END-USE RENEWABLES (EUR)

MARKET CHARACTERIZATION, MARKET ASSESSMENT AND CAUSALITY EVALUATION

Final Update Report

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NOTICE

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SECTION 1:

INTRODUCTION

In 2004, the Market Characterization, Market Assessment, and Causality (MCAC) evaluation contractor team completed a comprehensive evaluation of NYSERDA's **New York Energy $mart**[SM] End-Use Renewables (EUR) Program. This comprehensive evaluation covered the period from program inception through year-end 2003. The MCAC Team was tasked with updating certain aspects of that report in 2005 to reflect changes that had occurred during 2004 and an update report was completed in April of 2005. For 2006 the MCAC Team was tasked with completing a second update report covering the same areas included in the 2005 report. This report discusses the results of the 2006 work effort. For a full perspective on the MCAC evaluation results for the EUR Program, this report should be reviewed in conjunction with the initial comprehensive program evaluation report entitled *Market Characterization, Assessment, and Causality (MCAC) Evaluation Report: End-use Renewables Program Area*.[1]

For the remainder of this report, the comprehensive evaluation that reviewed EUR Program activity through 2003 will be referred to as the "2003 Comprehensive Report."[2] Related data will be referred to as "2003 data." The update report that reviewed program activity in 2004 will be referred to as the "2004 Update Report," and related data will be referred to as "2004 data."[3] This report, which reviews program activity during 2005, will be referred to as the "2005 Update Report," and related data will be referred to as "2005 data."

1.1 PROGRAM PARTICIPATION TO DATE[4]

As of December 31, 2005, 341 projects had been completed in the EUR Program. These projects include photovoltaic (PV) and wind installations that generate over 2.8 GWh of clean energy and 1.3 MW of peak demand reduction on an annual basis.[5]

1.2 COMPONENTS OF THE EUR UPDATE

This EUR Update consisted of the following tasks:

1. Analyze responses received from the Integrated Data Collection (IDC) efforts being conducted for the EUR Program. Develop summary statistics on the questions covered by the IDC and update, as needed, the program net-to-gross (NTG) ratio based on the findings.
2. Refine the estimate of PV installation activity that occurs in New York and is considered part of the eligible market for the EUR Program.
3. Refine the estimate of the size of the small wind installation market in New York

The results from these efforts are discussed in the remainder of this Update Report.

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[1] Skumatz Economic Research Associates, Inc. and Summit Blue Consulting, *Market Characterization, Assessment, and Causality (MCAC) Evaluation Report: End-use Renewables Program Area*, June 2004.

[2] This comprehensive program evaluation report was completed in June, 2004.

[3] This update evaluation report was completed in April, 2005.

[4] NYSERDA EUR Program data year-end 2005. This section cites the program-reported energy and demand savings figures. These figures are not adjusted for the realization rate or net-to-gross ratio.

[5] These figures refer to PON 716 for PV, PON 792 for Wind, Solar on Schools, and Large PV based on NYSERDA 2005 EUR year-end program records. The figures are based on values adjusted to account for Program realization rates.

SECTION 2:

INTEGRATED DATA COLLECTION (IDC) – WORK EFFORT & RESULTS

In 2004, the MCAC Team developed data collection protocols that could be integrated with EUR Program functions to facilitate on-going and near real-time data collection for evaluation. The MCAC Team worked closely with NYSERDA Staff to develop a protocol for collecting data as part of the standard program implementation practices and customer correspondence associated with the EUR Program. This protocol, termed Integrated Data Collection (IDC), garners participant feedback in near real-time on both market characterization and attribution/causality. The IDC is an important source of information going forward to supplement the more traditional retrospective survey efforts. The logic behind this approach is that customers and market actors will have a better idea of the factors influencing their decisions the closer the survey is in time to the decision itself.

For the EUR Program, the IDC effort targets end-use customers participating in Program Opportunity Notice (PON) 716 who have recently completed a system installation, and PV system installers who have recently been approved by NYSERDA to be an eligible installer. The IDC effort asks respondents to complete an abbreviated survey that contains only the key MCAC questions related to the program/market.

In 2004, the first year that the IDC effort was in place for the EUR Program, the MCAC Team received 20 completed IDC surveys. Of the 20 IDC responses, only one response was collected from a PV system installer. However, additional data were collected from PV installers through a separate survey conducted by NYSERDA's process evaluation contractor, Research Into Action (RIA).

During 2005, 49 IDC surveys were completed, including 43 end-use customer responses and six installer responses. This represents an overall response rate of 53% (Table 2-1). This response rate is in line with expectations and exceeds the response rates of IDC efforts underway for other NYSERDA programs. Selected results from the survey responses received in 2005 are presented in the remainder of this report.

Table 2-1. Survey Status

Survey	Population (Surveys distributed in 2005)	Number of 2005 Surveys Completed (Response Rate)
PV Installer – Application Phase IDC	13	6 (46%)
End-Use Customer – Project Completion Phase IDC	80	43 (54%)
Total Surveys	**93**	**49 (53%)**

2.1 PV INSTALLER SURVEY RESULTS

Due to the small number of PV installers who completed the IDC survey during 2005,[6] the data collected during this period cannot form the basis for conclusive findings about the program. However, the 2005 IDC PV installer data do include several notable details, and appear to indicate the existence of trends that are worthy of discussion. For further reference, data tables recording the complete results from the 2005 data, as well as comparisons to previous years' data (where available), are included in Appendix B.

[6] Six completed IDC surveys were collected from PV installers during 2005.

2.1.1 Number of Installer Employees and Certification

In general, it appears that the PV installation industry in New York is experiencing slow but steady growth. First, the number of people employed by PV firms, and focusing on PV installations (full-time equivalents - FTEs) appears to be increasing. In 2003, the average number of FTE PV system installers employed by PV companies was 3.3 (Table 2-2). The average increased to 7.7 FTEs in 2004, and 8.0 FTEs in 2005. The 2004 and 2005 figures are influenced by a few responses from larger firms. In 2004, the maximum response was 40 and the median was 4.5. In 2005, the maximum response was 30 and the median was 4.0.

Table 2-2. Full-Time Equivalents Employed by PV Installers

	2003	2004	2005
Average	3.3	7.7	8.0
Minimum	0	1	2
Maximum	12	40	30
Median	N/A	4.5	4

Sources: 2003 MCAC survey of PV installers and distributors, Q10, n=24; RIA 2004 PV Installer Survey, Q17, n=16; 2005 PV Installer Survey, Q4, n=6.

While large firms are still not the norm, the presence of large firms in both 2004 and 2005 implies growth in the industry. Furthermore, the fact that new firms continue to enter the market indicates somewhat steady growth in the PV installation industry in the State.[7]

The data also indicate growth in the number of PV installers obtaining certification. As shown in Table 2-3, the number of people employed by PV installers possessing some level of certification averaged 1.8 in 2003.[8] In 2004, the average number of certified employees per firm was less than one, and in 2005, the average was 6.2. This question, like the question regarding the number of people employed by each firm, was significantly affected by the presence of a large firm. In 2005, one firm reported having 30 certified employees, though the median response was just one employee. However, the firm's new participation in NYSERDA's EUR PV Program does appear to demonstrate growth and maturity of the PV installation industry. Note that while the question was phrased, "How many [employees of your firm] hold some form of PV installation certification?" it appears that at least some of the respondents based their responses on non-PV related certifications. NYSERDA staff report that NABCEP is the only recognized PV installer certification, and only 21 NYSERDA-eligible installers are NABCEP certified.

[7] As noted earlier, the 2005 IDC responses are from firms that have just recently been pre-qualified by NYSERDA to participate in the PV installation incentive program.

[8] In addition to the general question about how many employees in their firm possess some form of certification, in 2004 and 2005, installers were asked to report whether they (themselves) possess North American Board of Certified Energy Practitioners (NABCEP) certification. In 2005, one third of the respondents (33%) reported that they possess NABCEP certification, one third said they possess some other form of PV installer certification, and one third said they possess no certification (2005 PV Installer Survey, Q3, n=6).

Table 2-3. PV Installer Certification

	rrent Installer Certification *installers per firm currently certified)*			Planned Installer Certification *(number of installers per firm planning to obtain certification within one year)*		
	2003	**2004**	**2005**	**2003**	**2004**	**2005**
Average	1.8	0.7	6.2	0.8	1	1.8
Minimum	0	0	1	0	0	1
Maximum	12	40	30	3	5	4
Median	N/A	1	1.5	N/A	1	1.5

Source: 2003 MCAC survey of PV installers and distributors, Q11, n=24; RIA 2004 PV Installer Survey, Q13, n=20; 2005 PV Installer Survey, Q6, n=6.

The number of certified installers should increase over the next year as well. As shown in Table 2-3, when asked about the number of people in their firm planning to obtain certification within the next year, the average installer response was 1.8. In 2003 the average was 0.8, and in 2004 the average was one, a trend that demonstrates a slow but steady increase in plans to obtain certification.

On average, approximately one-half of the installers employed by each of the responding firms (51%) currently report that they are certified, and each firm has plans to certify additional employees in the coming year. These facts indicate that installer certification seems to be a priority among new entrants to the PV installation industry. The presence of these qualified installers should have a positive impact on the quality of future PV installations in New York.

2.1.2 Consumer Awareness and Adoption

On the topic of consumer awareness of PV applications, installers consistently rank commercial customers as having slightly lower levels of awareness than residential consumers. Data from 2004 reveal a dip in perceived levels of awareness among residential consumers compared to the 2003 data (from 18% in 2003 to 5% in 2004). The limited 2005 data show awareness levels that are more consistent with 2004 data (6%). On the commercial side, the data collected in all three years place perceived awareness levels within the 4% to 7% range.[9]

Installer estimates of the percent of participating end users who are early adopters as opposed to mainstream consumers were almost identical in 2003 and 2004 (72% and 73%, respectively). PV installers who responded during 2005 believe that somewhat fewer consumers (60%) are early adopters.[10] Interestingly, 56% of end-users characterized themselves as early adopters in 2005.[11]

2.1.3 Market Sustainable Price for PV

As shown in the Figure 2-1, the 2005 data indicate a slight increase in the market sustainable price for PV. In 2003 and 2004, estimates for the price at which the market for PV will be sustainable in the

