NEW YORK STATE
Renewable Portfolio Standard

Customer-Sited Tier Program
Market Evaluation, Program Expectations and Funding Considerations

2013-2015

September 6, 2013

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SECTION 1: INTRODUCTION

PURPOSE

The New York State Energy Research and Development Authority (NYSERDA) submits this Customer-Sited Tier Market Assessment (2013-2015) (CST Assessment) in response to the Public Service Commission's (Commission or PSC) April 2, 2010 order directing a Customer-Sited Tier (CST) program evaluation as part of an overall RPS 2013 review.[1] Specifically, the Commission requested that the evaluation of the CST include an impact and market evaluation for each technology to inform the Commission on the overall success and cost-effectiveness of the program. [2] This assessment reflects program experience with the technical evolution and market deployment of the affected technologies, including market reaction to program incentives. Based on experience in administering Customer-Sited Tier programs pursuant to Commission orders and the existing Customer Sited Tier Operating Plan (2012 CST Plan), NYSERDA proposes that the Commission consider the technology-specific market potential and associated costs contained herein as a sufficient and reasonable basis for adjusting RPS program targets based on funding budgets for the years 2013 through 2015.

BACKGROUND

In 2009, NYSERDA prepared a CST market potential report[3] to help inform Department of Public Service Staff and the Commission during its Mid-Course review of the RPS Program.[4] As a result, new program targets and funding levels were established by the Commission in its April 2, 2010 Order. Those targets and funding levels were reflected in the Customer-Sited Operating Plan developed for program years 2010-2015 (2010 CST Plan) and shown in Tables 1-1 and 1-2.

Table 1-1. Customer-Sited Tier Funding Budget by Program (2010 CST Plan)

Program	Funding Amounts (in millions)						
	2010	2011	2012	2013	2014	2015	Total
Solar Photovoltaic	24.000	24.000	24.000	24.000	24.000	24.000	144.000
Geographic Balancing	---	30.000	30.000	30.000	30.000	30.000	150.000
Fuel Cells	3.600	3.600	3.600	3.600	3.600	3.600	21.600
Anaerobic Digestion Systems	13.275	13.300	12.000	11.600	10.200	10.200	70.575
On-Site Wind	1.575	2.800	2.900	3.100	3.800	4.000	18.175
Solar Thermal	3.225	4.300	4.300	4.300	4.300	4.300	24.725
Total	**45.675**	**78.000**	**76.800**	**76.600**	**75.900**	**76.100**	**429.075**

[1] Case 03-E-0188, "Order Authorizing Customer-Sited Tier Program through 2015 and Resolving Geographic Balance and other Issues Pertaining to the RPS Program", issued and effective April 2, 2010.

[2] Ibid, pp 41-43.

[3] New York State Renewable Portfolio Standard Customer Sited Tier Program Market Potential, Program Expectation and Funding Consideration (2010-2015) , June 22, 2009

[4] The Renewable Portfolio Standard: Mid Course Report prepared by Department of Public Service Staff, October 26, 2009.

Table 1-2. Customer-Sited Tier Expected Results by Program 2015 Resource Category (2010 Plan)

	Capacity in MW Encumbered by 12/31/15	Annual Generation in MWh Encumbered by 12/31/15
Solar Photovoltaic	82.3	93,806
Geographic Balancing	82.9	130,477
Fuel Cells	8.7	67,385
Anaerobic Digester Biogas	24.1	169,657
On-Site Wind	10.5	18,351
Solar Thermal	45.5	51,923
Program Total	254.0	531,599

The 2010 CST Plan was revised in 2012 to incorporate the directives, decisions and guidance provided by the Commission in a series of orders concerning the CST program (Orders).[5] Table 2-1a in Section 2 presents a revised version of Table 1-2, which reflects the updated targets for capacity and annual generation by 2015 included in the 2012 Plan. These targets reflect program area experience with the technical evolution and market deployment of the eligible technologies and market reaction to program incentives. In addition, a series of Commission orders have been issued to date in 2013 that address reallocations of funds and program modifications to various CST technologies.[6]

The technologies included in the CST are two photovoltaic (PV) system programs (up to 200 kW, known as the Standard Offer Program[7] and greater than 200 kW, known as Competitive PV),[8] solar thermal, fuel cells, anaerobic digester gas-to-electric facilities, and customer-sited wind facilities. Table 1-3 below depicts the funding allocations established in the 2012 Plan (see Table 2-1b for funding allocations which reflect NYSERDA's 2013 Rollover Petition). Beginning in 2011, incentives were offered in the downstate region through a competitive process for PV, fuel cells and anaerobic digester-derived renewable biogas projects that accept delivery of biogas.[9] In 2012, the Competitive PV program was

[5] Including orders issued under Case 03-E-0188 and associated orders as relevant. For the most recent Commission CST directives see: "Order Authorizing the Expansion of the Solar Photovoltaic and Geobalance Programs from 2012 through 2015 and the Reallocation of Main Tier Unencumbered Funds, issued and effective April 24, 2012; "Order Authorizing Reallocation of Unencumbered 2011 Customer-Sited Tier Program Funds and Resolving Other Issues," issued and effective April 20, 2012; "Order Authorizing Reallocation of Unencumbered Customer-Sited Tier Program Funds through 2010 and Resolving Other Issues," issued and effective September 19, 2011; "Order Authorizing Customer-Sited Tier Program Through 2015 and Resolving Geographic Balance and Other Issues Pertaining to the RPS Program," issued and effective April 2, 2010.

[6] "Order Authorizing the Increase of Maximum Project Incentive for the Anaerobic Digester Gas to Electricity Program," issued and effective January 23, 2013; "Order Authorizing an Increase in the Maximum Project Incentive for the On-Site Wind Program in the Customer-Sited Tier," issued and effective February 14, 2013; "Order Authorizing Reallocation of Unencumbered 2012 Customer-Sited Tier Program Funds," issued and effective May 22, 2013; "Order Authorizing Transfer of Solar Photovoltaic Funding in the Customer-Sited Tier among New York Independent System Operator Load Zone Groups," issued and effective June 20, 2013; "Order Authorizing Modification of the Solar Photovoltaic Program in the Customer-Sited Tier," issued and effective July 22, 2013.

[7] The Standard Offer PV Program was referred to as the Solar PV Program in the both the 2010 and 2012 CST Operating Plans. The tables that reflect the 2010 Operating Plan still use this notation.

[8] The Standard Offer PV program size cap and the Competitive PV program minimum project size were changed simultaneously in "Order Authorizing Modifications of the Solar Photovoltaic Program in the Customer-Sited Tier," issued and effective July 22, 2013.

[9] This program was originally designated the "Geobalance" program as it was an attempt to focus more RPS resources on the Downstate area.

expanded to include incentives for all Upstate regions. Although authorized by the Commission as part of Governor Cuomo's NY-Sun initiative (NY-Sun), the source of the funding for the Solar PV and Competitive PV programs in 2014 and 2015 has yet to be identified.[10]

Table 1-3. 2012 Customer-Sited Tier Funding Allocations, 2012-2015

Resource Category	Percentage of Funds	Funding Amounts (in millions)				Total
		2012	2013	2014	2015	
Standard Offer PV	29.73%	41.594	37.500	37.500	37.500	154.094
Competitive PV	52.73%	66.400	70.500	70.500	65.943[a]	273.343
Fuel Cells	2.78%	3.600	3.600	3.600	3.600	14.400
Anaerobic Digesters	8.49%	12.000	11.600	10.200	10.200	44.000
On-Site Wind	2.95%	4.400	3.100	3.800	4.000	15.300
Solar Thermal	3.32%	4.300	4.300	4.300	4.300	17.200
Total	**100.00%**	**132.294**	**130.600**	**129.900**	**125.543**	**518.337**

[a] Some of the $70.5 million allocated to the Competitive PV 2015 budget was used earlier to support projects in 2011 and 2012 to assist with the ramp-up of the program.

CST PROGRAM PROGRESS

To date, at the portfolio level, progress has nearly matched the expectations included in the previous 2010 Plan. As anticipated, progress in some of the individual technology programs has exceeded expectations, while in others it has fallen short. The variances from the expected targets are due to a variety of reasons, most notably the depth of market capacity (i.e. consumer demand) for a given technology in relation to the level of funding provided for that technology, as demonstrated by the remaining year-end balances in certain programs. The Orders provide for an annual reallocation of unexpended funds, by NYSERDA petition, through which funding for the individual programs may be adjusted to reflect current market capacity and other relevant market conditions.

Table 1-4 presents the budget for CST programs as outlined in the 2012 CST Plan, and describes the funding status of CST programs as of December 31, 2012, depicting current program funding commitments. Tables 1-5 and 1-6 present actual and expected capacity and generation (respectively) based on current funding commitments. As of December 31, 2012, 39% of the RPS CST lifetime budget through 2015 was encumbered and 33% of the 2015 target was achieved.[11]

[10] NYSERDA filed a Petition on September 5, 2013 ("Petition NY-Sun 2014-2015 Funding Considerations and Other Program Modifications") asking the Public Service Commission to identify a source of funding for 2014-2015.

[11] On a commitment basis, not actual installations/expenditures.

Table 1-4: Funding Status of CST effective December 31, 2012[a]

	Budgeted through 2015	Expended & Encumbered	Applications in Process	Funding Balance Available for Future Contract Applications
Standard Offer PV	$293,749,535	$166,329,714	$3,318,300	$124,101,521
Competitive PV	$303,300,000	$11,266,595	$54,741,641	$237,291,764
Fuel Cells	$18,657,210	$2,807,210	$2,050,000	$13,800,000
Anaerobic Digesters	$75,859,269	$21,449,376	$9,478,879	$44,931,014
Small Wind	$18,988,978	$6,547,528	$41,450	$12,400,001
Solar Thermal	$15,620,008	$2,147,998	$572,010	$12,900,000
Total	**$726,175,000**	**$210,548,420**	**$70,202,280**	**$445,424,300**

[a] Funding amounts reflect the approval of NYSERDA's 2013 rollover petition in May 2013, and assume that NY-Sun funding is made available in 2014 and 2015. The table reflects the lifetime budgeted amount for 2007-2015. Expended is defined as the amount paid out for completed projects, encumbered is defined as the amount committed to projects currently under contract, but not complete, and applications in process is defined as the amount committed to projects that have applied but are not under contract.

Table 1-5. Actual and Expected Installed Capacity (MW) effective December 31, 2012

CST Program	Actual Installed Capacity	Additional Expected Capacity (applications accepted/contracted, but not yet installed)	Total Progress
Standard Offer PV	59.54	20.21	79.75
Competitive PV	2.55	57.46	60.01
Fuel Cells	0.39	0.86	1.25
Anaerobic Digesters	6.8	8.69	15.49
Small Wind	1.62	1.09	2.71
Solar Thermal	0.75	0.52	1.26
Total	**71.65**	**88.83**	**160.47**

Table 1-6. Actual and Expected Energy Production (MWh)[a] effective December 31, 2012

CST Program	Actual Energy Production from Installed Capacity	Additional Expected Production (applications accepted/contracted, but not yet installed)	Total Progress (as of 12/31/12)
Standard Offer PV	71,380	22,228	93,608
Competitive PV[b]	3,345	63,372	66,717
Fuel Cells	1,514	6,829	8,343
Anaerobic Digesters	77,507	60,836	138,343
Small Wind	2,399	2,544	4,943
Solar Thermal[b]	849	591	1,440
Total	**131,572**	**156,400**	**287,972**

[a] Standard Offer PV and Small Wind Actual Installed Capacity based on data calculated in NYSERDA Renewable Portfolio Standard Customer-Sited Tier Impact Evaluation Report: Solar PV and On-Site Wind Programs. Cadmus Group February 28, 2013. The 2013 Impact Evaluation found that on average, the PV capacity factor was 0.134 (based on verified MWh data); this capacity factor was used to estimate actual generation. The same evaluation found a realization rate of 1 (comparing pre-installation estimates to self-report meter data) for the Small Wind program, therefore the MWh for Small Wind reflect the pre-installation estimates. Generation for Fuel Cells and Anaerobic Digesters is sourced from actual metered data for all installed projects. Fuel Cell and ADG data source: http://chp.nyserda.ny.gov/home/index.cfm.

[b] The Competitive PV and Solar Thermal MWh figures are estimates, as these programs do not yet have sufficient actual data for evaluation and verification.

PROGRAM ASSUMPTIONS

This CST Assessment and the associated projections reflect the funding reallocations authorized by the Commission in May 2013,[12] and also operate on the assumption that funding will be made available for the full 2013-2015 budget identified in the 2012 Plan, including the additional NY-Sun funding for the Solar PV and Competitive PV programs. This funding level is referred to as the baseline funding.

[12] "Order Authorizing Reallocation of Unencumbered 2012 Customer-Sited Tier Program Funds," issued and effective May 22, 2013.

SECTION 2: **ACHIEVABLE MARKET POTENTIAL AND ASSOCIATED FUNDING**

NYSERDA has accumulated extensive experience with each of the eligible CST technologies, including experience with product research and development, business development, manufacturing, and other market transformation activities, and has amassed a significant amount of market knowledge and information from routine interaction with market actors and customers. The achievable, technology-specific market potential, program and funding assessment contained herein reflects this experience, and includes a systematic consideration of factors essential to technical maturation and market acceptance of the affected technologies, such as, but not limited to, the following:

- Available market potential by technology/location in New York.
- Design of and experience with similar programs deployed nationally.
- Current and expected technology performance/technical capabilities and limitations.
- Commercial limitations.
- Environmental benefits, reduction in harmful emissions.
- Peak reduction (e.g., peak relief in load pockets).
- Added fuel diversity.
- Economic cost-to-benefits trade-offs to the end-user.
- Stakeholder perspectives.
- Applicability/availability of non-NYSERDA program incentives.

