Location available
- d) (4)  Requested by building owner
- e) (5)  Operating conditions were right
- f) (6)  Other [LIST]

[IF 5 OR FEWER REPLICATIONS SKIP TO Q39.]

38. On average over all similar replications completed in New York State, how did the [Primary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

- a) (1)  Lower
- b) (2)  the same
- c) (3)  Higher
- d) (4)  Not Comparable, specify
- e) (5)  Don't know

[IF Q38 = 4] 38b. Why are the impacts not comparable to the original demonstration project?

[IF MORE THAN 5 REPLICATIONS, ASK Q39, Q40 AND Q41 FOR THE MOST RECENT 5.]

39. How did the [Primary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

	Replication				
	1	2	3	4	5
Lower than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Comparable, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[IF THE PROJECT HAS SECONDARY IMPACTS, ASK Q40.]

40. How did the [(Secondary Impact Unit of Measurement/ Magnitude)] of the replications compare to the original demonstration?

	Replication				
	1	2	3	4	5
Lower than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Comparable, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. Did NYSERDA provide funding assistance, technology assistance, both of these or other assistance for the replications?

	Replication				
	1	2	3	4	5
Yes, Funding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Technology Assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Both Funding & Technology Assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
----	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

42. Did any sources other than NYSEERDA provide funding or technology assistance for the replications?
- a) (1)  Yes, Funding
  - b) (2)  Yes, Technology assistance
  - c) (3)  Yes, Other
  - d) (4)  No
  - e) (5)  Don't know

[IF NO, SKIP NEXT QUESTION.]

43. What were the other funding sources?
- a) (1)  Investment Capital (internally financed, investment financed through venture capital or stocks, loan) Estimated % of total funding
  - b) (2)  Federal Government Grant or Subsidized Financing Estimated % of total funding
  - c) (3)  NYS agency Grant or Subsidized Financing Estimated % of total funding  
Specify NYS agency
  - d) (4)  Other private grant or philanthropic contribution Estimated % of total funding
  - e) (5)  Other, specify Estimated % of total funding
  - f) (6)  Don't know Estimated % of total funding

[

44. Please briefly describe how NYSEERDA's assistance with this demonstration project influenced your ability to get these replications developed in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to Q31, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get these replications of the NYSEERDA-supported demonstration project developed in New York, where "0" indicates that the NYSEERDA-supported demonstration project had no influence; "5" indicates that this demonstration project was the primary reason for these replications being developed in New York..]*

(No program influence)

(Program was primary influence)

0            1            2            3            4            5

Now I'd like to try to quantify the impact of the NYSEERDA-supported demonstration project.

45. **[Likelihood]** What is the likelihood that your firm would have been able to get these replications developed in New York without the NYSEERDA-supported demonstration project? Please provide a lower and upper bound, and then your best estimate.

1 = Lower bound → \_\_\_ %      2 = Upper bound → \_\_\_ %      3 = Best estimate → \_\_\_ %

46. [ONLY ASK Q46 and Q47 IF Q45 (BEST ESTIMATE) >= 50%.] Without the NYSERDA supported demonstration project would the magnitude of the [Primary impact type] for these replications have been of the same size, smaller or larger?

- a) (1)  Same [SKIP Q34]
- b) (2)  Smaller
- c) (3)  Larger
- d) (4)  Don't know

47. By what percent would the magnitude of the [Primary impact type] been [SMALLER, LARGER]?

- a) \_\_\_\_\_
- b)  Don't know

-[SKIP SECTION 4 IF Q32 = YES and Q35 > 0]

**SECTION 4: NON-REPLICATIONS**

---

48. What are the reasons you were not able to replicate the NYSERDA project in New York?

49. Do you expect to replicate in New York the NYSERDA project at some point in the future?

- a) (1)  Yes [REASONS]
- b) (2)  No [REASONS]

**SECTION 5: PROCESS EVALUATION**

---

50. How did you become aware of NYSERDA and the potential for NYSERDA assistance?

[DO NOT READ, MARK ALL STATED IN REPLY]

- a) (1)  Prior participation in a NYSERDA R&D program
- b) (2)  Another NYSERDA program
- c) (3)  Advertising
- d) (4)  Word-of-mouth (PROBE FOR FOLLOWING):
  - a)  Business colleague/client      b)  Friend/relative
- e) (5)  Contacted by a NYSERDA program representative
- f) (6)  Visit to another NYSERDA demonstration project
- g) (7)  Other

Please rate your agreement with the following statements. Please use a 1 to 5 scale where 5 indicates strongly agree, 4 indicates agree, 3 indicates neither agree nor disagree, 2 indicates disagree, and 1 is strongly disagree.

51. NYSERDA provides information that is highly supportive of the demonstration process.	(Strongly disagree)    1    2    3    4    5    (Strongly agree)
52. NYSERDA communicates well with demonstration project participants during the process.	(Strongly disagree)    1    2    3    4    5    (Strongly agree)

53. The turn-around time for assistance from NYSERDA significantly hampers the demonstration effort.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
54. The process of obtaining funding assistance from NYSERDA is adequate.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
55. NYSERDA staff members working with this program are well qualified.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
56. The assistance that NYSERDA provides to encourage knowledge gained from the demonstration is inadequate.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
57. NYSERDA's effort to increase market knowledge greatly assists in obtaining replications from the R&D demonstration projects.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
58. I am satisfied with my participation in NYSERDA's R&D program for this demonstration project.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)

59. Besides increasing financial incentives, what could NYSERDA improve in its R&D program to enable more demonstration projects such as this? [LIST]

60. Besides increasing financial incentives, what could NYSERDA improve in its R&D program to enable more replications of its demonstration projects? [LIST]

## SECTION 6: INTEGRATOR FIRMOGRAPHICS

---

I want to complete our interview with a few final questions about your firm.

61. What is the firm's principal business activity?

---

62. How many employees does the firm have overall? [APPROXIMATE NUMBER IS ADEQUATE.]

63. How many employees does the firm have in New York? [APPROXIMATE NUMBER IS ADEQUATE.]

64. Has your firm's employment in New York changed due to the NYSERDA-supported demonstration project?

- a)  Yes  
 b)  No [SKIP Q59 and Q60]

65. Was your firm's New York employment increased or decreased due to the NYSERDA-supported demonstration project?



- a)  Increase
- b)  Decrease

66. How many jobs were [added FOR Q59=A][eliminated for Q59=B]?

- a) \_\_\_\_\_
- b)  Don't know (DO NOT READ.)

67. Which of the following statements best describe how important it is to your firm's business to participate in projects such as this demonstration project?

- a)  Very important as this is a core part of our business model.
- b)  An important addition to what our business does.
- c)  Just a nice extra.
- d)  We learned this was a distraction from what our business needs to do.
- e)  Don't know (DO NOT READ.)

68. Can NYSERDA call you back at a later time to obtain more information about the NYSERDA R&D Program?

- a) Yes
- b) No

ON BEHALF ON NYSERDA, THANK YOU FOR YOUR TIME IN HELPING US CONDUCT THIS RESEARCH.  
HAVE A GREAT DAY.