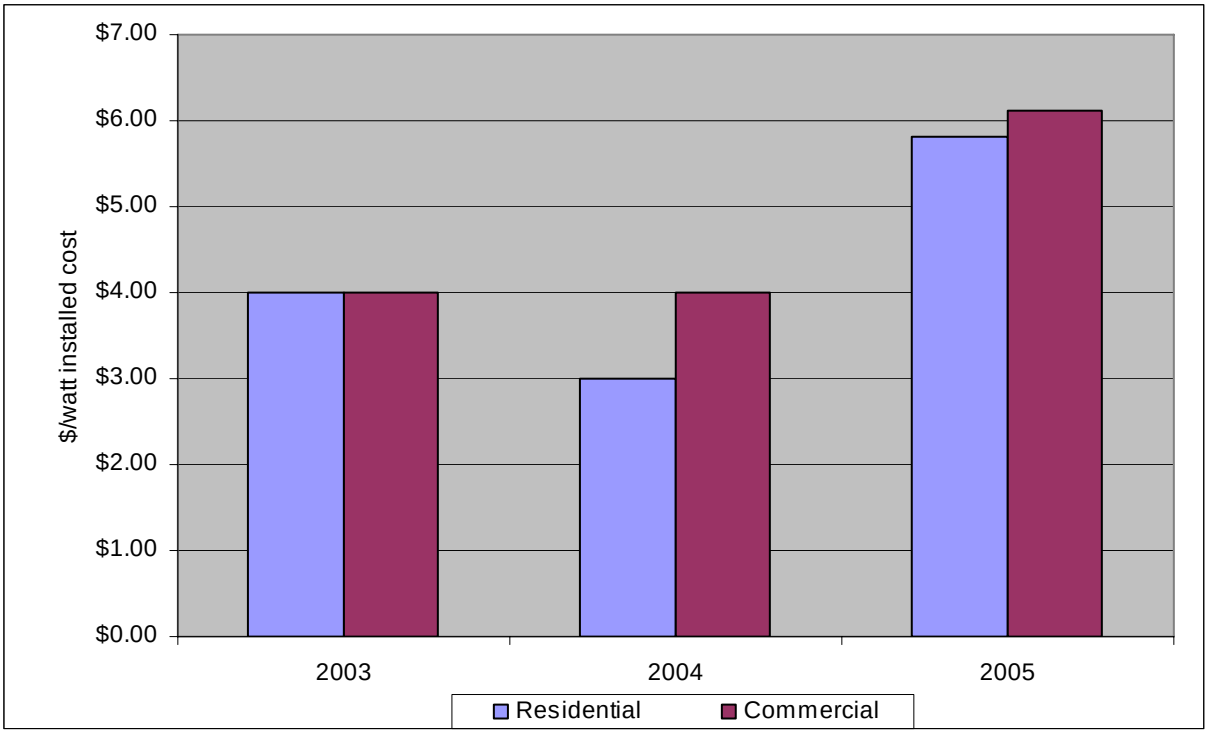
[9] 2003 MCAC Survey of PV Installers and Distributors, Qs 29 and 30, n=24; RIA 2004 PV Installer Survey, Q1, n=30 and Q2, n=29; 2005 PV Installer Survey, Q10 and Q11, n=6.

[10] 2003 MCAC Survey of PV Installers and Distributors, Qs 35, n=24; RIA 2004 PV Installer Survey, Q3, n=30; 2005 PV Installer Survey, Q12, n=6.

[11] 2005 Participating End User Post Installation IDC, Q18a, n=43.

absence of any incentives were consistent at an average of $3.50 per watt for residential consumers and $4.00 per watt for commercial consumers. Based on the PV installer responses collected during 2005, installer perceptions of the average market sustainable price for PV has grown to $5.81 per watt for residential consumers, and $6.12 per watt for commercial customers. This apparent increase in consumers' willingness to pay might be accounted for by the fact that rising energy prices are making consumers more tolerant of the high price of PV. Alternatively, the early adopters participating in NYSERDA's program may have a higher willingness to pay than typical consumers.

Figure 2-1. Installer Reports of Perceived Market Sustainable Price for PV



Source: 2003 MCAC survey of PV installers and distributors, Qs 63 and 64, n=24; RIA 2004 PV Installer Survey, Qs 4 and 5, n=25; 2005 PV Installer Survey, Q13, n=6.

2.1.4 PV Installer Geographic Coverage

The PV installers who completed the 2005 IDC survey indicate a willingness to travel that is generally consistent with, but slightly lower than the 2003 and 2004 results. While one response was dramatically higher than the others (5,000 miles), and one response was in a format that could not be calculated ("anywhere in New York"), the other four responses produce an average of 2.75 hours (the 2003 average was 3.3 hours and the 2004 average was 5.1 hours).[12] In a related question, installers were asked in which New York utility service territories they install and sell PV systems. In general, installers listed more than one territory, and 50% indicated that they serve all utility territories in the State.[13] One might expect

[12] In 2003 and 2004, responses were provided in terms of hours of driving time. In the 2005 survey, the question was framed in terms of driving distance (miles). To convert the 2005 data to hours, a travel speed of 50 miles per hour has been assumed. 2003 MCAC Survey of PV Installers and Distributors, Q16, n=24; RIA 2004 PV Installer Survey, Q6, n=30; 2005 PV Installer Survey, Q9, n=6.

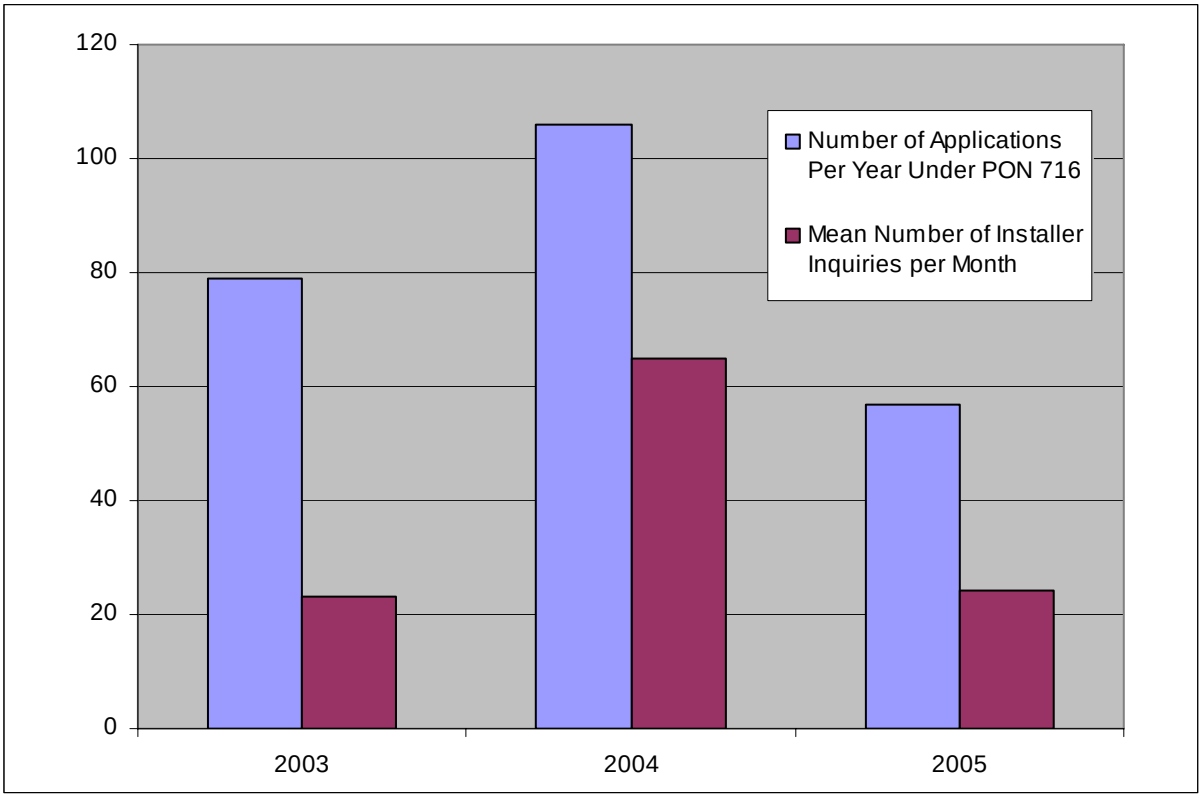
[13] 2005 PV Installer Survey, Q8, n=6.

that as the PV industry matures, installers could become more selective and take only jobs that require limited travel time. Assuming this is a sound hypothesis, the 2005 data, though limited, do not appear to indicate that the industry is mature yet.

2.1.5 PV-Related Inquiries

The installers were asked how many PV-related inquiries they receive per month. In 2003, installers reported receiving an average of 23 inquiries per month. In 2004, installers reported receiving nearly three times that number of inquiries: an average of 65 inquiries. This number dropped to 27.6 in 2005. The relatively high level of inquiries reported during 2004, compared to 2003 and 2005, is consistent with NYSERDA's records for the number of PON 716 applications submitted in each of the last three years, as shown in Figure 2-2 below. It is important to note the different circumstances of the installers responding in the past three years. In 2003 and 2004, survey participants had been active in NYSERDA's PV program for some time. In 2005, the survey respondents had just recently begun participating in NYSERDA's program. At the time they completed the survey, these installers may not yet have established their presence well enough to field a substantial number of inquiries.[14]

Figure 2-2. Relationship Between Number of PON 716 Applications Per Year and Mean Number of Installer Inquiries per Month



Sources: 2003 MCAC survey of PV installers and distributors, Q7, n=24; RIA 2004 PV Installer Survey, Q12, n=17; 2005 PV Installer Survey, Q2, n=6; NYSERDA EUR 2005 year-end program records.

[14] As shown in Figure 3-3, 2005 saw more PV system installations than either of the two previous years for which NYSERDA provided funding to residential and small commercial through PON 716.

2.1.6 Small Wind

In 2003 and 2004, nearly half of all PV installers completing the survey indicated that they also install small wind systems. In 2003, respondents had an average of four years of small wind system installation experience (Table 2-4). In 2004, respondents who install small wind systems averaged 10.2 years of experience. Two respondents to the 2005 IDC survey reported that they install small wind systems, and these two respondents averaged 2.75 years of installation experience. Reasons given by the respondents who reported that they do not install small wind systems included a lack of experience and a business focus on the PV industry. Since the PV installer IDC effort only collects data from installers who recently became pre-qualified for NYSERDA program participation, the decrease in the average number of PV installers also installing small wind systems may merely reflect the fact that the more seasoned renewable energy installers in the state are already participating in the Program. Furthermore, these figures may reflect growth in the PV industry, as new PV installers believe there is enough market potential to support businesses focused solely on PV installations.

Table 2-4. PV Installers Also Installing Small Wind

	2003 Survey	2004 Survey	2005 Survey
Install small wind?	46%	50%	33%
Years installing Mean	4	10.2	2.75
Minimum Years	1	5	0.5
Maximum Years	10	14	5

Sources: 2003 MCAC Survey of PV Installers and Distributors, Q5, n=24; RIA 2004 PV Installer Survey, Q7 (of data provided to the MCAC Team), n=19; 2005 PV Installer IDC Survey, Q1, n=6.