ACHIEVABLE MARKET POTENTIAL AND FUNDING BUDGET

Based on experience with program implementation, market potential and other influential market factors, as described in more detail in Section 3, Table 2-1a presents a projection of the achievable market potential, by technology, measured in terms of installed capacity and energy production for the period through 2015. The projected RPS funding necessary to achieve this potential is presented in Table 2-1b. The budget assumes all baseline funding conditions apply.

Table 2-1a. Customer-Sited Tier Expected Results through December 31, 2015

Resource Category	2012 CST Operating Plan: Target Encumbered Capacity by 12/31/15 (MW)	Projected Capacity Encumbered by 12/31/15 (MW)	2012 CST Operating Plan: Target Annual Generation Encumbered by 12/31/15 (MWh)	Projected Annual Generation Encumbered by 12/31/15 (MWh)
Standard Offer PV	157	191.05	184,279	224,297
Competitive PV	252.7	320.61	300,381	372,621
Fuel Cells	8.6	5.45	66,075	40,448
Anaerobic Digester	31.9	28.99	225,490	201,305
Small Wind	25.5	14.11	61,910	32,073
Solar Thermal	35.1	3.30	39,954	3,765
Total	**510.8**	**563.51**	**878,089**	**874,509**

Table 2-1b. Customer-Sited Tier Funding Assessment by Technology/Program[a]

Resource Category	Percentage of Funds	Funding Amounts (in millions)				Total
		2007-2012	2013	2014	2015	
Standard Offer PV	43%	169.6	49.1	37.5	37.5	293.7
Competitive PV	40%	66.0	70.5	70.5	65.9	272.9
Fuel Cells	3%	4.9	6.6	3.6	3.6	18.7
Anaerobic Digester	11%	30.9	24.5	10.2	10.2	75.8
Small Wind	3%	6.6	4.8	3.8	4.0	19.2
Solar Thermal[b]	1%	2.7	0.94	0.94	0.94	5.5
Total	100%	**280.8**	**156.4**	**126.54**	**122.14**	685.9

[a] Funding amounts in 2013 reflect the approval of NYSERDA's 2013 Rollover Petition.

[b] Solar thermal funding based on what the program is anticipated to spend, not full budget.

On the basis of the baseline funding presented in Table 2-1b and the currently authorized CST program design, Table 2-1a outlines the expectations for capacity and energy production associated with projects installed and under contract by the end of 2015 (the end of the current CST program) as approximately 553 MW and 862,499 MWh, 108% and 98%, respectively, of the program targets.

Table 2-2 represents the estimated cost of each program per MWh, with the costs spread out over the life of a typical project for each technology. Since the 2009 Mid-Course program review lifetime costs for PV

have fallen dramatically. Lifetime costs for the other CST technologies have also fallen, but at a less significant rate.

Table 2-2. Normalized Expected Incentive 2013-2015

Resource Category	Estimated $/MWh Cost (Over Life of Project)[13]
Standard Offer PV	$42
Competitive PV	$27
Fuel Cells	$43
Anaerobic Digesters	$34
Customer-Sited Wind	$23
Solar Thermal[a]	$49
Weighted Average Cost	$35

[a] Solar Thermal calculations are based on the assumption that only $0.94 million of the $4.3 million annual budget will be spent due to market constraints. This annual expenditure would lead to the installation of 0.681 MW of Solar Thermal each year.

Program Design and Types of Incentives

Changes in program delivery strategies to account for new market conditions and technology maturation have been analyzed, and recommendations are discussed in the following sections.

[13] Calculation Methodology: Total Budget for 2013-2015/ [Project life (in years)*Expected annual generation encumbered in 2013-2015]. The presumed Life of Project for the various technologies is: Fuel Cells for 10 years, ADG for 15 years, Small Wind for 20 years, Solar Thermal for 25 years, and PV for 25 years.

SECTION 3: **TECHNOLOGY-SPECIFIC MARKET AND PROGRAM ASSESSMENT**

STANDARD OFFER PV PROGRAM (≤ 200 KW)

Public Benefits

Photovoltaic generation continues to show great promise in satisfying various long-term policy objectives as articulated by the Commission during the design of the CST Program.[14] In particular, some of the benefits of PV installations include:

- Location in specific load pockets: the percentage of Standard Offer Program projects (installed plus approved) located in the New York City region is16.59%.
- Peak kW demand reductions: the ability of solar energy to assist in reducing peak power demand is greatest in areas where peak load is driven by air conditioning demand.
- Economic development: the incentive program in New York State, along with tax credits, encourages the creation and growth of in-State PV installation companies and has attracted a number of large national companies to set up operations in the New York State.
- Participation by the residential and small business sectors: the Standard Offer PV program has received more than 4,800 applications for residential systems and more than 1,600 applications for commercial systems. The number of total applications received in the Standard Offer Program in 2012 was an increase of nearly 80% over 2011. Installed capacity more than doubled during the same time period.

Overview of Market Conditions

The Standard Offer PV Program and the market it serves have changed significantly since the establishment of the RPS. Participants in the Standard Offer PV Program fall into two categories: contracting companies and individual eligible installers. Contracting companies are the corporate entities that customers contract with to purchase or lease a PV system. Individual installers are the persons who perform the actual installation of a PV system.

The program has grown from a funding level of less than $7 million a year and an installation base of a dozen companies to an annual funding level of $37.5 million and an installation base of 334 individual installers and 296 PV contracting companies. Installed costs have dropped considerably in this same period, from $8.69/watt in 2007 to $5.05/watt in 2012 for residential systems. Within NYSERDA, responsibility for implementing the Standard Offer PV Program was transferred to Residential Energy Services (RES) from Research and Development in mid-2010. The per-Watt incentive level for system sizes up to 50 kW (Base Tier) has also dropped, in four increments over the past three years, from $2.50/Watt in 2010 to the current level of $1.30/Watt (as of September 2013).

[14] Id.; Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program; issued and effective: April 14, 2005

An additional incentive change was made in July 2013 based on a Commission order granting NYSERDA's petition to create a Second Tier in the Standard Offer Program[15] (>50kW up to 200 kW). This order created a lower incentive for the Second Tier, initially set at 70% of the Base Tier incentive, rounded to the nearest $0.05 (currently $0.90). Over time, the Base and Second Tier incentives may change independently of each other.

The number of project applications submitted to the Standard Offer PV Program has also increased significantly from 902 in 2010, to 1,327 in 2011 and 2,375 in 2012.[16] In 2012, the Standard Offer PV Program also saw significant growth in the number of lease and power purchase agreements (PPAs). Many leases and PPAs require little if any upfront cost, thereby addressing one of, if not the largest barrier to broader public participation in the PV marketplace. Under a lease/PPA structure, a customer receives the benefit of lower cost electricity without having to incur a large outlay of capital. In 2012, the numbers of project applications received that were a lease or PPA totaled 1,063, or 45% of all project applications.

Although the 30% federal tax credit for PV systems remains in place, a federal provision that provided a grant-in-lieu of tax credit (and was a significant driver of the program's commercial sector activity) expired on January 1, 2012. Since the expiration of the grant-in-lieu of tax credit provision, project application activity in the Standard Offer PV Program has shifted away from the commercial sector and toward the residential sector.

The 25% New York State personal income tax credit for residential PV systems (primary residences only) remains in effect and was amended in 2012 to allow a tax credit to be claimed for systems installed under a lease or PPA of at least 10 years in duration. The maximum allowable tax credit amount of $5,000 applies regardless of the ownership arrangement. New York State also exempts the sale and installation of residential solar-energy systems from the State's sales and compensating use taxes. The exemption was extended to non-residential solar systems, effective January 1, 2013.

New York State Real Property Tax Law also provides a real property tax exemption for solar-energy systems constructed in New York State. As currently written, the law is a *local option* exemption, meaning that local governments are permitted to "opt out" of the tax exemption by local law should they choose to do so.

As a pre-requisite to participation, companies and installers must first submit an application to the Standard Offer PV Program. If the application is approved, the applicant signs a participation agreement with NYSERDA that provides details on the participant's obligations in the Standard Offer PV Program. Participants are required to maintain insurance, provide system warrantees, and otherwise comply with all program rules.

[15] Order Authorizing Modifications of the Solar Photovoltaic Program in the Customer-Sited Tier, issued and effective July 22, 2013.

[16] 1,580 applications received in 2013 as of June 30.

The Standard Offer PV Program works with a number of stakeholders involved in the PV industry. These organizations include:

- North American Board of Certified Energy Professionals (NABCEP). NABCEP provides a certification program for solar professionals.
- International Brotherhood of Electrical Workers (IBEW). The IBEW has developed a 40-hour PV training module that is available to their members.
- New York Solar Energy Industries Association (NYSEIA). NYSEIA is a membership organization committed to educating the public, legislators, policymakers and regulators on the environmental, economic development and energy supply benefits of solar energy use.
- Solar Energy Industries Association (SEIA). SEIA is a national trade association in the U.S. whose member companies research, manufacture, distribute, finance, and build solar projects domestically and abroad.
- Various Workforce Development training providers. NYSERDA works with a network of clean energy training providers such as Hudson Valley Community College, Bronx Community College, Alfred State University, Clinton Community College, Cornell University and others that deliver training on solar to a wide range of market actors including installers, contractors and code officials, primarily building inspectors. New activities will include a NY-Sun PV Balance-of-System training program for local decision makers, first responders, building inspectors and others involved in the PV permitting approval process. The training program is expected to begin sometime late in 2013, and has a goal of 200 trainings in localities (System Benefits Charge [SBC] service territories) across New York State over a two-to-three year period.

Current Program Performance

The Standard Offer PV Program continues to be the cornerstone of an integrated program designed to build a sustainable PV industry in New York State. It provides a per-watt incentive based on the installed capacity of a system. The incentive level as of September 2013 is $1.30/W for the Base Tier (up to 50 kW). The incentive level for the Second Tier (>50kW up to 200 kW) has been initially set to 70% of the Base Tier incentive; in future adjustments of the incentives, depending on market conditions, the Second Tier incentive need not necessarily remain at 70% of the Base Tier. The total incentive may not exceed 40% of the system cost after all tax credits have been applied.

Residential systems are incentivized up to 25 kW, commercial systems up to 200 kW. Individual installers in the Standard Offer PV Program are required to become either NABCEP- or IBEW-certified within 24 months of participation. The Standard Offer PV Program also has a robust Quality Assurance (QA) component. The protocol of the QA component requires inspection of the first three projects completed by all new installers. Provided the results of these three inspections are satisfactory, 15% of subsequent projects are inspected. Installers and Contractors whose projects fail to meet quality assurance or other requirements of the Standard Offer PV Program are subject to disciplinary actions, including probation, suspension, or termination.

NYSERDA has administered a Standard Offer-type PV program since 2003, beginning with very modest funds from the SBC program and since 2008 with funds from the RPS. Although not included in the RPS results presented in this section, NYSERDA has received additional non-RPS funding that was used to support the development of PV in New York, furthering the goals of NY-Sun. These funding sources include a modest one-time funding allocation from a settlement fund with VEPCO (Virginia Electric and Power Company), funding from the Regional Greenhouse Gas Initiative (RGGI), and federal funding from the American Recovery and Reinvestment Act of 2009. VEPCO funds were mandated to be used on municipal buildings in New York State per a legal settlement, and RGGI funds were provided at a time when SBC funds were inadequate to meet the demand for PV.

Table 3-1 shows the consistent and significant growth in demand in the program in recent years. The number of applications received in 2012 increased by nearly 80% from 2011.

