Berkeley Lab and the Clean Energy Group

CASE STUDIES OF STATE SUPPORT FOR RENEWABLE ENERGY

A Multi-Faceted Approach to Supporting PV in New York

Mark Bolinger, Berkeley Lab

CASE SUMMARY

Case Description

The New York State Energy Research and Development Authority (NYSERDA) has chosen not to pursue the "one size fits all" approach to supporting photovoltaics (and small wind) that is embodied by typical buy-down programs. Instead, NYSERDA has adopted a multi-faceted approach targeting different segments of the photovoltaics (PV) market, including commercial, industrial, and institutional buildings, the residential PV market, "high-value" PV installations, solar on schools, and PV systems on new Energy Star-labeled homes. To support these targeted programs, NYSERDA offers not only direct financial support but also technical support for PV (and small wind) systems, installer training and certification, and low-interest loans.

Innovative Features

- In contrast to buy-down programs, NYSERDA's multi-faceted approach allows it to proactively target what it considers the most economical, the most educational, and the most innovative PV (and small wind) applications.
- This approach is intended to allow NYSERDA to fund PV applications that are most likely to have long-term, sustainable demand and impact in the state.
- NYSERDA's goal is to help companies and markets succeed; one way it does this is by tapping into the expertise of the private market by allowing RFP respondents to identify and propose what they see as the best use of funds to create a sustainable market.

Results

- NYSERDA has committed $5.4 million in funding to its initial commercial, industrial, and institutional PV in buildings program, residential PV program, and high-value PV and wind program.
- Were all planned installations to occur (an unlikely event), 1.3 MW of PV and small wind would be installed, at an average subsidy level of $4/W.
- Though several of NYSERDA's PV programs have encountered roadblocks (most notably, interconnection hurdles have plagued the residential PV program), most programs

CONTENTS

C&I 2
Residential 3
High-Value 4
Solar on Schools 5
Energy Star Homes 5
Technical Support 5
Training & Certification 5
Loan Program 5

September 2002

Download other clean energy fund case studies from:

http://eetd.lbl.gov/ea/ems/cases/

or

www.cleanenergyfunds.org

appear likely to surpass their stated installation targets and NYSERDA continues to roll out new and interesting programs that incorporate lessons learned from the past.

- One potential drawback to NYSERDA's solicitation-based approach is that, unlike an open buy-down program, project-specific solicitations (particularly if issued irregularly) may not enable PV manufacturers and installers to plan for the long term, or encourage them to aggressively market their products or services. To address this concern, NYSERDA is considering a system of rolling solicitations, which would accept submissions every 6 months or so, to keep projects in the pipeline at all times.

CASE STUDY DETAILS

To date, "buy-down" programs that provide subsidies to buy down the capital cost of customer-sited photovoltaic (PV) systems (and other renewable technologies) have dominated PV (and small wind) programs offered by state clean energy funds: of the 14 funds in operation today, only Connecticut, Ohio, and Oregon do not currently offer some form of buy-down program. Buy-down programs encourage a stable market (for as long as the incentives last) and are generally not restrictive in the types of PV applications that are eligible for funding (two notable exceptions are that most buy-down programs will not support off-grid applications, and some buy-down programs do not cover commercial systems), allowing the private market to identify the most attractive *near-term* markets for PV. Arguably, buy-down programs may not, however, always specifically encourage the most economical, the most educational, or the most innovative applications that have the greatest *long-term* merit for achieving sustainable PV demand.

The New York State Energy Research and Development Authority (NYSERDA) has experimented with a different approach, using targeted solicitations to support different segments of the PV market that NYSERDA believes deserve special attention. NYSERDA's multi-faceted approach includes programs targeting PV installations on commercial, industrial, and institutional buildings, the residential PV market, "high-value" PV installations, solar on schools, and PV systems on new Energy Star-labeled homes. To support these targeted programs, NYSERDA offers not only direct financial support, but also technical support for PV (and small wind) systems, installer training and certification, and low-interest loans. This case describes each facet of NYSERDA's overall PV program.

PV on Commercial, Industrial, and Institutional Buildings

In October 1999, NYSERDA solicited proposals for innovative PV technologies and applications on commercial, industrial, institutional, and certain multifamily buildings. Due to the high quality of proposals received, NYSERDA increased the original $1.7 million budget to more than $3 million and ultimately funded 5 companies to install 11 systems with a combined capacity of 679 kW. By October 2000, the program's first installation was complete, a 150 kW Powerlight system installed on the roof of a library in Ithaca. A second 40 kW system has recently been completed but is awaiting interconnection. The slow pace of installations to date has been driven in part by a few sites falling through, requiring the identification of new sites, as well as construction delays in new buildings (i.e., unrelated to PV). In other cases, projects were not scheduled to be built until 2002/2003.