2.2 PARTICIPATING END-USE CUSTOMER – PROJECT COMPLETION PHASE IDC

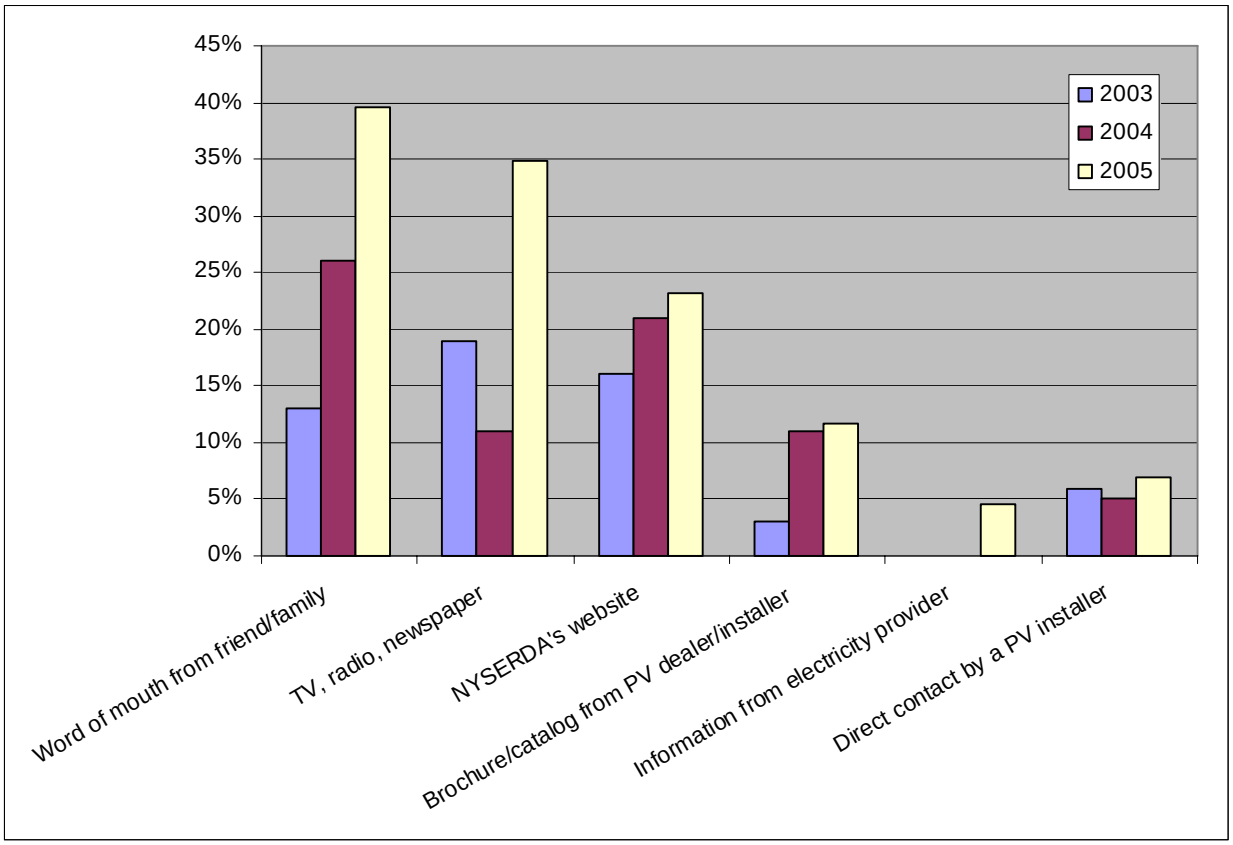
In 2005, 43 PV system owners completed the IDC survey. This is more than twice the number of respondents from 2004, the first year of the IDC effort. This increase in responses reflects the fact that the total number of NYSERDA-funded PV installations nearly doubled in 2005 compared to the previous year. Considering the increase in the number of responses, as well as the fact that IDC surveys were completed shortly after the PV systems were installed, the 2005 IDC data collected from PV system owners is the most robust data collected yet from Program participants.[15] Key findings from the 2005 IDC effort are discussed in this section. Data tables recording the complete set of responses from 2005, as well as comparisons to previous years' data (where available), are included in Appendix B.

Survey results show steady growth in the importance of word of mouth communications as a means of spreading awareness of the availability of PV technology. In 2005, the top two ways that respondents learned about PV system availability were word of mouth and mass media outlets such as radio, TV and newspapers (Figure 2-3). Mass media moved from being the fourth ranked answer in 2004 to the second in 2005. This could be due to increasing energy prices and the perception that prices will continue to rise, as an increasing level of media attention is focused on energy issues. The third most common answer was "other," which included sources such as the Internet, environmental groups, architects, and pre-existing

[15] The 2004 and 2005 data were collected using surveys distributed shortly after PV system installation was complete. Therefore, the customers' decision-making process was fresh in their minds. The 2003 survey, on the other hand, consisted of respondents who had installed systems at any point during the Program since its inception. Consequently, the operational experience and market conditions during which the system was purchased may be significantly different between the two groups of respondents.

background knowledge. The NYSERDA website remains a fundamental source of information about PV system availability, with the percentage of responses rising slightly each year.

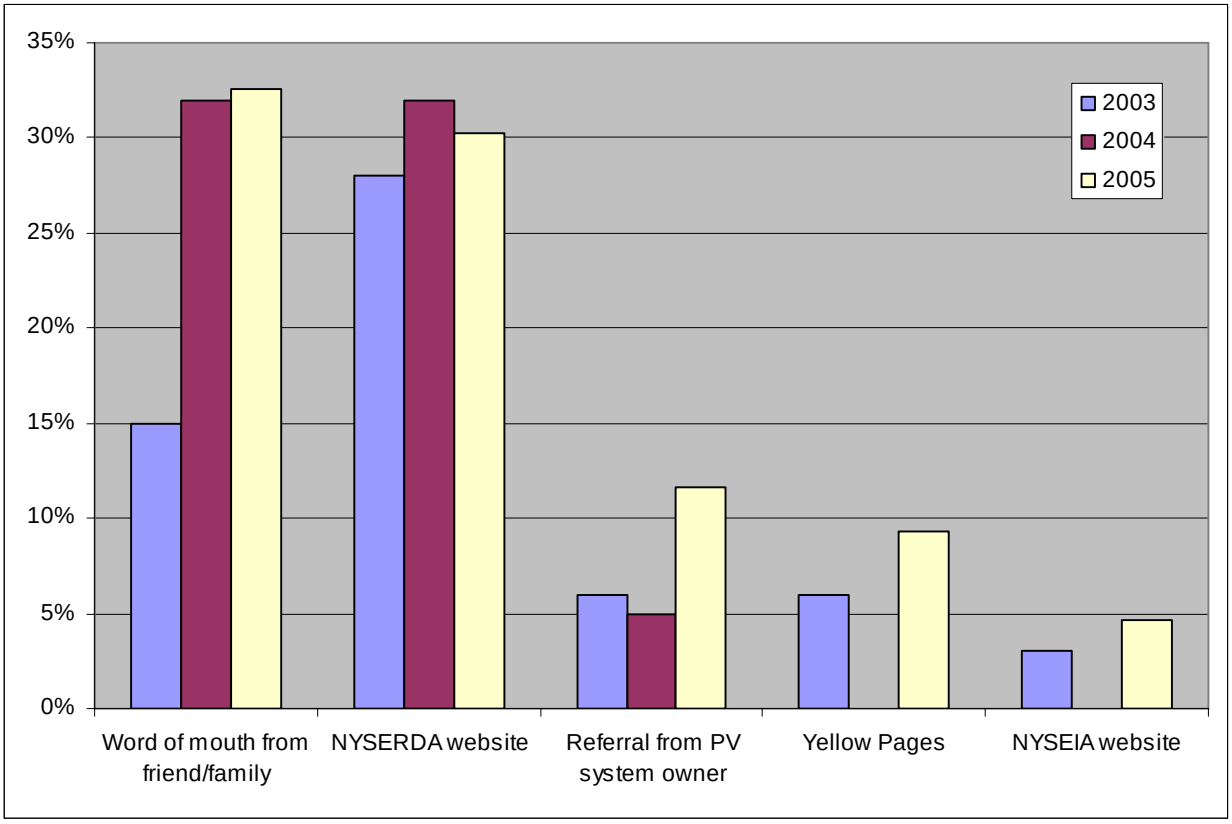
Figure 2-3. How Participating End Users First Learned About PV System Availability



Sources: 2003-2004 MCAC Survey of PV System Owners, Q4, n=32; 2004 Participating End User Post Installation IDC Q1, n=13; and 2005 Participating End User Post Installation IDC, Q1, n=43.

Word of mouth communications are steadily rising as a source of information about PV installers as well. Forty-five percent of respondents selected either "word of mouth from a friend or family member," or "referral from another PV system owner" as the source of information about their PV system installer (Figure 2-4). This represents a 23% increase over the 2004 results. A third of respondents indicated "other" sources of information about their installer, including newspaper, magazine and newsletter articles, as well as home shows and energy fairs, and mailings, literature and advertisements from distributors. The NYSERDA website held steady as a commonly reported source of information about PV system installers (28% in 2003, 32% in 2004, and 30% in 2005). This is a logical finding given that consumers must use NYSERDA-approved installers in order to obtain a financial incentive from NYSERDA.

Figure 2-4. How Participating End Users Learned About Installers[16]

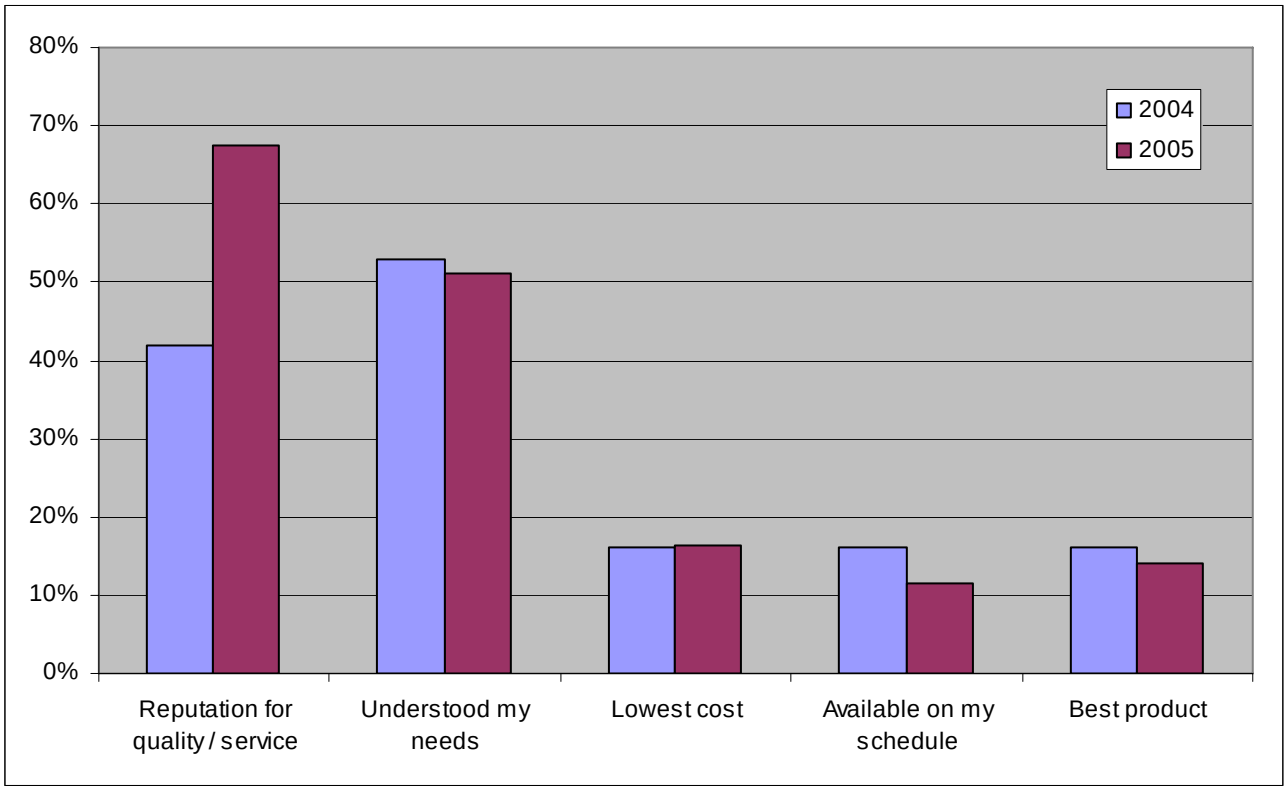


Sources: 2003 MCAC Survey of PV System Owners, Q9, n=32; 2004 Participating End User Post Installation IDC, Q4, n=19; and 2005 Participating End User Post Installation IDC, Q4, n=43.

