EXPRESS TERMS - SAPA No.: 03-E-0188SA18

The Commission is considering whether to adopt, modify, or reject, in whole or in part, potential modifications to the Renewable Portfolio Standard (RPS) program to increase the target level of photovoltaics & other on-peak resources in high-cost areas. The nature of siting opportunities for most of the renewable resources encouraged to date in the RPS program is that they have been located primarily in upstate New York outside of the higher-cost load pocket areas of the New York City metropolitan area. The Commission is considering whether the RPS tier allocations should be modified, or a new tier should be created, to increase the target level of photovoltaics & other on-peak resources in high-cost areas. The Commission is also considering whether the annual targets and schedule of collections should be modified to account for such changes to the RPS program. The RPS program is currently administered on a statewide basis by the New York State Energy Research and Development Authority (NYSERDA). The Commission is considering whether a targeted program to increase the level of photovoltaics & other on-peak renewable resources in the higher-cost load pocket areas in the New York City metropolitan area, including the targeting of particular network locations in need of load relief, would be better administered directly by the local electric utility. In addition, the Commission is considering whether the higher acquisition cost of photovoltaics & other on-peak renewable resources might be better financed directly by the utility as a ratebase addition or in some other manner.

Attached are some background documents, analyses and sensitivities that the Commission will consider it its deliberations:

1. Executive Summary, New York Renewable Portfolio Standard Cost Study Update (21 pages).

2. New York Renewable Portfolio Standard Cost Study Update, Customer-Sited Tier Target and Resources (14 pages).

3. Total Collections by Utility (one page).

4. Budget Sensitivities (3 pages).

5. Customer-Sited Tier Inputs & Calculations (14 pages).

6. Renewable Energy Task Force Report, February 2008 (50 pages)

Attachment 1

EXECUTIVE SUMMARY
NEW YORK RENEWABLE PORTFOLIO STANDARD COST STUDY UPDATE
(21 pages)

Executive Summary

New York Renewable Portfolio Standard

Cost Study Update

I. Background

The comprehensive RPS cost study conducted in 2003 estimated the overall costs of achieving the Main Tier and Customer-Sited Tier RPS goals as upwards of $1.5 billion. In its September 24, 2004 Order (2004 Order), the Commission included an initial, escalating annual schedule, which provides for collections totaling approximately $741.3 million through 2013[1]. Recognizing that, under the Main Tier, NYSERDA would be entering into long-term contracts requiring administrative support and contract payments beyond 2013, in December of 2005 the Commission approved post-2013 collections, but deferred specifying the amounts of those collections until the program was underway and actual program costs became better known.[2]

Of the $741.3 million of scheduled collections, approximately $674.9 million has been committed or allocated, leaving a total of $69 million available.[3] Current commitments include approximately $561 million for contracts payments to projects awarded under the first, second, and third Main Tier solicitations, $45 million allocated to the Customer-Sited Tier under the Commission's June, 2006 Order,[4] $33.9 million for Maintenance Tier contracts, $25.6 million for NYSERDA administration, and $9.1 million for NYS fees. A detailed accounting of authorized funding and funding commitments as of the first quarter of 2008 is presented in attached Figure 1.

NYSERDA engaged the services of Sustainable Energy Advantage and LaCapra to estimate the costs to achieve the balance program targets. The scope of the study was established through consultation with the Department of Public Service. This assessment forms the basis upon which the PSC will authorize funding and associated rate collections necessary to meet RPS program goals.

II. Approach

In reviewing the future costs of the New York RPS, NYSERDA asked Sustainable Energy Advantage (SEA) and La Capra Associates to update the 2004 Cost Study Report II, Volume A (2004 Report).[5] Comprehensive documentation of assumptions, methodology and results associated with the update are contained in the Main Tier and Customer Sited Tier Cost Study Update Reports.

For the assessment of Main Tier program costs, several changes have been made to the RPS targets, the supply curve methodology employed to derive costs associated with the Main Tier program component, import potential, resource potential and renewable energy cost assumptions. These include:

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[1] Case 03-E-0188 Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard, "Order Regarding Retail Renewable Portfolio Standard," at Appendix E.
[2] Order Regarding Petitions for Clarification and Reconsideration, at p. 5.
[3] As is shown on Table 1, interest earnings of approximately $1.55 million and $854,363 in contract security funds retained by reason of contract defaults have been added to the overall funding amount.
[4] "Order on Customer-Sited Tier Implementation," at pp. 9-11.
[5] Retail Renewable Portfolio Standard — Case 03-E-0188, "Cost Study Report II, Volume A" February 27,2004 http://www.dps.state.ny.us/03e0188_CostStudy_II.htm.

- RPS annual MWh target changes are a result of updated load forecasts and anticipated increases in new energy efficiency programs that New York is planning – specifically, implementation of the Governor's 15 x 15 plan (15% reduction in load by 2015). Three scenarios were evaluated: (1) 25% Reference; (2) 25% Reduced Load (by 2013); (3) 30% Reduced Load (by 2015).
- The modeling approach was modified to better reflect the approach to evaluation and contracting ultimately adopted by NYSERDA subsequent to the 2004 Report.
- The available import potential from Canadian provinces and Pennsylvania-Jersey Maryland (PJM) have been greatly reduced due to both expansive new renewable energy directives and RPS in these regions, and to the costs and risks associated with ultimate requirements placed upon generators importing energy into the New York Control Area.
- The resource potential for certain resources was modified to reflect updated information or a change in methodology/assumptions.
- With increasing demand for renewable energy across the country and internationally, high material and fuel costs, and the weakened US dollar, the installed cost of renewable generation capacity has increased by 50% or more relative to the 2004 Report; fossil fuel cost increases and increased demand has also driven the cost of biomass fuel higher since 2004.

In the assessment of CST program costs, a supply curve analysis of the type employed to estimate program costs for the Main Tier component of the program was not used. Instead, annual resource budgets were developed using NYSERDA projections of funding for individual projects and the maximum annual potential of developing each resource type. The resources examined are the same as those proposed in the Operating Plan.

- Anaerobic Digester Biogas (farm-based and water treatment facilities)[6]
- Small wind
- Solar photovoltaics (PV)
- Fuel cells (small and large)

The approach used in estimating future costs of the program is also based on the existing CST Operating Plan Allocations, as established by the PSC.[7] This method allocated funding between resources proportional to the allocation developed in the Operating Plan, while achieving the intermediate annual targets for CST resources.

In addition, the cost of achieving an overlapping 100 MW solar photovoltaic (PV) goal resulting from the recommendations of the Renewable Energy Task Force convened by Governor Paterson was also calculated. The proposed plan would require the state to achieve 100 MW of solar PV installations over the next four years (2009 to 2012). Since a portion of the CST resources developed to meet the RPS CST targets would already consist of solar PV, the calculation of additional solar related costs are based on the incremental PV needed to achieve a total of 100 MW of solar PV. Below is a summary of estimated CST targets under three RPS scenarios and the associated costs of meeting the targets, with and without an expanded PV program.

III. Load Forecasts Examined

Three different types of forecasts are used in the derivation of incremental program costs. The first is the state load forecast, which is the underlying basis for estimating the amount of renewable energy needed to

[6] Within the anaerobic digester group, resources located within the NYPA service territory have been included.
[7] Retail Renewable Portfolio Standard — Case 03-E-0188, " Order on Customer-Sited Tier Implementation

meet the RPS target. Second, a description of the methodology used in estimating the amount of Main Tier and Customer-Sited Tier resources that NYSERDA is responsible in procuring is presented. NYSERDA's obligation is then incorporated into a third set of forecasts that represent the New York renewable energy market as a whole, where multiple demands compete for the same pool of resources each year.

The load forecast used in the 2004 Report was updated using more current data. The analysis employs a summary of utility sales forecasts that was assembled by a working group under the Efficiency Portfolio Standard (EPS) proceeding[8]. The sales forecast was then grossed up to reflect generation (supply) level requirements. This forecast is referred herein as the New Load Forecast (used for the Reference Scenario). The revised load growth is slower than originally anticipated in the "As-ordered" Load Forecast from the September 24, 2004 PSC order[9] ("Order", see Table 1). The PSC is considering implementing additional energy efficiency initiatives that would achieve about 15% reductions in projected load by 2015. Various efficiency initiatives have been estimated and impacts (reductions to forecast) were presented in a straw man proposal dated February 11, 2008, that has been put before the parties to the EPS proceeding. Load and energy reductions described in the technical appendices to this straw man proposal were used to derive alternate, "Post-EPS" forecasts for the purpose of deriving new RPS program Targets.

Table 1: New York State Load Forecasts

(MWh)	New York State Load		
Year	As-ordered* Load Forecast	New Load Forecast **	Post-EPS Load
2005	165,280,000	167,208,000	167,208,000
2006	167,490,000	162,237,000	162,237,000
2007	169,977,000	164,666,379	164,666,379
2008	172,404,000	166,373,133	166,373,133
2009	174,658,000	167,993,151	164,393,298
2010	176,910,000	169,730,054	162,455,908
2011	179,031,000	171,888,546	160,838,568
2012	180,907,000	174,042,888	159,124,926
2013	182,866,999	176,081,053	157,215,226
2014		178,191,391	155,281,070
2015		180,364,930	153,310,190

** From PSC 9/24 order, App. D, Table 1*
***Actual historical State load for 2003-2006, forecast before adjustments from EPS proceeding for 2007-2015*

The Order adopting an RPS called for increasing the proportion of renewable energy used by New York consumers from the then current 19.3% to at least 25% by the end of 2013. The PSC in the Order expected that voluntary purchases of green power by retail customers would contribute at least 1% of the 25% target. The assumption that voluntary purchases would contribute 1% of the RPS program target remains unchanged throughout the analyses described herein.

Three Annual RPS Target Scenarios were developed, including two scenarios reflecting reductions to load anticipated as a result of the EPS proceeding:

[8] Case 07-M-0548, Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard
[9] Order Regarding Retail Renewable Portfolio Standard, Case 03-E-0188.

a. **25% New Load** Uses 2007 forecast of load developed by the EPS and assumes an RPS which contributes to achieving a 25% renewable energy goal by 2013.
b. **25% Post-EPS Load**: Given that DPS is developing targets for a more expansive energy efficiency program to meet the proposed EPS, a reduced NY load forecast is used. This scenario assumes meeting the 25% renewable energy goal by 2013 also, though the absolute MWh target is lower due to lower load
c. **30% Post-EPS Load:** This scenario assumes that, as a result of an EPS-driven lower load, the renewable energy target can be increased on a percentage basis to 30% by 2015, through the implementation of more aggressive RPS procurement targets.

IV. Derivation of Program Targets

Several steps were needed to develop the RPS Main Tier and Customer-Sited Tier (CST) targets for NYSERDA's procurement of renewable attributes.

1. Prior to the RPS, New York already had a baseline of about 19% renewable energy (~31,500 MWh/yr), primarily from large-scale hydroelectric projects. This "baseline" amount was deducted from the overall RPS energy target.
2. In addition, Executive Order 111(EO 111) targets for state facilities, and voluntary green market purchases (growing to 1% of load by 2015) would also contribute to the 25% target. These were also deducted from the overall target.
3. NYSERDA's energy procurement obligations under the program are derived by subtracting the following from the overall target of 25%: (a) baseline or historical renewable generation, (b) energy procurement targets associated with compliance with EO 111, and (c) anticipated voluntary green market purchases.
4. NYSERDA's total procurement obligations are then divided into two components. The Customer Sited Tier component is set at 2% of the total NYSERDA obligation calculated in step 3 and the balance of obligations are assigned to the Main Tier program component.
5. Because LIPA is not under the jurisdiction of the PSC and has no obligation to meet RPS requirements, the NYSERDA obligations for both program components are further adjusted downward to reflect LIPA load requirements expressed as a share of statewide load requirements.
6. Finally, targets for future procurements netted out prior contractual commitments resulting from NYSERDA's first two RPS procurements, as well as the anticipated contracts to result from the third procurement (whose bids are currently under review). For the purposes of this assessment, it was assumed that the third procurement for Main-Tier resources for 2009 procurement resulted in about 837,000 MWh per year. This is reflected in the total shown in "Contracted Renewables" in Table 2 below.