This targeted approach may, arguably, have several advantages over a traditional buy-down program. First, it requires receptive sites to be identified up front, removing one large barrier to project completion (though as

mentioned above, several pre-identified sites have fallen through). Second, it allows NYSERDA to select not only the lowest cost systems, but also those that are most visible to the public and provide the most demonstration value. Third, the competitive process may enable NYSERDA to spend fewer funds than they otherwise would have to support the same amount of capacity through a buy-down program. Dividing $3 million by 679 kW yields roughly $4.5/W of NYSERDA support on average.

For all its potential merits, however, some have argued that this approach is inferior to buy-down programs in creating stable long-term markets. Without knowledge of when (if ever) the next solicitation will be issued, or what the terms will be, PV manufacturers and installers have difficulty effectively marketing their products and planning for the long-term. A buy-down program, on the other hand, lays everything on the table up-front, allowing business to progress in an orderly fashion (at least as long as the incentive funding lasts).

NYSERDA plans to issue a new solicitation for PV on commercial, industrial, and institutional buildings later this year. The new program will likely be similar to the last one: it will favor innovative designs such as building-integrated photovoltaics (BIPV), but will continue to weigh the benefits of BIPV against what NYSERDA has found to be its higher costs, due both to high module prices and the fact that more parties are involved in the installation (architects, engineers, etc.). Depending on the budget, NYSERDA may structure the new program to allow rolling submissions (e.g., accepted every 6 months or so) to keep projects in the pipeline at all times. By creating some regularity, this new structure would at least partially address the concerns expressed in the previous paragraph.

Residential PV

NYSERDA has targeted the residential PV market in a more indirect way by funding three PV manufacturers/distributors to (1) develop distribution channels that will enable them to more effectively market their products to residential customers, and (2) provide customer incentives. By leaving the solicitation open-ended in terms of the types of responses it would consider, NYSERDA hoped to effectively tap into the expertise of the private sector, allowing respondents to propose funding approaches that would best suit their needs.

- **Astropower** was awarded $500,000 to develop the *NY Shines* outreach program with the Pace Energy Project, identify PV system dealers and installers to work with, and install up to 150 kW of residential systems (discounted by $3/W). As of May 2002, Astropower had installed 20 systems in New York, with another 30 in the pipeline.
- **SunWize Technologies** was awarded $500,000 to prepare educational materials for customers, identify dealers and installers to work with, and install up to 100 kW of residential systems. In mid-2000, SunWize launched the Solar Connect New York program, a 2-year buy-down program offering $3/Watt up to the lesser of 50% of system costs or $7,500/system. Installed systems are to be monitored for a 2-year period (and NYSERDA withholds 20% of the incentive from SunWize until receiving 2 years of production data). As of May 2002, SunWize had installed 14 systems, with another 39 in the pipeline.
- **Four Seasons Solar** was awarded $250,000 to create PV panels that fit into existing (or new) sunroom frames. The company had expected to install 35 kW in residential sunrooms, but dropped out of the program after experiencing problems integrating panels directly into the roof system.

Were the planned installations to occur, NYSERDA's $1.2 million in funding would have generated 285 kW of PV, with an effective subsidy of $4.2/W. Utility interconnection approvals have reportedly caused many delays, however, leading to reduced expectations for the program as a

whole.[1] Nevertheless, NYSERDA estimates that the 2 remaining contractors will spend out their subsidies by the end of the summer of 2002, at which point NYSERDA will roll out a new residential program. The design of the new program has yet to be determined, but will reflect what NYSERDA has learned from the first program.

The main advantage of directly funding PV manufacturers/distributors (e.g., Astropower and SunWize) to develop their own programs is that these entities are typically in an excellent position to market the programs, train installers, and educate consumers. These are all important features in a state like New York that does not already have a strong PV industry infrastructure in place. Furthermore, because they have already made an investment to build the market, manufacturers/distributors have a strong interest in developing programs that work (Gouchoe et al. 2002).

The primary disadvantage of this approach, however, is that it "picks winners": PV manufacturers/distributors other than Astropower and SunWize have been unable to participate in NYSERDA's residential program or offer subsidies to potential customers. Furthermore, the programs developed by Astropower and SunWize are not entirely consistent with one another, potentially creating confusion among potential customers. NYSERDA chose not to initiate a follow-up program open to other manufacturers/distributors because of the severe interconnection roadblocks plaguing the two existing programs (Gouchoe et al. 2002).