**NYSERDA  
Demonstration Project Survey**

**VENDORS**

Interview Date: [mm/dd/yyyy]

Interviewer name:

Interviewer phone:

Contract Number:

Project Description:

Best Contact:

NYSERDA Project Manager

Integrator Name:

Title:

Phone:

Email:

Project Role:

Vendor Name:

Title:

Phone:

Email:

Project Role:

Owner Name:

Title:

Phone:

Email:

Project Role:

Holder of Contract: Firm:

Program Area: [Buildings, Transportation, Energy Resources, etc.]

Project Type: [PRODUCT, PROCESS OR POWER PRODUCTION]

NYSERDA expenditure (\$) (Encumbered \$ for this project.)

Earliest contract signed date

Latest contract closed date

Impact locations

THE APPRISE POLICY ANALYST CONDUCTING THE INTERVIEW WILL WORK THROUGH THE INSTRUMENT USING THE SPECIFIC DATASET INPUT AND PROJECT DESCRIPTION TO REFINE QUESTION WORDING AS NECESSARY TO PROVIDE MORE CORRECT AND CLEAR LANGUAGE TO OBTAIN THE INFORMATION DESIRED FROM EACH QUESTION. GIVEN THE INFORMATION IN THE DATASET, THE SURVEY INSTRUMENT FOR THAT INTERVIEW WILL BE MARKED FOR THE APPROPRIATE HANDLING OF QUESTIONS AND SKIP PATTERNS REGARDING THE IMPACTS FROM THE DEMONSTRATION PROJECT ITSELF (QUESTIONS 8 THROUGH 14).

### Identify the Appropriate Contact

---

Hello, my name is [interviewer name], and I am calling from [company name] on behalf of the New York State Energy Research and Development Authority, also known as NYSERDA. NYSERDA is conducting a study to assess the impact of its funding on New York State companies and on the State's economy. This study will also assess the impact of its funding and technological support on [use "product", "process", or "generation" depending on participant] demonstrations conducted in New York State.

NYSERDA has contracted with [company name] to perform this study. I would like to ask some questions about your involvement in a completed NYSERDA demonstration project. We make every attempt to maintain this survey as confidential information within our evaluation and only use it within aggregate reporting that will protect your identity. The information you provide will be used to improve NYSERDA's research and development programs. NYSERDA is contacting all participants who completed demonstration projects within the last five years.

### SCREENING

Our records show that NYSERDA has provided \$\_\_\_\_\_ in funding to [Contractor] for the demonstration project [ project description], and that your company provided the [product] [process] [technology] [generator] for the project. [PROVIDING THIS INFO ALERTS PARTICIPANT THAT NYSERDA FUNDING OR TECHNICAL ASSISTANCE HAS BEEN PROVIDED AND THAT SOMEONE AT THE FIRM SHOULD BE QUALIFIED TO ANSWER QUESTIONS. IF THE CONTRACTOR IS THE SAME AS THE VENDOR, PLEASE INSERT THE NAME OF THE SITE OWNER.]

SCR-1. This survey will take about 20 to 30 minutes to complete. We would like to talk to the person who is most knowledgeable about the project. If not you, could you please direct me to, or provide me with the name of the person who is the most qualified to discuss this project?

- a. Caller [PROCEED TO SECTION 1: INITIAL DEMONSTRATION]
- b. Most qualified contact [CONTACT THIS PERSON, REPEAT INITIAL INTRODUCTION AND THE INTRODUCTION TO THE SCREENING SECTION, AND CONTINUE WITH THE FOLLOWING QUESTION]

SCR-2 Mr./Ms. [name] referred me to you to answer specific questions about this project [DESCRIBE PROJECT BRIEFLY as this is another person]. This survey will take about 20 to 30 minutes to complete. Can we discuss the project now, or can we schedule a time when I can call you back?

- d. Can discuss now [PROCEED TO SECTION 1: INITIAL DEMONSTRATION]
- e. Call back on \_\_\_\_\_ at time:
- f. [IF THIS PERSON IS NOT THE MOST QUALIFIED PERSON, LOOP BACK TO SCR-1]

**SECTION 1: NYSERDA DEMONSTRATION PROJECT**

---

9. Does this project represent the first time your firm was involved with a demonstration of this ["product", "process", "technology" or "type of generation" .....tailor to project]?
- a) (1)  Yes
  - b) (2)  No
  - c) (3)  Don't know

[IF ANSWER TO Q1 IS NO, ASK Q2 and Q3. Otherwise, skip to Q4]

10. How many times has your firm demonstrated this ["product", "process", "technology" or "type of generation" .....tailor to project] prior to the [reference NYSERDA demo project]?
- a)  1
  - b)  Don't know

11. How did [reference NYSERDA demo project] differ from previous demonstrations of this ["product", "process", "technology" or "type of generation" .....tailor to project]? [ALLOW MULTIPLE RESPONSES]
- a)  No difference
  - b)  Smaller in scale than previous demonstrations
  - c)  Larger in scale than previous demonstrations
  - d)  Different inputs
  - e)  Different application/type of facility
  - f)  Other, specify
  - g)  Don't know

12. On a scale of 0 to 5, with 5 being highly successful and 0 being having no success, how would you rate the success of this demonstration project in terms of site owner acceptance of the ["product", "process", "technology" or "type of generation" .....tailor to vendor]?

(Not Successful)						(Highly Successful)
0	1	2	3	4	5	

13. Were you involved with planning this project?
- a) (1)  Yes
  - b) (2)  No
  - c) (3)  Don't know

[IF ANSWER TO Q5 IS YES, ASK Q6. OTHERWISE SKIP TO Q7.]

14. Can you identify specific challenges you faced when planning this project? [ASK UNPROMPTED FIRST, RECORD UNPROMPTED RESPONSES.]
- a)
  - b)
  - c)

[PROMPT - BE CAREFUL NOT TO BIAS OR INFLUENCE RESPONSE, SUGGEST CODE FOR ANSWERS PROVIDED ABOVE IF APPROPRIATE]

- d) (1)  Lack of funding or cost prohibitive
- e) (2)  Lack of qualified personnel or expertise
- f) (3)  Lack of interest among potential end users
- g) (4)  Could not find an appropriate site
- h) (5)  Timing was not right
- i) (6)  Regulatory impediments
- j) (7)  Technological issues
- k) (6)  Other - specify

15. Which two products, currently on the market, most directly compete with the technology that was demonstrated in this project?

- a)
- b)
- c)
- d) None

16. What do you consider to be the most important attributes of this technology?

- a)
- b)
- c)

[PROMPT IF NEEDED - BE CAREFUL NOT TO BIAS OR INFLUENCE RESPONSE]

- more efficient generation
- improved productivity
- saves energy
- reduced emissions
- reduced waste stream
- lower production costs
- lower capital cost
- reduced labor overhead
- other

[IF PROGRAM DATA INCLUDES PRIMARY IMPACT TYPE OR SECONDARY IMPACT TYPE ASK Q9-Q13. ELSE ASK Q9B AND Q9C, THEN SKIP TO Q14.]

17. NYSERDA program records indicate that this project had [Primary impact type] impacts and [Secondary impact type] impacts.

