



Using Theory-based Evaluation to Help Plan Improvements for LIPA's Solar Pioneer Program

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Primary Authors & Presenters

- Ann Clarke of the Long Island Power Authority (LIPA)
- Tim Pettit of Nexus Market Research

Co-authors

- Carolyn Jaskot of the Long Island Power Authority (LIPA)
- David Hill of Vermont Energy Investment Corporation (VEIC)
- Lynn Hoefgen of Nexus Market Research
- Marjorie McRae of Research Into Action
- Ralph Prael of Prael & Associates

Solar Pioneer Program

- Introduced in 1999 as part of LIPA's Clean Energy Initiative (CEI)
- Solar energy captured by PV systems is an environmentally clean and viable alternative to energy generated from fossil fuels
- Initially open only to residential rooftop grid-connected PV systems, in 2000 opened to commercial
- LIPA is committed to transform the market for PV on Long Island - funding for the CEI has been renewed for an additional 5 years, from 2004 to 2008

Key Program Objectives

- Increasing consumer awareness and demand for rooftop PV systems;
- Accelerating the development of self-sustaining local infrastructure for the delivery and maintenance of PV systems;
- Accelerating the reduction in system costs while increasing system reliability and performance; and
- Developing and institutionalizing new mechanisms to overcome financial barriers to purchasing PV systems.

Program Incentives

- The rebate level is currently \$4.50/watt for utility-grid connected PV installations up to 10 kW
- Excess electricity generated by PV systems receives full retail credit through net metering
- A New York State tax credit of 25%, up to a maximum of \$3,750
- A New York State fifteen-year real property tax exemption

Key Program Elements

- Newspaper advertisements, bill stuffers, trade shows, etc.
- Solar section of LIPA's web site: www.lipower.org/solar
 - Solar photovoltaics
 - Solar Pioneer Program
 - List of PV Contractors
- LIPA-sponsored Solar PV Seminars
- Contractor training - State University of NY (SUNY) Farmingdale
- Solar Pioneer Program Contractor Allies
- Participation in Long Island Shines

PV Installations as of 5/31/04

- 401 rebated residential systems
- 71 residential lottery systems
- 20 commercial systems
- Over \$11 million in rebates paid
- Over 2.1 MW (DC) installed

Research Methodology

- Based on a Market Progress and Evaluation Report (MPER) in 2002
- Builds on a baseline study of the photovoltaic market on Long Island, conducted in 2000
- Program theory document written in 2000 included the following framework:
 - Market barriers (5)
 - Market effects (38)
- In baseline study, the five general market barriers inadequately described 38 market effects, so individual barriers were assigned

Research Elements

- In-depth interviews with 15 PV and inverter manufacturers and 2 distributors
- In-depth interviews with 8 participating and 4 non-participating PV contractors
- In-depth interviews with representatives from 18 other local market actors such as contractor associations, permitting officials, an association of appraisers, mortgage lenders, electrical inspectors, and other solar energy organizations and programs
- Interviews by Solar Pioneer Program Staff of system planning and distributed generation teams
- In-depth interviews with 6 program staff.

Research Elements (continued)

- Survey of 250 nonparticipating homeowners; plus 200 from among members of the New York League of Conservation Voters (NYLCV)
- Survey of 82 participating residential customers
- Survey of 100 nonparticipating Solar Seminar attendees (consumers that have not installed a PV system but have attended a LIPA-sponsored seminar on PV and the Solar Pioneer Program)
- Survey of 5 participating commercial customers

Market Structure

- Direct market actors (manufacturers, distributors, and contractors) are aware of the program; other market actors less aware
- Contractors are highly knowledgeable of program features; manufacturers have relatively less specific knowledge of program features; other market actors' program knowledge is mixed
- Most manufacturers report increases in sales for the global PV market
- Many manufacturers believe the Long Island area has excellent sales potential for residential PV systems based on population size, income, education, climate, and higher than average utility rates

Market Structure (continued)

- The Solar Pioneer Program's efforts to develop the market for contractors is progressing:
 - Traditional electrical contracting firms are entering the market.
 - PV contractors are completing the SUNY Farmingdale course and enrollment is increasing.
 - Contractors are building relationships to bring together skills needed for installation jobs as required and as local jurisdictions permit.