Table 3-1. PV Incentive Program Results RPS Only

Year	Incentive Amount	Total Cost	kW	kWh	Number of Applications	Annual Rate of Growth in Applications
2010	$22,631,185	92,547,143	12,399	14,554,442	932	n/a
2011	$35,498,646	130,653,812	21,807	25,598,581	1,327	42%
2012	$41,984,703	161,423,560	29,181	35,310,237	2,375	79%

Through December 31, 2012, the Standard Offer PV Program had 79.75 MW of installed capacity and capacity contracted but not yet installed. This figure represents 50% of the 2015 target of 157 MW identified in the 2012 Operating Plan. Annual production of systems either in operation or under contract, but not yet installed was 93,608 MWh as of December 31, 2012. This total represents 50% of the 2015 target of 184,279 MWh. Recent evaluation findings show that PV systems are generally achieving realization rates of 112% and 110% for the residential and nonresidential sectors, respectively. Results also show that the Standard Offer PV Program is driving the installations. The evaluation found an overall free-ridership rate for RPS residential and non-residential PV systems of 4.3%, which indicates that nearly all of the electricity generated by RPS-CST funded PV projects, is directly attributable to NYSERDA's programs.[17]

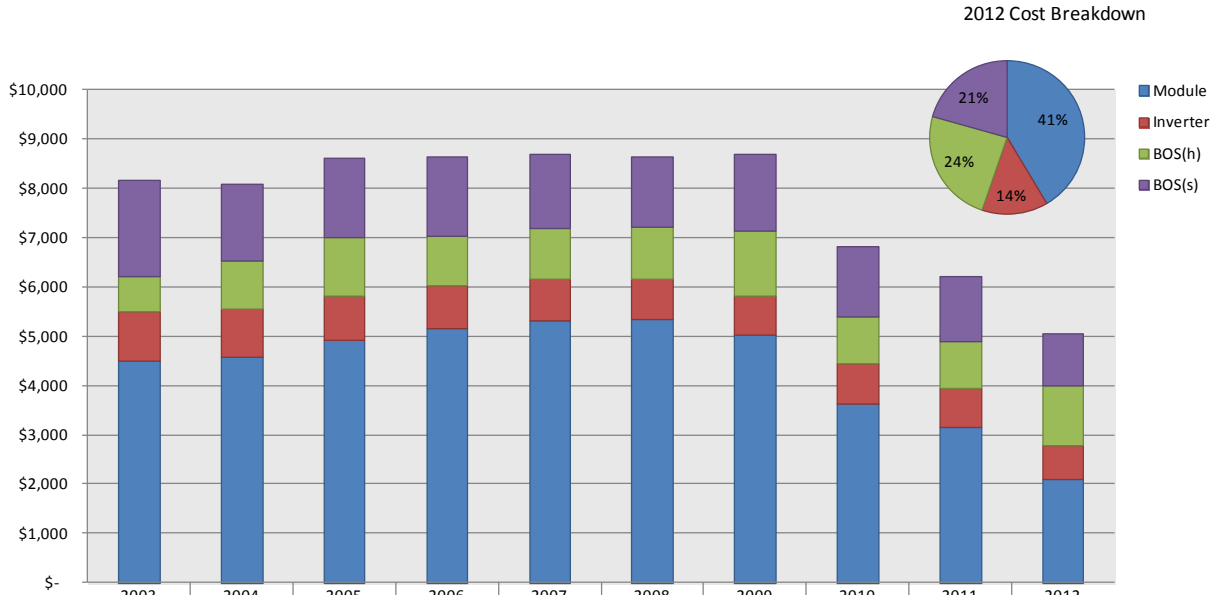
Key to the success of the Standard Offer PV Program was the ongoing effort by program staff to streamline program processes. This effort was especially effective with respect to the development, refinement and implementation of the project application review and incentive payment processes. The streamlining of these processes has resulted in faster project application approval times, which has provided a high level of certainty for participating contractors. The timeliness of project approvals allows participating contractors to schedule their installations with more certainty, and has provided them with a predictable cash flow. Predictability of cash flow is crucial to all businesses, but especially small businesses, which comprise a significant percentage of the contractor base in the Standard Offer PV

[17] NYSERDA Renewable Portfolio Standard Customer-Sited Tier Impact Evaluation Report: Solar PV and On-Site Wind Programs. Cadmus Group February 28, 2013.

Program. Faster project and invoice approval also benefits the program as more projects can be approved and completed annually, resulting in a higher percentage of annual incentive budgets being committed. This benefit was realized in 2011 and 2012, during which time 100% and 99%, respectively, of allocated incentive funds were committed.

Program growth was also aided by an unprecedented decline in installed system cost in the last five years. As shown in Figure 3-1, the majority of the decline is attributable to PV module cost decreases (17% annual cost decline for the residential modules). Balance of system and inverter costs showed much less change, and now account for the majority of total system costs (60%).

Figure 3-1. NYSERDA Residential System Component Costs[a]



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
BOS(s)	$1,948	$1,549	$1,585	$1,601	$1,483	$1,422	$1,545	$1,440	$1,304	$1,042
BOS(h)	$717	$968	$1,206	$1,004	$1,047	$1,070	$1,317	$953	$965	$1,214
Inverter	$996	$990	$888	$857	$839	$807	$784	$819	$793	$700
Module	$4,496	$4,574	$4,923	$5,168	$5,317	$5,343	$5,036	$3,617	$3,147	$2,090

[a] Data from PowerClerk in nominal $/kW. BOS (s) represents balance-of-system soft costs (i.e., profit, permitting), and BOS (h) represents balance-of-system hard costs (equipment other than module and inverter).

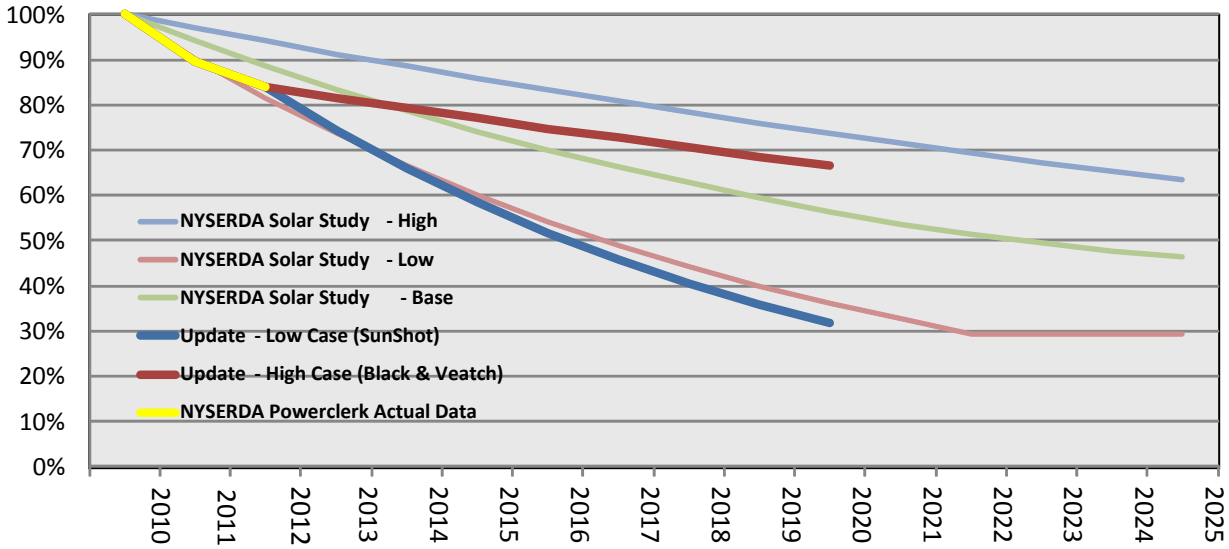
Program Projections through 2015

Based on recently conducted market research, PV system costs are expected to continue to decline through 2015. Two cost trajectories were developed. The first is consistent with a 2012 market projection by Black and Veatch (high case), and estimated a 3% nominal price decline.[18] The second is based on a 2012 U.S. Department of Energy analysis of the SunShot program goals (low case), and estimated an 11

[18] Black & Veatch. (2012). Cost and Performance Data for Power Generation Technologies. Overland Park, KS: Black & Veatch.

percent nominal decline.[19] The new cost decline forecasts are in line with the 2012 NYSERDA Solar Study. The updated high case trajectory falls between the high and base cases from the Solar Study, and the updated low case falls slightly below the previous low case. NYSERDA's 2010-2012 below 50 kW installed cost data indicate that the New York State market for smaller systems is currently following the lower cost trends. Figure 3-2 provides the basis for the high-low cost decline trajectory.

Figure 3-2. Forecasted Cost Decline Trajectories for all System Sizes



Using historical data and expectations regarding how the market will respond to changes in installed costs, avoided retail electricity prices, developer and consumer requirements for return on investment and analysis of complementary financial incentives such as the Federal Investment Tax Credit (ITC), an estimate of the required incentive was developed for the Standard Offer PV Program for 2013-2015. Table 3-2 shows the incentive trajectory by year.

Table 3-2. Projected RPS Required Financial Incentive to Stimulate Project Development

	2013[a]	2014	2015
Incentive Level ($/Watt)	$1.30	$1.10	$0.95

[a] This incentive is lower than the current $1.40/watt but reflects the introduction of a second (lower) tier incentive for systems from >50 up to 200 kW.

Under the current programmatic approach NYSERDA reduces the PV incentive in response to market demand and persistent exhaustion of the available monthly budget. Should New York decide to shift to a PV program approach that seeks to drive the market to lower costs through a schedule of prescriptive

[19] U.S. Department of Energy. 2012. *SunShot Vision Study*. Golden, CO: Office of Energy Efficiency and Renewable Energy. http://www1.eere.energy.gov/solar/pdfs/47927_executive_summary.pdf

incentive reductions, NYSERDA would expect a steeper rate of incentive decline and a different rate of PV deployment given that lower incentive level.

On the basis of program experience and market research as described, Tables 3-3a and 3-3b present projections of achievable market potential, through 2015, measured in terms of installed capacity and annual energy production, and the associated budget, for consideration. The budget is based on the 2012 Plan, reflects the funding reallocation authorized by the Commission's May 22, 2013 order, and assumes that the NY-Sun funding is made available in 2014 and 2015. Note, this assumption of the required incentive is based on a statewide weighted average electricity rate, and it does not assume that a fundamental restructuring of the solar industry occurs as a result of a technology-forcing policy mechanism. Alternative scenarios for more aggressive incentive reductions may be appropriate when considered over a longer timeframe, e.g., through 2020.

Table 3.3a. Estimate of Standard Offer PV Program Annual Capacity and Energy Expectations

Period	MW[a]	MWH
2013	37.77	44,335
2014	34.09	40,017
2015	39.47	46,336
Total	**111.33**	**130,688**

[a] Encumbrance/commitment basis

Table 3-3b. Estimate of Funding for Standard Offer PV Program

Period	Incentive Budget
2013	$ 49.1 million[a]
2014	$ 37.5 million
2015	$ 37.5 million
Total	**$124.1 million**

[a]2013 budget reflects approval of NYSERDA's 2013 Rollover Petition

Program Changes for Consideration

NYSERDA is exploring a number of program changes, including a revised mechanism for lowering the program incentive level, such as a structure whereby the incentive level automatically declines in steps based on the volume of MW in received applications. This type of approach may also be deployed on a regional basis, providing different incentive levels in different regions of the State depending on market conditions. NYSERDA filed a Petition on September 5, 2013 ("Petition NY-Sun 2014-2015 Funding Considerations and Other Program Modifications) which asks for flexibility to work with DPS to establish a regional, MW block based structure.

NYSERDA is exploring a community solar model, which may particularly fit the New York City market (see Section 4 for further discussion). NYSERDA will also monitor the development and cost of energy storage systems and consider whether energy storage systems should be eligible for incentives, particularly to increase resiliency in critical locations.

While it is expected that financing for residential systems may be made available under the Green Jobs - Green New York program, NYSERDA will also explore the market and need for alternative PV financing as part of Green Bank development. Providing customer choice is expected to be an important factor in developing a sustainable renewable energy industry.

It is not yet known whether the budget currently allocated to the Standard Offer PV Program will be adequate to meet demand based on the recently increased size caps, or impact the ability of installers who focus on small residential systems to maintain market share. NYSERDA will monitor demand, lower incentive prices as needed and required, and will update DPS staff regarding the adequacy of the budget. NYSERDA will also monitor the volume and capacity of small residential systems as compared to previous trends, and alert DPS staff of any significant changes in small residential market share as a result of increased numbers of commercial systems.

Finally, the 2010 Order states that "the incentive amount may not exceed 40% of total installed cost after all other tax credits have been applied."[20] Because the actual tax credits are determined at some future date based upon taxable income, there is no accurate way to determine an individual's or company's tax liability at the time the incentive is approved. NYSERDA proposes that this rule be eliminated, and instead, be tracked internally as an indicator of market conditions.[21] Currently, the incentives are approximately 30 -35% of installed cost. NYSERDA will track this metric and use it in setting appropriate incentive levels.

Exit Strategy

As the price of PV systems declines and the supply chain matures, it is expected that the levelized cost of energy from PV will converge with retail electricity rates (called grid parity), which could potentially happen in Downstate counties by 2017 if federal tax credits are maintained at current levels. (Larger systems are expected to achieve grid parity first due to economies of scale.) Reaching grid parity depends on a variety of factors including module price, labor cost, permitting and other soft costs, the price of the electricity being offset by the PV and the level of competition within markets. There is uncertainty surrounding grid parity due to current legislation that dictates that the federal Investment Tax Credit ITC will decrease from 30% to 10% in 2017, combined with international uncertainty as to module pricing. NYSERDA will monitor pricing and market share trends for both purchase and lease/PPA systems within New York, as well as in other states with large PV markets. Using this data, NYSERDA will consider

[20] Case 03-E-0188, "Order Authorizing Customer-Sited Tier Program through 2015 and Resolving Geographic Balance and other Issues Pertaining to the RPS Program", issued and effective April 2, 2010, p 21.

[21] NYSERDA asked for the elimination of the 40% rule in the Petition filed September 5, 2013.

strategies and other best practices that could accelerate the pace for achieving grid parity in New York State.

Once grid parity is reached, NYSERDA will likely no longer need to provide direct incentives, and will assess the need for new financing mechanisms, marketing and consumer education to ensure success in transforming the market. Market research was conducted to assess the current financing landscape, including the types of financing available, underwriting criteria and general financing terms. Based on market research, options for the post-incentive/reduced incentives period include the development of public financing that reduces payback periods to accelerate market adoption, continuation of net metering, crediting PV at or below its calculated value to society (incorporating benefit categories such as avoided line losses and distribution system upgrades), and a switch to a wholesale arrangement similar to current feed-in tariffs.