9A. Is that correct?

- (1)  Yes [SKIP TO Q9]
- (2)  No

(3)  Don't know [SKIP TO Q13]

9B. Which of the following best describe the type of primary impacts this project produced?

- (1)  Power Production
- (2)  energy efficiency
- (3)  productivity
- (4)  waste management
- (5)  product quality/reliability improvement
- (6)  water recycling
- (7)  water quality
- (8)  O & M cost improvement
- (9)  Marketability
- (10)  environmental quality improvement
- (11)  Other *Specify:* \_\_\_\_\_

9C. Which of the following best describe the type of secondary impacts this project produced?

- m) (1)  Power Production
- n) (2)  energy efficiency
- o) (3)  productivity
- p) (4)  waste management
- q) (5)  product quality/reliability improvement
- r) (6)  water recycling
- s) (7)  water quality
- t) (8)  O & M cost improvement
- u) (9)  Marketability
- v) (10)  environmental quality improvement
- w) (11)  Other *Specify:* \_\_\_\_\_
- x) (12) None

[ ASK Q10 – Q14 IF Q9A = 1/YES AND IMPACT MAGNITUDE(S) IS(ARE) NOT MISSING]

NYSERDA's records indicate that this project produced [IF PRIMARY IMPACT IS POWER PRODUCTION] *saved* [IF PRIMARY IMPACT IS NOT POWER PRODUCTION]

[Primary Annual Impact]

[Primary Impact Magnitude]

[Primary Impact Units]

69. Are the actual impacts higher than this, approximately the same or lower than this?

- (1)  Higher
- (2)  Approximately the same [SKIP Q10]
- (3)  Lower

(4)  Don't know [SKIP Q10]

70. Please estimate the percentage higher [IF Q10=1] lower [IF Q10=3] in comparison to the NYSERDA's projected impacts.

[ASK Q12 IF THE PRIMARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

71. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

[SKIP Q13 TO Q15 IF NO SECONDARY IMPACT MAGNITUDE PROVIDED]

NYSERDA's records also show impacts of [Secondary Annual Impact] [Secondary Impact Magnitude] [Secondary Impact Units]

72. Are the actual impacts higher than this, approximately the same or lower than this?

- (1)  Higher
- (2)  Approximately the same [SKIP Q14]
- (3)  Lower
- (4)  Don't know [SKIP Q14]

73. Please estimate the percentage higher [IF Q13=1] lower [IF Q13=3] in comparison to NYSERDA's projected impacts.

[ASK Q15 IF THE SECONDARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

74. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

[ASK Q17 – Q19 IF Q9A = 2/No OR IMPACT MAGNITUDE IS MISSING, EITHER MISSING PRIMARY OR SECONDARY IMPACT MAGNITUDE]

75. Please provide an estimate or range of the primary impacts.

(Quantity – Annual Impact) (Unit of Measurement/ Magnitude) 999  Don't know

[ASK Q17 IF THE PRIMARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

76. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

77. Please provide an estimate or range of the secondary impacts.

(Quantity – Annual Impact) (Unit of Measurement/ Magnitude) 999  Don't know

[ASK Q19 IF THE SECONDARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

78. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAYLOR TO SPECIFICS.]

Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

79. Did you receive any valuable feedback from end-users from this demonstration site?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

[IF YES, ASK THEM TO ELABORATE]

80. Did you receive any valuable technical or marketing information from being involved with this demonstration site?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

[IF YES, ASK THEM TO ELABORATE]

81. Do you know if the integrator, manufacturer, or customer received any valuable technical or marketing information from being involved with this demonstration site?

- a) (1)  Yes
- b) (2)  No

[IF YES, ASK THEM TO ELABORATE]

## SECTION 2: NYSERDA INFLUENCE ON THIS NYSERDA DEMONSTRATION PROJECT

---

I would now like to discuss your interactions with NYSERDA concerning this demonstration project. [Project Description]

82. Have you had an interaction with NYSERDA regarding this demonstration project?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

83. When did you learn about NYSERDA's R&D program?



- a) (1)  Before you began planning this project
- b) (2)  During the planning process but before the plans were finalized
- c) (3)  After the plans were finalized
- d) (4)  Have not heard about NYSERDA's R&D program
- e) (5)  Don't know - ask who would be able to answer this question and record contact information.

[SKIP TO SECTION 3 IF Q23=NO or DON'T KNOW.]

84. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's financial assistance was in the decision to pursue this project?

(Not at all important) (Very important)  
 0            1            2            3            4            5

85. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's technical assistance was in the decision to pursue this project?

(Not at all important) (Very important)  
 0            1            2            3            4            5

86. Did sources other than NYSERDA provide funding or assistance on this demonstration project?

- a) (1)  Yes, funding                    \$                    Identify source:
- b) (2)  Yes, assistance                    Identify source:
- c) (3)  No
- d) (4)  Don't know

[PROBE FOR BOTH FUNDING AND ASSISTANCE. MAY REQUIRE MULTIPLE RESPONSES. ]

87. Please briefly describe how the assistance received from NYSERDA influenced the ability to get this demonstration project developed in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to 21, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get this demonstration project developed in New York. "0" indicates that the program had no influence; "5" indicates that the program was the primary reason that this demonstration project was developed in New York.]*

(No program influence) (Program was primary influence)  
 0            1            2            3            4            5

Now I'd like to try to quantify the impact of NYSERDA's assistance.

88. **[Likelihood]** What is the likelihood that this demonstration project would have been developed in New York without NYSERDA's financial or technical assistance? Please provide a lower and upper bound, and then your best estimate.

1 = Lower bound → \_\_\_ %      2 = Upper bound → \_\_\_ %      3 = Best estimate → \_\_\_ %

[ONLY ASK Q30 – Q31 IF Q29-3(BEST ESTIMATE)>=50%.]

89. Without NYSERDA's assistance would the magnitude of the [Primary impact type] for this demonstration project have been of the same size, smaller or larger?

- a) (1)  Same [SKIP Q31]
- b) (2)  Smaller
- c) (3)  Larger
- d) (4)  Don't know

90. By what percent would the magnitude of the [Primary impact type] been [SMALLER, LARGER]?

- a) \_\_\_\_\_
- b)  Don't know

---

### SECTION 3: REPLICATIONS

---

I have some questions now concerning your experience with demonstration projects and replications. NYSERDA classifies the project we have been discussing as a demonstration project. We define a demonstration project as the demonstration of a new technology, process or application of an existing technology in a commercial setting designed to showcase its value and effectiveness. We define replication as an additional installation of the technology or process demonstrated under the NYSERDA-supported project. The replication could be at the same NYSERDA demonstration site and/or at another site.

[SKIP TO Q33 IF Q1 = 'No']

91. Does this project represent the only time your firm was involved with any demonstration project,?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

[SKIP Q33 IF Q32=YES.]

92. Approximately what percent of your demonstration projects are replicated at least once by you or another company?

% [ENTER PERCENT]

S1.

Have your firm or any firms ever sold the technology or process from the NYSERDA demonstration project for a similar market or similar application?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

S2. Have your firm or any firms ever sold the technology or process from the NYSERDA demonstration project for a different market or application?