Table 2. Existing, Committed and Planned Resource Contributions to Targets

	Baseline Resources	EO 111	NYSERDA Contracted Renewables	Green Market %	% LIPA
2003	31,210,710	0			
2004	31,468,717	0			
2005	31,486,189	251,065		0.0%	
2006	31,503,661	282,812	865,582	0.1%	15.76%
2007	31,509,370	314,579	865,582	0.3%	15.80%
2008	31,515,079	346,366	2,665,730	0.4%	15.83%
2009	31,520,788	378,174	***3,502,673***	0.5%	15.83%
2010	31,526,497	410,002		0.6%	15.88%
2011	31,532,206	391,857		0.8%	15.89%
2012	31,537,915	373,712		0.9%	15.98%
2013	31,543,624	355,568		1.0%	16.01%

It is important to keep in mind that New York's RPS has a defined goal of 25% by 2013. The annual incremental targets or "glide paths" presented below in Table 3 were developed only to estimate intermediate years' procurements and are not "hard" targets that must be satisfied at any cost. Actual procurements have and will likely deviate from the "glide paths" presented. In the scenario for 25% RPS Target with Post-EPS Load, minimal incremental renewable attribute purchases are needed after the 2009 procurement. Thus, fewer future procurements were modeled and the 25% target was achieved sooner (by 2011).

The As-Ordered Main Tier target of 25% of load established in 2004 for program year 2013 was approx. 9.9 million MWH. This target drops by 1.6 million MWh to 8.3 million MWh in 2013 when the new 2007 State wide load forecast is used. Only in the case where the target percentage of load requirement satisfied by renewable generation grows to 30% does the target increase to 10.1 million MWh, or nearly equivalent to the original, As-Ordered target quantity. However, this occurs in year 2015 coinciding with the terminal year of the EPS initative.

Table 3. Derived Main Tier Cumulative and Incremental Annual Targets

(MWh)	As-Ordered Main Tier	Cumulative Main Tier			Incremental Main Tier		
Year		New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)	New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)
2006	1,121,247	***865,582***	***865,582***	***865,582***			
2007	2,326,171	***865,582***	***865,582***	***865,582***			
2008	3,549,026	***2,665,730***	***2,665,730***	***2,665,730***			
2009	4,767,994	***3,502,673***	***3,502,673***	***3,502,673***			
2010	6,012,179	4,632,702	4,025,881	4,586,531	1,130,029	523,208	1,083,858
2011	7,297,746	5,836,353	4,570,699	5,865,682	1,203,651	544,817	1,279,150
2012	8,556,710	7,047,592	4,570,699	6,993,365	1,211,239	0	1,127,684
2013	**9,854,038**	**8,319,625**	**4,570,699**	8,113,074	1,272,033	0	1,119,709
2014				9,134,256			1,021,183
2015				**10,123,157**			988,901

*****Incremental Main Tier includes contracted procurements through three rounds of NYSERDA procurements (2006-2009).*

Pursuant to the order adopting the RPS program, Customer-Sited Tier (CST) resources must make up 2% of the calculated incremental targets.[1] In February 2007, NYSERDA and Department of Public Service

staff released a plan for implementing the CST program for the period of 2006-2009.[10] Budgets were developed for individual resources with anticipated expenditures totaling $45 million; a level less than half the level of funding originally predicted by the 2003 cost study as necessary to achieve the As-Ordered 2% target. In developing the Customer-Sited Tier Targets, it is assumed that all programs proposed in the Operating Plan are achieved resulting in 52,878 MWh by the end of 2009. The Operating Plan target for 2009 is a function of authorized funding appropriation and allocation by resource and is far less than 2 % of incremental NYSERDA obligation by 2009. The updated cost analysis establishes future costs of the program after 2009 based on the load scenarios and derived targets described by Table 4. For comparison purposes, Table 4 also exhibits the As-Ordered CST targets.

Table 4. Derived Customer-Sited Tier Cumulative and Incremental Annual Targets

(MWh)	As-Ordered Customer-Sited Tier	Cumulative Customer-Sited Tier			Incremental Customer-Sited Tier		
Year		New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)	New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)
2006	25,259	0	0	0			
2007	50,488	17,626	17,626	17,626			
2008	75,685	35,252	35,252	35,252			
2009	100,855	52,878	52,878	52,878			
2010	125,988	92,687	82,182	93,638	39,809	29,304	40,760
2011	151,081	119,131	93,280	119,736	26,445	11,097	26,098
2012	176,123	143,840	93,280	142,743	24,708	0	23,007
2013	201,130	169,788	93,280	165,587	25,949	0	22,844
2014				186,420			20,834
2015				206,595			20,175

V. Main Tier Costs Results

Below is a summary of the expected costs to satisfy RPS Main Tier procurement targets for the post-2009 period under the three scenarios analyzed. In the scenario with 25% RPS Target with Post-EPS Load, very little incremental renewable energy is needed after the 2009 procurement. For the 30% RPS Target with Post-EPS Load, the expected incremental program costs are almost 50% higher than in the New Load Reference scenario, but may achieve only an increase of about 20% in additional total renewable energy relative to the New Load Reference scenario (101 TWh versus 8.3 TWh).

The annual contract payments shown below in Table 5 represent commitments for future solicitations, excluding payments under contracts entered into as a result of the 1st, 2nd and 3rd main tier solicitations. In the Post-EPS 25% (Reduced Load 15x15) Scenario, there are no incremental procurements needed after 2011.

[10] February 12, 2007C

Table 5 Projected Annual RPS Contract Payments

	New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)
2010	$22,239,617	$10,302,902	$21,334,354
2011	$45,028,839	$20,602,943	$45,557,306
2012	$71,768,113	$20,602,943	$64,521,205
2013	$100,094,963	$20,602,943	$81,479,496
2014	$100,094,963	$20,602,943	$110,529,444
2015	$100,094,963	$20,602,943	$141,838,153
2016	$100,094,963	$20,602,943	$141,838,153
2017	$100,094,963	$20,602,943	$141,838,153
2018	$100,094,963	$20,602,943	$141,838,153
2019	$100,094,963	$20,602,943	$141,838,153
2020	$77,855,346	$10,300,041	$120,503,800
2021	$55,066,124	$0	$96,280,847
2022	$28,326,850	$0	$77,316,948
2023	$0	$0	$60,358,657
2024	$0	$0	$31,308,709
Total	$1,000,949,631	$206,029,435	$1,418,381,533

VI. Customer Sited Tier Cost Results

The total additional costs for the three RPS target scenarios evaluated are detailed in the table below. These costs DO NOT include the costs associated with the programs in the Operating Plan. Including the 100 MW PV Plan for CST renewable energy would increase the cost of the CST program by over $300 million under each scenario. Without the 100 MW PV plan, the CST program is estimated to cost in the range of $38 million to $141 million, depending on the RPS Scenario. The costs presented by Table 6 are the sum of annual costs.

Table 6. CST Costs* by RPS Scenario Examined

	With 100 MW PV Plan	Without 100 MW PV Plan	Difference in Cost
25% New Load	$393,787,000	$104,119,00	$289,668,000
25% Post-EPS Load	$351,871,000	$35,923,000	$315,948,000
30% Post-EPS Load	$423,091,000	$135,208,000	$287,883,000

**** does not include cost associated with monitoring and verification and program administrative costs***

VII. Total Program Cost Results

Table 7 below presents the costs as-modeled and described above on a total program basis.

Table 7. As-Modeled Incremental Program Costs *

(all costs in $ millions)	25% New Load	25% EPS Load	30% EPS Load
MAIN-TIER PROGRAM			
Energy Target (GWh)	8,320	4,571	10,123
Cost	$1,000.9	$206.0	$1,418.4
CUSTOMER-SITED TIER PROGRAM			
Energy Target (GWh)	170	93	207
Individual Program Cost:			
Anaerobic Digester Program	$ 26.2	$ 9.5	$ 33.0
Small Wind Program	$ 2.8	$ 1.4	$ 4.6
PV Program	$ 54.1	$ 18.0	$ 69.6
Fuel Cell Program	$ 21.0	$ 7.0	$ 27.9
Total Base Program Cost	$ 104.1	$ 35.9	$ 135.1
TOTAL BASE RPS PROGRAM COSTS	$ 1,105.0	$ 242.0	$ 1,553.5
Aggressive PV (100 MW) Initiative Cost	$ 289.7	$ 316.0	$ 287.8
TOTAL RPS COST W/ 100 MW PV INITIATIVE	$ 1,394.7	$ 558.0	$ 1,841.4

**** does not include cost associated with monitoring and verification and program administrative costs***

Appendixes A, B and C present detailed cost study results for the Main and Customer-Sited Tier program components associated with the 25% Reference, 25% Post-EPS Load, and 30% Post-EPS Load scenarios as described above. These appendices depict derived targets, annual incremental funding requirements by program component and expectations for the development of resources by type of eligible resource and program component. The Appendices **do not include**;

(a) costs associated with monitoring and verification of CST program performance,
(b) NYSERDA administrative expenses including public authority fees, and
(c) any consideration of how the remaining positive balance of program funding, as depicted in Figure 1, should be applied programmatically.

Figure 1. Current RPS Program Cash Flow Estimates

Current RPS Program Cash Flow Estimates*

	Revenues			Estimated Costs							
	Specified Collections	Interest	Ltr of Credit proceeds	NYSERDA Admin	NYS Fees	Main Tier 3 RFPs	Maintenance Tier	Cust Tier	Total Estimated Costs	Annual Cash Flow	Cash Balance
2006	$24,072,908	$ 308,826	$ 192,107	$ (2,448,522)	($460,820)	($8,216,756)	$0	$0	$ (11,126,098)	$13,447,743	$13,447,743
2007	$43,143,017	$ 1,247,056	$ 662,256	$ (1,505,690)	($511,003)	($14,407,485)	($3,104,220)	($6,735)	$ (19,535,133)	$25,517,196	$38,964,939
2008	$62,136,526	n/a	$ -	$ (2,807,631)	($746,000)	$ (33,223,153.78)	($4,289,379)	($8,998,653)	$ (50,064,817)	$12,071,709	$51,036,648
2009	$82,639,913	n/a	$ -	$ (3,767,632)	($992,000)	$ (56,548,673.08)	($4,124,798)	($8,998,653)	$ (74,431,756)	$8,208,157	$59,244,805
2010	$100,765,818	n/a	$ -	$ (3,767,631)	($1,209,000)	$ (58,684,755.55)	($4,124,798)	($8,998,653)	$ (76,784,838)	$23,980,980	$83,225,785
2011	$122,617,832	n/a	$ -	$ (3,767,631)	($1,471,000)	$ (58,354,974.19)	($4,124,798)	($8,998,653)	$ (76,717,057)	$45,900,775	$129,126,561
2012	$138,876,294	n/a	$ -	$ (3,767,631)	($1,667,000)	$ (57,943,505.44)	($4,124,798)	($8,998,653)	$ (76,501,588)	$62,374,706	$191,501,267
2013	$167,222,814	n/a	$ -	$ (3,767,631)	($2,007,000)	$ (57,806,349.19)	($4,124,798)	$0	$ (67,705,779)	$99,517,035	$291,018,302
2014	$0	n/a	$ -			$ (57,806,349.19)	($3,480,439)	$0	$ (61,286,788)	($61,286,788)	$229,731,514
2015	$0	n/a	$ -			$ (57,806,349.19)	($1,920,000)	$0	$ (59,726,349)	($59,726,349)	$170,005,165
2016	$0	n/a	$ -			$ (44,340,257.66)	($480,000)	$0	$ (44,820,258)	($44,820,258)	$125,184,907
2017	$0	n/a	$ -			$ (25,902,320.85)		$0	$ (25,902,321)	($25,902,321)	$99,282,586
2018	$0	n/a	$ -			$ (27,141,252.02)		$0	$ (27,141,252)	($27,141,252)	$72,141,334
2019	$0	n/a	$ -			$ (3,125,426.56)		$0	$ (3,125,427)	($3,125,427)	$69,015,908
2020	$0	n/a	$ -					$0	$ -	$0	$69,015,908
2021	$0	n/a	$ -					$0	$ -	$0	$69,015,908
	$741,475,122	$ 1,555,882.00	$ 854,363.00	($25,600,001)	($9,063,823)	($561,307,608)	($33,898,028)	($45,000,000)	$ (674,869,459)	$69,015,908	