In contrast to the 2004 results, the most common reason respondents reported for selecting their installer was the company's reputation for quality and service (Figure 2-5). The next most frequently cited basis for choosing an installer was that the installer understood their needs. "Other" was the third most frequent response, with issues of geography being the most common among those who responded in this category (*i.e.*, convenience due to other ongoing installations in the area or knowledge and experience resulting from having worked in a particular area). Interestingly, "lowest cost" has consistently ranked among the least common reasons for selecting an installer. A possible explanation for this finding is that, having accepted the high cost of investing in PV, Program participants place a high priority on the quality of their PV installation, and their experience working with their installer. It is also possible that there is not much of a price difference from one installer to the next. It is clear, however, that Program participants are sensitive to other aspects of project economics. As discussed below, the second most commonly cited reason for installing PV (79% of respondents) was to decrease their monthly electric bills.

[16] Note that "yellow pages" and "NYSEIA website" were not included as options in the 2004 survey.

Figure 2-5. Why Participating End Users Selected Installers



Sources: 2004 Participating End User Post Installation IDC, Q6, n=19; and 2005 Participating End User Post Installation IDC, Q6, n=40.

The reasons given for installing a PV system were generally consistent with the results from 2003 and 2004. The most popular reason for installing a PV system was to help the environment (91%), followed by lowering utility bills (79%) and increasing energy independence (74%). The percentages of respondents choosing either of the latter two reasons were more closely matched than in previous years. Two-thirds of respondents (67%) reported using the PV system to hedge against high electricity prices as a reason for the making the investment, a 16% increase over 2004.[17]

In keeping with the results from 2003 and 2004, the majority of PV installations (53%) were completed as stand-alone projects. Compared to 2004, an increasing number of systems were installed as part of new construction (16% in 2005 compared to 11% in 2004) and large renovation projects (19% in 2005 compared to 5% in 2004). However, the 2005 results are fairly consistent with the results from 2003 with regard to the percentage of systems installed as part of new construction or renovation, so these data do not appear to indicate a trend.[18]

The 2005 survey results reflect a moderate decrease in the importance of the availability of net metering. The percentage of respondents reporting that the availability of net metering influenced their decision to

[17] 2003 MCAC Survey of PV System Owners, Q5, n=32; 2004 Participating End User Post Installation IDC, Q2, n=19; 2005 Participating End User Post Installation IDC, Q2, n=43.

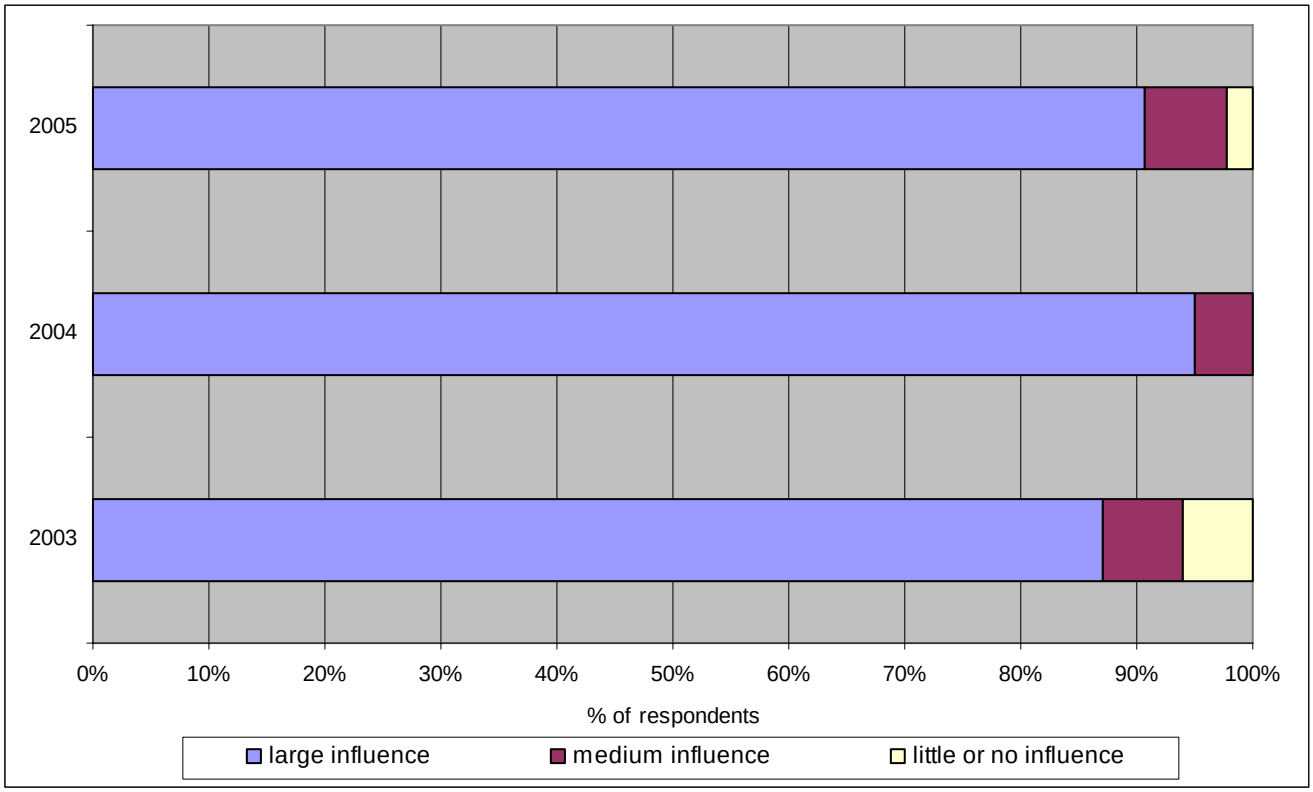
[18] 2003 MCAC Survey of PV System Owners, Q7, n=32; 2004 Participating End User Post Installation IDC, Q3, n=19; 2005 Participating End User Post Installation IDC, Q3, n43.

install a PV system dropped from 94% in 2004, to 72% in 2005. However, it is not clear that this represents a trend. In 2003, only 56% of respondents reported that net metering influenced their decision.[19]

2.3 RESPONSES RELATED TO PROGRAM INFLUENCE ON PV ADOPTION

Based on survey responses, the NYSERDA incentives continue to play an extremely important role in participating end users' decisions to purchase a PV system. Nearly all respondents (98%) reported that the incentive influenced their decision to install a PV system, and 93% of those respondents claimed that the incentive had a large influence on their decision (Figure 2-6). Similar results were found in prior years with 93% of respondents in 2003 and 95% of respondents in 2004 reporting that the NYSERDA incentive had a major influence on their decision-making.[20]

Figure 2-6. Importance of NYSERDA Incentive



Sources: 2003 MCAC Survey of PV System Owners QN/A, n=32; 2004 Participating End User Post Installation IDC Q9, n=18; 2005 Participating End User Post Installation IDC Q9, n=43. Note: records indicate that in 2003, 94% of respondents (30 respondents) said the incentive influenced their decision, and 93% of those respondents (28 respondents) said it had a large influence. It was assumed that the level of influence for the remaining two respondents was medium.

Of the 65% of respondents who said the incentive affected the timing of their PV installation, 54% said they never would have invested in a PV system without the NYSERDA incentive, and 37% said they would not have installed a system for five or more years without the incentive (Table 2-5). This is

[19] 2003 MCAC Survey of PV system owners, Q17, n=32; 2004 Participating End User Post Installation IDC, Q8, n=18; and 2005 Participating End User Post Installation IDC, Q8, n=40.

[20] 2005 Participating End User Post Installation IDC, Q9, n=43.

consistent with the results from the 2004 surveys wherein 80% of respondents said the NYSERDA incentive affected the timing of their decision to install a PV system. Of those respondents, 45% said they would never have installed a system without the incentive, and 50% said they would not have completed an installation for five or more years without the incentive. While these figures clearly demonstrate that the incentive plays an extremely important role in end-users' decisions to install PV systems, it does appear that a small fraction of PV system installations would still occur in the absence of the NYSERDA incentive program. In 2004 and 2005, a substantial percentage of respondents indicated that the timing of their decision to install a PV system was not affected by the availability of the NYSERDA incentive (20% and 35% respectively). In addition, in 2005, one of the respondents who reported that the incentive did affect the timing of his decision said he would have installed a PV system within one year in the absence of the NYSERDA incentive. The 2004 comprehensive program evaluation report estimated program freeridership at less than 5%. The 2005 IDC findings confirm that estimate.

Table 2-5. Impact of NYSERDA Incentive on Timing of PV Installations

	2004	2005
Incentive affected timing	80%	65%
Without incentive, would have installed PV….		
within 1 year	N/A	4%
within 5 or more years	50%	37%
never	45%	54%
don't know	N/A	5%

Sources: 2004 Participating End User Post Installation IDC Q9, n=19; and 2005 Participating End User Post Installation IDC Q11, n=43.

2.4 RESPONSES TO SPILLOVER QUESTIONS

In 2005, 11 respondents reported that PV systems have been installed by friends and family members.[21] During 2004, respondents reported that six systems had been installed as a result of participant installations.[22] No information was collected regarding whether the systems were installed in New York, or if the referenced system owners were also participants in the NYSERDA EUR Program. Therefore, the value of these installations should be discounted for the purposes of calculating program spillover.[23] The 2003 Comprehensive Report estimated spillover of between 0% and 6%. The 2005 data confirm this estimate.

2.5 NET-TO-GROSS RATIO

Due to low initial estimates for freeridership and spillover, the 2003 Comprehensive Report estimated the net-to-gross (NTG) ratio for the EUR Program at close to 1 or 100%. Freeridership (*i.e.*, the percentage of renewable energy generation supported by the program that would have been installed in the absence

[21] Sixteen percent of 2005 End User Post Installation survey respondents reported that friends or family members had installed PV systems as a result of the participant's installation. Ten reported that systems have already been installed by friends or family, and one reported that an installation is in progress (Q16, n=43).