- a) (1)  Yes
- b) (2)  No
- c) (3)  Don't know

**IF S1 OR S2 = YES ASK S3 – S6, OTHERWISE GO TO 32]**

S3. Please provide an estimate of the number of sales of this technology or process made since the completion of the NYSERDA demonstration project.

**[IF 0 GO TO 34]**

S4. Now, please provide an estimate of the number of sales of this technology or process made in New York since the completion of the NYSERDA demonstration project.

**[IF 0 GO TO 34]**

S5. Please briefly describe how NYSERDA's assistance with this demonstration project influenced your ability to develop sales of this product or process in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to S5, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get these New York sales of the product or process that were in the NYSERDA-supported demonstration project, where "0" indicates that the NYSERDA-supported demonstration project had no influence; "5" indicates that this demonstration project was the primary reason for sales being developed in New York..]*

(No program influence)

(Program was primary influence)

0            1            2            3            4            5

Now I'd like to try to quantify the impact of the NYSERDA-supported demonstration project.

S6. **[Likelihood]** What is the likelihood that your firm would have been able to make new sales of this technology or process in New York without the NYSERDA-supported demonstration project? Please provide a lower and upper bound, and then your best estimate.



[CONTINUE IF Q36 = YES ; SKIP TO Q50 IF Q36 = NO OR DON'T KNOW.]

37. How many times has your firm or another firm applied the technology demonstrated in the NYSERDA project for a similar market and application in New York? [DO NOT ENTER "DON'T KNOW". QUESTION RESPONDENT TO GET AN ESTIMATE.]

[IF Q37 = 0, SKIP TO Q50]

38. From the time that the NYSERDA demonstration project was operational, how long did it take to find the next customer in New York that wanted to use the technology? From the NYSERDA demonstration project to the completion of your 2<sup>nd</sup> project in New York that applied the technology? To the completion of your 3<sup>rd</sup> project? [GET NUMBER OF YEARS AND/OR MONTHS]
- a) First replication
  - b) Next replication
  - c) Next replication

39. What are the primary reasons you were able to apply the technology used in the demonstration project?
- a) (1)  Technical expertise gained
  - b) (2)  Financing available
  - c) (3)  Location available
  - d) (4)  Requested by building owner
  - e) (5)  Operating conditions were right
  - f) (6)  Other [LIST]

[IF 5 OR FEWER REPLICATIONS SKIP TO Q39.]

40. On average over all similar replications completed in New York State, how did the [Primary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?
- a) (1)  Lower
  - b) (2)  the same
  - c) (3)  Higher
  - d) (4)  Not Comparable, specify
  - e) (5)  Don't know

[IF Q40 = 4] 40b. Why are the impacts not comparable to the original demonstration project?

[IF MORE THAN 5 REPLICATIONS, ASK Q41, Q42 AND Q43 FOR THE MOST RECENT 5.]

1. How did the [Primary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

	Replication				
	1	2	3	4	5
Lower than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Comparable, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[IF THE PROJECT HAS SECONDARY IMPACTS, ASK Q40.]

2. How did the ([Secondary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

	Replication				
	1	2	3	4	5
Lower than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Comparable, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Did NYSERDA provide funding assistance, technology assistance, both of these or other assistance for the replications?

	Replication				
	1	2	3	4	5
Yes, Funding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Technology Assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Both Funding & Technology Assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Did any sources other than NYSERDA provide funding or technology assistance for the replications?

1. (1)  Yes, Funding
2. (2)  Yes, Technology assistance
3. (3)  Yes, Other
4. (4)  No
5. (5)  Don't know

[IF NO, SKIP NEXT QUESTION.]

5. What were the other funding sources?

1. (1)  Investment Capital (internally financed, investment financed through venture capital or stocks, loan) Estimated % of total funding
  2. (2)  Federal Government Grant or Subsidized Financing Estimated % of total funding
  3. (3)  NYS agency Grant or Subsidized Financing Estimated % of total funding
- Specify NYS agency
4. (4)  Other private grant or philanthropic contribution Estimated % of total funding
  5. (5)  Other, specify Estimated % of total funding
  6. (6)  Don't know Estimated % of total funding

6. Please briefly describe how NYSERDA's assistance with this demonstration project influenced the ability to get these replications developed in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to Q31, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get these replications of the NYSERDA-supported demonstration project developed in New York, where "0" indicates that the NYSERDA-supported demonstration project had no influence; "5" indicates that this demonstration project was the primary reason for these replications being developed in New York..]*

(No program influence)

(Program was primary influence)

0                      1                      2                      3                      4                      5

Now I'd like to try to quantify the impact of the NYSERDA-supported demonstration project.

7. **[Likelihood]** What is the likelihood that your firm would have been able to get these replications in New York without the NYSERDA-supported demonstration project? Please provide a lower and upper bound, and then your best estimate.

1 = Lower bound → \_\_\_ %      2 = Upper bound → \_\_\_ %      3 = Best estimate → \_\_\_ %

8. [ONLY ASK Q48 and Q49 IF Q47 (BEST ESTIMATE) >= 50%.] Without the NYSERDA supported demonstration project would the magnitude of the [Primary impact type] for these replications have been of the same size, smaller or larger?

1. (1)  Same [SKIP Q50]
2. (2)  Smaller
3. (3)  Larger
4. (4)  Don't know

9. By what percent would the magnitude of the [Primary impact type] been [SMALLER, LARGER]?

1. \_\_\_\_\_
2.  Don't know

-[SKIP SECTION 4 IF Q34 =YES and Q37>0]

**SECTION 4: NON-REPLICATIONS**

---

10. What are the reasons you were not able to replicate the NYSERDA project in New York?
11. Do you expect to replicate in New York the NYSERDA project at some point in the future?
1. (1)  Yes [REASONS]
  2. (2)  No [REASONS]

**SECTION 5: PROCESS EVALUATION**

---

12. How did you become aware of NYSERDA and the potential for NYSERDA assistance?

[DO NOT READ, MARK ALL STATED IN REPLY]

1. (1)  Prior participation in a NYSERDA R&D program
2. (2)  Another NYSERDA program
3. (3)  Advertising
4. (4)  Word-of-mouth (PROBE FOR FOLLOWING):
  - a)  Business colleague/client
  - b)  Friend/relative
5. (5)  Contacted by a NYSERDA program representative
6. (6)  Visit to another NYSERDA demonstration project
7. (7)  From the site owner or integrator for this project
8. (8)  Other

Please rate your agreement with the following statements. Please use a 1 to 5 scale where 5 indicates strongly agree, 4 indicates agree, 3 indicates neither agree not disagree, 2 indicates disagree, and 1 is strongly disagree.