*estimated cash flow based on multi-year performance payments

NYSERDA Administration

	Staff/overhead	Consultant Support	Program Evaluation	CST Systems M&V	Total Admin
2006	$ 1,713,459	$ 675,715	$ 59,348	$ -	$ 2,448,522
2007	$ 1,122,544	$ 242,663	$ 138,865	$ 1,618	$ 1,505,690
2008	$ 1,610,666	$ 246,937	$ 550,297	$ 399,731	$ 2,807,631
2009	$ 2,570,666	$ 246,937	$ 550,298	$ 399,731	$ 3,767,632
2010	$ 2,570,666	$ 246,937	$ 550,298	$ 399,730	$ 3,767,631
2011	$ 2,570,666	$ 246,937	$ 550,298	$ 399,730	$ 3,767,631
2012	$ 2,570,666	$ 246,937	$ 550,298	$ 399,730	$ 3,767,631
2013	$ 2,570,666	$ 246,937	$ 550,298	$ 399,730	$ 3,767,631
Totals	$ 17,300,001	$ 2,400,000	$ 3,500,000	$ 2,400,000	$ 25,600,001

Notes:
1. Shaded cells are actual figures obtained from NYSERDA finance department
2. Original NYS fee budget for 2006-2013 period ($12.12 million) was based on program's share of the then current annual assessment, which was subsequently reduced

Appendix A. 25% New Load Case

Derived Incremental Targets

	Reference Load (1)	Baseline Resources (2)	EO 111 (2)	NY Main Tier and CST (3)	Main Tier and CST Requirement (4)	Green marketing % (5)	Green Marketing MWh	CST requirement = 2% of Incremental (6)	Main Tier Requirement Minus CST	% LIPA (3)	NYSERDA CST (6)	NYSERDA Main Tier	LIPA CST (7)	LIPA Main Tier (7)
2003	158,013,000	31,210,710	-	-	19.8%				-	0.00%	-	-	-	-
2004	160,211,000	31,468,717	-	-	19.6%				-	0.00%	-	-	-	-
2005	167,208,000	31,486,189	251,065	-	19.0%	0.0%	-		-	0.00%	-	-	-	-
2006	162,237,000	31,503,661	282,812	865,582	20.1%	0.1%	202,796		865,582	0.00%	-	865,582	-	-
2007	162,433,219	31,509,370	314,579	883,208	20.1%	0.3%	406,083		883,208	15.80%	17,626	865,582	-	-
2008	164,402,854	31,515,079	346,366	2,700,982	21.0%	0.4%	616,511		2,700,982	15.83%	35,252	2,665,730	-	-
2009	166,343,040	31,520,788	378,174	4,224,432	21.7%	0.5%	831,715	**52,878**	4,171,554	15.83%	52,878	3,502,673	9,948	658,933
2010	168,013,530	31,526,497	410,002	5,508,933	22.3%	0.6%	1,050,085	110,179	5,398,755	15.88%	92,687	4,634,326	17,492	857,115
2011	170,641,997	31,532,206	391,857	7,081,459	22.9%	0.8%	1,279,815	141,629	6,939,830	15.89%	119,131	5,837,431	22,498	1,102,399
2012	172,742,491	31,537,915	373,712	8,560,299	23.4%	0.9%	1,511,497	171,206	8,389,093	15.98%	143,840	7,048,137	27,366	1,340,956
2013	175,028,192	31,543,624	355,568	10,107,574	24.0%	1.0%	1,750,282	202,151	9,905,423	16.01%	169,788	8,319,625	32,363	1,585,798

(1) Actual numbers 2003-2006, Forecast from Case 07-M-0548, STRAW PROPOSAL, TECHNICAL APPENDIX, (February 11, 2008).
(2) from PSC 9/24 order, App. D, Table 1
(3) Sum of Actual NYSERDA contracts for Main Tier and CST plus Estimates for LIPA Procurements through 2009, based on RPS requirements 2010 and later
(4) "Glide Path" interpolated between 2010 and 2013 to reach the 24% goal, assume 1% from green marketing
(5) Interpolated between 2005 and 2013 to reach the 1% goal
(6) 2009 Value differs from the 2006-2009 Operating Plan to reflect corrected small wind numbers
(7) LIPA procurements are estimates based on LIPA's proporportional share of annual RPS glide path

Main Tier Incremental Demand Calculations
(MWh)

	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Main Tier w/o LIPA	2,665,730	3,502,673	4,634,326	5,837,431	7,048,137	8,319,625		
NYSERDA Incremental w/o LIPA	-	836,943	1,131,653	1,203,104	1,210,706	1,271,488		
Less Total Renewables Under NYSERDA contract (up	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730		
Exports to New England	829,330	829,330	842,082	842,082	842,082	842,082		
Additional Exports to NE			255,227	510,454	765,681	1,020,907		
Green Marketing Estimates	616,511	831,715	1,050,085	1,279,815	1,511,497	1,750,282		
EO 111	346,366	378,174	410,002	391,857	373,712	355,568	-	-
Total New York Renewables Demand(MWH)	1,792,206	2,876,162	4,525,991	6,195,908	7,875,378	9,622,734	-	-
Annual New York Incremental Demand(MWh)	**1,792,206**	**1,083,956**	**1,649,830**	**1,669,917**	**1,679,470**	**1,747,356**		

Appendix A. 25% New Load Case Results

Summary of Direct Program Costs Only

(all nominal dollars)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Main Tier Budget															
NYS Incremental RPS Demand (MWhs)			1,131,653	1,203,104	1,210,706	1,271,488	0	0							
Renewable Attributes Market Clearing Price/MWh			$ 19.65	$ 18.94	$ 22.09	$ 22.28	$ -	$ -							
Contract Cost (2010 Increment)			$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617			
Contract Cost (2011 Increment)				$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222		
Contract Cost (2012 Increment)					$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	
Contract Cost (2013 Increment)						$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850
Contract Cost (2014 Increment)							$0	$0	$0	$0	$0	$0	$0	$0	$0
Contract Cost (2015 Increment)								$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Premium Cost (RPS Main Tier)		$0	$22,239,617	$45,028,839	$71,768,113	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$77,855,346	$55,066,124	$28,326,850
Annual Encumbered Budget		$0	$222,396,173	$227,892,221	$267,392,732	$283,268,504	$0	$0							
Total of Contracts		$1,000,949,631													
Customer Sited Tier Budget															
Incremental to Operating Plan															
Anearobic Digester			$ 10,237,018	$ 5,591,865	$ 5,110,486	$ 5,254,919									
Small Wind			$ 648,560	$ 713,416	$ 706,282	$ 776,910									
PV			$ 24,110,285	$ 10,513,316	$ 9,608,270	$ 9,879,820									
Fuel Cell (Small)			$ 750,000	$ 761,834	$ 696,251	$ 715,929									
Fuel Cell(Large)			$ 4,000,000	$ 4,921,451	$ 4,497,784	$ 4,624,901									
Total Annual Base CST Costs			$ 39,745,863	$ 22,501,882	$ 20,619,074	$ 21,252,479									
Total Cumulative Costs			$ 39,745,863	$ 62,247,746	$ 82,866,820	$ 104,119,299									
Additional PV for Aggressive PV Set Aside Scenario		$ 90,000,000	$ 65,889,715	$ 70,486,684	$ 63,291,730										
Total Cumulative Balance of PV Set Aside Costs		$ 90,000,000	$ 155,889,715	$ 226,376,399	$ 289,668,129										
al Annual Program w/PV Set Aside Funding Requirements		$ 90,000,000	$ 105,635,578	$ 92,988,566	$ 83,910,804	$ 21,252,479									
Current Program Positive Funding Balance	$ 69,016,000														
Net Annual Program Funding Requirement(1)		$ 90,000,000	$127,875,196	$138,017,406	$155,678,916	$121,347,442	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$100,094,963	$77,855,346	$55,066,124	$28,326,850
Cumulative Program Funding Requirement		$ 90,000,000	$ 217,875,196	$ 355,892,602	$ 511,571,518	$ 632,918,960	$ 733,013,923	$ 833,108,886	$ 933,203,849	$ 1,033,298,812	$ 1,133,393,775	$ 1,233,488,738	$ 1,311,344,084	$ 1,366,410,207	$ 1,394,737,058
Net Annual Program Funding Reqmt(w/o PV Set Aside)			$ 61,985,481	$ 67,530,722	$ 92,387,186	$ 121,347,442	$ 100,094,963	$ 100,094,963	$ 100,094,963	$ 100,094,963	$ 100,094,963	$ 100,094,963	$ 77,855,346	$ 55,066,124	$ 28,326,850
Cumulative Program Funding Reqmt(w/o PV Set Aside)			$ 61,985,481	$ 129,516,203	$ 221,903,389	$ 343,250,831	$ 443,345,794	$ 543,440,757	$ 643,535,720	$ 743,630,683	$ 843,725,646	$ 943,820,609	$ 1,021,675,955	$ 1,076,742,079	$ 1,105,068,929
(1) budget excludes NYSERDA adminstrative expenses,NYS PAL fee, CST monitoring and verification costs															

Appendix A. 25% New Load Case Results

Customer-Sited Tier Program Component

	2008	2009	2010	2011	2012	2013	Total By 2013	Total MW Potential by 2015	% of Potential
Incremental MWh									
Anaerobic Digester*	-	-	23,142	12,641	11,553	11,880	59,216		
Small Wind	-	-	530	583	641	705	2,460		
PV	-	-	8,800	4,264	4,330	4,947	22,340		
Fuel Cell (small)	-	-	329	334	305	314	1,281		
Fuel Cell (large)	-	-	7,008	8,622	7,880	8,103	31,613		
Total Base CST MWh	-	-	*39,809*	*26,444*	*24,709*	*25,948*	*116,910*		
Additional PV for 100 MW	-	32,850	24,050	28,586	28,520	-	114,006		
Total Incremental MWh	**-**	**32,850**	**63,859**	**55,030**	**53,229**	**25,948**	**230,916**		
Incremental MW									
Anaerobic Digester*	-	-	3.3	1.8	1.6	1.7	8.4	21.0	40%
Small Wind	-	-	0.2	0.3	0.3	0.3	1.1	1.9	60%
PV	-	-	6.7	3.2	3.3	3.8	17.0	187.4	9%
Fuel Cell (small)	-	-	0.2	0.2	0.1	0.1	0.6	3.2	19%
Fuel Cell (large)	-	-	0.8	1.0	0.9	0.9	3.6	7.8	46%
Total Base CST MW	-	-	*11.2*	*6.5*	*6.3*	*6.9*	*30.8*		
Additional PV for 100 MW	-	25.0	18.3	21.8	21.7	-	86.8		
Total PV	**-**	**25.0**	**25.0**	**25.0**	**25.0**	**3.8**	**104**		
Total Incremental MW	**-**	**25.0**	**29.5**	**28.2**	**28.0**	**6.9**	**118**		
CST Cost (thousands)									
Anaerobic Digester*	$0	$0	$10,237	$5,592	$5,110	$5,255	$ 26,194		
Small Wind	$0	$0	$649	$713	$706	$777	$ 2,845		
PV	$0	$0	$24,110	$10,513	$9,608	$9,880	$ 54,112		
Fuel Cell (small)	$0	$0	$750	$762	$696	$716	$ 2,924		
Fuel Cell (large)	$0	$0	$4,000	$4,921	$4,498	$4,625	$ 18,044		
Annual Base CST Cost	*$0*	*$0*	*$39,746*	*$22,502*	*$20,619*	*$21,252*	$ 104,119		
Additional PV Cost	$0	$90,000	$65,890	$70,487	$63,292	$0	$ 289,668		
Total Annual Cost	$0	$90,000	$105,636	$92,989	$83,911	$21,252	$ 393,787		
Total Cost	$393,787								
NPV	**$281,357**								

*** Includes Anaerobic Digesters in NYC metropolitan area (currently NYPA customers)**

Program specific results are a function of annual operating plan program allocations, estimates of technical potential and level of program incentives

Costs associated with program monitoring and verification and administration not included