To accelerate a transition to a subsidy-free solar industry, New York will send a clear signal to the market place that it intends to zero out cash incentives by 2020. This plan should allow for adequate time for the industry to adapt and make necessary changes in its business models.

COMPETITIVE PV PROGRAM (> 200 kW)

Public Benefits

In 2012, the Geographic Balance Program was renamed the Competitive PV Program. The program was originally launched to encourage additional larger-scale customer-sited projects Downstate (NYISO Zones G, H, I and J). The program was geared to help address overall geographic balance in the RPS program (so that geographically, the relative awards of funds would more closely align with the relative contributions into the fund). This design element was continued in the Competitive PV Program. The focus on siting PV in specific load pockets, such as the New York City region, provides peak kilowatt demand reductions in areas where peak load is driven by air conditioning demand. The overall public benefits of PV for all system sizes are described in Section 3.

The use of a competitive selection process based on bid price (as opposed to a standard offer incentive) for these larger-scale systems, combined with the economies of scale of larger projects provides an opportunity to acquire these resources at the lowest ratepayer cost.

Overview of Market Conditions

In April 2012, the Commission expanded funding for NYSERDA's Standard Offer Program and Competitive PV programs from a total of $54 million annually in 2011 to $108 million annually in 2012 through 2015. PV is also eligible to compete for incentives under the RPS Main Tier; however, there have not been any successful PV project bids to date in that program. From the launch and through the early rounds of the Competitive PV program (Public Opportunity Notice [PON] 2156, PON 2484, and the first round of PON 2589); several dozen different PV installers have been awarded funds.

NYSERDA has partnered with each of the investor-owned utilities in whose service territories the program is available. These utilities have identified Strategic Locations where PV could allow the deferral of system reinforcements or upgrades on day-peaking circuits. The program offers a bonus incentive to projects to be located in these Strategic Locations. Of the 107 contracts issued to date, 18 included Strategic Location sites earning bonuses; the bonuses represent $1.8 million out of $112 million awarded (1.5% of funding).

In addition, NYSERDA meets periodically with stakeholders to get input on the program. For example, in October of 2012 NYSERDA, in partnership with Consolidated Edison and the City University of New York (CUNY), held a PV Connections event in Manhattan. This event was an innovative mechanism to help match PV customers with PV vendors, and thereby lower the PV vendors' acquisition costs for customers. Lower acquisition costs tend to reduce the overall cost of a project and should translate into a lower requested incentive. Several hundred owners of large buildings located in the Consolidated Edison territory attended the event, which was arranged in an expo format and showcased two dozen PV vendors that NYSERDA determined were credible vendors for PV projects that would fit the eligibility criteria of the Competitive PV Program. The event was marketed by invitation-only to thousands of owners of large buildings known to have sufficiently-sized vacancies on their roofs to accommodate PV systems larger

than 50 kW (as determined by CUNY via their Solar Map[22]) and also known to have sufficiently-sized electric loads to justify a PV system larger than 50 kW (as determined by Consolidated Edison via customer interface channels). The 50 kW minimum size was used as that was the program minimum project size at the time. Several project leads resulted from this matchmaking event.

Current Program Performance

The Competitive PV Program is built on the model of the Geographic Balance program. It is a performance-based program for systems larger than 200 kW[23] located on the customer's side of the meter in NYISO Zones A-J. The program currently conducts a competitive auction twice a year, where bids are made as a $/kWh request. The program offers a maximum incentive of $3 million per site ($6 million per applicant per round), which is paid as follows: 15% of the award when the equipment is delivered to the site, 15% when the system is installed and operational, and the balance of 70% over three years based on actual measured and verified production. The total incentive may not exceed 50% of total system costs.

PON 2156 (2011) awarded $34.5 million in support of 26.6 MW of new capacity. The portfolio-average incentive rate was $1.30 per watt. PON 2484 (early 2012) awarded $32.1 million in support of 34.6 MW. The portfolio-average incentive rate was $0.93 per watt. PON 2589 Round 1 (proposals received in late 2012, awards made in early 2013) awarded $46 million in support of 52 MW. The portfolio-average incentive rate was $0.88 per watt).

Note that portfolio average incentive rates are influenced by a number of factors, including: the frequency and budget of solicitations, differences in geographic distribution of awards and their relative costs, the characteristics of awarded contracts as far as scale of individual projects and the aggregate scale of awards in each solicitation round. Overall, given the economy of scale associated with large systems and the competitive bidding structure, the program has committed projects at a significantly lower cost to ratepayers compared to the 2012 Standard Offer PV Program incentive of $1.50 per watt, and has achieved an on-going trend of continuingly-reducing incentive bids. These large projects are beginning to show all-in costs of approximately $3 per watt; thus, NYSERDA's incentive tends to represent approximately 30% of all-in costs. As of early 2013, $113 million was committed for 113 MW of capacity. Due to the longer lead time for these larger-scale projects, 2.55 MW was actually installed as of December 31, 2012.

This longer time frame for larger-scale project installations may be partly explained by the unfamiliarity of program participants with the PV market for systems of this size. It may also be explained by challenges in pursuing larger-scale projects, requiring new skills and knowledge regarding customer acquisition and retention, financing, permitting, especially for large ground-mounted arrays and possible wetlands restrictions, and utility approvals, particularly the new procedures for remote net metering provisions.

[22] CUNY NYC Solar Map, http://www.cuny.edu/about/resources/sustainability/solar-america/map.html

[23] 200 kW became the program minimum project size in July 2013, in conjunction with an increase in the size cap of the Standard Offer PV program. Solicitations and bids prior to July 2013 reflect a 50 kW minimum project size.

As market actors progress through these stages and gain more experience with larger systems, with a similar project mix and geographic distribution it is possible that future projects could be completed in a timelier manner. The Competitive PV Program has already taken steps to accelerate project timelines. To reinforce the importance of bidding only shovel-ready projects into the Competitive PV Program, projects must now be completed within eight months of the award. The program also transitioned from supporting capacity blocks to a one site per bid format. These changes have been prominently emphasized through various means of communication, such as bidder workshops.

The demand for PV in Zones I-J (Downstate) thus far has been less than the funding designated for that region. Demand for PV in Zones A-F (Upstate) has exceeded available funding. The Commission issued an order in April 2013 authorizing a one-time transfer of funding to Zones A-F.[24] In addition, in July 2013, the Commission provided flexibility for the use of unencumbered Competitive PV Downstate (Zone I-J) program funding to fund Standard Offer PV applications in Zones I-J where the Standard Offer monthly funding maximum has been exceeded. [25]

Program Projections Through 2015

Based on recently conducted market research, PV system costs are expected to continue to decline through 2015.

Using the cost forecasts identified in Figure 3-2, avoided retail electricity prices, and analysis of complementary financial incentives such as the Federal Investment Tax Credit (ITC), an estimated portfolio weighted average incentive was developed for the Competitive PV program for 2013-2015. Table 3-4 presents the incentive trajectory by year, based on a mid-case scenario which is bounded by a shallow cost decline scenario and an aggressive cost decline.

Table 3-4. Projected RPS Financial Incentive to Stimulate Project Development

	2013	2014	2015
Portfolio Average Incentive Level $/watt	$0.90	$0.80	$0.70

On the basis of program experience and market research as described, Figures 3-5a and 3-5b show projections of achievable market potential, measured in terms of commitments for installed capacity and annual energy production, and the associated budget, for consideration. The budget is based on the 2012 Plan, with the additional assumption that the 2014 and 2015 NY-Sun funding is made available.

[24] Order Authorizing Transfer of Solar Photovoltaic Funding in the Customer-Sited Tier Among New York Independent System Operator Load Zone Groups, issued and effective June 20, 2013.

[25] Order Authorizing Modifications of the Solar Photovoltaic Program in the Customer-Sited Tier, issued and effective July 22, 2013. This flexibility can only be employed after the third round of awards is made under the current Competitive PV program solicitation.

Table 3.5a. Estimated Competitive PV Program Annual Capacity and Energy Expectations

Period	MW[a]	MWh
2013	78.33	91,951
2014	88.13	103,445
2015	94.14	110,509
Total	**260.60**	**5**

[a] Encumbrance/commitment basis

Table 3-5b. Estimate of Funding for Competitive PV Program

Period	Program
2013	$ 70.5 million
2014	$ 70.5 million
2015	$ 65.9 million[a]
Total	**$206.9 million**

[a] A portion of the $70.5 million allocated to the 2015 budget was used earlier to support projects in 2011 and 2012 to help with ramp-up of the program.

Program Changes to Consider

In early 2014, the Competitive PV Program will be transitioned from NYSERDA's Research and Development department to Commercial and Industrial deployment staff administration. This transition reflects NYSERDA's determination that the program is no longer a research tool and is ready for full deployment. NYSERDA is exploring streamlined ways to integrate PV development along with building efficiency, demand response and energy storage technologies. New opportunities could include a pilot performance-based standard-offer, indexed to the results of the latest competitive solicitation, to enable an avenue of participation that fosters integrated or comprehensive projects, including, for example, net-zero energy buildings. NYSERDA will also consider increasing the bonus payment for strategic locations and adjusting the duration of the performance payment period, which may increase activity in the New York City area. Discussion will be held with stakeholders and DPS staff to determine the need and advisability of this change.

NYSERDA is also considering the advisability of making other adjustments to the program, including the current requirement that projects be operational within eight months. Given the increase in minimum project size to 200 kW and the lag times associated with larger and more complex projects, will consider increasing the time to project operation. NYSERDA may also consider instituting a requirement that bidders provide financial security, refundable upon project installation, to limit customer attrition. NYSERDA is also exploring, as part of Green Bank development, opportunities for PV financing, and a community solar model, which may particularly fit the NYC market (see Section 4 for further discussion). Finally, as the market continues to mature and scale up, and the trend line of the all-in cost and the performance-based incentive level paid out under this program begins to plateau, it is expected to become

more effective to transition the program to a fixed-price offer. Current trends suggest that it may be appropriate to manage this transition to a fixed-price offer in a 2015 timeframe. NYSERDA filed a Petition on September 5, 2013 which asked for the flexibility to work with DPS Staff in transitioning the Competitive Bid Program to a MW Block performance based incentive program by 2015.

Exit Strategy

As previously indicated, the portfolio-average incentives awarded has shown a declining trend, and the slope of this trend will be further revealed via subsequent rounds of the program. This declining incentive trend contains two major sources of uncertainty. One issue is that current legislation dictates that the ITC will decrease from 30% to 10% in 2017. This uncertainty is compounded by additional uncertainty surrounding the cost decline trajectory.

The ambiguity surrounding the decrease in system costs also has implications on when solar will reach grid parity. Under the more aggressive cost decline trajectory, PV could potentially break even with electricity prices by 2017 if federal incentives are maintained, particularly in the New York City and Downstate regions due to the high value of displaced grid electricity, which counteracts the relatively higher costs of construction. Were this situation to occur, more narrowly targeted incentives (e.g. net-zero energy buildings) or their elimination may be possible.

Based on market research, options for the post-incentive/reduced incentive period include the continuation of net metering, crediting PV at or below its calculated value, and a switch to a wholesale arrangement similar to current feed-in tariffs. In addition, financing options that could lower the cost of capital are currently being explored. Market research was conducted to assess the current financing landscape, including the types of financing available, underwriting criteria, and general financing terms. See Section 4 for further discussion.

To accelerate a transition to a subsidy-free solar industry, New York will send a clear signal to the marketplace that it intends to zero out cash incentives by 2020. This plan should allow for adequate time for the industry to adapt and make necessary changes in its business models.

FUEL CELL PROGRAM

Public Benefits

The technological challenges to the wide-scale deployment of fuel cells are significant, and market transformation issues remain, but fuel cell technology represents a promising route to cleaner, more efficient energy production. Fuel cells can provide the desired societal benefits articulated by the Commission during the design of the CST Program:[26]

- Can be installed rapidly at locations within load pockets.
- Sized to appeal to both residential and small business consumers.
- Typically run base-loaded and reduce demand at all times including during system peak periods.
- Provide process heat to the host site; deliver uninterrupted electrical service to critical loads.
- Drive economic development in New York (new jobs, job retention, siting of new companies and manufacturing facilities. increased manufacturing output from existing facilities).
- Are recognized for their environmental benefits and reduction of harmful emissions.

Overview of Market Conditions

The program maintains lists of eligible equipment in both the small fuel cell size and the large fuel cell size.[27] The list of eligible small fuel cells contains items furnished from one vendor (Altergy Systems) with product modules ranging from 5 to 10 kW, and the list of eligible large fuel cells contains items furnished from three vendors (Bloom Energy; Fuel Cell Energy; and UTC Power, which on February 13, 2013, was acquired by ClearEdge Power) with product modules ranging from 100 to 2,800 kW.

Fuel cells continue to be an emerging technology, with a need for both technological advances and market development. Customer demand remains sluggish.

Current Program Performance

The program operates as a rolling-admission first-come/first-served offering. The incentives are structured as a combination of capacity-based payments and performance-based payments (performance is measured and verified over a three year period to compute those actual payments). The fuel cell equipment must be designed and installed to operate in continuous duty as stationary power production. In addition to basic capacity payments, the program offers bonus capacity payments to projects that provide secure power/standalone capability at sites of essential public services, such as police stations and hospitals, or where the fuel cell system will be an integral part of a documented and verifiable facility of refuge.

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[26] Case 03-E-0188; "Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program," issued and effective April 14, 2005.