3.	NYSERDA provides information that is highly supportive of the demonstration process.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
4.	NYSERDA communicates well with demonstration project participants during the process.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
5.	The turn-around time for assistance from NYSERDA significantly hampers the demonstration effort.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
6.	The process of obtaining funding assistance from NYSERDA is adequate.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
7.	NYSERDA staff members working with this program are well qualified.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
8.	The assistance that NYSERDA provides to encourage knowledge gained from the demonstration is inadequate.	(Strongly disagree)	1	2	3	4	5	(Strongly agree)
9.	NYSERDA's effort to increase market knowledge	(Strongly						(Strongly



greatly assists in obtaining replications from the R&D demonstration projects.	disagree) 1    2    3    4    5    agree)
0. I am satisfied with my participation in NYSERDA's R&D program for this demonstration project.	(Strongly disagree) 1    2    3    4    5    (Strongly agree)

21. Besides increasing financial incentives, what could NYSERDA improve in its R&D program to enable more demonstration projects such as this? [LIST]
22. Besides increasing financial incentives, what could NYSERDA improve in its R&D program to enable more replications of its demonstration projects? [LIST]

**SECTION 6: VENDOR FIRMOGRAPHICS**

---

I want to complete our interview with a few final questions about your firm.

23. What is the firm's principal business activity?
- \_\_\_\_\_
24. How many employees does the firm have overall? [APPROXIMATE NUMBER IS ADEQUATE.]
25. How many employees does the firm have in New York? [APPROXIMATE NUMBER IS ADEQUATE.]
26. Has your firm's employment in New York changed due to the NYSERDA-supported demonstration project?
1.  Yes
  2.  No [SKIP Q59 and Q60]
27. Was your firm's New York employment increased or decreased due to the NYSERDA-supported demonstration project?
1.  Increase
  2.  Decrease
28. How many jobs were [added FOR Q59=A][eliminated for Q59=B]?
1. \_\_\_\_\_
  2.  Don't know (DO NOT READ.)
29. Which of the following statements best describe how important it is to your firm's business to participate in projects such as this demonstration project?
1.  Very important as this is a core part of our business model.
  2.  An important addition to what our business does.
  3.  Just a nice extra.
  4.  We learned this was a distraction from what our business needs to do.
  5.  Don't know (DO NOT READ.)

*Advance Letter and Telephone Survey Instruments*

30. Can NYSERDA call you back at a later time to obtain more information about the NYSERDA R&D Program?
1. Yes
  2. No

ON BEHALF ON NYSERDA, THANK YOU FOR YOUR TIME IN HELPING US CONDUCT THIS RESEARCH.  
HAVE A GREAT DAY.

**NYSERDA**

**Demonstration Project Survey**

**SITE OWNERS & CONTRACTORS**

Interview Date: [mm/dd/yyyy]

Interviewer name:

Interviewer phone:

Contract Number:

Project Description:

Best Contact:

NYSERDA Project Manager

Integrator Name:

Owner Name:

Title:

Phone:

Email:

Project Role:

Holder of Contract: Firm:

Contractor Name:

Title:

Phone:

Email:

Program Area: [Buildings, Transportation, Energy Resources, etc.]

Project Type: [PRODUCT, PROCESS OR POWER PRODUCTION]

NYSERDA expenditure (\$) (Encumbered \$ for this project.)

Earliest contract signed date

Latest contract closed date

Impact locations

THE APPRISE POLICY ANALYST CONDUCTING THE INTERVIEW WILL WORK THROUGH THE INSTRUMENT USING THE SPECIFIC DATASET INPUT AND PROJECT DESCRIPTION TO REFINE QUESTION WORDING AS NECESSARY TO PROVIDE MORE CORRECT AND CLEAR LANGUAGE TO OBTAIN THE INFORMATION

DESIRED FROM EACH QUESTION. GIVEN THE INFORMATION IN THE DATASET, THE SURVEY INSTRUMENT FOR THAT INTERVIEW WILL BE MARKED FOR THE APPROPRIATE HANDLING OF QUESTIONS AND SKIP PATTERNS REGARDING THE IMPACTS FROM THE DEMONSTRATION PROJECT ITSELF (QUESTIONS 8 THROUGH 14).

### Identify the Appropriate Contact

---

Hello, my name is [interviewer name], and I am calling from [company name] on behalf of the New York State Energy Research and Development Authority, also known as NYSERDA. NYSERDA is conducting a study to assess the impact of its funding on New York State companies and on the State's economy. This study will also assess the impact of its funding and technological support on [use "product", "process", or "generation" depending on participant] demonstrations conducted in New York State.

NYSERDA has contracted with [company name] to perform this study. I would like to ask some questions about your involvement in a completed NYSERDA demonstration project. We make every attempt to maintain this survey as confidential information within our evaluation and only use it within aggregate reporting that will protect your identity. The information you provide will be used to improve NYSERDA's research and development programs. NYSERDA is contacting all participants who completed demonstration projects within the last five years.

### SCREENING

Our records show that NYSERDA has provided \$\_\_\_\_\_ in funding to [Contractor] for the demonstration project [project description]. [PROVIDING THIS INFO ALERTS PARTICIPANT THAT NYSERDA FUNDING OR TECHNICAL ASSISTANCE HAS BEEN PROVIDED AND THAT SOMEONE AT THE FIRM SHOULD BE QUALIFIED TO ANSWER QUESTIONS]

SCR-1. This survey will take about 20 to 30 minutes to complete. We would like to talk to the person who is most knowledgeable about the project. If not you, could you please direct me to, or provide me with the name of the person who is the most qualified to discuss this project?

- a. Caller [PROCEED TO SECTION 1: INITIAL DEMONSTRATION]
- b. Most qualified contact \_\_\_\_\_ [CONTACT THIS PERSON, REPEAT INITIAL INTRODUCTION AND THE INTRODUCTION TO THE SCREENING SECTION, AND CONTINUE WITH THE FOLLOWING QUESTION]

SCR-2 Mr./Ms. [name] referred me to you to answer specific questions about this project [DESCRIBE PROJECT BRIEFLY as this is another person]. This survey will take about 20 to 30 minutes to complete. Can we discuss the project now, or can we schedule a time when I can call you back?

- o Can discuss now [PROCEED TO SECTION 1: INITIAL DEMONSTRATION]
- o Call back on \_\_\_\_\_ at time:
- o [IF THIS PERSON IS NOT THE MOST QUALIFIED PERSON, LOOP BACK TO SCR-1]

### SECTION 1: NYSERDA DEMONSTRATION PROJECT

---

1. Does this project represent the first time your firm was involved with a demonstration of this ["product", "process", "technology" or "type of generation" .....tailor to project?
  - a) (1)  Yes
  - b) (2)  No

- c) (3)  Don't know

[IF ANSWER TO Q1 IS NO, ASK Q2 and Q3. Otherwise, skip to Q4]

2. How many times has your firm demonstrated this ["product", "process", "technology" or "type of generation" .....tailor to project] prior to the [reference NYSERDA demo project]?

a)

- b)  Don't know

3. How did [reference NYSERDA demo project] differ from previous demonstrations of this ["product", "process", "technology" or "type of generation" .....tailor to project]? [ALLOW MULTIPLE RESPONSES]

a)  No difference

b)  Smaller in scale than previous demonstrations

c)  Larger in scale than previous demonstrations

d)  Different inputs

e)  Different application/type of facility

f)  Other, specify

g)  Don't know

4. On a scale of 0 to 5, with 5 being highly successful and 0 being having no success, how would you rate the success of this demonstration project in terms of site owner acceptance of the ["product", "process", "technology" or "type of generation" .....tailor to integrator]?