Appendix A. 25% New Load Case

Summary of Cummulative Cleared MW by Year, Zone and Resource Type

Main Tier Program Component

Resource	Zone	2010	2011	2012	2013
Biomass	1	19.3	38.5	67.5	109.9
Biomass Total		19.3	38.5	67.5	109.9
Hydro	1	25.0	50.0	74.9	99.9
	2	4.6	9.2	13.7	18.3
	3	0.0	0.0	0.1	0.1
	ON	17.6	35.2	52.8	70.4
	QC	20.0	40.0	60.0	80.0
Hydro Total		67.2	134.4	201.5	268.7
Landfill Gas	1	17.6	35.3	52.9	70.5
	2	5.1	10.3	15.4	20.6
	3	0.7	1.3	2.0	2.7
Landfill Gas Total		23.4	46.9	70.3	93.8
Wind (Offshore) Total		-	-	-	-
Wind (Onshore)	1	320.0	647.0	953.6	1,251.1
	2	33.6	67.2	100.8	134.3
Wind (Onshore) Total		353.6	714.1	1,054.4	1,385.5
Grand Total		**463.5**	**933.9**	**1,393.7**	**1,857.9**

Summary of Cummulative Cleared GWh by Year, Zone and Resource Type

Resource	Zone	2010	2011	2012	2013
Biomass	1	134.9	269.8	473.0	770.4
Biomass Total		134.9	269.8	473.0	770.4
Hydro	1	100.7	201.3	302.0	402.6
	2	18.5	36.9	55.4	73.8
	3	0.1	0.1	0.2	0.3
	ON	103.3	206.6	309.9	413.2
	QC	87.6	175.2	262.8	350.4
Hydro Total		310.1	620.2	930.2	1,240.3
Landfill Gas	1	131.3	262.5	393.8	525.1
	2	38.3	76.6	114.9	153.3
	3	5.0	9.9	14.9	19.9
Landfill Gas Total		174.6	349.1	523.7	698.2
Wind (Offshore) Total		-	-	-	-
Wind (Onshore)	1	939.7	1,899.4	2,800.5	3,675.1
	2	90.6	181.2	271.9	362.5
Wind (Onshore) Total		1,030.3	2,080.7	3,072.3	4,037.6
Grand Total		**1,649.8**	**3,319.7**	**4,999.2**	**6,746.6**

Appendix B. 25% Post-EPS Load Case

Derived Incremental Targets

	Post-EPS Load (1)	Baseline Resources (2)	EO 111 (2)	NY Main Tier and CST (3)	Main Tier and CST Requirement (4)	Green marketing % (5)	Green Marketing MWh	CST requirement = 2% of Incremental (6)	Main Tier Requirement Minus CST	% LIPA (3)	NYSERDA CST (6)	NYSERDA Main Tier	LIPA CST (7)	LIPA Main Tier (7)
2003	158,013,000	31,210,710	-	-	19.8%				-	0.00%	-	-	-	-
2004	160,211,000	31,468,717	-	-	19.6%				-	0.00%	-	-	-	-
2005	167,208,000	31,486,189	251,065	-	19.0%	0.0%	-		-	0.00%	-	-	-	-
2006	162,237,000	31,503,661	282,812	865,582	20.1%	0.1%	202,796		865,582	0.00%	-	865,582	-	-
2007	162,433,219	31,509,370	314,579	883,208	20.1%	0.3%	406,083		883,208	15.80%	17,626	865,582	-	-
2008	163,552,495	31,515,079	346,366	2,700,982	21.1%	0.4%	613,322		2,700,982	15.83%	35,252	2,665,730	-	-
2009	162,041,065	31,520,788	378,174	4,224,432	22.3%	0.5%	810,205	**52,878**	4,171,554	15.83%	52,878	3,502,673	9,948	658,933
2010	160,192,211	31,526,497	410,002	4,884,601	22.7%	0.6%	1,001,201	97,692	4,786,909	15.88%	82,182	4,026,932	15,510	759,977
2011	159,167,794	31,532,206	391,857	5,544,771	23.1%	0.8%	1,193,758	110,895	5,433,875	15.89%	93,280	4,570,699	17,616	863,176
2012	157,553,065	31,537,915	373,712		23.6%	0.9%	1,378,589	-	-	15.98%	93,280	4,570,699	-	-
2013	156,016,509	31,543,624	355,568		24.0%	1.0%	1,560,165	-	-	16.01%	93,280	4,570,699	-	-

(1) Actual numbers 2003-2006, Forecast from Case 07-M-0548, STRAW PROPOSAL, TECHNICAL APPENDIX, (February 11, 2008).
(2) from PSC 9/24 order, App. D, Table 1
(3) Sum of Actual NYSERDA contracts for Main Tier and CST plus Estimates for LIPA Procurements through 2009, based on RPS requirements 2010 and later
(4) "Glide Path" interpolated between 2010 and 2013 to reach the 24% goal, assume 1% from green marketing
(5) Interpolated between 2005 and 2013 to reach the 1% goal
(6) 2009 Value differs from the 2006-2009 Operating Plan to reflect corrected small wind numbers
(7) LIPA procurements are estimates based on LIPA's proporportional share of annual RPS glide path

Main Tier Incremental Demand Calculations
(MWh)

	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Main Tier w/o LIPA	2,665,730	3,502,673	4,026,932	4,570,699	4,570,699	4,570,699		
NYSERDA Incremental w/o LIPA	-	836,943	524,259	543,767	-	-		
Less Total Renewables Under NYSERDA contract (up	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730		
Exports to New England	829,330	829,330	842,082	842,082	842,082	842,082		
Additional Exports to NE			255,227	510,454	765,681	1,020,907		
Green Marketing Estimates	613,322	810,205	1,001,201	1,193,758	1,378,589	1,560,165		
EO 111	346,366	378,174	410,002	391,857	373,712	355,568	-	-
Total New York Renewables Demand(MWH)	1,789,017	2,854,652	3,869,714	4,843,120	5,265,032	5,683,691	-	-
Annual New York Incremental Demand(MWh)	**1,789,017**	**1,065,635**	**1,015,062**	**973,406**	**-**	**-**		

Appendix B. 25% Post-EPS Load Case Results

Summary of Direct Program Costs Only

(all nominal dollars)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Main Tier Budget													
NYS Incremental RPS Demand (MWhs)			524,259	543,767	0	0	0	0					
Renewable Attributes Market Clearing Price/MWh			$ 19.65	$ 18.94	$ -	$ -	$ -	$ -					
Contract Cost (2010 Increment)			$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	
Contract Cost (2011 Increment)				$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041
Contract Cost (2012 Increment)					$0	$0	$0	$0	$0	$0	$0	$0	$0
Contract Cost (2013 Increment)						$0	$0	$0	$0	$0	$0	$0	$0
Contract Cost (2014 Increment)							$0	$0	$0	$0	$0	$0	$0
Contract Cost (2015 Increment)								$0	$0	$0	$0	$0	$0
Subtotal Premium Cost (RPS Main Tier)		$0	$10,302,902	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$10,300,041
Annual Encumbered Budget		$0	$103,029,023	$103,000,412	$0	$0	$0	$0					
Total of Contracts		$206,029,435											
Customer Sited Tier Budget													
Incremental to Operating Plan													
Anearobic Digester			$ 7,274,638	$ 2,273,637									
Small Wind			$ 648,560	$ 713,416									
PV			$ 13,677,112	$ 4,274,686									
Fuel Cell (Small)			$ 750,000	$ 309,760									
Fuel Cell(Large)			$ 4,000,000	$ 2,001,049									
Total Annual Base CST Costs			$ 26,350,309	$ 9,572,548									
Total Cumulative Costs			$ 26,350,309	$ 35,922,857									
Additional PV for Aggressive PV Set Aside Scenario		$ 90,000,000	$ 76,322,888	$ 76,725,314	$ 72,900,000								
Total Cumulative Balance of PV Set Aside Costs		$ 90,000,000	$ 166,322,888	$ 243,048,202	$ 315,948,202								
(all nominal dollars)													
Total Annual Program w/PV Funding Requirements		$ 90,000,000	$ 102,673,198	$ 86,297,862	$ 72,900,000								
Current Program Positive Funding Balance	$ 69,016,000												
Net Program Funding Requirement(1)		$ 90,000,000	$112,976,100	$106,900,805	$93,502,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$10,300,041
Cumulative Program Funding Requirement		$ 90,000,000	$ 202,976,100	$ 309,876,905	$ 403,379,849	$ 423,982,792	$ 444,585,736	$ 465,188,679	$ 485,791,623	$ 506,394,566	$ 526,997,510	$ 547,600,453	$ 557,900,494
Net Annual Program Funding Reqmt(w/o PV Set Aside)			$36,653,211	$30,175,491	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$20,602,943	$10,300,041
Cumulative Program Funding Reqmt(w/o PV Set Aside)			$36,653,211	$66,828,703	$87,431,646	$108,034,590	$128,637,533	$149,240,477	$169,843,420	$190,446,364	$211,049,307	$231,652,251	$241,952,292
(1) budget excludes NYSERDA adminstrative expenses,NYS PAL fee, CST monitoring and verification costs													

Appendix B. 25% Post-EPS Load Case Results

Customer-Sited Tier Program Component

	2008	2009	2010	2011	2012	2013	Total By 2013
Incremental MWh							
Anaerobic Digester*	-	-	16,445	5,140	-	-	21,585
Small Wind	-	-	530	583	-	-	1,113
PV	-	-	4,992	1,734	-	-	6,726
Fuel Cell (small)	-	-	329	136	-	-	464
Fuel Cell (large)	-	-	7,008	3,506	-	-	10,514
Total Base CST MWh	-	-	*29,304*	*11,098*	-	-	*40,402*
Additional PV for 100 MW	-	32,850	27,858	31,116	32,850	-	124,674
Total Incremental MWh	**-**	**32,850**	**57,162**	**42,214**	**32,850**	**-**	**165,076**

Incremental MW								**Total MW Potential by 2015**	**% of Potential**
Anaerobic Digester*			2.3	0.7	-	-	3.1	21.0	15%
Small Wind			0.2	0.3	-	-	0.5	1.9	27%
PV			3.8	1.3	-	-	5.1	187.4	3%
Fuel Cell (small)			0.2	0.1	-	-	0.2	3.2	7%
Fuel Cell (large)			0.8	0.4	-	-	1.2	7.8	15%
Total Base CST MW	-	-	*7.3*	*2.8*	-	-	*10.1*		
Additional PV for 100 MW	-	25.0	21.2	23.7	25.0	-	94.9		
Total PV	**-**	**25.0**	**25.0**	**25.0**	**25.0**	**-**	**100**		
Total Incremental MW	**-**	**25.0**	**28.5**	**26.5**	**25.0**	**-**	**105**		

CST Cost (thousands)							
Anaerobic Digester*	$0	$0	$7,275	$2,274	$0	$0	$ 9,548
Small Wind	$0	$0	$649	$713	$0	$0	$ 1,362
PV	$0	$0	$13,677	$4,275	$0	$0	$ 17,952
Fuel Cell (small)	$0	$0	$750	$310	$0	$0	$ 1,060
Fuel Cell (large)	$0	$0	$4,000	$2,001	$0	$0	$ 6,001
Annual Base CST Cost	*$0*	*$0*	*$26,350*	*$9,573*	*$0*	*$0*	$ 35,923
Additional PV Cost	$0	$90,000	$76,323	$76,725	$72,900	$0	$ 315,948
Total Annual Cost	$0	$90,000	$102,673	$86,298	$72,900	$0	$ 351,871
Total Cost	$351,871						
NPV	**$255,728**						

*** Includes Anaerobic Digesters in NYC metropolitan area (currently NYPA customers)**

Program specific results are a function of annual operating plan program allocations, estimates of technical potential and level of program incentives

Costs associated with program monitoring and verification and administration not included

Appendix B. 25% Post EPS Load Case

Summary of Cummulative Cleared MW by Year, Zone and Resource Type

Main Tier Program Component

Resource	Zone	2010	2011
Biomass	1	19.3	38.5
Biomass Total		19.3	38.5
Hydro	1	25.0	50.0
	2	4.6	9.2
	3	0.0	0.0
	ON	17.6	35.2
	QC	20.0	40.0
Hydro Total		67.2	134.4
Landfill Gas	1	17.6	35.3
	2	5.1	10.3
	3	0.7	1.3
Landfill Gas Total		23.4	46.9
Wind (Offshore) Total		-	-
Wind (Onshore)	1	100.4	186.4
	2	33.6	67.2
Wind (Onshore) Total		134.0	253.6
Grand Total		**243.9**	**473.4**