[1] Although the *number* of PV systems likely to be installed by Astropower and SunWize is roughly half of what was initially expected, the average system *size* is roughly twice as large as was initially expected, resulting in a total amount of capacity installed under the program that will be close to initial expectations (with the exception of Four Season's withdrawal).

High-Value PV (and Wind)

In April 2000, NYSERDA made $1.3 million available to support "high-value" or niche applications for which PV and small wind are particularly well-suited and in which sustainable market for PV may be found. The program is intended to foster markets for customer- and cooperative-owned wind systems, as well as off-grid and dedicated load on-grid PV applications. Three contractors were selected in November 2001.

- **AWS Scientific** was awarded $450,000 to implement a market development and demonstration program for small wind systems. The program provides a 30% buy-down of the installed costs on systems between 1 and 50 kW, and is targeting 200 kW of wind at 9 sites. As of late 2001, AWS had screened more than 90 applicants and visited 22 sites to present an economic analysis, but no systems had yet been installed.
- **Great Brooks Enterprises** was awarded $270,000 to demonstrate the usefulness of off-grid PV and hybrid PV/wind systems. The program is targeting 18 kW of PV and 2 kW of wind at 18 sites. As of mid-2001, Great Brooks had held 4 end-user workshops on hybrid wind/PV systems, published and distributed educational flyers, and installed 9 systems.
- **PowerLight Corporation** was awarded $490,000 to install PV-powered uninterruptible power supply (UPS) systems in 3 buildings. Each system will have 50 kW of PV and batteries capable of sustaining 100 kW of load for at least one hour. Powerlight is working on its first installation at a manufacturing and design center in Brooklyn. In addition to serving as a UPS, this system will offset peak power requirements during the week and use PV to recharge the batteries during the weekend, when consumption and power costs are lower.

If these projects met their overall kW targets, 370 kW of PV and small wind would be installed at a cost to NYSERDA of $1.2 million, for a subsidy value of $3.3/W.

Solar on Schools
In January 2002, NYSERDA accepted proposals for a PV demonstration and teaching initiative at K-12 schools. A contract is currently under negotiation. The program's objectives are to install at least 50 2 kW PV systems on New York State schools by June 2006. NYSERDA will fund up to 90% of the cost of the system, with the schools picking up the remaining 10%. As is typical for solar on schools programs, the contractor must develop an age-appropriate "solar curriculum" that incorporates the operational data from each school's PV system.

PV on Energy Star-Labeled Homes
Attempting to marry energy efficiency with renewable energy, building on previous NYSERDA programs promoting Energy Star-labeled homes, and acknowledging the lower costs of PV in new construction than in retrofits, NYSERDA accepted proposals in January 2002 targeting the construction of Energy Star-labeled homes and Energy Star-labeled homes with PV systems. The program seeks to identify one approved subdivision (minimum of five lots each) in each of the six participating utility service territories for the exclusive construction of Energy Star-labeled homes, at least one of which must incorporate a PV system. Through this program, NYSERDA hopes to demonstrate to all stakeholders (1) the benefits of such homes, including lower utility bills and greater comfort, and (2) the "process," from house plans to closing.

A budget of up to $650,000 is allotted for this project. This includes $400,000 in incentives for PV systems (see below) and PV consultants, $20,000 for appraiser and realtor training, and up to $230,000 for surveys, marketing, and implementation. NYSERDA will provide materials and training on PV systems through a separate NYSERDA PV technical support program (described below), and an additional $135,000 in consumer and home builder incentives is also available.

NYSERDA will provide the following funding for PV installations:

- 1st PV system per subdivision: 100% of installed costs up to the lesser of $10/W or $20,000.
- 2nd PV system per subdivision: 75% of installed costs up to the lesser of $10/W or $15,000.
- 3rd PV system per subdivision: 60% of installed costs up to the lesser of $10/W or $12,000.

This program is just getting underway, with no results to report.

PV (and Wind) Technical Support
In the second half of 2002, NYSERDA plans to solicit bids for PV and wind technical support. This program is intended to support all of NYSERDA's other PV and small wind programs (described above). The winning contractor will help NYSERDA review system designs and inspect installations to determine whether or not they are worthy of incentive funding.

Installer Training and Certification
In the second half of 2002, NYSERDA will begin working with the Institute for Sustainable Power and the North American Board of Certified Energy Practitioners to offer nationally accredited PV installer training and certification.