[22] 2004 Participating End-User Post Installation IDC, Q16, n=N/A.

[23] The IDC survey instruments did not contain questions targeting this information due to the desire to keep the instruments concise. Going forward, the IDC survey instruments can be revised should NYSERDA want to collect this information via the IDC effort. In addition, future non-IDC survey efforts can contain questions targeting this information.

of the Program) was estimated to be less than 5%. Spillover (*i.e.*, the additional renewable energy generation installations that occurred as a result of the Program, but are not currently counted by the Program) ranged from 0%-6%. The 2004 Update Report also estimated a NTG ratio of 1.0, but based this on 0% estimates for freeridership and spillover effects.

Since the freeridership and spillover estimates for this 2005 Update Report fall within the same range as those presented in the 2003 Comprehensive Report and the 2004 Update Report, no modifications to the freeridership or spillover estimates are recommended at this time (Table 2-6).

Table 2-6. EUR Net Savings (Cumulative Annual from Program Inception through Year-End 2005)

	Cumulative Annual Impacts[1]	**Realization Rate[2]**	**Adjusted Gross Impacts**	**Net Factor** *1 minus freeridership*	**Market Factor** *1 plus total spillover*	**Net-to-Gross Ratio[3]**	**Net Savings[3]**
MWh/year	2,724	1.04	2,833	1.0	1.0	1.0	2,833
MW on peak (AC)	1.56	0.85	1.33	1.0	1.0	1.0	1.33

[1] Values for unadjusted program-reported savings obtained from NYSERDA EUR 2005 year-end data.

[2] Values for realization rates were obtained from **New York Energy $mart Program**[SM] Evaluation and Status Report, May 2005.

[3] The following formula is used to estimate the NTG ratio: NTG = (1 – Freeridership) x (1 + Spillover).

SECTION 3:

PV AND SMALL WIND MARKET ACTIVITY

3.1 NEW YORK PV AND SMALL WIND INSTALLED CAPACITY

In addition to NYSERDA, two other entities, the Long Island Power Authority (LIPA), and New York Power Authority (NYPA), have funded PV installations in recent years, and both LIPA and NYSERDA have funded small wind[24] installations as well. Table 3-1 shows the total kW capacity of PV and small wind systems installed across New York by year since 1999, according to New York Public Service Commission (PSC) records.

Table 3-1. New York Public Service Commission records of PV and small wind system interconnections by year (kW AC)

Year	PV PSC	Small Wind	Total
1999	7		7
2000	154		154
2001	121		121
2002	995	270	1,265
2003	1,339	30	1,369
2004	1,278	53	1,331
2005	1,855	42	1,897
Total	**5,749**	**395**	**7,817**

Source: New York Public Service Commission, March 2006.

Figure 3-1 and Figure 3-2 below show the PV and small wind installed capacity totals by funding source, as well as the percentage of total statewide PV and small wind installed capacity represented by each. NYSERDA has installed a total of 1,673 kW[25] of PV system capacity through its range of installation incentive programs.[26] NYSERDA-funded PV systems account for 29% of the total PV installed capacity on record with the PSC. NYSERDA's installation record is second to LIPA, which has funded 2,511 kW, or 44% of New York's installed PV system capacity.[27] NYPA has funded 634 kW, or 11% of the State's installed PV system capacity.[28]

NYSERDA's small wind installation incentive program has funded 71 kW, or 18% of the State's total small wind energy capacity. As with PV, LIPA-funded small wind installations account for the largest

[24] "Small wind" refers to wind turbines, typically sized between 10 and 50 kW, that are installed on the customer side of the meter at the distribution system level of the electric grid. NYSERDA has also helped fund several large scale wholesale wind projects.

[25] All system capacity figures discussed in this report refer to AC capacity ratings.

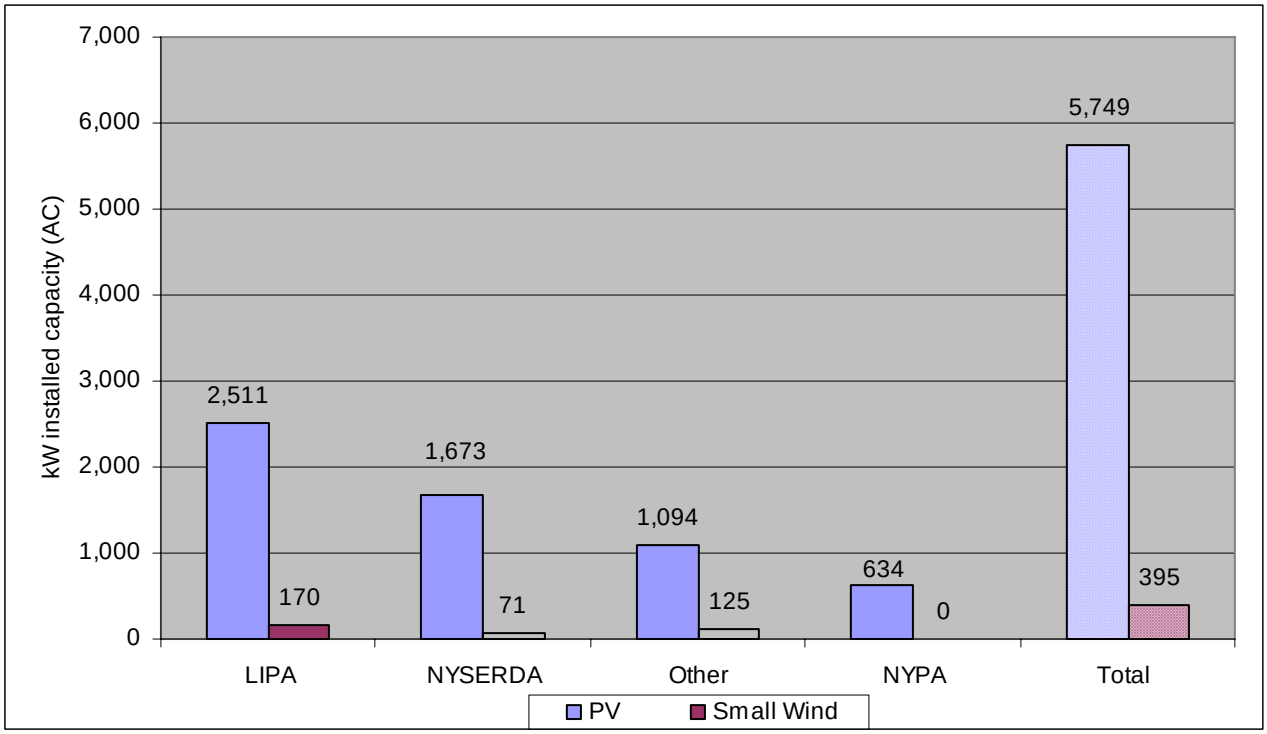
[26] NYSERDA's current PV installation incentive programs include PON 716 for residential and small commercial consumers, Solar on Schools, and a large PV program. Additional residential and small commercial PV systems were installed under a program that pre-dated PON 716.

[27] Information obtained from: http://www.lipower.org/cei/solar.rebate.html (April, 2006).

[28] Information obtained from: http://www.nypa.gov/services/solarprojects.htm (April, 2006).

portion of the installed small wind energy capacity in the State. The 170 kW of small wind energy capacity funded by LIPA represents 43% of the State's total.

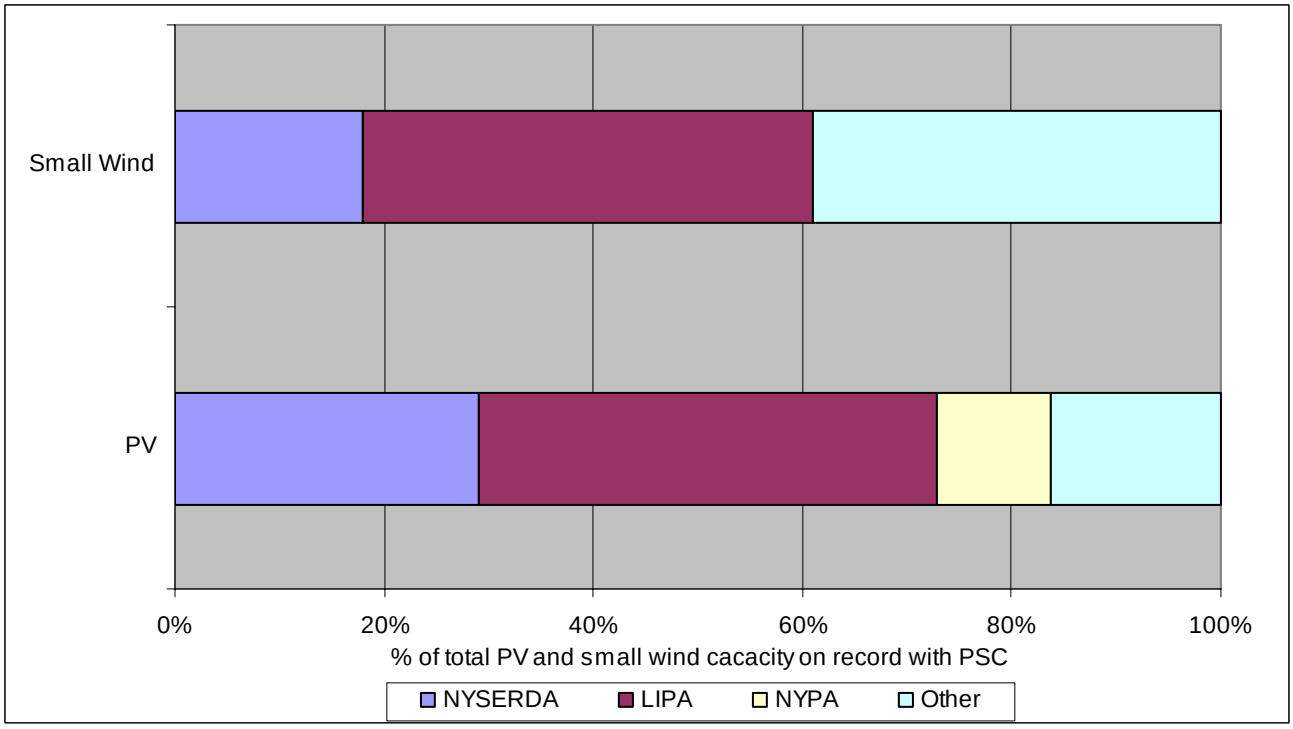
Figure 3-1. Installed PV and small wind capacity by funding entity and in total.[29]



Source: New York Public Service Commission interconnection records, March, 2006; NYSERDA year-end 2005 program records; LIPA website, http://www.lipower.org/cei/solar.rebate.html (April, 2006); NYPA website, http://www.nypa.gov/services/solarprojects.htm (April, 2006).