(Not Successful)

(Highly Successful)

0

1

2

3

4

5

5. Can you identify specific challenges you faced when planning this project? [ASK UNPROMPTED FIRST, RECORD UNPROMPTED RESPONSES.]

a)

b)

c)

[PROMPT – BE CAREFUL NOT TO BIAS OR INFLUENCE RESPONSE, SUGGEST CODE FOR ANSWERS PROVIDED ABOVE IF APPROPRIATE]

a) (1)  Lack of funding or cost prohibitive

b) (2)  Lack of qualified personnel or expertise

c) (3)  Lack of interest among potential end users

d) (4)  Could not find an appropriate site

e) (5)  Timing was not right

f) (6)  Regulatory impediments

g) (7)  Technological issues

- h) (8)  Other - specify

- 

6. Q6 HAS BEEN DELETED

7. What do you consider to be the most important attributes of this technology?

- a)
- b)
- c)

[PROMPT IF NEEDED - BE CAREFUL NOT TO BIAS OR INFLUENCE RESPONSE]

- more efficient generation
- improved productivity
- saves energy
- reduced emissions
- reduced waste stream
- lower production costs
- lower capital cost
- reduced labor overhead
- other

- 

• [IF PROGRAM DATA INCLUDES PRIMARY IMPACT TYPE OR SECONDARY IMPACT TYPE ASK Q8-Q12. ELSE ASK Q8B AND Q8C, THEN SKIP TO Q13.]

8. NYSERDA program records indicate that this project had [Primary impact type] impacts and [Secondary impact type] impacts.

- 8A. Is that correct?

(1)  Yes [SKIP TO Q9]

(2)  No

(3)  Don't know [SKIP TO Q13]

- 

- 8B. Which of the following best describe the type of primary impacts this project produced?

(1)  Power Production

(2)  energy efficiency

(3)  productivity

(4)  waste management

- (5)  product quality/reliability improvement
- (6)  water recycling
- (7)  water quality
- (8)  O & M cost improvement
- (9)  Marketability
- (10)  environmental quality improvement
- (11)  Other *Specify*: \_\_\_\_\_

•

•

- 8C. Which of the following best describe the type of secondary impacts this project produced?

- (1)  Power Production
- (2)  energy efficiency
- (3)  productivity
- (4)  waste management
- (5)  product quality/reliability improvement
- (6)  water recycling
- (7)  water quality
- (8)  O & M cost improvement
- (9)  Marketability
- (10)  environmental quality improvement
- (11)  Other *Specify*: \_\_\_\_\_

(12) None

•

•

- [ ASK Q9 – Q12 IF Q8A = 1/YES AND IMPACT MAGNITUDE(S) IS(ARE) NOT MISSING]
- NYSERDA's records indicate that this project produced [IF PRIMARY IMPACT IS POWER PRODUCTION]  
*saved* [IF PRIMARY IMPACT IS NOT POWER PRODUCTION]

[Primary Annual Impact]

[Primary Impact Magnitude]

[Primary Impact Units]

- 9. Are the actual impacts higher than this, approximately the same or lower than this?

- (1)  Higher
- (2)  Approximately the same [SKIP Q10]
- (3)  Lower

*Advance Letter and Telephone Survey Instruments*

(4)  Don't know [SKIP Q10]

10. Please estimate the percentage higher [IF Q9=1] lower [IF Q9=3] in comparison to the NYSERDA's projected impacts.

•

• [ASK Q11 IF THE PRIMARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

11. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAILOR TO SPECIFICS.]

•

• Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

•

•

•

• [SKIP Q12 AND Q13 IF NO SECONDARY IMPACT MAGNITUDE PROVIDED]

NYSERDA's records also show impacts of [Secondary Annual Impact] [Secondary Impact Magnitude] [Secondary Impact Units]

12. Are the actual impacts higher than this, approximately the same or lower than this?

(1)  Higher

(2)  Approximately the same [SKIP Q13]

(3)  Lower

(4)  Don't know [SKIP Q13]

13. Please estimate the percentage higher [IF Q12=1] lower [IF Q12=3] in comparison to NYSERDA's projected impacts.

•

• [ASK Q14 IF THE SECONDARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

14. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAILOR TO SPECIFICS.]

•

• Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

•

• [ASK Q15 – Q18 IF Q8A = 2/No OR IMPACT MAGNITUDE IS MISSING, EITHER MISSING PRIMARY OR SECONDARY IMPACT MAGNITUDE]



- 15. Please provide an estimate or range of the primary impacts.
  - (Quantity – Annual Impact) (Unit of Measurement/ Magnitude) 999  Don't know
- [ASK Q16 IF THE PRIMARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

16 Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAILOR TO SPECIFICS.]

- 
- Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]
- 

17. Please provide an estimate or range of the secondary impacts.

- (Quantity – Annual Impact) (Unit of Measurement/ Magnitude) 999  Don't know
- [ASK Q18 IF THE SECONDARY IMPACT IS REPRESENTED AS A PERCENTAGE.]

18. Please provide an estimate of the actual reduction in [ENERGY, kW, EMISSIONS, ETC. – TAILOR TO SPECIFICS.]

- 
- Specify unit: [kWh, kW, MMBtu, pounds of pollutant, etc.]

19. Did you receive any valuable feedback from this demonstration?

- (1)  Yes
- (2)  No
- (3)  Don't know

[IF YES, ASK THEM TO ELABORATE]

20. Did you receive any valuable technical or marketing information from being involved with this demonstration?

- (1)  Yes
- (2)  No
- (3)  Don't know

[IF YES, ASK THEM TO ELABORATE]

21. Do you know if the technology vendor or manufacturer received any valuable technical or marketing information from being involved with this demonstration?

- (1)  Yes
- (2)  No

[IF YES, ASK THEM TO ELABORATE]

•

## SECTION 2: NYSEKDA INFLUENCE ON THIS NYSEKDA DEMONSTRATION PROJECT

---

- I would now like to discuss your interactions with NYSERDA concerning this demonstration project.  
[Project Description]

22. When did you learn about NYSERDA's R&D program?

1. (1)  Before you began planning this project
2. (2)  During the planning process but before the plans were finalized
3. (3)  After the plans were finalized
4. (4)  Don't know – ask who would be able to answer this question and record contact information.

23. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's financial assistance was in your decision to pursue this project?

- (Not at all important)  
(Very important)

• 0 1 2 3 4 5

24. On a scale of 0 to 5, where 0 = "not at all important" and 5 = "very important," please indicate how important NYSERDA's technical assistance was in your decision to pursue this project?

- (Not at all important)  
(Very important)

• 0 1 2 3 4 5

25. Did sources other than NYSERDA provide funding or assistance on this demonstration project?

- (1)  Yes, funding \$ Identify source:
- (2)  Yes, assistance Identify source:
- (3)  No
- (4)  Don't know

- [PROBE FOR BOTH FUNDING AND ASSISTANCE. MAY REQUIRE MULTIPLE RESPONSES.]