- The equipment specification process is similar across all contractors, while the variation in marketing practices is due to seasoned contractors' efforts to minimize marketing costs

Market Structure (continued)

- The number of installations still represent an extremely small proportion of the general Long Island population
 - Installations have increased dramatically since 2000
 - Self-reported installations of PV systems are about the same as in the baseline study
- Customer loyalty is fairly strong when measured as customer satisfaction, willingness to recommend, and likelihood to purchase again
- Willingness to pay for PV technologies decreased since the baseline study, probably due to soft economic conditions

Market Structure (continued)

- Unaided consumer awareness—a conservative measure of awareness—of PV technologies is virtually unchanged since 2000
- Seminar attendees show much higher awareness than do other groups
- Participants are the group with the highest proportion of respondents who are knowledgeable about PV technologies, followed by seminar attendees
- There has been no change in the proportion of the general population who are aware of how PV systems differ from standard household electricity systems

Market Indicators

- All of the key market effects were associated with, and grouped into, 13 market barriers
- One of the 13 barriers was shown in the baseline and follow-up studies not to exist, so it was dropped from this discussion.
- The current status of each of the twelve remaining market barriers was then compared to its status in the baseline study
 - Five of the barriers had improved (meaning the barrier had reduced)
 - Seven of the barriers remained unchanged.

Improved Market Indicators

Market Barrier	Supply/ Demand Side	Improvement Due To ...
Lack of widespread adoption of PV technologies and experience in owning PV systems inhibits customer loyalty	Demand	Program
Lack of contractors and contractor knowledge/experience inhibits effective marketing, servicing, and installation	Supply	Program
Contractors do not offer warranty/service packages	Supply	External Forces
Manufacturers do not recognize Long Island as a significant market	Supply	Program
Quantities of PV equipment produced are insufficient to generate economies of scale	Supply	External Forces

Unchanged Market Indicators

Market Barrier	Supply/ Demand Side
Lack of consumer awareness and knowledge of PV systems	Demand
PV system costs deter customer investment in systems	Demand
Costs of PV systems make them difficult to sell, and are not a source of revenue/profit for contractors without incentives	Supply
Lack of necessary knowledge about PV systems among many market actors inhibits market growth	Supply
Interconnection requirements are burdensome and lack standardization	Supply
Lack of financing for PV systems presents customers with no alternative to facilitate system purchase	Supply
PV not considered in utility system planning	Supply

MPER Conclusions

- Some positive changes over the past two years in the Long Island PV market are consistent with a reduction of market barriers:
 - More contractors offering PV installation services and they are all aware of LIPA's program
 - Contractors are becoming more experienced in PV installation because of increased business volume
 - Highly satisfied participating customers are setting the stage for word-of-mouth marketing and stimulating demand
 - Manufacturers' prices for photovoltaic components are coming down, although it is unclear at what rate
 - Total installed costs for PV systems on Long Island are also decreasing

MPER Conclusions (continued)

- To what extent are the positive changes attributable to the Solar Pioneer Program?
 - The worldwide drop in PV component prices is attributable to worldwide demand - the growth in demand on Long Island is not large enough to account for it
 - Increased equipment reliability and warranties is attributable to increased R&D and production experience worldwide
 - BUT
 - the increase in the number of installers and improvements in their experience and professionalism
 - reduced installation costs
 - education of seminar attendees
 - the emergence of a customer base on Long Island
- ARE attributable to LIPA's incentives, marketing efforts, and contractor training programs

MPER Conclusions (continued)

- The Long Island market and LIPA's role in it is a microcosm of the world market: wherever a PV market is thriving (except in places where there is no electric grid in place), it is dependent on subsidies from ratepayers and/or governments
- LIPA's ongoing involvement is essential for market development - subsidies are still necessary and will likely remain so for several years
- Worldwide forces external to Long Island are driving PV costs down and with the Solar Pioneer Program, LIPA is part of that worldwide process.

Program Refinements

- To increase awareness of PV technology among the general LI population, the following activities are being considered for the future:
 - Solar Sprint Competition in Long Island schools
 - “Solar on Schools” element in the program,
 - Sponsor a local team at the national Solar Decathlon in Washington, DC
 - Produce a consumer education video highlighting Long Island-specific content and information

Program Refinements (continued)

- Enhancements to LIPA's web site - www.lipower.org/solar
 - Solar Pioneer section made more user-friendly
 - Track incentive level vs. 1 MW allotment
 - Checklist of permitting requirements by zip code
 - Publish total installed costs on Long Island (*planned*)
 - Consumer education
 - Competitive pricing

Program Refinements (continued)

- Addressing the cost of PV
 - Cross-marketing through residential new construction
 - Research strategies that other programs employ to maximize incentive dollars

Conclusions

- Theory-based evaluation process important for market transformation programs, esp. emerging markets
 - Not just a rebate count
 - All relevant market actors
 - Supply-side and demand-side factors
 - Successes and issues needing more work

- Theory-based evaluation and LIPA's Solar Pioneer Program
 - Useful to the program team
 - Will continue to be used in the future

Contact Information



Ann Clarke – Long Island Power Authority

e-mail: aclarke@keyspanenergy.com

Phone: 631-436-4112



Tim Pettit – Nexus Market Research

e-mail: pettit@nexusmarketresearch.com

Phone: 703-241-3880

www.lipower.org