Summary of Cummulative Cleared GWh by Year, Zone and Resource Type

Resource	Zone	2010	2011
Biomass	1	134.9	269.8
Biomass Total		134.9	269.8
Hydro	1	100.7	201.3
	2	18.5	36.9
	3	0.1	0.1
	ON	103.3	206.6
	QC	87.6	175.2
Hydro Total		310.1	620.2
Landfill Gas	1	131.3	262.5
	2	38.3	76.6
	3	5.0	9.9
Landfill Gas Total		174.6	349.1
Wind (Offshore) Total		-	-
Wind (Onshore)	1	304.9	568.1
	2	90.6	181.2
Wind (Onshore) Total		395.5	749.4
Grand Total		**1,015.1**	**1,988.5**

Appendix C. 30% Post-EPS Load Case

Derived Incremental Targets

	Post-EPS Load (1)	Baseline Resources (2)	EO 111 (2)	NY Main Tier and CST (3)	Main Tier and CST Requirement (4)	Green marketing % (5)	Green Marketing MWh	CST requirement = 2% of Incremental (6)	Main Tier Requirement Minus CST	% LIPA (3)	NYSERDA CST (6)	NYSERDA Main Tier	LIPA CST (7)	LIPA Main Tier (7)
2003	158,013,000	31,210,710	-	-	19.8%				-	0.00%	-	-	-	-
2004	160,211,000	31,468,717	-	-	19.6%				-	0.00%	-	-	-	-
2005	167,208,000	31,486,189	251,065	-	19.0%	0.0%	-		-	0.00%	-	-	-	-
2006	162,237,000	31,503,661	282,812	865,582	20.1%	0.1%	202,796		865,582	0.00%	-	865,582	-	-
2007	162,433,219	31,509,370	314,579	883,208	20.1%	0.3%	406,083		883,208	15.80%	17,626	865,582	-	-
2008	163,552,495	31,515,079	346,366	2,700,982	21.1%	0.4%	613,322		2,700,982	15.83%	35,252	2,665,730	-	-
2009	162,041,065	31,520,788	378,174	4,224,432	22.3%	0.5%	810,205	**52,878**	4,171,554	15.83%	52,878	3,502,673	9,948	658,933
2010	160,192,211	31,526,497	410,002	5,565,486	23.4%	0.6%	1,001,201	111,310	5,454,176	15.88%	93,638	4,588,262	17,672	865,914
2011	159,167,794	31,532,206	391,857	7,117,399	24.5%	0.8%	1,193,758	142,348	6,975,051	15.89%	119,736	5,867,057	22,612	1,107,994
2012	157,553,065	31,537,915	373,712	8,495,015	25.6%	0.9%	1,378,589	169,900	8,325,115	15.98%	142,743	6,994,385	27,158	1,330,730
2013	156,016,509	31,543,624	355,568	9,857,452	26.8%	1.0%	1,560,165	197,149	9,660,303	16.01%	165,587	8,113,747	31,562	1,546,556
2014	154,177,290	31,543,624	337,424	11,106,854	27.9%	1.0%	1,541,773	222,137	10,884,717	16.08%	186,420	9,134,589	35,717	1,750,129
2015	152,351,948	31,543,624	319,280	12,319,161	29.0%	1.0%	1,523,519	246,383	12,072,778	16.15%	206,595	10,123,157	39,788	1,949,621.12

(1) Actual numbers 2003-2006, Forecast from Case 07-M-0548, STRAW PROPOSAL, TECHNICAL APPENDIX, (February 11, 2008).
(2) from PSC 9/24 order, App. D, Table 1
(3) Sum of Actual NYSERDA contracts for Main Tier and CST plus Estimates for LIPA Procurements through 2009, based on RPS requirements 2010 and later
(4) "Glide Path" interpolated between 2010 and 2013 to reach the 29% goal, assume 1% from green marketing
(5) Interpolated between 2005 and 2013 to reach the 1% goal
(6) 2009 Value differs from the 2006-2009 Operating Plan to reflect corrected small wind numbers
(7) LIPA procurements are estimates based on LIPA's proporportional share of annual RPS glide path

Main Tier Incremental Demand Calculations
(MWh)

	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Main Tier w/o LIPA	2,665,730	3,502,673	4,588,262	5,867,057	6,994,385	8,113,747	9,134,589	10,123,157
NYSERDA Incremental w/o LIPA	-	836,943	1,085,589	1,278,795	1,127,328	1,119,362	1,020,842	988,568
Less Total Renewables Under NYSERDA contract (up	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730	2,665,730
Exports to New England	829,330	829,330	842,082	842,082	842,082	842,082	842,082	842,082
Additional Exports to NE			255,227	510,454	765,681	1,020,907	1,020,907	1,020,907
Green Marketing Estimates	613,322	810,205	1,001,201	1,193,758	1,378,589	1,560,165	1,541,773	1,523,519
EO 111	346,366	378,174	410,002	391,857	373,712	355,568	337,424	319,280
Total New York Renewables Demand(MWH)	1,789,017	2,854,652	4,431,044	6,139,478	7,688,719	9,226,739	10,211,045	11,163,216
Annual New York Incremental Demand(MWh)	**1,789,017**	**1,065,635**	**1,576,392**	**1,708,434**	**1,549,241**	**1,538,020**	**984,305**	**952,171**

Appendix C. 30% Post-EPS Load Case Results

Summary of Direct Program Costs Only

(all nominal dollars)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Main Tier Budget																	
NYS Incremental RPS Demand (MWhs)			1,085,589	1,278,795	1,127,328	1,119,362	1,020,842	988,568									
Renewable Attributes Market Clearing Price/MWh			$ 19.65	$ 18.94	$ 16.82	$ 15.15	$ 28.46	$ 31.67									
Contract Cost (2010 Increment)			$21,334,354	$21,334,354	$21,334,354	$21,334,354	$21,334,354	$21,334,354	$21,334,354	$21,334,354	$21,334,354	$21,334,354					
Contract Cost (2011 Increment)				$24,222,952	$24,222,952	$24,222,952	$24,222,952	$24,222,952	$24,222,952	$24,222,952	$24,222,952	$24,222,952	$24,222,952				
Contract Cost (2012 Increment)					$18,963,899	$18,963,899	$18,963,899	$18,963,899	$18,963,899	$18,963,899	$18,963,899	$18,963,899	$18,963,899	$18,963,899			
Contract Cost (2013 Increment)						$16,958,291	$16,958,291	$16,958,291	$16,958,291	$16,958,291	$16,958,291	$16,958,291	$16,958,291	$16,958,291	$16,958,291		
Contract Cost (2014 Increment)							$29,049,948	$29,049,948	$29,049,948	$29,049,948	$29,049,948	$29,049,948	$29,049,948	$29,049,948	$29,049,948	$29,049,948	
Contract Cost (2015 Increment)								$31,308,709	$31,308,709	$31,308,709	$31,308,709	$31,308,709	$31,308,709	$31,308,709	$31,308,709	$31,308,709	$31,308,709
Subtotal Premium Cost (RPS Main Tier)		$0	$21,334,354	$45,557,306	$64,521,205	$81,479,496	$110,529,444	$141,838,153	$141,838,153	$141,838,153	$141,838,153	$141,838,153	$120,503,800	$96,280,847	$77,316,948	$60,358,657	$31,308,709
Annual Encumbered Budget		$0	$213,343,535	$242,229,524	$189,638,990	$169,582,911	$290,499,482	$313,087,092									
Total of Contracts		$1,418,381,533															
Customer Sited Tier Budget																	
Incremental to Operating Plan																	
Anearobic Digester			$ 10,237,018	$ 5,517,050	$ 4,749,087	$ 4,608,738	$ 4,086,432	$ 3,845,509									
Small Wind			$ 648,560	$ 713,416	$ 706,282	$ 776,910	$ 854,601	$ 940,061									
PV			$ 26,715,765	$ 10,372,656	$ 8,928,801	$ 8,664,931	$ 7,682,938	$ 7,229,976									
Fuel Cell (Small)			$ 750,000	$ 751,642	$ 647,015	$ 627,894	$ 556,735	$ 523,911									
Fuel Cell(Large)			$ 4,000,000	$ 4,855,606	$ 4,179,714	$ 4,056,192	$ 3,596,506	$ 3,384,467									
Total Annual Base CST Costs			$ 42,351,343	$ 22,210,370	$ 19,210,899	$ 18,734,665	$ 16,777,213	$ 15,923,925									
Total Cumulative Costs			$ 42,351,343	$ 64,561,713	$ 83,772,612	$ 102,507,276	$ 119,284,489	$ 135,208,414									
Additional PV for Aggressive PV Set Aside Scenario		$ 90,000,000	$ 63,284,235	$ 70,627,344	$ 63,971,199												
Total Cumulative Balance of PV Set Aside Costs		$ 90,000,000	$ 153,284,235	$ 223,911,579	$ 287,882,778												
Total Annual Program w/PV Funding Requirements	$ -	$ 90,000,000	$ 105,635,578	$ 92,837,714	$ 83,182,098	$ 18,734,665	$ 16,777,213	$ 15,923,925									
Current Program Positive Funding Balance	$ 69,016,000																
Net Program Funding Requirement(1)		$ 90,000,000	$126,969,932	$138,395,020	$147,703,302	$100,214,161	$127,306,657	$157,762,079	$141,838,153	$141,838,153	$141,838,153	$141,838,153	$120,503,800	$96,280,847	$77,316,948	$60,358,657	$31,308,709
Cumulative Program Funding Requirement		$ 90,000,000	$ 216,969,932	$ 355,364,952	$ 503,068,254	$ 603,282,415	$ 730,589,071	$ 888,351,150	$ 1,030,189,303	$ 1,172,027,457	$ 1,313,865,610	$ 1,455,703,763	$ 1,576,207,563	$ 1,672,488,411	$ 1,749,805,359	$ 1,810,164,016	$ 1,841,472,726
Net Annual Program Funding Reqmt(w/o PV Set Aside)			$63,685,696	$67,767,676	$83,732,104	$100,214,161	$127,306,657	$157,762,079	$141,838,153	$141,838,153	$141,838,153	$141,838,153	$120,503,800	$96,280,847	$77,316,948	$60,358,657	$31,308,709
Cumulative Program Funding Reqmt(w/o PV Set Aside)			$63,685,696	$131,453,372	$215,185,476	$315,399,636	$442,706,293	$600,468,372	$742,306,525	$884,144,678	$1,025,982,832	$1,167,820,985	$1,288,324,785	$1,384,605,632	$1,461,922,581	$1,522,281,238	$1,553,589,947
(1) budget excludes NYSERDA adminstrative expenses,NYS PAL fee, CST monitoring and verification costs																	

Appendix C. 30% Post-EPS Load Case Results

Customer-Sited Tier Program Component

	2008	2009	2010	2011	2012	2013	2014	2015	Total by 2015		
Incremental MWh											
Anaerobic Digester*	-	-	23,142	12,472	10,736	10,419	9,238	8,693	74,700		
Small Wind	-	-	530	583	641	705	776	854	4,089		
PV	-	-	9,751	4,207	4,023	4,338	4,274	4,469	31,063		
Fuel Cell (small)	-	-	329	329	283	275	244	229	1,689		
Fuel Cell (large)	-	-	7,008	8,507	7,323	7,106	6,301	5,930	42,175		
Total Base CST MWh	-	-	*40,760*	*26,098*	*23,007*	*22,844*	*20,833*	*20,175*	*153,717*		
Additional PV for 100 MW	-	32,850	23,099	28,643	28,827	-	-	-	113,419		
Total Incremental MWh	**-**	**32,850**	**63,859**	**54,741**	**51,834**	**22,844**	**20,833**	**20,175**	**267,136**		
Incremental MW										**Total MW Potential by 2015**	**% of Potential**
Anaerobic Digester*			3.3	1.8	1.5	1.5	1.3	1.2	10.7	21.0	51%
Small Wind			0.2	0.3	0.3	0.3	0.4	0.4	1.9	1.9	100%
PV			7.4	3.2	3.1	3.3	3.3	3.4	23.6	187.4	13%
Fuel Cell (small)			0.2	0.2	0.1	0.1	0.1	0.1	0.8	3.2	24%
Fuel Cell (large)			0.8	1.0	0.8	0.8	0.7	0.7	4.8	7.8	62%
Total Base CST MW	-	-	*11.9*	*6.4*	*5.9*	*6.0*	*5.8*	*5.8*	*41.8*		
Additional PV for 100 MW	-	25.0	17.6	21.8	21.9				86.3		
Total PV	**-**	**25.0**	**25.0**	**25.0**	**25.0**	**3.3**	**3.3**	**3.4**	**110**		
Total Incremental MW	**-**	**25.0**	**29.5**	**28.2**	**27.8**	**6.0**	**5.8**	**5.8**	**128**		
CST Cost (thousands)											
Anaerobic Digester*	$0	$0	$10,237	$5,517	$4,749	$4,609	$4,086	$3,846	$ 33,044		
Small Wind	$0	$0	$649	$713	$706	$777	$855	$940	$ 4,640		
PV	$0	$0	$26,716	$10,373	$8,929	$8,665	$7,683	$7,230	$ 69,595		
Fuel Cell (small)	$0	$0	$750	$752	$647	$628	$557	$524	$ 3,857		
Fuel Cell (large)	$0	$0	$4,000	$4,856	$4,180	$4,056	$3,597	$3,384	$ 24,072		
Annual Base CST Cost	*$0*	*$0*	*$42,351*	*$22,210*	*$19,211*	*$18,735*	*$16,777*	*$15,924*	$ 135,208		
Additional PV Cost	$0	$90,000	$63,284	$70,627	$63,971	$0	$0	$0	$ 287,883		
Total Annual Cost	$0	$90,000	$105,636	$92,838	$83,182	$18,735	$16,777	$15,924	$ 423,091		
Total Cost	$423,091										
NPV	**$295,418**										