[29] LIPA data obtained from http://www.lipower.org/cei/solar.rebate.html (March, 2006). NYPA data obtained from http://www.nypa.gov/services/solarprojects.htm (March, 2006). PSC data provided by Patrick Maher of PSC (March, 2006).

Figure 3-2. Percentage of total PV and small wind installed capacity on record with PSC.



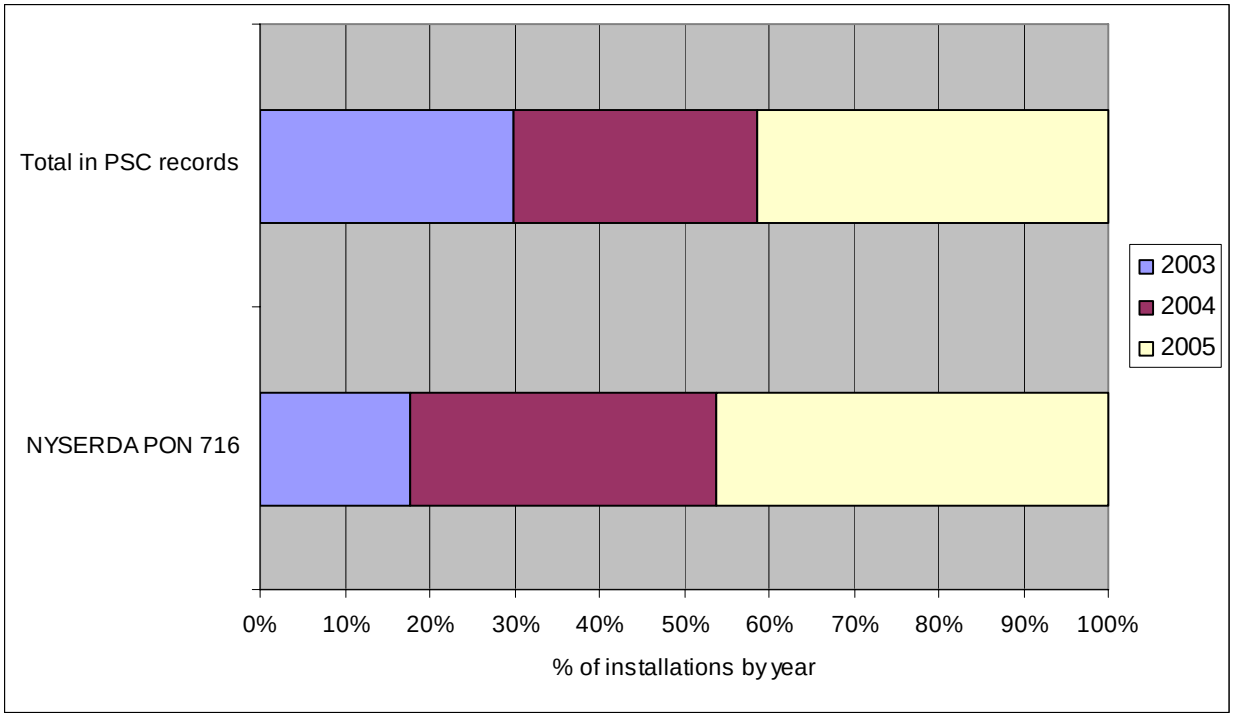
Source: New York Public Service Commission interconnection records, March, 2006; NYSERDA year-end 2005 Program records; LIPA website, http://www.lipower.org/cei/solar.rebate.html (April, 2006); NYPA website, http://www.nypa.gov/services/solarprojects.htm (April, 2006).

Based on the data reviewed in preparing this report, 19% of PV capacity and 31% of small wind capacity included in the PSC's interconnection records is unaccounted for by projects funded by any of the three funding entities.[30] This may indicate that additional renewable energy installations are occurring, but further research is necessary to determine the accuracy of LIPA and NYPA figures.

The distribution of NYSERDA's residential and small commercial (PON 716) PV installation activity over the past three years is similar to that of total statewide PV installation activity (Figure 3-3). However, NYSERDA has seen steady growth each year, while the statewide activity was slightly greater in 2003 than in 2004.

[30] Note that the data included in this report for LIPA and NYPA was obtained from organization websites and has not been confirmed by representatives from either organization.

Figure 3-3. Distribution of NYSERDA PON 716 and total statewide PV installation 2003-2005.



Source: New York Public Service Commission interconnection records, March, 2006; NYSERDA year-end 2005 Program records.

3.2 FURTHER GROWTH LIKELY IN PV AND WIND MARKETS

A number of factors will likely lead to continued growth in PV and wind system installations in New York, as well as at the national and international levels. At the national level, the Energy Policy Act of 2005 (H.R. 6, Sec. 1335) introduced a solar tax credit that offers residential consumers a 30% credit up to $2,000. Systems installed between January 1, 2006 and December 31, 2007 will be eligible for the credit.[31] Substantial corporate tax incentives also continue to be available to improve the financial viability of commercial PV installations.[32] New York also introduced its own residential solar tax incentives in 2005. Governor George Pataki signed a bill in August, 2005 that exempts both the sale and installation of PV equipment from state sales and compensating use taxes, and allows municipalities to waive their city sales taxes as well. The Governor also signed a separate bill that extends the State's personal income tax credit for solar energy systems to include systems used for water heating and space heating or cooling. The credit applies to 25% of the cost of buying and installing solar energy equipment, and has a cap of $5,000, up from $3,750.[33] In addition, 2006 is the first year in which New York's investor-owned utilities must

[31] This credit also applies to solar water heating systems, and a similar incentive is available for residential fuel cell installations. For more information, see http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=US37F&State=Federal&currentpageid=1&ee=0&re=1.

[32] For further information, see http://www.dsireusa.org/library/includes/genericfederal.cfm?currentpageid=1&search=federal&state=US&RE=1&EE=0

[33] For further information, see http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=NY24F&state=NY&CurrentPageID=1&RE=1&EE=0

begin purchasing energy from renewable sources, including customer-sited PV and small wind systems, in compliance with the State's Renewable Portfolio Standard (RPS).[34]

Furthermore, rising fuel prices, interest in diversifying energy supplies, and maturing infrastructure in the PV and wind industries are all contributing to record growth in the U.S. and global renewable energy markets. In 2005, 1,460 MW of PV installations occurred worldwide, representing 34% growth over the previous year.[35] The global wind power market grew by 43% in 2005. In the U.S., 2,431 MW of new wind power capacity resulted in an annual growth rate of 35%.[36]

One negative consequence of the rapid growth in demand for wind and solar energy is an equipment supply shortage. Aggressive financial incentive programs in countries like Germany and Japan are absorbing much of the PV industry's manufacturing capacity and are leaving many U.S. distributors unable to keep pace with the local demand for PV equipment.[37] Further pressure is being placed on PV equipment manufacturers and distributors by large PV financial incentive programs in states like California,[38] New Jersey, and New York, as well as a shortage of the silicon used in PV cell production.[39]

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[34] For further information, see http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=NY03R&state=NY&CurrentPageID=1&RE=1&EE=0

[35] Obtained from Solarbuzz website: www.solarbuzz.com/Marketbuzz2006-intro.htm. (March, 2006).

[36] Worldwide wind growth rate obtained from Global Wind Energy Council website: www.gwec.net/index.php?id=30&no_cache=1&tx_ttnews%5Btt_news%5D=21&tx_. U.S. wind data obtained from American Wind Energy Association website: www.awea.org/news/US_Wind_Industry_Ends_Most_Productive_Year_012406.html.

[37] Welch, Michael. "U.S. PV Module Shortage." Home Power, August&September, 2004.

[38] On January 12, 2006, the California Public Utilities Commission approved the California Solar Initiative which will provide $3.2 billion in funding for solar projects over 11 years.

[39] Solar manufacturers currently depend on waste from the microelectronics industry as a source of silicon for PV cell production. High demand for this waste has driven up prices and limited availability. According to Scott Sklar, President of the Stella Group, Ltd, and former Executive Director of the Solar Energy Industries Association, new sources of solar silicon production are emerging, and many in the PV industry believe the silicon supply shortage will subside in 2007. (Renewable Energy Access, February 9, 2006)

SECTION 4:

SUMMARY AND CONCLUSIONS

The results of this report confirm and update the results presented in the 2004 Update Report, as well as the 2003 Comprehensive Report. This year's results provide additional evidence that the EUR Program is responsible for the vast majority of end-user investment in PV installations in New York. The results also indicate that the PV industry is slowly but steadily maturing in the State, and that the ways in which consumers are learning about and making choices regarding their PV investments are shifting somewhat. A summary of results from surveys collected during 2005, and a comparison of these results to Year 1 and Year 2 MCAC EUR Program reports are provided below.

Advancement and Growth of PV Installer Industry

With 29 installers already registered to install systems under the EUR Program at the end of 2004, it is impressive that an additional 13 installers became eligible to participate in the program during 2005. In addition to the growth in the number of installers, the level of installer training appears to be improving, with an increasing number of installers obtaining some form of certification; an average of 6.7 installers were certified per firm in 2005, compared to 0.7 installers certified per firm in 2004. The trend toward installer certification should result in higher quality installations, providing NYSERDA with greater confidence in the security of the investment of EUR Program funds. New entrants to the PV installation market employ more FTE individuals than in previous years (an average of eight in 2005, compared to 3.3 in 2003). Furthermore, the entrance of larger firms focusing exclusively on PV installation appears to reflect industry growth. In each of the past two years, a large PV-focused firm has entered the market (one 40-person firm entered in 2004, and one 30-person firm entered in 2005).

Reasons for Installing PV Remain Consistent

The reasons why Program participants are choosing to invest in PV have not changed. Bettering the environment remains the most commonly cited reason for installing PV systems through the Program (91%). The NYSERDA incentive continues to play a fundamental role in influencing consumers' decisions to install PV. The incentive had a large influence on over 93% of respondents in each of the last three years. The importance of net metering has dropped slightly in the last year, but is still higher than the level reported in 2003 (56% in 2003, 94% in 2004, and 72% in 2005).

Reasons for Choosing PV Installer Remain Consistent

Reputation for quality and service became the number one reason for selecting a PV system installer in 2005 while understanding of consumer needs moved from the first, to the second-ranked reason for choosing an installer. For the most part, Program participants appear to choose their installer for reasons of quality and service rather than cost.

Communication Channels are Shifting Slightly

Survey results show steady growth in the importance of word of mouth communications as a source of both awareness about the availability of PV technology, and references for PV installers. In 2005, the top three ways that respondents learned about PV system availability were word of mouth, followed by mass media outlets such as radio, TV and newspapers, and then the NYSERDA website. In 2004, "other"[40]

[40] Of those answering "other" in 2004 most (63%) said that they had pre-existing knowledge and awareness of PV (2004 Participating End User Post Installation IDC Q1, n=13).

was the most common answer, with the majority of respondents in this category reporting that they already possessed knowledge of PV technology. Word of mouth, and the NYSERDA website were the next most frequently cited sources of information about PV system availability.