[27] To be eligible, fuel cell systems must be commercially available, warranted for continuous duty for the three year period of performance monitoring, and certified by a nationally recognized product standard for stationary fuel cell power systems such as ANSI/CSA America FC1-2004.

From program inception in December 2007 through 2012, small fuel cells were installed and became operational at 19 sites comprising 187 kW of installed capacity, and a large fuel cell was installed at one site comprising 200 kW of installed capacity. The 19 small fuel cells were all installed as emergency backup power devices running on a stockpile of bottled hydrogen (the program did not initially require continuous duty operation); one of these is used to jump-start a large traditional emergency generator, and the others are used to provide emergency power to cell phone tower repeaters.

Program Projections Through 2015

On the basis of program experience as previously described, Tables 3-6a and 3-6b show projections of achievable market potential, measured in terms of installed capacity and annual energy production, and the associated funding requirements.

Table 3-6a. Estimate of Fuel Cell Program Capacity and Energy Expectations

Year	Small Fuel Cells		Large Fuel Cells		Total	
	Capacity in MW	Annual Generation in MWh	Capacity in MW	Annual Generation in MWh	Capacity in MW[a]	Annual Generation in MWh
2013	0.05	0	2.0	15,374	2.0	15,374
2014	0.05	0	1.1	8,278	1.1	8,278
2015	0.05	0	1.1	8,278	1.1	8,278
Total	**0.14**	**0**	**4.1**	**31,930**	**4.2**	**31,930**

[a] Encumbrance/Commitment basis

Table 3-6b. Estimate of Funding for Fuel Cell Program

Period	Small Fuel Cell Set-Aside	General Fuel Cell Category	Total
2013	$0.1 million	$6.5 million	$6.6 million
2014	$0.1 million	$3.5 million	$3.6 million
2015	$0.1 million	$3.5 million	$3.6 million
Total	**$0.3 million**	**$13.5 million**	**$13.8 million**

Program Changes for Consideration

Customers have expressed interest in large multi-module fuel cell installations, but the current cap of $1 million per project is insufficient to leverage these projects. In early 2013, marketplace participants filed several dozen notices of intent to propose large multi-module fuel cells to the Main Tier program. The

outcome of the bid review process will provide additional insight as to whether large fuel cells are suitable for the Main Tier program, or if the CST should adjust the per project funding cap.

The program's early support for emergency backup power devices was discontinued in favor of continuous duty projects to seek both kilowatt and kilowatt hour accomplishments. This should be re-examined in light of the very positive role that these emergency backup power fuel cells performed in the aftermath of Superstorm Sandy. The funding allocated in May 2013 as a result of the rollover process came with the stipulation that large fuel cell projects associated with this funding must be able to run during a grid outage.[28] This requirement will be carried over for 2014 and 2015. Additionally, the program will incorporate bonus payments for fuel cells located in strategic locations.

Exit Strategy

The fuel cell industry is still at a very early stage of development. Although several vendors have recently transitioned from technology development to product sales focus, the market uptake is still minimal. As familiarity with fuel cells increases, product quality is proven, and costs decrease, the available federal tax credits should become sufficient to compensate for the premium price of the technology. At such point, NYSERDA would consider reducing or discontinuing any payment of incentives.

[28] "Order Authorizing Reallocation of Unencumbered 2012 Customer-Sited Tier Program Funds," issued and effective May 22, 2013.

ANAEROBIC DIGESTER BIOGAS-TO-ELECTRICITY PROGRAM

Public Benefits

Anaerobic Digester Biogas (ADG) systems produce a number of the desirable impacts in New York State that were identified by the Commission during the design of the CST Program.[29] ADG systems are installed for a number of reasons: to hedge against rising electricity prices, for odor abatement, to allow for seasonal storage of manure (versus daily spreading), to produce bedding and liquid fertilizer for farms, to spur economic development, and as an alternative to land filling of sewage sludge. Ultimately, ADG systems enable farms and water treatment facilities to operate more efficiently. ADG also decreases peak demand on the grid and increases the diversity of the State's fuel mix, which has positive impacts on both the State's environment and its economy. However, cost effective systems can only be installed in a market that has broad-based acceptance of the technology – acceptance that attracts developmental expertise and may ultimately lead to declining costs.

Overview of Market Conditions

NYSERDA has actively engaged the dairy farm, food processing, and wastewater treatment sectors in support of ADG systems. Additionally, NYSERDA has partnered with important trade allies to promote ADG systems, including but not limited to the Cornell Pro-Dairy Program, NYS Department of Agriculture and Markets, NYS Empire State Development Corp, New York Farm Bureau, Farm Credit East, U. S. Environmental Protection Agency's AgStar Program, and U. S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS). NYSERDA co-hosted a three-day conference with more than 300 attendees entitled "Got Manure? Enhancing Environmental and Economic Sustainability" in Syracuse in March 2012 with Cornell Pro-Dairy, AgStar, and NRCS.

On August 15, 2012, Governor Cuomo convened a Yogurt and Dairy Summit in further dialog about bolstering the blossoming economic vitality of that sector. The Summit recognized the important contribution that ADG biogas-to-electricity projects can bring to the growth and integration of dairy suppliers and dairy processors, where growth of one reinforces growth of the other. In follow-up, an event was organized by industry stakeholders on February 4, 2013, and provided additional feedback that has helped refine the format of the solicitation for the ADG biogas-to-electricity program.

Anaerobic digestion-to-electricity continues to be an emerging technology, with a need for both technological advances (for instance in smaller, transportable systems, as opposed to permanently-embedded construction), and market development. Customer curiosity remains high, although commitment to proceed with implementation remains sluggish due to various economic factors enumerated in NYSERDA's October 2012 petition and the subsequent order.[30]

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[29] Case 03-E-0188; "Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program," issued and effective April 14, 2005.

[30] Case 03-E-0188, In the Matter of a Renewable Energy Portfolio Standard, Order Authorizing the Increase of Maximum Project Incentive for the Anaerobic Digester Gas-to-Electricity Program, issued and effective January 23, 2013.

Current Program Performance

The program operates as a rolling-admission first-come/first-served offering, with incentives available for systems that demonstrate technical appropriateness (proper match between size of digester and available feedstock, proper match between forecasted quantity/quality of biogas and size of generator).
The incentives are structured as a combination of capacity-based payments and performance-based payments. Electric production is measured and verified over a multi-year period to compute the performance payments. At different times, the program has used a 3-year, a 5-year, and a 10-year period. In December 2012, the program established a menu-based approach for computing incentives, offering higher incentives for expensive digester construction/refurbishment compared to lower incentives for less-expensive digester construction/refurbishment, as well as bonus incentives to projects that include high-quality gas clean-up equipment, black-start capability for generator operation during a utility grid outage, or design and operation with substantial amounts of food wastes.

Applications for ADG projects had a surge of activity in November/December 2010 (19 applications received and accepted, representing 10.8 MW of new installed capacity) but trailed-off significantly thereafter. One application was received in 2011, and one in 2012 before program changes were implemented in December 2012. Nine projects re-applied and eight new applications were received in December 2012/January 2013 under the new rules. The majority of the 19 projects from 2010 had not progressed to construction as of the opening of the new program in December 2012. In general, those projects sought but were not successful in acquiring additional funds through federal programs such as 1603 Treasury Grants or NRCS/EQIP digester funding, and remain stalled because they have not met the investment hurdle.

Changes to the program in December 2012 to raise the per-project cap to $2 million, and adjusting the funding formulas to increase the incentives as well as extend the performance payments for a 10-year term to ensure an ongoing stream of cash flow for proper maintenance activities were implemented in part to compensate for the unavailability of other public funds. These changes have revived the viability of 9 of the 19 projects, and resulted in full commitment of the program funds available in early 2013. Additional program funds for 2013 were allocated when NYSERDA’s rollover petition was granted in May 2013.

Program Projections through 2015

On the basis of program experience as previously described, Tables 3-7a and 3-7b show projections of achievable market potential, measured in terms of installed capacity and annual energy production, and the associated funding requirements.

Table 3-7a. Estimate of ADG-to-Electricity Program Capacity and Energy Expectations

Year	Farm-Based ADG		Industrial/WWTP ADG		Total	
	Capacity in MW	Annual Generation in MWh	Capacity in MW	Annual Generation in MWh	Capacity in MW[a]	Annual Generation in MWh
2013	5.9	38,681	1.5	9,670	7.4	48,351
2014	2.4	16,083	0.6	4,021	3.1	20,104
2015	2.4	16,083	0.6	4,021	3.1	20,104
Total	**10.8**	**70,847**	**2.7**	**17,712**	**13.5**	**88,559**

[a] Encumbrance/Commitment basis

Table 3-7b. Estimate of Funding for ADG-to-Electricity Program

Period	Funding
2013	$24.5 million
2014	$10.2 million
2015	$10.2 million
Total	**$44.9 million**

Program Changes for Consideration

Changes to the program in December 2012 raised the per-project cap to $2 million[31] and adjusted the funding formulas to increase the incentives as well as extend the performance payments for a 10-year term to ensure an ongoing stream of cash flow for proper maintenance activities. These changes have re-invigorated the marketplace, and will be monitored throughout the next several months to see if additional minor adjustments to the program are necessary.

[31] The cap was initially raised to $2 million per project based on a limited amount of supplemental "bridge funding" provided by NYPA, and subsequently based on a Commission Order issued January 23, 2013.

Exit Strategy

The proposed ADG budget should provide sufficient incentive for the acquisition of ADG systems at a large fraction of the most favorably configured New York State dairy farms and a significant number of medium-to-large wastewater treatment plants. This market penetration strategy is aggressive but given that ADG technology has an attractive cost among the customer-sited tier technologies and is a relatively mature technology; such a strategy is considered prudent. According to the Order that made ADG eligible under the CST: "maximum, cost effective systems can only be installed in a market that has broad-based acceptance and adoption of the renewable energy technology. Infrequent installations will not attract developmental expertise or lead to declining costs."[32] The funding incentives can also be expected to bring additional digester developers and greater cost competition to the New York State farmers and food processors. The ADG program is an acquisition program. NYSERDA does not expect material reductions in digester system costs.

As the RPS Program is implemented, NYSERDA will not only monitor the renewable electricity produced but will also compile and disseminate information on digester system costs and waste treatment effectiveness, so that other facilities can make more informed decisions about the suitability of digester systems. NYSERDA will also support technology transfer efforts to widely distribute case studies and reports about digester systems.

During RPS Program implementation, NYSERDA will continue its cooperation with the New York State Departments of Environmental Conservation and Agriculture and Markets, New York State Environmental Facilities Corporation, Federal Rural Development Office of the U.S. Department of Agriculture, and the AgSTAR Program of the U.S. EPA, to exchange information about the availability of incentives for ADG system installation. Changes in the availability and impact of any such programs, as well as potential decreases in digester system costs, will be monitored by NYSERDA and may result in alterations to proposed RPS incentives and/or additional digesters installed beyond the current estimates.

[32] Case 03-E-0188, "Order Approving Request for Inclusion of Methane Digester Systems as Eligible Technologies in the Customer-Sited Tier," issued and effective November 2, 2005.

CUSTOMER-SITED WIND PROGRAM

Public Benefits

Customer-sited wind power is starting to show results in satisfying various long-term policy objectives as articulated by the Commission.[33] With the recent adjustment of the program to support larger customer-sited systems, the benefits of the initiative will grow. Some of the benefits of the customer-sited wind program include:

- Economic development. As of December 31, 2012, 21 small businesses across New York State had installers that were eligible to participate in the NYSERDA program. This number has increased from the 12 businesses enrolled in the program in June 2009, in part due to the availability and proliferation of small wind training programs.
- Fuel diversity and reduction in harmful emissions. Wind systems reduce the amount of grid power used to meet the load at the site.
- Participation by the residential and small business sectors. The majority of customers in the customer-sited wind program are either residences or farms.

Overview of Market Conditions

In 2011, the program size cap was raised from 600 kW to 2 MW, without an increase in the maximum funding level, to enable participation by larger projects who asserted that they did not need funding in excess of the program's $400,000 per project maximum. However, according to the industry other factors in the marketplace hindered the ability of these larger systems to proceed at the $400,000 cap.[34] The raise of the funding cap to $1 million per project, based on the Commission's February 2013 Order, [35] provides a greater opportunity for larger-scale commercial sector participation.

NYSERDA refers to a list of eligible equipment that has been established and is maintained by a national organization, the Interstate Turbine Advisory Council (ITAC) which was organized by the Clean Energy States Alliance (CESA); NYSERDA is a founding member and routinely participates in reviews of turbine equipment and decision making regarding updates to the list of eligible equipment. On-site wind continues to be an emerging technology with a need for market development. Recently, customer interest has waned; customers appear to be pursuing PV as a more-attractive option to fulfill their desire for renewable power.

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[33] Case 03-E-0188, "Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program," issued and effective April 14, 2005.

[34] See the petition filed by Distributed Wind Energy Association (DWEA) and Sustainable Energy Development (SED) in October of 2012.

[35] Case 03-E-0188, " Order Authorizing an Increase in the Maximum Project Incentive for the On-Site Wind Program in the Customer-Sited Tier," issued and effective February 14, 2013.

Current Program Performance

The program operates as a rolling-admission first-come/first-served offering, with incentives available for eligible (pre-qualified) equipment installed by an eligible (pre-qualified) installer. NYSERDA has established and maintains a list of eligible installers. NYSERDA assesses a combination of experience installing turbines, education/training regarding turbines, and credentials relevant from the original equipment manufacturer of the turbines they seek to install when an installer applies seeking to be added to the list of eligible installers.