*** Includes Anaerobic Digesters in NYC metropolitan area (currently NYPA customers)**

Program specific results are a function of annual operating plan program allocations, estimates of technical potential and level of program incentives

Costs associated with program monitoring and verification and administration not included

Appendix C. 30% Post EPS Case

Summary of Cummulative Cleared MW by Year, Zone and Resource Type

Main Tier Program Component

Resource	Zone	2010	2011	2012	2013	2014	2015
Biomass	1	19.3	38.5	57.8	77.0	163.2	235.0
Biomass Total		19.3	38.5	57.8	77.0	163.2	235.0
Hydro	1	25.0	50.0	74.9	99.9	99.9	99.9
	2	4.6	9.2	13.7	18.3	18.3	18.3
	3	0.0	0.0	0.0	0.0	0.1	0.1
	ON	17.6	35.2	52.8	70.4	88.0	88.0
	QC	20.0	40.0	60.0	80.0	100.0	100.0
Hydro Total		67.2	134.4	201.5	268.7	306.3	306.3
Landfill Gas	1	17.6	35.3	52.9	70.5	70.5	70.5
	2	5.1	10.3	15.4	20.6	21.5	21.5
	3	0.7	1.3	2.0	2.7	2.7	2.7
Landfill Gas Total		23.4	46.9	70.3	93.8	94.6	94.6
Wind (Offshore) Total		-	-	-	-	-	-
Wind (Onshore)	1	294.6	634.9	920.1	1,201.5	1,257.5	1,324.0
	2	33.6	67.2	100.8	134.3	134.3	258.1
	3	-	-	-	-	10.0	10.0
Wind (Onshore) Total		328.2	702.1	1,020.9	1,335.8	1,401.8	1,592.1
Grand Total		**438.1**	**921.8**	**1,350.5**	**1,775.3**	**1,966.0**	**2,228.1**

Summary of Cummulative Cleared GWh by Year, Zone and Resource Type

Resource	Zone	2010	2011	2012	2013	2014	2015
Biomass	1	134.9	269.8	404.7	539.6	1,135.6	1,576.1
Biomass Total		134.9	269.8	404.7	539.6	1,135.6	1,576.1
Hydro	1	100.7	201.3	302.0	402.6	402.6	402.6
	2	18.5	36.9	55.4	73.8	73.8	73.8
	3	0.1	0.1	0.1	0.1	0.3	0.3
	ON	103.3	206.6	309.9	413.2	516.5	516.5
	QC	87.6	175.2	262.8	350.4	438.0	438.0
Hydro Total		310.1	620.2	930.2	1,240.2	1,431.3	1,431.3
Landfill Gas	1	131.3	262.5	393.8	525.1	525.1	525.1
	2	38.3	76.6	114.9	153.3	159.7	159.7
	3	5.0	9.9	14.9	19.9	19.9	19.9
Landfill Gas Total		174.6	349.1	523.7	698.2	704.7	704.7
Wind (Offshore) Total		-	-	-	-	-	-
Wind (Onshore)	1	866.2	1,864.5	2,703.6	3,531.6	3,693.4	3,883.5
	2	90.6	181.2	271.9	362.5	362.5	684.0
	3	-	-	-	-	28.9	28.9
Wind (Onshore) Total		956.9	2,045.7	2,975.5	3,894.1	4,084.8	4,596.5
Grand Total		**1,576.4**	**3,284.8**	**4,834.1**	**6,372.1**	**7,356.4**	**8,308.6**

Attachment 2

NEW YORK RENEWABLE PORTFOLIO STANDARD COST STUDY UPDATE, CUSTOMER-SITED TIER TARGET AND RESOURCES

(14 pages)

New York Renewable Portfolio Standard Cost Study Update

Customer-Sited Tier Target and Resources

Prepared for:

New York State Energy Research and Development Authority

By:

La Capra Associates & Sustainable Energy Advantage, LLC

With input from

AWS TrueWind
Antares Group

March 18, 2008

NOTICE

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Introduction

In reviewing the future costs of the New York Renewable Portfolio Standard Program, NYSERDA asked Sustainable Energy Advantage (SEA) and La Capra Associates to update the 2004 Cost Study Report II, Volume A (2004 Report).[1] Part of the 2004 Report included costs for the CST program under the New York RPS. The purpose of this report is to estimate the total additional cost associated with the Customer-Sited Tier (CST) Program after 2009. According to the NY RPS, CST resources will make up 2% of the total NYSERDA incremental requirements.[2] In February 2007, NYSERDA and DPS Staff released a plan for implementing the CST program for the period of 2006-2009, referred herein as the "Operating Plan".[3] Budgets were developed for individual resources with anticipated expenditures totaling $45 million. The purpose of the cost study update is to estimate the future cost of the program after 2009. The costs reported herein refer to the future or incremental costs of the program. Additionally, an expanded solar photovoltaic (PV) program is also being considered. In this report, CST targets under three RPS scenarios and the associated costs of meeting the targets are examined, with and without an expanded PV program.

Customer-Sited Tier Targets

As depicted in Table 1, three different RPS load forecast scenarios were examined matching those scenarios tested for Main-Tier resources. All of the CST targets pertain to only the portion of the RPS that NYSERDA is responsible in procuring.[4] On the basis of these load forecast scenarios, three annual RPS target scenarios were developed, including two scenarios reflecting reductions to load anticipated as a result of more expansive energy efficiency programs being reviewed in the Energy Efficiency Portfolio Standard (EPS) Proceeding (15% reduction by 2015, or "Post-EPS"):

a. **New Load (25% Goal):** Uses 2007 forecast of unadjusted load collected by the EPS and assumes an RPS which contributes to achieving a 25% renewable energy goal by 2013.
b. **Post-EPS Load (25% Goal)**: Given that DPS is developing targets for a more expansive energy efficiency program to meet the proposed EPS, a reduced NY load forecast is used to reflect a 15% reduction below the reference forecast by 2015. This scenario assumes meeting the 25% renewable energy goal by 2013 also, though the absolute MWh target is lower due to lower load.

[1] Retail Renewable Portfolio Standard — Case 03-E-0188, "Cost Study Report II, Volume A" February 27,2004 http://www.dps.state.ny.us/03e0188_CostStudy_II.htm.
[2] Retail Renewable Portfolio Standard — Case 03-E-0188 < http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/Web/85D8CCC6A42DB86F85256F1900533518/$File/301.03e0188.RPS.pdf?OpenElement>
[3] "Renewable Portfolio Standard: Operating Plan for Customer-Sited Tier Program (2006-2009)." February 12, 2007, NYSERDA AND DPS STAFF < http://www.dps.state.ny.us/CST_OP_02-12-07.pdf >
[4] It does not include the portion that LIPA is responsible for.

c. **Post-EPS Load (30% Goal):** This scenario assumes that, as a result of an EPS-driven lower load, the renewable energy target can be increased on a percentage basis to 30% by 2015, through the implementation of more aggressive RPS procurement targets.

Table 1: New York State Load Forecasts

(MWh)	New York State Load		
Year	As-ordered* Load Forecast	New Load Forecast **	Post-EPS Load**
2005	165,280,000	167,208,000	167,208,000
2006	167,490,000	162,237,000	162,237,000
2007	169,977,000	162,433,219	162,433,219
2008	172,404,000	164,402,854	163,552,495
2009	174,658,000	166,343,040	162,041,065
2010	176,910,000	168,013,530	160,192,211
2011	179,031,000	170,641,997	159,167,794
2012	180,907,000	172,742,491	157,553,065
2013	182,866,999	175,028,192	156,016,509
2014		177,074,908	154,177,290
2015		179,237,586	152,351,948

** From PSC 9/24 order, App. D, Table 1*

***Actual historical state load for 2003-2006. For 2007-2015, forecast from Case 07-M-0548, Straw Proposal, Technical Appendix.2007, Forecast Sendout*

In developing the Customer-Sited Tier Targets depicted in Figure 1 and Table 2 below, it was assumed that all programs proposed in the Operating Plan are achieved through 2009. The CST projects that result from the Operating Plan are expected to produce 52,878 MWh by the end of 2009.[5] Thereafter, the annual incremental CST targets are equal to 2% of the total NYSERDA incremental requirements.[6] This approach resulted in a larger incremental increase from 2009 to 2010 than subsequent years, because the Operating Plan procurements up to 2009 do not keep pace with the procurements of Main-Tier resources.

[5] Target is different than Operating Plan, corrected for small wind error.

[6] For a more detailed description of how the Main Tier targets were developed, refer to Report on Main Tier Target and Resources.

Figure 1: CST Targets

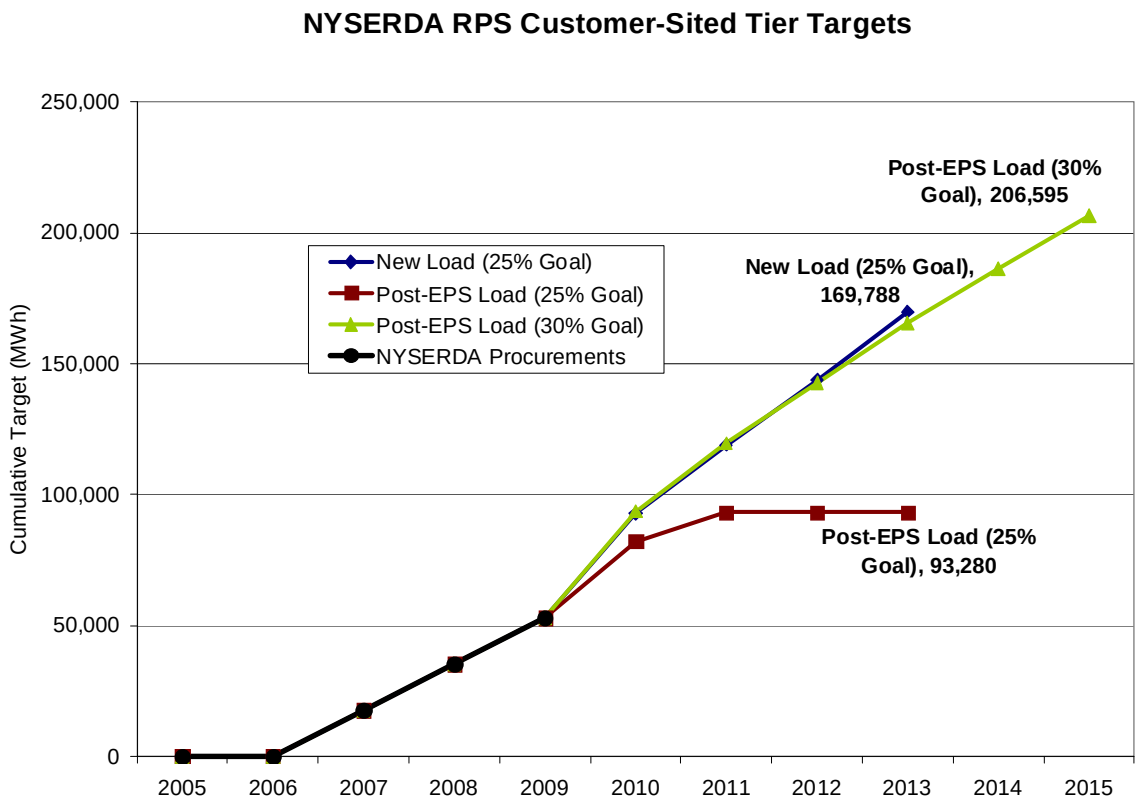


Table 2: Customer-Sited Tier RPS Targets

(MWh)	As-Ordered Customer-Sited Tier	Cumulative Customer-Sited Tier			Incremental Customer-Sited Tier		
Year		New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)	New Load (25% Goal)	Post-EPS Load (25% Goal)	Post-EPS Load (30% Goal)
2006	25,259	0	0	0			
2007	50,488	17,626	17,626	17,626			
2008	75,685	35,252	35,252	35,252			
2009	100,855	52,878	52,878	52,878			
2010	125,988	92,687	82,182	93,638	39,809	29,304	40,760
2011	151,081	119,131	93,280	119,736	26,445	11,097	26,098
2012	176,123	143,840	93,280	142,743	24,708	0	23,007
2013	201,130	169,788	93,280	165,587	25,949	0	22,844
2014				186,420			20,834
2015				206,595			20,175

Consistent with the recommendations of the Renewable Energy Task Force convened by Governor Paterson, this cost study update includes an assessment of the costs associated with achieving an interim goal of installing 100 MW of photovoltaic capacity over a 4 year period commencing in 2009.