Word of mouth played a key role when it came to choosing an installer as well. Forty-five percent of respondents selected either "word of mouth from a friend or family member" or "referral from another PV system owner" as the source of information about their PV system installer. This represents a 22% increase over the 2004 results. One-third of respondents indicated "other" sources of information about their installer, including newspaper, magazine and newsletter articles, as well as home shows and energy fairs, mailings and literature from distributors, and advertisements. The NYSERDA website held steady as a commonly reported source of information about PV system installers (28% in 2003, 32% in 2004, and 30% in 2005).

Consumer Awareness Remains Low

Installers continue to report a low level of awareness about PV technology on the part of consumers. For each of the past three years, installers have reported commercial awareness levels in the range of 4% - 7%. On the residential side, installer reports of consumer awareness have dropped from 18% to 6% over the past three years. While it is unclear whether the drop represents a trend, the clear indication is that consumer awareness levels remain low, implying a continued need for NYSERDA's consumer education and marketing efforts.

Market Sustainable Price for PV

Installer reports of the market sustainable price for PV indicate that both residential and commercial consumers are willing to pay somewhat more for PV now than in previous years (about six dollars per watt in 2005, compared to four dollars per watt in 2003). However, these data are based on a small number of installer respondents, complicating efforts to draw conclusions based on the results.

Attribution

This MCAC report updated information presented in the 2003 Comprehensive Report, and the 2004 Update Report. This update identified no basis for revising the initial estimated NTG components or ratio. Initial estimates of the NTG ratio for this Program are close to 1.0. Therefore, the net benefits attributable to the End-use Renewables Program are estimated to be equal to the energy generated, or 2,833 MWh per year, and the capacity available on-peak, or 1.33 MW.[41]

[41] Source: Nexant, NexMVRollUp2005_Ver09_041206.xls.

APPENDIX A: DATA COLLECTION INSTRUMENTS

End-Use Renewables Project Decision-Making Tracking – Installer Application

End-Use Renewables Project Decision-Making Tracking – PV Inspection

END USE RENEWABLES PROJECT DECISIONMAKING TRACKING – INSTALLER APPLICATION QUESTIONNAIRE

Name_____ **Date** _____

Firm Name_____ **Phone** _____

Address_____

City / State / Zip _____

1. Do you install wind systems at this time? If yes, when did you start installing wind systems? If no, are you planning on doing so? If not, why not.

   _____ Yes ➔ When started? _____

   _____ No ➔ Planning to? Yes ____ No ____➔ Why not?: _____

2. Roughly how many inquiries about PV do you receive per month (i.e., phone calls, or other. A general estimate is acceptable here.) _____

3. Please check which, if any, of the following certifications you possess:

   __NABCEP __Other (Please specify _____)

4. How many people does your company employ working on PV sales and installation? (FTE) _____ #

5. What % of your company's total annual revenues (PV-related plus other work) currently comes from grid-connected PV system design, sales, and installation?

6. How many of these people hold some form of PV installation certification? _____ #

7. How many installers in your firm are planning to obtain certification in the next year?

   _____ #

8. In what New York State utility areas do you install/sell PV equipment? _____

9. In general, how far are you willing to travel (in miles) for a PV design/installation job? _____ miles

10. In your estimation, what percent of <u>homeowners</u> are aware of the potential applications of PV technology? _____%

11. In your estimation, what percent of commercial facility managers and owners are aware of the potential applications of PV technology? _____%

12. What percent of PV buyers would you say are "early adopters" (technology innovators, independent-minded, first on the block) as opposed to more mainstream consumers? _____% early adopters.

13. At what installed cost per Watt would the market for grid-connected PV become sustainable in the residential and commercial sectors? [Not including any incentives, and assuming current electric rates remain constant] _____$/Watt commercial _____$/Watt residential

Please return this form in the enclosed envelope or forward to:

NYSERDA, c/o EBH PON 716, 17 Columbia Circle, Albany, NY 12203-6399

END USE RENEWABLES PROJECT DECISIONMAKING TRACKING – PV INSPECTION QUESTIONNAIRE

Name_____ **Date** _____

Firm Name (or N/A)_____ **Phone** _____

Project/Facility Address_____

Project City / State / Zip _____

PV Installer Company Name_____

1. How did first you learn about the availability of solar or photovoltaic (PV) energy systems for home/businesses? (Check all that apply)

   _____ Word of mouth from friend or family member

   _____ Brochure or catalog from a PV dealer or installer

   _____ TV, radio, newspaper

   _____ Information from electricity provider

   _____ Direct contact by a PV installer

   _____ NYSERDA's website

   _____ Other (describe: _____)

2. What are the main reasons you decided to have your PV (solar) system installed? (Check all that apply)

   _____ Wanted to be an innovator

   _____ Do my part to help the environment

   _____ Increase my energy/electricity supply choices

   _____ Increase my energy independence

   _____ Wanted the positive publicity/recognition

   _____ To hedge against rising electricity prices

   _____ To reduce my utility bill

   _____ Availability of Net Metering

   _____ Other (describe: _____)

3. Was the PV system part of any other improvements you were making to the home/building, was it part of a new home/building, or was it the only thing done at the time? (Check the **one** best answer)

   _____ Done alone

   _____ As part of a larger remodeling project

   _____ New home

   _____ Other (describe: _____)

4. How did you find the installer that you hired? (Check all that apply)

   _____ Word of mouth from friend/family member

   _____ "Yellow Pages" telephone listing

   _____ Referral from other PV system owner

   _____ NYSERDA website

   _____ NYSEIA website

   _____ Other (describe: _____)

5. Did you "shop around" and talk with more than one installer when you were considering PV?

   ____ Yes

   ____ No

   ____ Don't know (D/K)

6. What things made you ultimately choose the installer you went with? (Check all that apply)

   ____ Reputation for quality/service

   ____ Lowest cost

   ____ Best product

   ____ Available on my desired schedule

   ____ Seemed to understand my needs the best

   ____ Other (describe: _____)

7. How many weeks was it from when you agreed to purchase your PV system to when it was installed and operating?

   _____ weeks

8. Did the availability of net metering influence your decision to purchase the PV system?

_____ No influence

_____ D/K if influence

_____ Yes ➔

8a. Was the incentive a Large, Medium or Small influence on your general decision to purchase the PV system? (Check one)

___Large ___Medium ___Small

9. Did the incentive offered by NYSERDA and passed along to you through your installer influence your decision to purchase the PV system?

____ No influence

____ D/K if influence

____ Yes ➔

9a. Was the incentive a Large, Medium, or Small influence on your general decision to purchase the PV system? (Check one)

___Large ___Medium ___Small

10. Did the incentive affect the size of the system you purchased?

____ No, incentive didn't affect the size

____ D/K if incentive affected size

____ Yes ➔

10a. Would the incentive have been larger or smaller?

___Larger ___Smaller

10b. Why would it have been larger/smaller?

_____

_____

_____

11. Did the incentive affect the timing of your purchase of this PV system?

____ No

____ D/K

____ Yes ➔

11a. When would you have bought the PV system if you didn't receive any incentive?

___within one year ___five years ___ten years ___never

12. How satisfied are you with the installation and service provided by the PV installer?

___Very Satisfied ___Satisfied ___Unsatisfied ___Very Unsatisfied

13. Did you experience any problems with the **installation** of your system?

_____ No

_____ D/K

_____ Yes ➔

13a. Please tell us about these problems:

_____

_____

14. How much added confidence in your system do you get from knowing that data on the performance of your system is being provided to and reviewed by NYSERDA? (Check one)

____ A lot of added confidence ____ Some added confidence

____ A little added confidence ____ No added confidence

15. Have any of your friends/family members looked into purchasing their own system after seeing yours? (Check one)

_____ Yes

_____ No

_____ D/K

16. Have any of them actually purchased a system?

_____ No

_____ D/K

_____ Yes ➔

16a. How many have? _____

16b. Do you know what size they were in kW?

_____ kW _____ kW _____ kW

17. We would like to ask your opinion about the following statements. Please tell me if you strongly agree, agree, disagree or disagree strongly with each of the following statements Please place a number after each statement where 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree.

    A. What I do only makes a difference if others do it too. _____
    B. Each of us has to be responsible; what I do can make a difference. _____
    C. There is not much I can do to save energy in my home. _____
    D. Conservation is an easy, common sense way to reduce the amount of energy use from my home. _____
    E. Comfort is more important to me than saving energy in my home. _____
    F. The amount of energy I use has little impact on future generations or the environment. _____
    G. Promoting energy efficiency or conservation can provide an easy way for my utility and the State to control energy costs. _____
    H. We are using up our energy supplies too fast. _____
    I. There are no NEW energy efficient products on the market. _____

18. When it comes to trying any type of new technology, would you consider your self an "early adopter", or are you usually a more "mainstream" consumer who waits until you feel the technology is tried and true? (Check one)

    _____ Early Adopter
    _____ Mainstream consumer
    _____ D/K
    _____ Other (describe: _____)

    ➘ On a scale of 1 to 5, where 1 is very early, and
    ➔ 5 is very much mainstream, how would you rate yourself? 1 2 3 4 5

Please return this form in the enclosed postage-paid envelope or forward to:

Summit Blue Consulting, 1722 14th Street, Suite 230, Boulder, CO 80302

APPENDIX B: DATA TABLES FOR INSTALLER AND PARTICIPANT IDC SURVEYS

Installer IDC Survey Tables

Q1: PV installers also installing small wind

	2003	2004	2005
% Install small wind?	46%	50%	33%
Years Installing Mean	4	10.2	2.75
Minimum Years	1	5	0.5
Maximum Years	10	14	5

*2003 MCAC survey of PV installers and distributors, Q5, n=24

**RIA 2004 PV Installer Survey, Q7, n=19

***2005 PV Installer Survey, Q1, n=6

Q2: Number of inquiries per month regarding PV?

	2003	2004	2005
Mean	23	65	24
Minimum	0.5	1	8
Maximum	200	500	60

*2003 MCAC survey of PV installers and distributors, Q7, n=24

**RIA 2004 PV Installer Survey, Q12, n=17

***2005 PV Installer Survey, Q2, n=6

Q3: Which certifications do you possess?

NABCEP	33.3%
Other*	33.3%
None	33.3%

*Other certifications listed included module / inverter manufacturer certifications, and USGBC LEED certification.

Source: 2005 PV Installer Survey, Q3, n=6

Q4: How many people does your company employ working on PV sales and installation (FTE)?

	2003	2004	2005
Mean	3.3	7	8
Minimum	0	1	2
Maximum	12	40	30

*2003 MCAC survey of PV installers and distributors, Q10, n=24

**RIA 2004 PV Installer Survey, Q17, n=16

***2005 PV Installer Survey, Q4, n=6

Q5: What percent of your company's total annual revenues current comes from PV installations?

	2003	2004	2005
Mean	68	54	50.875
Minimum	1	0	10
Maximum	100	100	100

*2003 MCAC survey of PV installers and distributors, Q21, n=24

**RIA 2004 PV Installer Survey, Q20, n=16

***2005 PV Installer Survey, Q5, n=6

Q6: How many people in your firm hold some form of PV installation certification?