The incentive is structured as two lump sum payments: one when the equipment is delivered to the site and the other when the equipment is installed and operational. The overall incentive is determined based on computer-modeled projection of performance of the specific turbine at the specific site at a specific tower height; the incentive cannot exceed 50% of the total cost of the project. The computer modeling predicts the number of kilowatt hours that the system will produce in a given year. The incentive is determined by allocating blocks of funds per kilowatt-hour at declining rates. The first 10,000 kWh are awarded at $3.50 per kWh, the next 115,000 kWh are awarded at $1 per kWh, and any additional kWh are awarded at $0.30 per kWh. An additional block rate will be added to the program in conjunction with raising the cap to $1 million per project.

Applications for on-site wind projects were very active in 2011(62 application received and accepted, representing nearly 2 MW of new installed capacity) but trailed-off significantly in 2012 (15 application received representing 141 kW). As of year-end 2012, the program had engaged with 144 projects: 125 of which are operational and the remainder are in various stages of contracting, design and construction. Of the 144 projects, 130 are in the 2-19 kW range, 13 are in the 20-78 kW range, and one is 800 kW. Recent evaluation results indicate that installers of On-Site Wind projects are successfully predicting electricity generation, and the program achieved a realization rate of 1.0.[36]

Program Projections through 2015

On the basis of program experience as previously described and accounting for the program's new per-project funding cap. Tables 3-8a and 3-8b show projections of achievable market potential, measured in terms of installed capacity and annual energy production, and the associated funding requirements.

[36] NYSERDA Renewable Portfolio Standard Customer-Sited Tier Impact Evaluation Report: Solar PV and On-Site Wind Programs. Cadmus Group February 28, 2013.

Table 3-8a. Estimated Customer-Sited Wind Program Annual Capacity and Energy Expectations

Year	Number of Systems	MW[a]	MWh
2013	40	3.7	9,640
2014	37	2.8	6,140
2015	30	4.9	11,350
Total	**107**	**11.4**	**27,130**

[a] Encumbrance/Commitment basis

Table 3-8b. Estimate of Funding for Customer-Sited Wind Program 2013-2017

Period	Program
2013	$ 4.6 million
2014	$ 3.8 million
2015	$ 4.0 million
Total	**$12.4 million**

Program Changes for Consideration

NYSERDA will revise the incentive formula to create an additional "rate block" for incentive awards to accommodate the new per-project cap. Some stakeholders in the marketplace have suggested that a second program element be created for the larger behind-the-meter projects in a structure similar to the Competitive PV Program. While NYSERDA is not ideologically opposed to such a concept, the market in New York State has not yet attracted sufficient number of participants in that size range to establish a truly competitive bidding opportunity. NYSERDA will continue to track development of the marketplace and may consider a competitive program element in the future.

Exit Strategy

The market for customer-sited wind technology applications in New York State is still at a very early stage of development. As the number of installations increase and more installers and communities have experience with siting the systems, local institutional barriers will decrease. This shift will likely result in reduced installation costs, and will open the market to additional customers. It is not expected that the cost of energy from the systems will be competitive with retail electricity by the end of the next program phase.

SOLAR THERMAL PROGRAM

Public Benefits

The Solar Thermal program has two main public benefits:

- Economic development: The open enrollment structure of the Solar Thermal incentive program in New York State is designed to encourage the creation of new in-state Solar Thermal installation companies, and provide a catalyst for established in-state Solar Thermal installation companies to expand.
- Participation by the residential and small business sectors: In the RPS Solar Thermal program, there have been more than 763 residential and 56 commercial system applications received since program launch in December 2010.

Overview of Market Conditions

The Solar Thermal program and its market have been sluggish in New York State as well as nationally. The $1.50/ displaced kWh incentive level established when the program launched in December 2010 is still in effect today. Due to the timing of the program launch, no project applications were received 2010. In 2011, 716 applications were submitted to the Solar Thermal Program, and in 2012, 103 applications were received. The large number of applications received in 2011 was the result of a large project, comprised of 632 individual solar thermal systems, planned for a student housing complex on the South Campus of Syracuse University. Program staff was notified in late 2012 that the scope of this project would be scaled back significantly, and as of December 31, 2013, the program only had 520 kW in the pipeline.

Solar Thermal systems are eligible to receive a 30% federal tax credit. However, the provision that provided for a grant-in-lieu of tax credit expired on January 1, 2012. The expiration of the grant-in-lieu provision has had minimal impact on program activity levels.

The 25% New York State personal income tax credit for residential Solar Thermal systems (primary residences only) remains in effect and was amended to allow it to be claimed for systems installed under lease or power purchase agreements (PPAs) of at least 10 years in length. The maximum allowable New York State tax credit is $5,000 regardless of the ownership arrangement. The Solar Thermal program has yet to receive a lease or PPA project application.

New York State also exempts the sale and installation of residential solar-energy systems from the State's sales and compensating use taxes. The exemption was extended to non-residential solar systems effective beginning January 1, 2013.

New York State Real Property Tax Law also provides a real property tax exemption for solar-energy systems constructed in New York State. As currently effective, the law is a *local option* exemption, meaning that local governments are permitted decide whether or not to allow the tax exemption.

Participants in the Solar Thermal program fall into two categories: contracting companies and individual eligible installers. Contracting companies are the corporate entities that customers contract with to purchase or lease a solar thermal system. Individual installers are the persons who perform the actual installation of the system. As a pre-requisite to participation, companies and installers must first submit an application to the Program. If the application is approved, the applicant signs a participation agreement with NYSERDA that provides details on the participant's obligations in the Solar Thermal program. Participants are required to maintain insurance, provide system warrantees, and otherwise comply with all program rules. Currently, there are 87 individual installers participating in the Solar Thermal program, representing 81 contracting companies.

The Solar Thermal program works with a number of stakeholders and organizations that represent the Solar Thermal industry. These organizations include:

- North American Board of Certified Energy Professionals (NABCEP). NABCEP provides a certification program for the solar professionals.
- New York State Solar Energy Industry Association (NYSEIA). Membership organization committed to educating the public, legislators, policy makers, and regulators on the environmental, economic development, and energy supply benefits of solar energy use.
- Various Workforce Development training providers. NYSERDA works with a number of clean energy training providers to deliver training services to Installers and Contractors.

Current Program Performance

The Solar Thermal program provides an incentive based on the estimated number of displaced kilowatt hours of a system. The current incentive level is $1.50/displaced kWh. Incentive amounts are capped at $4,000/site/meter for a residential system and $25,000/site/meter for a nonresidential system. The Solar Thermal Program also has a robust Quality Assurance (QA) component. The protocol of the QA component requires inspection of the first three projects completed by all new installers. Provided the results of these three inspections are satisfactory, the per installer project inspection rate is then reduced to 15%. Installers and Contractors whose projects fail to comply with the requirements of the Solar Thermal program may be subject to disciplinary action, including: probation, suspension or termination.

NYSERDA has administered the Solar Thermal program with funding from the RPS CST. The Solar Thermal program was launched in December 2010 and is designed to create a sustainable market for Solar Thermal technology in New York State. A Solar Thermal outreach effort was recently launched to educate consumers in the State about Solar Thermal technology and its benefits. This integrated effort targets both home and business owners who currently heat their hot water with electricity, utilizing online advertising and direct marketing (email) to drive prospects to an informational, engaging microsite where they can download educational tools and test their knowledge of solar thermal technology. NYSERDA is also reaching out to potential eligible installers in the State to increase participation in the program. Table 3-9 shows the application activity in the program through 2012.

Table 3-9. Solar Thermal Program Results with RPS (All Sectors)

Incentive Amount	Total Cost	kW	kWh	Year	Number of Applications
$0	$0	0	0	2010	0
$2,234,342	$7,635,870	3378	3,847,217	2011	716
$ 938,731	$1,971,309	683	775,371	2012	103

Program Projections through 2015

The annual capacity and energy expectation in Table 3-10a are based on program performance to date and the anticipated effect of the Solar Thermal Outreach and Education initiative. As indicated by Table 3-10b, these projections assume that under current Commission rules, only approximately $0.94 million of the total budget ($4.3 million) will actually be spent each year, and that the program will continue to be electric only. If program changes are implemented, the amount spent would likely be greater. Remaining funds will be reprogrammed at the end of each year during the rollover process.

Table 3-10a. Estimated Solar Thermal Program: Annual Capacity and Energy Expectations

Period	MW[a]	MWH
2013	0.681	775
2014	0.681	775
2015	0.681	775
Total	**2.04**	**2,325**

[a] Encumbrance/Commitment Basis

Table 3-10b. Estimate of Funding for Solar Thermal Program

Period	Budget [a]
2013	$ 0.94 million
2014	$ 0.94 million
2015	$ 0.94 million
Total	**$ 2.82 million**

[a] Solar Thermal assumes that only $0.94 million of the $4.3 million annual budget will be spent due to market constraints.

Program Changes to Consider

Currently, the Solar Thermal Program RPS funded incentives are limited to systems that displace electrically-heated domestic hot water (DHW), which is a small and disperse market in New York State. Consequently, the Solar Thermal program and solar hot water industry in the State has been very slow to develop, resulting in low program production numbers. The opportunities for installation of Solar Thermal systems displacing electrically heated DHW are somewhat limited, as electric DHW represents

only a small portion of the DHW market, and is further limited by siting issues. Solar thermal installers find greater opportunity in targeting displacement of non-electrically heated DHW, in particular, oil or propane-fired DHW, where the cost-effectiveness of the conversion is greater.

Fuel neutrality and a modification to the nonresidential incentive structure would foster greater participation in the Solar Thermal Program. However, to be effective, these issues need to be addressed as a package. Allowing for fuel neutrality will greatly expand the potential customer base, creating opportunities for business growth, significant increase in program participation, and a lowering of costs across the industry as a whole. Program eligibility should also be expanded to allow for combination-systems (systems that provide hot water for DHW and space heating use). Allowing fuel neutrality and combination-systems would also allow for pool heating as the heat dump for the excess hot water produced during the summer months. However, stand alone pool heating systems would not be incentivized; they would need to be part of a space heating/combination system.

NYSERDA also proposes that the nonresidential Solar Thermal incentive cap be raised to $100,000 per project. NYSERDA's proposal is based upon contractor feedback indicating that there is a market for nonresidential Solar Thermal systems that are larger than the current $25,000 maximum will support. To ensure that these larger systems are not over incentivized, this policy would include a provision that the nonresidential incentive amount would not exceed 50% of the total non–residential system cost. Finally, NYSERDA proposes to allow for the replacement of previously installed solar thermal systems, if they are past their useful life, with new equipment. These systems would be eligible to enter the Solar Thermal program and receive incentives for their replacement equipment.

The Solar Thermal Program has historical data to support the conclusion that demand on the non-electric side is strong. In the program's two year history, $1.4 million in nonelectric incentive funding (from ARRA and RGGI) was provided to 170 projects. Although availability of nonelectric funding has been sporadic and was primarily available during 2011, the demand has been consistently strong, with the number of projects exceeding the availability of nonelectric incentive funding. Inquiries from contractors on the availability of new nonelectric funding are received by staff on a regular basis.

Exit Strategy

The market for customer-sited solar hot water applications to replace electrically-heated hot water in New York State is still at a very early stage of development, and demand for these systems has been very low. In order for the Solar Thermal technology to reach its potential in the State, the menu of eligible applications previously described must be expanded. Expanded opportunities for Solar Thermal installation companies will spur competition, resulting in lower system costs and a more attractive payback period.

SECTION 4: ITEMS FOR CONSIDERATION IN THE CST PROGRAM (2013-2015)

This section summarizes the recommendations that would require near-term Commission action, including the following items that were addressed in the petition filed by NYSERDA on September 5, 2013[37]:

- Identify the funding source for the NY-Sun 2014-2015 program years
- Eliminate the 40% of installed cost rule for the Standard Offer PV program
- Allow NYSERDA the flexibility to lower the Standard Offer PV incentive level, as measured regionally based on MW under contract
- Allow NYSERDA the flexibility to transition the Competitive PV program to a fixed-price performance-based program

Additional items requiring near-term Commission action, not addressed in the September 5, 2013 petition include:

- Expand solar thermal program eligibility to cover combination systems
- Allow the solar thermal program to become fuel neutral
- Allow NYSERDA the flexibility to adjust CST program incentive caps
- Allow NYSERDA the flexibility to pursue financing options through the Green Bank to achieve the CST objectives
- Authorize the use of program funds for Quality Assurance/Quality Control

In addition to the recommendations requiring near-term Commission action, the previous sections also identified a number of changes and opportunities NYSERDA plans to explore further. These changes and opportunities would benefit from the input from stakeholders, DPS Staff and the Commissioners, with the intent that action may be needed at a future date. They are in the following areas:

- Community solar opportunities
- Integrated solar energy and energy efficiency
- Energy storage for resiliency
- Additional technology-specific program refinements

Finally, in support of Governor Cuomo's statewide NY-Sun Initiative, , New York State should consider whether there would be efficiencies and greater success achieved if a better-coordinated, statewide PV incentive program were to be implemented, as opposed to separate programs offered by multiple program administrators. NYSERDA filed a petition on September 5, 2013 which requested authorization to work with DPS and LIPA staff to assess the merits and potential of establishing a statewide program.