26. Please briefly describe how the assistance you received from NYSERDA influenced your ability to get this demonstration project developed in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to 26, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get this demonstration project developed in New York. "0" indicates that the program had no influence; "5" indicates that the program was the primary reason that this demonstration project was developed in New York.]*

(No program influence)  
influence)

(Program was primary  
influence)

• 0 1 2 3 4 5

Now I'd like to try to quantify the impact of NYSERDA's assistance.

- 27 **[Likelihood]** What is the likelihood that your firm would have been able to get this demonstration project developed in New York without NYSERDA's financial or technical assistance? Please provide a lower and upper bound, and then your best estimate.

1 = Lower bound → \_\_\_ %      2 = Upper bound → \_\_\_ %      3 = Best estimate → \_\_\_ %

- 
- [ONLY ASK Q28 – Q29 IF Q27-3(BEST ESTIMATE) >= 50%.]

28. Without NYSERDA's assistance would the magnitude of the [Primary impact type] for this demonstration project have been of the same size, smaller or larger?

- (1)  Same [SKIP Q28]  
(2)  Smaller  
(3)  Larger  
(4)  Don't know

29. By what percent would the magnitude of the [Primary impact type] been [SMALLER, LARGER]?

\_\_\_\_\_

- Don't know

---

### SECTION 3: REPLICATIONS

---

I have some questions now concerning your experience with demonstration projects and replications. NYSERDA classifies the project we have been discussing as a demonstration project. We define a demonstration project as the demonstration of a new technology, process or application of an existing technology in a commercial setting designed to showcase its value and effectiveness. We define replication as an additional installation of the technology or process demonstrated under the NYSERDA-supported project. The replication could be at the same NYSERDA demonstration site and/or at another site.

[SKIP TO Q31 IF Q1 = 'No']

30. Does this project represent the only time your firm was involved with any demonstration project?

- (1)  Yes  
(2)  No  
(3)  Don't know

[SKIP Q31 IF Q30=YES.]

31. Approximately what percent of your demonstration projects are replicated at least once by you or another company?

% [ENTER PERCENT]

32. Has your firm or another firm been able to replicate the technology or process from the NYSERDA demonstration project in a similar market and for similar application?

(1)  Yes How Many?: Month, Year : , , , ,

(2)  No [IF MORE THAN 5, GET DATES FOR THE MOST RECENT 5]

(3)  Don't know

33. Has your firm or another firm been able to replicate the technology or process from the NYSERDA demonstration project for a different market or application?

(1)  Yes How Many?: Month, Year : , , , ,

(2)  No [IF MORE THAN 5, GET DATES FOR THE MOST RECENT 5]

(3)  Don't know

[IF Q33=YES, ASK Q34. OTHERWISE, SKIP TO Q35.]

34. In what way was the replication different from the original NYSERDA demonstration project? [RECORD OPEN-ENDED RESPONSES.]

[CONTINUE IF Q32 = YES ; SKIP TO Q48 IF Q32 = NO OR DON'T KNOW.]

35. How many times has your firm or another firm replicated this demonstration project for a similar market and application in New York? [DO NOT ENTER "DON'T KNOW". QUESTION RESPONDENT TO GET AN ESTIMATE.]

•

• [IF Q35 = 0, SKIP TO Q48]

36. From the time that the NYSERDA demonstration project was operational, how long did it take to complete your 1<sup>st</sup> replication in New York? From the NYSERDA demonstration project to the completion of your 2<sup>nd</sup> replication in New York? To the completion of your 3<sup>rd</sup> replication? [GET NUMBER OF YEARS AND/OR MONTHS]

a) First replication

b) Next replication

c) Next replication

37. What are the primary reasons you were able to replicate the demonstration?

(1)  Technical expertise gained

(2)  Financing available

(3)  Location available

(4)  Requested by building owner

(5)  Operating conditions were right

(6)  Other [LIST]

[IF 5 OR FEWER REPLICATIONS SKIP TO Q39.]

38. On average over all similar replications completed in New York State, how did the [Primary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

5. (1)  Lower

6. (2)  the same

7. (3)  Higher

8. (4)  Not Comparable, specify

9. (5)  Don't know

[IF Q38 = 4] 38b. Why are the impacts not comparable to the original demonstration project?

•

[IF MORE THAN 5 REPLICATIONS, ASK Q39, Q40 AND Q41 FOR THE MOST RECENT 5.]

39. How did the [Primary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

	Replication				
	1	2	3	4	5
Lower than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Comparable, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[IF THE PROJECT HAS SECONDARY IMPACTS, ASK Q40.]

40. How did the ([Secondary Impact Unit of Measurement/ Magnitude] of the replications compare to the original demonstration?

	Replication				
	1	2	3	4	5
Lower than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same size	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher than Original Demo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not Comparable, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. Did NYSERDA provide funding assistance, technology assistance, both of these or other assistance for the replications?

	Replication				
	1	2	3	4	5
Yes, Funding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Technology Assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Both Funding & Technology Assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

42. Did any sources other than NYSERDA provide funding or technology assistance for the replications?

- (1)  Yes, Funding
- (2)  Yes, Technology assistance
- (3)  Yes, Other
- (4)  No

(5)  Don't know

[IF NO, SKIP NEXT QUESTION.]

43. What were the other funding sources?

(1)  Investment Capital (internally financed, investment financed through venture capital or stocks, loan) Estimated % of total funding

(2)  Federal Government Grant or Subsidized Financing Estimated % of total funding

(3)  NYS agency Grant or Subsidized Financing Estimated % of total funding  
Specify NYS agency

(4)  Other private grant or philanthropic contribution Estimated % of total funding

(5)  Other, specify Estimated % of total funding

(6)  Don't know Estimated % of total funding

44. Please briefly describe how NYSERDA's assistance with this demonstration project influenced your ability to get these replications developed in New York.

*[WILL NOT ASK RESPONDENT DIRECTLY. Based on response to Q44, fill in a "0 to 5" score indicating the extent to which the program influenced the ability to get these replications of the NYSERDA-supported demonstration project developed in New York, where "0" indicates that the NYSERDA-supported demonstration project had no influence; "5" indicates that this demonstration project was the primary reason for these replications being developed in New York..]*

(No program influence)  
was primary influence)

(Program

• 0 1 2 3 4 5

Now I'd like to try to quantify the impact of the NYSERDA-supported demonstration project.

45. **[Likelihood]** What is the likelihood that your firm would have been able to get these replications developed in New York without the NYSERDA-supported demonstration project? Please provide a lower and upper bound, and then your best estimate.

• 1 = Lower bound → \_\_\_ %      2 = Upper bound → \_\_\_ %      3 = Best estimate → \_\_\_ %

46. **[ONLY ASK Q46 and Q47 IF Q45 (BEST ESTIMATE) >= 50%.]** Without the NYSERDA supported demonstration project would the magnitude of the [Primary impact type] for these replications have been of the same size, smaller or larger?