Calculating Additional Cost of CST Program

In this assessment of CST program costs, a supply curve to estimate the cost of various CST resources was not used, unlike the 2004 Report. Instead, budgets were developed based on NYSERDA's staff projections of funding for individual projects and the maximum annual potential of developing each resource type. The resources examined are the same as those proposed in the Operating Plan.

- Anaerobic Digester Biogas (farm-based and water treatment facilities)[7]
- Small wind
- Solar photovoltaics (PV)
- Fuel cells (small and large)

The projections for maximum annual installations on an incremental basis are detailed below in Table 3 for each resource. Likewise, the estimated incentive level on a $ per kW basis are shown in Table 4. These show incentives being fairly flat throughout the years, except for PV which has declining incentive levels.

Table 3: Maximum Potential Annual Installations

	Maximum Annual Installation (Incremental kW/year)					
	2010	2011	2012	2013	2014	2015
Anaerobic Digester	3,302	2,261	2,276	2,319	2,319	2,319
Small Wind	242	266	293	322	354	390
PV	9,018	13,527	20,291	30,436	45,654	68,480
Fuel Cell (small)	150	200	400	600	800	1000
Fuel Cell (large)	800	1000	1200	1400	1600	1800

Table 4: Estimated Incentive Level (per Kilowatt)

	Incentive Amount ($/kW)					
	2010	2011	2012	2013	2014	2015
Anaerobic Digester	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100
Small Wind	$2,680	$2,680	$2,412	$2,412	$2,412	$2,412
PV	$3,600	$3,240	$2,916	$2,624	$2,362	$2,126
Fuel Cell (small)	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Fuel Cell (large)	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000

The resulting incentive cost per unit of energy may vary considerably between resources depending on their respective capacity factors, as shown on Table 5. The incentive level per megawatt hour for PV and wind decreases over time because the incentive per kilowatt decreases over time for these resources.

[7] Within the anaerobic digester group, resources located within the NYPA service territory have been included.

Table 5: Estimated Incentive Level (per MWh)

	Incentive Amount ($/MWh)					
	2010	2011	2012	2013	2014	2015
Anaerobic Digester	$29	$29	$29	$29	$29	$29
Small Wind	$61	$61	$55	$55	$55	$55
PV	$137	$123	$111	$100	$90	$81
Fuel Cell (small)	$457	$326	$326	$326	$228	$228
Fuel Cell (large)	$114	$82	$82	$82	$57	$57

Funding Scenario Examined

Operating Plan Allocation

The approach used in estimating future costs of the program is based on the Operating Plan Allocations. This method allocated funding between resources proportional to the allocation developed in the Operating Plan, while achieving the intermediate annual targets for CST resources.

In addition, the cost of achieving an overlapping 100 MW solar photovoltaic (PV) goal that is being considered was also calculated. The proposed plan would require the state to achieve 100 MW of solar PV installations over the next four years (2009 to 2012). Since a portion of the CST resources developed to meet the RPS CST targets would already consist of solar PV, the calculation of additional solar related costs are based on the incremental PV needed to achieve a total of 100 MW of solar PV. All the funding estimates presented herein are for additional programs that are not part of the Operating Plan.

The total additional costs for the three RPS target scenarios evaluated are detailed in the Table 6 below. These costs DO NOT include the costs associated with the Operating Plan. Including the 100 MW PV Plan for CST renewable energy would increase the cost of the CST program by approximately $300 million under each scenario. Without the 100 MW PV plan, the CST program is estimated to cost in the range of $36 million to $135 million, depending on the RPS Scenario. The costs presented below are the sum of annual costs. Table 7 presents cost estimates by resource type. Costs for the PV component of the program as depicted in Table 7 include incremental costs associated with reaching the100 MW PV target.

Table 6: CST Costs For Each RPS Scenario (in Millions)

	With 100 MW PV Plan	Without 100 MW PV Plan	Difference in Cost
25% Reference	$393.8	$104.1	$289.7
25% Post-EPS Load	$351.9	$35.9	$316.0
30% Post-EPS Load	$423.1	$135.2	$287.9

Table 7: Total Costs by Resource (in Millions)

	New Load (25% Goal)	EPS Load (25% Goal)	EPS Load (30% Goal)
Anaerobic Digester	$26.2	$9.5	$33.0
Small Wind	$2.8	$1.4	$4.6
PV	$343.8	$333.9	$357.5
Fuel Cell (small)	$2.9	$1.1	$3.9
Fuel Cell (large)	$18.0	$6.0	$24.1
Total	*$393.8*	*$351.9*	*$423.1*

Since the approach taken in calculating the incentive budget requirements for CST resources uses the same allocation method as the Operating Plan, the resulting resource mix for each scenario is very similar (see Figures 2 and 3 below). The graph shows that if the 100 MW PV Program is implemented, it can add 86 MW to 95 MW of additional PV installations to the CST Program, depending on the scenario.

Figure 2: Cumulative Incremental Capacity Installed by End of Program

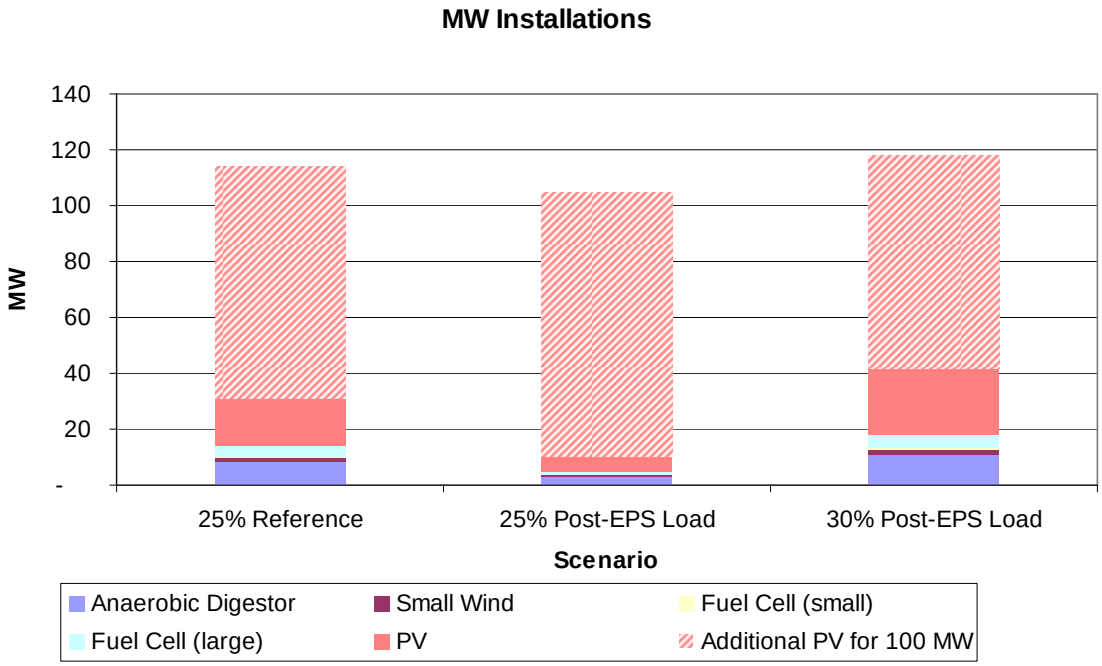
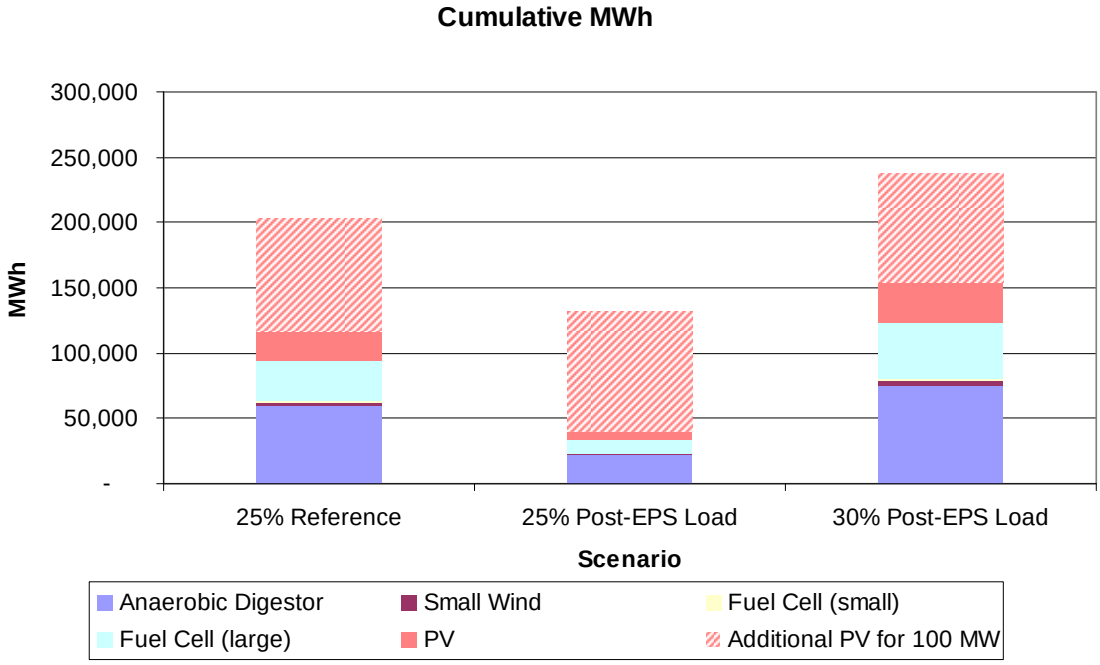


Figure 3: Cumulative Incremental Energy Production by End of Program



Appendix: Detailed Summary Sheets

Table A-1: New Load (25% Goal)