Additional information is provided on these topics below.

[37] The petition also included a request for the flexibility, in consultation with DPS Staff, to establish and to periodically adjust the allocation of funds between the Standard Offer and Competitive PV Programs.

TECHNOLOGY-SPECIFIC PROGRAM REFINEMENTS

As presented in the previous sections, several program refinements are suggested for consideration in the context of this program review. The suggested refinements that require Commission action are:

- Standard Offer PV program:
  - Eliminate the 40% of installed cost rule.
  - Allow NYSERDA the flexibility (in consultation with DPS Staff) to revise the method for lowering the incentive level based on market participation, as measured by MW under contract as opposed to budget consumed. This type of approach may also be deployed on a regional basis, providing different incentive levels in different regions of the State depending on market conditions.
- Competitive PV program:
  - Allow NYSERDA the flexibility to establish streamlined ways to integrate PV development along with a building efficiency, demand response or energy storage project, based on an indexed fixed price offer to enable an avenue of participation that fosters integrated or comprehensive projects, including for example net-zero energy buildings.
  - To minimize transaction costs and facilitate market growth, allow NYSERDA in consultation with DPS staff, the flexibility to transition the larger-scale PV program to a fixed-price performance-based incentive as program and market experience is gained and factors such as the rate of decline in project costs and incentives is revealed.
- Solar Thermal program:
  - Expand program eligibility to cover combination systems.
  - Allow the program to become fuel neutral.
- Cross Program: Allow NYSERDA the flexibility to adjust program incentive caps (i.e. Fuel Cell, On-Site Wind, and Solar Thermal programs) based on market conditions and available budgets, in consultation with DPS staff.

In addition to the programmatic changes requiring Commission action, the previous sections also identified a number of changes NYSERDA plans to explore further, such as:

- Standard Offer PV Program: Explore potential community solar opportunities; assess the market and need for alternative financing.
- Fuel Cell Program: Incentives for small systems that are intended only to provide backup power during grid outages.
- Competitive PV Program: Explore potential community solar opportunities; assess the market and need for alternative financing; consider including financial security as part of the application process; consider revising the performance payment period; consider increasing the time allowed for the project to enter operation; assess the need for an increased strategic location bonus.

INTEGRATED SOLAR ENERGY AND ENERGY EFFICIENCY

NYSERDA will explore whether it is beneficial to include complimentary low cost conservation and energy efficiency measures in the PV and Solar Thermal programs. A recent impact evaluation[38] indicated that participation in the PV program increased overall energy saving behaviors in small percentage of participants. While solar programs currently require a walk-through audit of energy efficiency opportunities, these programs have the potential to more directly integrate energy efficiency practices and increase this synergy in a larger percentage of participants. Best practice research also indicates that consideration should be given to including complimentary water saving measures in the Solar Thermal Program[39].

COMMUNITY SOLAR

New York State is in the very early stages of embracing community solar,[40] which is expected to provide consumers new points of market entry and lower costs from economies of scale. Community solar enables those whose homes or buildings are not well-suited for rooftop or ground-mounted solar systems to benefit from larger, community-sited systems. Community solar is also seen as a means to enable owners of condominiums and co-ops to more readily participate in the PV market – and therefore as a means to increase participation in PV incentive programs within the New York City region. Community solar may need to be enabled through changes to remote net metering law or other policies. In all likelihood, there will be a need for support and funding for the development of standards and pilot community PV projects. Such a pilot program would likely be administered through NYSERDA's Technology and Market Development program. NYSERDA will monitor the development of community solar and may revisit the development of a program in the future.

ENERGY STORAGE

NYSERDA is also currently reviewing/assessing the role for energy storage in the RPS program, particularly as it related to enhancing both sustainability and resiliency. NYSERDA may at some future date request inclusion of specific energy storage incentives in the CST program. Other states, such as Pennsylvania, include a wider range of technologies in their RPS programs, including geothermal heat pumps.[41] While not advocating for the addition of any new technologies at this time, NYSERDA will continue to monitor the need to incentivize any new or emerging technologies through the CST.

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[38] NYSERDA Renewable Portfolio Standard Customer-Sited Tier Impact Evaluation Report: Solar PV and On-Site Wind Programs. Cadmus Group February 28, 2013.

[39] Clean Energy Resource Teams, http://www.cleanenergyresourceteams.org/community-projects/case-study/solar-pioneers-case-study-se-como-neighborhood-solar-thermal-project

[40] Arista and community solar, http://www.cleanenergyauthority.com/solar-energy-news/arista-launches-solarize-genesee-campaign-0107013;http://www.yourindustrynews.com/arista+power+launches+community+solar+purchasing+program+for+hornell,+new+york_85907.html

[41] http://www.nrel.gov/geothermal/guidebooks/heating_cooling/state_policies.html. NREL indicates that CT, DE, NJ PA, provide a state incentive. PA includes them in their RPS.

GREEN BANK

In the 2013 State of the State address, Governor Cuomo pledged to create a "Green Bank" in New York State. The Green Bank would leverage public funding with private sector money to spur investment in clean energy. NYSERDA is currently assessing market conditions and determining financing needs and opportunities related to this effort. Given this priority initiative, NYSERDA requests flexibility in offering incentives and/or financing to achieve the RPS objectives, within the available budget. As the Green Bank evolves, NYSERDA will work with DPS staff to implement appropriate changes to the CST programs, including potential adjustments to incorporate financing.

FUNDING CONSIDERATIONS

Funding for RPS CST Program Administration

Program administration activities for the CST include program design, development of solicitations, review of applications/proposals, review of installer eligibility, contracting, monitoring project progress, review and payment of invoices, stakeholder communication and outreach, and as described as follows, other third-party quality assurance and quality control (QA/QC) necessary to maintain safety and performance of the program. The CST program, which is generally a high-volume application-based program, is being administered at a rate of 3.8%, excluding expenses for QA/QC. With third-party QA/QC, the administrative rate for 2013 is estimated to be approximately 5 %.

In April 2010, the Commission approved a $54 million Program Administration budget for the entire RPS. This $54 million in funding was to cover administration of the $3 billion RPS program from 2006 through completion in 2024. Unlike other rate-payer funded deployment programs (e.g., Energy Efficiency Portfolio Standard [EEPS]), necessary third-party QA/QC expenses were required to be funded within the NYSERDA Program Administration budget. NYSERDA was given the flexibility, however, to fund its administration cost for the RPS program as a whole and not strictly on a category-by-category, or year-by-year basis.

The Commission authorized NYSERDA to treat the administration costs for the RPS program as transferrable between Main Tier and Customer-Sited Tier administrative functions.

Notwithstanding this flexibility, NYSERDA has raised potential concerns about the overall adequacy of the RPS Program Administration budget, given the requirement of including CST QA/QC within the Program Administration budget. Working in collaboration with DPS staff, NYSERDA has streamlined its QA/QC program and reduced estimates of anticipated QA/QC funding needs, however NYSERDA still projects that QA/QC costs for the CST will amount to approximately $11 million in total, thereby putting substantial pressure on the approved RPS Program Administration budget.

When the NY-Sun program was launched in 2012 and funding was transferred from the Main-Tier program to the CST, NYSERDA included within a petition a request that the Commission increase the Program Administration funding given the creation of a considerably expanded CST function, which has a higher administrative burden per dollar than does the Main-Tier program given the nature of the

programs. The Commission denied NYSERDA's request, stating that the adequacy of the administrative costs would be assessed during the 2013 RPS Program Review.

As part of the 2013 RPS Review, NYSERDA has analyzed RPS administration costs incurred to date and projected program administration costs (including QA/QC) through RPS program completion in 2024. Even with the current lean administrative structure in the CST, NYSERDA estimates that overall RPS program administration costs (for the CST and MT) will exceed approved funding for program administration by 2017. NYSERDA estimates this shortage to be on the order of $15 million, recognizing that it is difficult to make such long-term projections. This issue will need to be tracked carefully, and adjustments within the RPS budgets will need to be made prior to program completion. Allocating third-party QA/QC expenses to program budgets (estimated at approximately $11 million), as is done in EEPS programs, would ameliorate a substantial portion of this potential problem (approximately $11 million of the $15 million shortfall).

Cost Recovery Fee Issues

Public Authorities Law § 2975 requires each public benefit corporation to "reimburse to New York state an allocable share of state governmental costs attributable to the provision of services" by the State to such public benefit corporation. The amount of this annual "Cost Recovery Fee" for each public benefit corporation is determined by the Division of Budget, and imposed as an assessment by the State treasurer, pursuant to the statute (see Public Authorities Law § 2975(1)). This cost is considered an administrative cost for NYSERDA and, under generally accepted accounting principles; it is allocated among NYSERDA programs in proportion to each program's annual expenditures, as a percentage of total annual expenditures. The amount allocated in each fiscal year to each program can vary depending upon the total annual assessment and each program's allocable share of total expenditures.

In April 2010, the Commission approved an RPS budget for the New York State Cost Recovery Fee (CRF) of $16,783,325 (increased to $19,676,000 when interest earnings were applied to cover shortfalls) for both the CST and the Main-Tier Program. Based on the CRF assessment rate in place at the time, NYSERDA concluded that this CRF budget would not be adequate for the budgeted RPS expenditures. NYSERDA petitioned the Commission to provide additional funding for CRF. The Commission subsequently authorized NYSERDA to use interest earning and unexpended administrative funds to cover any shortfalls of the CRF. Based on NYSERDA's latest projections, the CRF budget combined with interested earnings is estimated to be exhausted by mid-2019, prior to RPS program completion. A reallocation of program funds to cover CRF will likely need to be done prior to that time. This issue will need to be tracked carefully, and adjustments in the RPS budget to accommodate the CRF may need to be made prior to program completion.

Funding for Quality Assurance/Quality Control

NYSERDA recommends that the Commission consider funding necessary implementation costs, such as QA/QC out of program funds, as is the case with all other customer-based EEPS programs. NYSERDA conducts QA/QC activities designed to ensure that CST program efforts result in renewable resource

installations/projects that are safe, reliable, and effective and administered with proper fiduciary controls in accordance with generally accepted principles. To date, NYSERDA has expended $2.5 million for QA/QC in support of the CST.

To enable effective QC/QA processes, NYSERDA will continue to use certain web-enabled software and databases, such as Clean Power Estimator, Power Clerk (PV), NYSERDA's Combined Heat and Power (CHP) data collection website (Fuel Cells, ADG and Competitive PV), Small wind Explorer (On-Site Wind), performance monitoring equipment and systems for documenting program design, performance and status. QA/ QC contractors will have access to the systems.

Although QA/QC activities are an important aspect of the CST as a whole, they differ by technology and each program has its own programmatic and funding needs. A detailed projection of those needs by technology going forward is presented in Appendix A. NYSERDA estimates that the QA/QC work will cost, on average, $1.8million per year through 2015, with the bulk of the funds associated with the PV program. Table 4-1 presents the total projected QA/QC funding needs for 2013-2015[42]. These projected expenses represent new funding commitments/encumbrances going forward. Two programs, ADG and On-Site Wind, have some pre-encumbered funds that can be used toward these expenses. Where program and related QA/QC activities were robust in 2012, NYSERDA has provided data on actual expenditures.

Table 4-1 Total Expected QA/QC Costs

	2013	2014	2015	**Total by Program**
Standard Offer PV[a]	$851,944	$1,084,612	$1,084,612	**$3,021,218**
Competitive PV	$355,000	$235,000	$235,000	**$825,000**
ADG	$485,667	$257,667	$257,667	**$1,001,000**
Fuel Cells	$47,000	$20,000	$27,000	**$94,000**
Solar Thermal	$143,496	$119,658	$111,227	**$374,381**
Wind	$29,000	$29,000	$29,000	**$87,000**
Total New Funding Year	$1,912,157	$1,745,937	$1,744,506	**$5,402,599**

[a] The total QA/QC costs for Standard Offer PV include $0.50 million per year for QC and technical support services.

Reallocation of CST Funding

NYSERDA requests the flexibility to reallocate CST funds between technologies and program offerings, including from the Competitive PV Program to other programs (contingent upon DPS approval) throughout the year. NYSERDA has demonstrated the ability to manage approved CST budgets while maintaining program stability. In situations where it becomes clear that a particular program budget will not be used over the course of the year, overall CST goals could be further advanced if NYSERDA was

[42] QA/QC numbers are presented on a commitment basis, rather than an expenditure/cash flow basis to reflect the commitment based budget and target projections throughout the report.

provided this flexibility and it would be beneficial for NYSERDA to utilize this money as soon as possible. If granted this flexibility, NYSERDA will work with DPS to determine an appropriate cap on what portion of a budget would be eligible for transfer.

APPENDIX A

Quality Assurance and Quality Control: Standard Offer PV

NYSERDA has made efforts to streamline the QA/QC costs of the Standard Offer PV Program, including the use of consultants for field-level QA and in-house staff for QC and technical assistance. PV and Solar Thermal consultant services for field QA were negotiated to a fixed cost per inspection and software tools and processes were improved to better streamline project tracking and reporting. QC services were conducted by in-house staff and are under evaluation to further improve cost-effectiveness and best use NYSERDA resources.