	2003	2004 NABCEP	2005
Mean	1.8	0.7	6.2
Minimum	0	0	1
Maximum	12	2	30

*2003 MCAC survey of PV installers and distributors, Q11, n=24

**RIA 2004 PV Installer Survey, Q13, n=20

***2005 PV Installer Survey, Q6, n=6

Q7: How many installers in your firm are planning to obtain certification in the next year?

	2003	2004	2005
Mean	0.8	1	1.8
Minimum	0	0	1
Maximum	3	5	4

*2003 MCAC survey of PV installers and distributors, QN/A, n=24

**RIA 2004 PV Installer Survey, Q19, n=15

***2005 PV Installer Survey, Q7, n=6

Q8: In what NY utility areas do you sell/install PV?

Utility Territory	% of respondents
Con Edison	100.0%
LIPA*	66.7%
Orange & Rockland	66.7%
Central Hudson	50.0%
NIMO	50.0%
NYSEG	33.3%
All*	50.0%

*While LIPA is outside of the scope of NYSERDA funding, several installers included LIPA in their response to this open-ended question.

**For respondents who answered "all," their response was counted for each utility, as well as the "all" category.

Source: 2005 PV Installer Survey, Q8, n=6

Q9: How far are you willing to travel for a PV installation?

	2003	2004	2005*
Mean	3.3 hours	5.1 hours	18.5 hours
Minimum	1 hour	1 hour	50 minutes
Maximum	10 (or anywhere)	24 hours	83 hours

*2003 MCAC survey of PV installers and distributors, Q16, n=24

**RIA 2004 PV Installer Survey, Q6, n=30

***2005 PV Installer Survey, Q9, n=6. In 2005 survey, question was asked in terms of mileage. A travel speed of 60 mph was assumed to translate responses into travel times. One respondent was an outlier with a response of 5000 miles (83 hours). Without this response, average time willing to travel would be 2.3 hours.

Q10 and Q11: What percent of homeowners and commercial facility managers are aware of potential applications of PV?

	Residential Customers			Commercial Customers		
	2003*	**2004****	**2005*****	**2003***	**2004****	**2005*****
Mean	18%	5%	6%	6%	4%	7%
Minimum	1%	0%	2%	1%	0%	5%
Maximum	90%	20%	50%	15%	20%	40%

*2003 MCAC survey of PV installers and distributors, Qs 29 and 30, n=24

**RIA 2004 PV Installer Survey, Q1, n=30, and 2, n=29

***2005 PV Installer Survey, Qs 10 and 11, n=6

Q12: What percent of participating end-users are early adopters?

	2003*	**2004****	**2005*****
Mean	72%	73%	2%
Minimum	0%	5%	10%
Maximum	100%	100%	100%

*2003 MCAC survey of PV installers and distributors, Q35, n=24

**RIA 2004 PV Installer Survey, Q3, n=30

***2005 PV Installer Survey, Q12, n=6

Q13: Market Sustainable Price of PV?

	Residential Customers			Commercial Customers		
	2003*	**2004****	**2005*****	**2003***	**2004****	**2005*****
Mean	$4.00	$3.00	$5.81	$4.00	$4.00	$6.12
Minimum	$2.00	$1.00	$3.75	$2.00	$1.00	$3.00
Maximum	$8.00	$8.00	$8.00	$8.00	$10.00	$12.00

*2003 MCAC survey of PV installers and distributors, Qs 63 and 64, n=24

**RIA 2004 PV Installer Survey, Qs 4 and 5, n=25

***2005 PV Installer Survey, Q13, n=6

B. Participating End-User Post-Installation IDC Survey Tables

Q1: How Participating End Users Learned about PV Systems

	2003*	2004**	2005***
Word of mouth from friend/family	13%	26%	40%
TV, radio, newspaper	19%	11%	35%
Other	63%	42%	30%
NYSERDA's website	16%	21%	23%
Brochure/catalog from PV dealer/installer	3%	11%	12%
Information from electricity provider	0%	0%	5%
Direct contact by a PV installer	6%	5%	7%

*2003 MCAC Survey of PV System Owners Q4, n=32

**2004 Participating End User Post Installation IDC Q1, n=13

***2005 Participating End User Post Installation IDC Q1, n=43

Q2. Reasons for Installing a PV System

	2004*	2005**
Do my part to help the environment	95%	91%
To reduce my utility bill	68%	79%
Increase my energy independence	84%	74%
To hedge against rising electricity prices	58%	67%
Availability of net metering	63%	49%
Wanted to be an innovator	37%	30%
Increase energy supply choices	21%	23%
Wanted the positive publicity/recognition	5%	16%
Other	11%	7%

*2004 Participating End User Post Installation IDC Q2, n=19

**2005 Participating End User Post Installation IDC Q2, n=43

Q3: Full Scope of Project Including PV System

	2003*	2004**	2005***
Done alone	56%	79%	53%
Part of larger remodel	19%	5%	19%
New home	25%	11%	16%
Other	0%	5%	12%

*2003 MCAC Survey of PV System Owners Q7, n=32

**2004 Participating End User Post Installation IDC Q3, n=19

***2005 Participating End User Post Installation IDC Q3, n=43

Q4: How Participating End Users Learned About Installers

	2003*	2004**	2005***
Word of mouth from friend/family	15%	32%	33%
Other	42%	42%	33%
NYSERDA website	28%	32%	30%
Referral from PV system owner	6%	5%	12%
Yellow Pages	6%	0%	9%
NYSEIA website	3%	0%	5%

*2003 MCAC Survey of PV System Owners Q9, n=32

**2004 Participating End User Post Installation IDC Q4, n=19

***2005 Participating End User Post Installation IDC Q4, n=43

Q5: Did you shop around and talk to more than one installer?

Yes	47%
No	53%

Source: 2005 Participating End-User Post Installation IDC Q5, n=43

Q6. Why Participating End Users Selected Installers

	2004*	2005**
Reputation for quality/service	42%	67%
Understood my needs	53%	51%
Other	42%	28%
Lowest cost	16%	16%
Available on my schedule	16%	12%
Best product	16%	14%

*2004 Participating End User Post Installation IDC Q6, n=19

**2005 Participating End User Post Installation IDC Q6, n=43

Q7: How many weeks from agreement to purchase PV until system inspection?

	2003*	2004**	2005***
average # of weeks	12.75	22	21
minimum	3	8	4
maximum	36	72	104

*2003 MCAC Survey of PV System Owners QN/A, n=32

**2004 Participating End User Post Installation IDC Q7, n=18

***2005 Participating End User Post Installation IDC Q7, n=38

Note: Based on NYSERDA staff reports, a shortage in the supply of PV modules delayed projects for all installers during 2005.

Q8: Importance of Availability of Net Metering

	2003*	2004**	2005***
Influenced decision	56%	94%	72%
large influence	72%	89%	77%
medium influence	17%		19%
small influence	11%		3%

*2003 MCAC Survey of PV System Owners Q17, n=32

**2004 Participating End User Post Installation IDC Q8 n=18

***2005 Participating End User Post Installation IDC Q8, n=41

Q9: Importance of NYSERDA Incentive

	2003*	2004**	2005***
Influenced decision	94%	100%	98%
large influence	93%	95%	93%
medium influence		5%	7%

*2003 MCAC Survey of PV System Owners QN/A, n=32

**2004 Participating End User Post Installation IDC Q9, n=18

***2005 Participating End User Post Installation IDC Q9, n=43

Q10: Did the incentive affect the size of the system your purchased?

Yes	60%
No	40%

Source: 2005 Participating End-User Post Installation IDC Q10, n=43

Q10a: Would the system have been larger or smaller?

Larger	40.0%
Smaller	60.0%

Source: 2005 Participating End-User Post Installation IDC Q10a, n=25

Q11: Did the incentives affect the timing of your purchase of this PV system?

	2004*	2005**
Incentive affected timing	80%	65%
Without incentive, would have installed PV….		
within 1 year	N/A	4%
within 5 or more years	50%	37%
never	45%	54%
don't know	N/A	5%

*2004 Participating End-User Post Installation IDC Q10, n=19

**2005 Participating End-User Post Installation IDC Q11, n=43

Q12: Satisfaction with installation and service provided by PV installer

	Number of responses	Percent of total responses
very satisfied	15	35.7%
satisfied	14	33.3%
unsatisfied	10	23.8%
very unsatisfied	3	7.1%
Total	**42**	**100**

Source: 2005 Participating End-User Post Installation IDC Q12, n=42

Q13: Did you experience any problems with the installation of your system?

Yes	21%
No	79%

"Yes" response details included: long time to completion of project; lack of attention to finish work (landscape disruption, etc.); and lack of knowledge of part of local officials.

Source: 2005 Participating End-User Post Installation IDC Q13, n=43

Q14: How much added confidence in your system do you get from knowing NYSERDA is monitoring system performance?

a lot	35.7%
a little	33.3%
some	23.8%
none	7.1%

Source: 2005 Participating End-User Post Installation IDC Q14, n=42

Q15: Have friends or family members looked into purchasing their own system after seeing yours?

Yes	79%
No	9%
Don't Know	12%

Source: 2005 Participating End-User Post Installation IDC Q15, n=43

Q16: Have any of them actually purchased a system?

Yes	16%
No	51%
Don't Know	33%

Source: 2005 Participating End-User Post Installation IDC Q16, n=43

Q17: What are your opinions about the following statements?

Statement:	strongly disagree	disagree	agree	strongly agree
What I do only makes a difference if others do it too.	39.5%	46.5%	7.0%	7.0%
Each of us has to be responsible; what I do can make a difference	4.7%	0.0%	23.3%	72.1%
There is not much I can do to save energy in my home.	86.0%	9.3%	4.7%	0.0%
Conservation is an easy, common sense way to reduce the amount of energy use from my home.	9.3%	4.7%	20.9%	65.1%
Comfort is more important to me than saving energy in my home.	16.3%	60.5%	20.9%	2.3%
The amount of energy I use has little impact on future generations or the environment.	69.0%	21.4%	0.0%	9.5%
Promoting energy efficiency or conservation can provide an easy way for my utility and the State to control energy costs.	2.4%	4.8%	40.5%	52.4%
We are using up our energy supplies too fast.	2.4%	2.4%	11.9%	83.3%
There are no NEW energy efficient products on the market.	56.1%	31.7%	9.8%	2.4%

Source: 2005 Participating End-User Post-Installation IDC Q17, n=43

Q18a: Do you consider yourself an early adopter of new technology, or a mainstream consumer?

Early Adopter	56.1%
Mainstream Consumer	31.7%
Don't Know	2.4%
Other	9.8%

Source: 2005 Participating End-User Post Installation IDC Q18a., n=43

Q18b: On a scale of 1-5, where 1 is an early adopter and 5 is mainstream, how would you rate yourself?

1 = very early adopter	8.1%
2	48.6%
3	27.0%
4	13.5%
5 = very mainstream	2.7%

Source: 2005 Participating End-User Post Installation IDC Q18b., n=43