New York Energy $mart Loan Fund
This loan program buys down the interest rate on loans for energy efficiency projects and renewable energy technologies by 4.5%. NYSERDA originally funded the interest rate reduction by purchasing certificates of deposit from participating lenders and foregoing part of the interest rate, but this approach was recently abandoned because it tied up capital (essentially the principal amount of the loan) for a five-year period. NYSERDA now simply pays a lump sum to the lender to finance the interest rate reduction. Thirty-eight lenders throughout New York State are participating in the program. See a separate case study on renewable energy loan programs for more information on NYSERDA's program.

Organization and Contact Information

Jennifer Harvey
NYSERDA
17 Columbia Circle
Albany, NY 12203-6399
http://www.nyserda.org/
jlh@nyserda.org
(518) 862-1090

Information Sources

Bolinger, M. and R. Wiser. 2002. "Customer-Sited PV: A Survey of Clean Energy Fund Support." LBNL-49668. Berkeley, Calif.: Lawrence Berkeley National Laboratory.

Bolinger, M., R. Wiser, L. Milford, M. Stoddard, K. Porter. 2001. "Clean Energy Funds: An Overview of State Support for Renewable Energy." LBNL-47705. Berkeley, Calif.: Lawrence Berkeley National Laboratory.

Gouchoe, S., V. Everette, R. Haynes. 2002. "State Financial Incentives for Renewable Energy: Case Studies on Program Effectiveness." North Carolina Solar Center, July 2002 draft.

RFP for Energy Star-Labeled Homes program: http://www.nyserda.org/655rfp.html

RFP for New York Solar Schools program: http://www.nyserda.org/622rfp.html

New York Energy $mart Program Evaluation and Status Report (January 2002): http://www.nyserda.org/02sbcreport.html

Program descriptions on NYSERDA web site: http://www.nyserda.org/programs.html

Personal communication with: Jennifer Harvey (NYSERDA)

About this Case Study Series

A number of U.S. states have recently established clean energy funds to support renewable and clean forms of electricity production. This represents a new trend towards aggressive state support for clean energy, but few efforts have been made to report and share the early experiences of these funds.

This paper is part of a series of clean energy fund case studies prepared by Lawrence Berkeley National Laboratory and the Clean Energy Group, under the auspices of the Clean Energy Funds Network. The primary purpose of this case study series is to report on the innovative programs and administrative practices of state (and some international) clean energy funds, to highlight additional sources of information, and to identify contacts. Our hope is that these brief case studies will be useful for clean energy funds and other stakeholders that are interested in learning about the pioneering renewable energy efforts of newly established clean energy funds.

Twenty-one total case studies have now been completed. Additional case studies will be distributed in the future. For copies of all of the case studies, see:
http://eetd.lbl.gov/ea/ems/cases/ or http://www.cleanenergyfunds.org/

About the Clean Energy Funds Network

The Clean Energy Funds Network (CEFN) is a foundation-funded, non-profit initiative to support the state clean energy funds. CEFN collects and disseminates information and analysis, conducts original research, and helps to coordinate activities of the state funds. The main purpose of CEFN is to help states increase the quality and quantity of clean energy investments and to expand the clean energy market. The Clean Energy Group manages CEFN, while Berkeley Lab provides CEFN analytic support.

Contact the Managers of the Case Study Series

Ryan Wiser
Berkeley Lab
1 Cyclotron Rd., MS90-4000
Berkeley, CA 94720
510-486-5474
rhwiser@lbl.gov

Mark Bolinger
Berkeley Lab
1 Cyclotron Rd., MS90-4000
Berkeley, CA 94720
510-495-2881
mabolinger@lbl.gov

Lewis Milford
Clean Energy Group
50 State Street
Montpelier, VT 05602
802-223-2554
lmilford@cleanegroup.org

Funding Acknowledgements

Berkeley Lab's contributions to this case study series are funded by the Assistant Secretary of Energy Efficiency and Renewable Energy of the U.S. Department of Energy under Contract No. DE-AC03-76SF00098. The Clean Energy Group's contributions are funded by the Energy Foundation, the Surdna Foundation, the Rockefeller Brothers Fund, and the Turner Foundation. An earlier version of this case study was prepared for the Energy Trust of Oregon, and we appreciate the vision of the Energy Trust – and Peter West in particular – for initiating this work. We also thank Larry Mansueti and Jack Cadogan of the U.S. Department of Energy for their ongoing support.

Disclaimer

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor The Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or The Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, or The Regents of the University of California.