With expansion of the CST Standard Offer Program goals to reflect the goals of the NY-Sun Initiative, the anticipated increase in the number of applications from new installers, existing PV installation companies with expanding workforce, and large national companies that attract and hire new installers, the Standard Offer PV program will require continued robust quality assurance (QA). Provisional Installers and Provisional Contractors are subject to 100% QA field inspection for their first three or five installations, respectively. Thereafter, Installers and Contractors with Provisional, Probationary or Suspended status are subject to 30% QA field inspections as a percentage of all installed projects. Installers and Contractors with Full status are subject to 15% QA field inspections as a percentage of all installed projects.

Table A-1 shows projections for Standard Offer PV QA. The number of QA inspections has increased from 483 in 2011 to 567 in 2012, and is expected to continue at close to 30% of all installed projects; therefore, NYSERDA recommends maintaining a higher level of QA funding. The projections presented in Table 4-1 in main text assume 90% conversion from application to executed contract, and an 85% conversion to installed PV project. Currently, the Program continues to see significant growth in the number of new installers. As new installers gain experience and contractors compete for experienced and credentialed installers, NYSERDA may be able to decrease the rate of inspection. As the percentage of Lease or PPA applications increase, it is likely that these installers are already Full installers with NYSERDA, and it is also likely that the inspection rate can decrease, as these business models are performance-based. Current costs per installation are approximately $836. An increased number of installers have completed NABCEP credentialing, and it is expected that contractors will seek NABCEP Company Accreditation as this model is introduced as a voluntary component of the Program. NABCEP Company Accreditation provides a way for contractors to distinguish themselves by adhering to a set of industry best practices with respect to staffing, policies, and quality performance. Companies who qualify for accreditation will have to pass a minimum of three randomly selected inspections of completed installations.

Table A-1 Standard Offer PV QA Projections (dollars in millions)

	2012 (actual)	2013	2014	2015
Program Budget	$41.5	$49.1	$37.5	$37.5
Number of new PV Installers	94	100	60	60
Number of Applications Received	2,378	2,600	1,986	1,986
Number of Contracts Executed	2,212	2,340	1,787	1,787
Number of PV Completions	1,961	2,210	1,688	1,688
Number of Inspections	567	639	488	488
Percentage of Inspections (average)	29%	29%	29%	29%
QA Costs	**$0.52**	**$0.85**	**$0.58**	**$0.58**
QC Contractor	**NA**	**$0.0**	**$0.50**	**$0.50**

Quality Control consists of application review, design review and technical assistance to installers. This function is currently accomplished in-house by program staff. However, as the number of applications has dramatically increased (932 in 2010; 1,325 in 2011; 2,378 in 2012), program staff's ability to continue to provide all of these services with the current staffing has diminished. In addition, as the installer and contracting company network has expanded, program staff's ability to provide technical assistance, including technical assistance to correct and reduce future deficiencies found during QA inspections, has also diminished. Due to the higher in-house workload, staff was less able to focus on improving and streamlining program processes, recruiting new installers and reviewing and updating program policies and documents. The program has an immediate need for a Quality Control and Technical Services contractor to provide application design review (as needed for more complicated designs) and in-field technical assistance services. The cost of these services is estimated at $500,000 per year; however a competitive solicitation will be issued to acquire competitive rates and this estimate will be updated annually.

Quality Assurance and Quality Control: Competitive PV

The Competitive PV projects are incentivized via some upfront payments as well as via some ongoing performance payments and QA/QC processes are in place to clarify and confirm deliverables and metrics. The upfront payment is provided upon verification of installation of proper equipment at the approved host site, undergoes a due diligence process that involves the tasking of a QA/QC contractor to conduct a site inspection, which occurs at each and every site. Additionally, the program requires the use of QA/QC contractor activities for "secure chain of custody" collection, transmittal and archiving of performance data for each and every site. This requirement ensures that the data aren't being inflated in order to be able to rely on that performance data when using them to compute the magnitude of the project's performance payment. Through competitive solicitation RFP 2282 NYSERDA has selected and contracted with QA/QC contactors to perform these services at a site inspection cost of $875 per site and at a chain of custody data management service cost of $1,120 per site (for a total QA/QC cost of $1,995 per site). Table A-2 forecasts number of projects and associated QA/QC budgets. These budgets are based on the annual program budgets, and program experience of awarding $48 million in support of a batch of 80 projects. Thus, on average $600,000 per project will be typical for a competitive PV project.).

Table A-2. Competitive PV QA/QC Projections (dollars in millions)

	2013	2014	2015
Program Budget	$106.9[a]	$70.5	$65.9
Achievable Number of Projects	178	118	118
QA/QC Cost per Project	$0.002	$0.002	$0.002
Annual QA/QC Costs	**$0.355**	**$0.235**	**$0.235**

[a] The full $106.9 million budget of PON 2589, consisting of $36.4 million for calendar year (CY) 2012 plus $70.5 million for CY2013, will all be awarded during CY2013, and as such, this table uses $106.9 million for CY2013 for the purpose of forecasting the going-forward needs of QA/QC activities.

Program staff will monitor QA/QC contractors and projections shown above to continue to seek ways and means to provide more efficient and effective services. This monitoring may lead to needed adjustments in order to manage a different number or scale of projects or if there is an identified need to improve the level or extent of quality assurance/quality control.

Quality Assurance and Quality Control: Solar Thermal

The Solar Thermal industry has been slow to develop, resulting in low program production numbers, and a limited number of new installers that require continued robust quality assurance (QA). Provisional Installers and Provisional Contractors are subject to 100% QA field inspection for their first three installations. Thereafter, Installers and Contractors with Provisional, Probationary or Suspended status are subject to 30% QA field inspections as a percentage of all installed projects. Installers and Contractors with Full status are subject to 15% QA field inspections as a percentage of all installed projects.

The number of QA inspections is anticipated to remain steady at close to 30% of all installed projects. With many Provisional Solar Thermal installers, it is expected that the inspection rate will not be changed significantly during the upcoming 24 months, therefore NYSERDA recommends maintaining current activity levels. Current costs per inspection are approximately $850. Table A-3 shows projections for QA related to solar thermal installation. All installers are required to achieve their NABCEP Solar Thermal Installer certification, which will be evaluated for any correlation to improved quality performance and consideration for reduced inspection rates.

Table A-3 Solar Thermal QA Projections (dollars in millions)

	2012 (actual)	2013	2014	2015
Program Budget	$4.3	$4.3	$4.3	$4.3
Number of New Installers	13	10	10	10
Number of Completions	176	175	175	175
Number of Inspections	52	52	53	53
Percentage of Inspections (average)	30%	30%	30%	30%
QA Budget	**$0.05**	**$0.14**[a]	**$0.12**	**$0.11**

[a] QA/QC costs anticipated to increase due to anticipated additional inspection follow up and technical assistance.

Quality Assurance and Quality Control: Fuel Cells

For Small Fuel Cells, NYSERDA staff will perform QA/QC. This is due to the small number of sites that participate in the program and the type of applicable QA/QC activities. The Large Fuel Cell projects will be paid via some upfront payments as well as via some ongoing performance payments. The upfront payment, to be paid upon verification of installation of proper equipment at the approved host site, undergoes a due diligence process that consists of a site inspection. NYSERDA staff will perform inspections at all sites because of the small number of sites participating in the program. Additionally, the program requires the use of QA/QC contractor activities for secure chain-of-custody collection, transmittal, and archiving of performance data for each and every site. This requirement ensures that the data aren't being inflated and to be able to rely on that performance data when using it to compute the magnitude of the project's performance payment. Through competitive solicitation RFP 2282 NYSERDA has selected and contracted with QA/QC contactors to perform these services at a cost of $6,170 per site. Based on the annual program budgets, and program experience of awarding $1 million per project to typical large fuel cell projects, the number of projects to occur per year and the associated necessary Table A-4 shows the forecasted QA/QC budgets.

Table A-4. Fuel Cell QA/QC Projections (dollars in millions)

	2013	2014	2015
Program Budget	$6.6	$3.6	$3.6
Achievable Number of Projects	7	3	4
QA/QC Cost per Project	$0.007	$0.007	$0.007
Annual QA/QC Costs	$0.047	$0.020	$0.027

Quality Assurance and Quality Control: Anaerobic Digester Biogas-to-Electricity

The ADG projects will be paid via some upfront payments as well as via some ongoing performance payments. The upfront payment, to be paid upon verification of installation of proper equipment at the approved host site, undergoes a due diligence process that involves the tasking of a QA/QC contractor to conduct numerous site inspections per site and advising throughout the process of construction/start-up/routine operation (this occurs at each and every site). Additionally, the program requires the use of QA/QC contractor activities for secure chain-of-custody collection, transmittal, and archiving of

performance data for three years for each and every site. This requirement ensures that the data aren't being inflated and that performance data can be relied on when using it to compute the magnitude of the project's performance payment. Through competitive solicitation RFP 2282 NYSERDA has selected and contracted with QA/QC contactors to perform these services at a site inspection/advising cost of $21,040 per site and at a chain of custody data management service cost of $6,710 per site for the initial 3 year period (for a total QA/QC cost of $27,750 per site for all sites).

For a few projects (presumed to be one project per year) the program will use QA/QC contractor activities for "secure chain of custody" collection, transmittal, and archiving of performance data strictly for information gathering purposes for an extended period of seven additional years. Through competitive solicitation RFP 2282 NYSERDA has selected and contracted with QA/QC contactors to perform these services at a cost of $9,240 per site.

Additionally, the ADG program will also occasionally incur QA/QC contractor expenses for review of complex applications (when that service is needed, it will be tasked at a cost of $3,000 per site). Based on the annual program budgets, and program experience of awarding $2 million per project to typical ADG projects, the number of projects to occur per year, the associated necessary QA/QC budgets can be forecasted as shown in Table A-5 (with a presumption that 25% of all projects will undergo the QA/QC contractor tasking for review of complex applications).

Table A-5. ADG QA/QC Projections[a] (dollars in millions)

	2013[b]	**2014**	**2015**
Program Budget	$24.5	$10.2	$10.2
Achievable Number of Projects	24	5	5
QA/QC Cost per Project for All projects	$0.028	$0.028	$0.028
Subtotal QA/QC Cost for All projects	**$0.672**	**$0.139**	**$0.139**
Number of Projects for Extended Data	3	1	1
QA/QC Cost per Project for Extended Data	$0.009	$0.009	$0.009
Subtotal QA/QC Cost for Extended Data	**$0.027**	**$0.009**	**$0.009**
Number of Projects Tasking for Complex Review	3	1	1
QA/QC Cost per Project for Complex Review	$0.003	$0.003	$0.003
Subtotal QA/QC Cost for Complex Review	**$0.009**	**$0.003**	**$0.003**
Total	***$0.699***	***$0.151***	***$0.151***

[a] Some QA/QC funds, in the amount $800,000 have already been pre-encumbered for the ADG program, for services to be rendered at any time throughout the program. Therefore, the need for additional QA/QC funds can be determined by subtracting $800,000 from the sum of the needs shown above for the period of 2013-2015.

[b] 11 projects were received in late 2012. There were no QA/QC expenditures for these projects in 2012; the 11 projects will require QA/QC funding of $0.32 million in 2013. Total QA/QC costs for 2013-2015 including these projects are $1 million.

Quality Assurance and Quality Control: On-Site Wind

NYSERDA is a founding member of the Clean Energy States Alliance's Interstate Turbine Advisory Council (ITAC). ITAC was established to create and maintain a unified list of pre-qualified turbines, which is used by NYSERDA in determining eligibility for the program. Annual costs for ITAC, as a QA/QC contractor activity, are $10,000.

The program uses computer modeling services to forecast the energy production of a given turbine mounted at a given tower height at a specific site location, and the project incentive is then calculated based on the modeled energy production. Through competitive solicitation RFP 2282, NYSERDA has selected and contracted with a QA/QC contactor to provide this computer modeling service at an annual subscription cost of $12,000.

For a few projects (presumed to be one project per year), the program will use QA/QC contractor activities for "secure chain of custody" collection, transmittal, and archiving of performance data strictly for information gathering purposes for a three-year period. Using a QA/QC contractor ensures that the data aren't being inflated, and that performance data can be relied on when using it to compute the magnitude of the project's performance payment. Through competitive solicitation RFP 2282, NYSERDA has selected and contracted with QA/QC contactors to perform these services at a cost of $6,710 per site. In 2012, 20 projects reached the executed contract stage and utilized the Interstate Turbine Advisory Council (ITAC) and Computer Modeling Services components of QA/QC.

Table A-6. On-Site Wind QA/QC Projections[a] (dollars in millions)

	2012	2013	2014	2015
Program Budget	$4.4	$4.6	$3.8	$4.0
Cost for ITAC Dues	$0.010	$0.010	$0.010	$0.010
Cost for Computer Modeling Services	$0.012	$0.012	$0.012	$0.012
Subtotal ITAC/Computer Modeling Costs	**$0.022**	**$0.022**	**$0.022**	**$0.022**
Number of Projects For Data Management	NA	1	1	1
Data Management Cost per Project	NA	$0.007	$0.007	$0.007
Subtotal Data Management Cost per Project	**NA**	**$0.007**	**$0.007**	**$0.007**
Total Annual QA/QC Costs	***$.022***	***$0.029***	***$0.029***	***$0.029***

[a] Some QA/QC funds in the amount $36,000 have already been pre-encumbered for the On-Site Wind program for services to be rendered at any time throughout the program. Therefore, the need for additional QA/QC funds can be determined by subtracting $36,000 from the sum of the needs shown above for the period of 2013-2017.