(1)  Same [SKIP Q47]

- (2)  Smaller
- (3)  Larger
- (4)  Don't know

47. By what percent would the magnitude of the [Primary impact type] been [SMALLER, LARGER]?

\_\_\_\_\_

Don't know

-[SKIP SECTION 4 IF Q32 =YES and Q35>0]

#### SECTION 4: NON-REPLICATIONS

---

48. What are the reasons you were not able to replicate the NYSERDA project in New York?

49. Do you expect to replicate in New York the NYSERDA project at some point in the future?

- (1)  Yes [REASONS]
- (2)  No [REASONS]

#### SECTION 5: PROCESS EVALUATION

---

50. How did you become aware of NYSERDA and the potential for NYSERDA assistance?

[DO NOT READ, MARK ALL STATED IN REPLY]

- (1)  Prior participation in a NYSERDA R&D program
- (2)  Another NYSERDA program
- (3)  Advertising
- (4)  Word-of-mouth (PROBE FOR FOLLOWING):
  - a)  Business colleague/client
  - b)  Friend/relative
- (5)  Contacted by a NYSERDA program representative
- (6)  Visit to another NYSERDA demonstration project
- (7)  Other

Please rate your agreement with the following statements. Please use a 1 to 5 scale where 5 indicates strongly agree, 4 indicates agree, 3 indicates neither agree nor disagree, 2 indicates disagree, and 1 is strongly disagree.



<ul style="list-style-type: none"> <li>51. NYSERDA provides information that is highly supportive of the demonstration process.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>52. NYSERDA communicates well with demonstration project participants during the process.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>53. The turn-around time for assistance from NYSERDA significantly hampers the demonstration effort.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>54. The process of obtaining funding assistance from NYSERDA is adequate.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>55. NYSERDA staff members working with this program are well qualified.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>56. The assistance that NYSERDA provides to encourage knowledge gained from the demonstration is inadequate.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>57. NYSERDA's effort to increase market knowledge greatly assists in obtaining replications from the R&amp;D demonstration projects.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>
<ul style="list-style-type: none"> <li>58. I am satisfied with my participation in NYSERDA's R&amp;D program for this demonstration project.</li> </ul>	<ul style="list-style-type: none"> <li>(Strongly disagree) 1 2 3 4 5</li> <li>(Strongly agree)</li> </ul>

59. Besides increasing financial incentives, what could NYSERDA improve in its R&D program to enable more demonstration projects such as this? [LIST]

60. Besides increasing financial incentives, what could NYSERDA improve in its R&D program to enable more replications of its demonstration projects? [LIST]

**SECTION 6: FIRMOGRAPHICS**

---

I want to complete our interview with a few final questions about your firm.

61. What is the firm's principal business activity?

---

62. How many employees does the firm have overall? [APPROXIMATE NUMBER IS ADEQUATE.]

63. How many employees does the firm have in New York? [APPROXIMATE NUMBER IS ADEQUATE.]
64. Has your firm's employment in New York changed due to the NYSERDA-supported demonstration project?
- a)  Yes
  - b)  No [SKIP Q65 and Q66]
65. Was your firm's New York employment increased or decreased due to the NYSERDA-supported demonstration project?
- a)  Increase
  - b)  Decrease
66. How many jobs were [added FOR Q65=A][eliminated for Q65=B]?
- a) \_\_\_\_\_
  - b)  Don't know (DO NOT READ.)
67. Which of the following statements best describe how important it is to your firm's business to participate in projects such as this demonstration project?
- a)  Very important as this is a core part of our business model.
  - b)  An important addition to what our business does.
  - c)  Just a nice extra.
  - d)  We learned this was a distraction from what our business needs to do.
  - e)  Don't know (DO NOT READ.)
68. Can NYSERDA call you back at a later time to obtain more information about the NYSERDA R&D Program?
- a) Yes
  - b) No

ON BEHALF ON NYSERDA, THANK YOU FOR YOUR TIME IN HELPING US CONDUCT THIS RESEARCH.  
HAVE A GREAT DAY.

# **R&D Demonstration Survey Report**

---

Appendix B

## **SURVEY RESPONDENT FEEDBACK ON PRODUCT DEMONSTRATION PROCESS**

---

*Survey Respondent Feedback on Product Demonstration Process*

- “Provide or assist with developing greater or more targeted industry/actor partnerships.”
- “Reduce bureaucracy in process.”
- “Increase outreach efforts.”
- “Simplify/streamline the application process.”
- “Solicit more input from small to medium sized companies. Have more focus groups and interaction.”
- “Should have a greater pot of funding available.”
- “Improve turnaround time (particularly on proposals and funding approvals).”
- “Publicize project or program outcomes.”
- “Greater onsite and stakeholder engagement in projects.”
- “More follow up assistance. After one project is completed, NYSERDA should be more encouraging of other projects and discussing the issues faced in previous projects.”
- “Help to better connect with potential end users. Find people to help demonstrate the technology.”
- “Streamline the selection and funding processes.”
- “Push into alternative technologies for electric transmission.”
- “Make funds available to firms that don't pay the SBC charge.”
- “Taking the political aspect out of funding awards. Some R&D projects have been funded for political reasons.”
- “Need to fund better projects and better distinguish what is a good project. Look more closely at the credentials of the person proposing the project. NYSERDA should also not put such strict regulations on the type of project and the funding.”
- “More technical assistance (especially for smaller companies).”
- “NYSERDA should have regular reviews of industries and should jump out in front of promising technologies.”
- “NYSERDA could act more as a clearinghouse and be able to broker participants at different levels.”

# **R&D Demonstration Survey Report**

---

Appendix C

## **SURVEY RESPONDENT FEEDBACK ON REPLICATION PROCESS**

---

*Survey Respondent Feedback on Replication Process*

- “Awareness of the industries in the state and closer participation with industrial organizations.”
- “Making connections between manufacturers and potential customers within and outside the state.”
- “Simplify the application process.”
- “More outreach to industries. Better collaboration with industry associates. Greater availability of information regarding completed projects should exist for industry associates.”
- “The turn-around time could be improved.”
- “Installer workshops. Dealing with lessons learned, posting lessons learned on NYSERDA website. Opportunities for installers to tour demonstration projects.”
- “More personal involvement.”
- “Getting reports published and publicized quicker. There should be more opportunities for posting project descriptions for current projects.”
- “Greater promotion of findings and conclusions.”
- “Getting reports published and publicized quicker. There should be more opportunities for posting project descriptions for current projects.”
- “More Assistance with listings and permitting -bureaucratic issues.”
- “NYSERDA is well networked with issues and companies; I wish it was translated back to us.”
- “Follow up with funding to address problems in the development stage.”
- “Technology transfer seminars and getting the word out.”
- “More visibility of publications. There should be a library of solutions for particular problems that could be categorized.”
- “More marketing assistance, and facilitate multi-disciplinary feedback from different industries.”
- “Speed up the contract process.”
- “Increase the frequency of RFPs- this would show a strong signal in terms of the health of program funding.”
- “NYSERDA should select top performing projects and incentivize similar projects. This process has to be data driven and based on actual performance.”
- “More help finding additional sites. This particular project was very site specific.”
- “More efficient bureaucratic approval process.”
- “Publish results”
- “Low interest loans not done through banks. The installer should act as a go between and present the loan to the customer. Installer should go to the bank for the customer.”
- “Publicize the results of the R&D demo projects.”