	2008	2009	2010	2011	2012	2013	Total By 2013	Total kW by 2013
Incremental MWh								
Anaerobic Digester*	-	-	23,142	12,641	11,553	11,880	59,216	8,450
Small Wind	-	-	530	583	641	705	2,460	1,123
PV	-	-	8,800	4,264	4,330	4,947	22,340	17,002
Fuel Cell (small)	-	-	329	334	305	314	1,281	585
Fuel Cell (large)	-	-	7,008	8,622	7,880	8,103	31,613	3,609
Total Base CST MWh	-	-	*39,809*	*26,444*	*24,709*	*25,948*	*116,910*	*30,768*
Additional PV for 100 MW	-	32,850	24,050	28,586	28,520	-	114,006	82,998
Total Incremental MWh	**-**	**32,850**	**63,859**	**55,030**	**53,229**	**25,948**	**230,916**	**113,767**
Incremental MW								
Anaerobic Digester*	-	-	3.3	1.8	1.6	1.7	8.4	
Small Wind	-	-	0.2	0.3	0.3	0.3	1.1	
PV	-	-	6.7	3.2	3.3	3.8	17.0	
Fuel Cell (small)	-	-	0.2	0.2	0.1	0.1	0.6	
Fuel Cell (large)	-	-	0.8	1.0	0.9	0.9	3.6	
Total Base CST MW	-	-	*11.2*	*6.5*	*6.3*	*6.9*	*30.8*	
Additional PV for 100 MW	-	25.0	18.3	21.8	21.7	-	86.8	
Total PV	**-**	**25.0**	**25.0**	**25.0**	**25.0**	**3.8**	**104**	
Total Incremental MW	**-**	**25.0**	**29.5**	**28.2**	**28.0**	**6.9**	**118**	
CST Cost (thousands)								
Anaerobic Digester*	$0	$0	$10,237	$5,592	$5,110	$5,255	$ 26,194	
Small Wind	$0	$0	$649	$713	$706	$777	$ 2,845	
PV	$0	$0	$24,110	$10,513	$9,608	$9,880	$ 54,112	
Fuel Cell (small)	$0	$0	$750	$762	$696	$716	$ 2,924	
Fuel Cell (large)	$0	$0	$4,000	$4,921	$4,498	$4,625	$ 18,044	
Annual Base CST Cost	*$0*	*$0*	*$39,746*	*$22,502*	*$20,619*	*$21,252*	$ 104,119	
Additional PV Cost	$0	$90,000	$65,890	$70,487	$63,292	$0	$ 289,668	
Total Annual Cost	$0	$90,000	$105,636	$92,989	$83,911	$21,252	$ 393,787	
Total Cost	$393,787							
NPV	**$281,357**							

*Includes Anaerobic Digesters in NYPA

Table A-2: Post-EPS (25% Load)

	2008	2009	2010	2011	2012	2013	Total By 2013	Total kW by 2013
Incremental MWh								
Anaerobic Digester*	-	-	16,445	5,140	-	-	21,585	3,080
Small Wind	-	-	530	583	-	-	1,113	508
PV	-	-	4,992	1,734	-	-	6,726	5,119
Fuel Cell (small)	-	-	329	136	-	-	464	212
Fuel Cell (large)	-	-	7,008	3,506	-	-	10,514	1,200
Total Base CST MWh	-	-	*29,304*	*11,098*	-	-	*40,402*	*10,119*
Additional PV for 100 MW	-	32,850	27,858	31,116	32,850	-	124,674	94,881
Total Incremental MWh	**-**	**32,850**	**57,162**	**42,214**	**32,850**	**-**	**165,076**	**105,000**
Incremental MW								
Anaerobic Digester*			2.3	0.7	-	-	3.1	
Small Wind			0.2	0.3	-	-	0.5	
PV			3.8	1.3	-	-	5.1	
Fuel Cell (small)			0.2	0.1	-	-	0.2	
Fuel Cell (large)			0.8	0.4	-	-	1.2	
Total Base CST MW	-	-	*7.3*	*2.8*	-	-	*10.1*	
Additional PV for 100 MW	-	25.0	21.2	23.7	25.0	-	94.9	
Total PV	**-**	**25.0**	**25.0**	**25.0**	**25.0**	**-**	**100**	
Total Incremental MW	**-**	**25.0**	**28.5**	**26.5**	**25.0**	**-**	**105**	
CST Cost (thousands)								
Anaerobic Digester*	$0	$0	$7,275	$2,274	$0	$0	$ 9,548	
Small Wind	$0	$0	$649	$713	$0	$0	$ 1,362	
PV	$0	$0	$13,677	$4,275	$0	$0	$ 17,952	
Fuel Cell (small)	$0	$0	$750	$310	$0	$0	$ 1,060	
Fuel Cell (large)	$0	$0	$4,000	$2,001	$0	$0	$ 6,001	
Annual Base CST Cost	*$0*	*$0*	*$26,350*	*$9,573*	*$0*	*$0*	$ 35,923	
Additional PV Cost	$0	$90,000	$76,323	$76,725	$72,900	$0	$ 315,948	
Total Annual Cost	$0	$90,000	$102,673	$86,298	$72,900	$0	$ 351,871	
Total Cost	$351,871							
NPV	**$255,728**							

*Includes Anaerobic Digesters in NYPA

Table A-3: Post-EPS (30% Goal)

	2008	2009	2010	2011	2012	2013	2014	2015	Total by 2015	Total kW by 2015
Incremental MWh										
Anaerobic Digester*	-	-	23,142	12,472	10,736	10,419	9,238	8,693	74,700	10,659
Small Wind	-	-	530	583	641	705	776	854	4,089	1,867
PV	-	-	9,751	4,207	4,023	4,338	4,274	4,469	31,063	23,640
Fuel Cell (small)	-	-	329	329	283	275	244	229	1,689	771
Fuel Cell (large)	-	-	7,008	8,507	7,323	7,106	6,301	5,930	42,175	4,814
Total Base CST MWh	-	-	*40,760*	*26,098*	*23,007*	*22,844*	*20,833*	*20,175*	*153,717*	*41,752*
Additional PV for 100 MW	-	32,850	23,099	28,643	28,827	-	-	-	113,419	76,360
Total Incremental MWh	**-**	**32,850**	**63,859**	**54,741**	**51,834**	**22,844**	**20,833**	**20,175**	**267,136**	***118,112***
Incremental MW										
Anaerobic Digester*			3.3	1.8	1.5	1.5	1.3	1.2	10.7	
Small Wind			0.2	0.3	0.3	0.3	0.4	0.4	1.9	
PV			7.4	3.2	3.1	3.3	3.3	3.4	23.6	
Fuel Cell (small)			0.2	0.2	0.1	0.1	0.1	0.1	0.8	
Fuel Cell (large)			0.8	1.0	0.8	0.8	0.7	0.7	4.8	
Total Base CST MW	-	-	*11.9*	*6.4*	*5.9*	*6.0*	*5.8*	*5.8*	*41.8*	
Additional PV for 100 MW	**-**	**25.0**	**17.6**	**21.8**	**21.9**				86.3	
Total PV	**-**	**25.0**	**25.0**	**25.0**	**25.0**	**3.3**	**3.3**	**3.4**	**110**	
Total Incremental MW	**-**	**25.0**	**29.5**	**28.2**	**27.8**	**6.0**	**5.8**	**5.8**	**128**	
CST Cost (thousands)										
Anaerobic Digester*	$0	$0	$10,237	$5,517	$4,749	$4,609	$4,086	$3,846	$ 33,044	
Small Wind	$0	$0	$649	$713	$706	$777	$855	$940	$ 4,640	
PV	$0	$0	$26,716	$10,373	$8,929	$8,665	$7,683	$7,230	$ 69,595	
Fuel Cell (small)	$0	$0	$750	$752	$647	$628	$557	$524	$ 3,857	
Fuel Cell (large)	$0	$0	$4,000	$4,856	$4,180	$4,056	$3,597	$3,384	$ 24,072	
Annual Base CST Cost	*$0*	*$0*	*$42,351*	*$22,210*	*$19,211*	*$18,735*	*$16,777*	*$15,924*	$ 135,208	
Additional PV Cost	$0	$90,000	$63,284	$70,627	$63,971	$0	$0	$0	$ 287,883	
Total Annual Cost	$0	$90,000	$105,636	$92,838	$83,182	$18,735	$16,777	$15,924	$ 423,091	
Total Cost	$423,091									
NPV	**$295,418**									

Attachment 3

TOTAL COLLECTIONS BY UTILITY
(one page)

Total Collections by Utility

25% Reference

Utility	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
CHG&E	$6,714,046	$6,951,809	$8,152,379	$9,649,583	$8,360,458	$8,278,445	$7,236,797	$7,201,066	$5,826,314	$5,201,539	$4,053,669	$2,877,490	$1,497,244
CONED	57,734,709	60,459,119	71,538,832	85,317,608	74,480,663	74,248,960	64,906,474	64,585,999	52,255,920	46,652,347	36,357,153	25,808,063	13,428,706
NYSEG	33,155,843	34,237,899	40,039,618	47,249,050	40,801,143	40,285,466	35,216,487	35,042,606	28,352,641	25,312,294	19,726,402	14,002,753	7,286,051
NIMO	17,580,823	18,080,774	21,070,816	24,764,886	21,301,627	20,923,259	18,290,559	18,200,249	14,725,649	13,146,570	10,245,398	7,272,678	3,784,192
O&R	5,015,190	5,154,553	6,064,046	7,205,020	6,270,409	6,236,635	5,451,901	5,424,983	4,389,302	3,918,623	3,053,865	2,167,781	1,127,961
RG&E	8,645,148	8,871,755	10,317,012	12,101,912	10,389,812	10,186,978	8,905,187	8,861,217	7,169,527	6,400,715	4,988,212	3,540,874	1,842,422
Total	$128,845,759	$133,755,908	$157,182,703	$186,288,060	$161,604,112	$160,159,744	$140,007,404	$139,316,119	$112,719,354	$100,632,089	$78,424,699	$55,669,638	$28,966,576

25% Post-EEPS

Utility	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CHG&E	$5,251,929	$4,908,953	$4,372,272	$4,374,184	$4,277,198	$4,111,136	$3,142,702	$3,101,044	$1,726,821	$1,102,607	$572,324
CONED	45,161,825	42,692,621	38,367,600	38,674,721	38,104,195	36,872,572	28,186,735	27,813,109	15,487,775	9,889,230	5,133,146
NYSEG	25,935,497	24,176,760	21,473,989	21,418,133	20,873,803	20,006,055	15,293,355	15,090,636	8,403,245	5,365,627	2,785,106
NIMO	13,752,248	12,767,563	11,300,669	11,225,995	10,897,880	10,390,642	7,942,985	7,837,697	4,364,435	2,786,772	1,446,514
O&R	3,923,033	3,639,837	3,252,260	3,266,057	3,207,932	3,097,158	2,367,580	2,336,197	1,300,915	830,658	431,165
RG&E	6,762,495	6,264,703	5,533,204	5,485,832	5,315,412	5,058,927	3,867,228	3,815,966	2,124,927	1,356,805	704,269
Total	$100,787,025	$94,450,437	$84,299,994	$84,444,922	$82,676,420	$79,536,491	$60,800,585	$59,994,651	$33,408,119	$21,331,701	$11,072,524

30% Post-EEPS

Utility	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CHG&E	$6,821,130	$6,978,600	$7,779,354	$8,629,229	$9,871,055	$11,361,131	$9,503,944	$9,467,972	$8,099,775	$7,369,095	$6,268,610	$5,018,954	$4,041,274	$3,167,415	$1,668,715
CONED	58,655,536	60,692,118	68,265,459	76,296,067	87,938,091	101,897,418	85,240,400	84,917,766	72,646,482	66,093,043	56,222,854	45,014,746	36,245,989	28,408,384	14,966,619
NYSEG	33,684,655	34,369,845	38,207,542	42,252,904	48,173,237	55,286,767	46,249,122	46,074,069	39,416,005	35,860,287	30,504,991	24,423,777	19,666,087	15,413,616	8,120,480
NIMO	17,861,224	18,150,454	20,106,687	22,146,231	25,150,480	28,714,558	24,020,632	23,929,714	20,471,683	18,624,932	15,843,526	12,685,096	10,214,072	8,005,445	4,217,573
O&R	5,095,179	5,174,417	5,786,576	6,443,157	7,403,368	8,559,003	7,159,875	7,132,775	6,102,033	5,551,569	4,722,510	3,781,071	3,044,528	2,386,198	1,257,140
RG&E	8,783,032	8,905,945	9,844,941	10,822,248	12,267,079	13,980,355	11,695,007	11,650,742	9,967,118	9,067,984	7,713,791	6,176,036	4,972,960	3,897,638	2,053,424
Total	$130,900,756	$134,271,380	$149,990,558	$166,589,836	$190,803,310	$219,799,231	$183,868,981	$183,173,038	$156,703,097	$142,566,911	$121,276,282	$97,099,679	$78,184,910	$61,278,697	$32,283,951

Attachment 4

BUDGET SENSITIVITIES
(3 pages)

25% New Load Case: Budget														
(all nominal dollars)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Main Tier Budget														
Contract Cost (2006 Increment)	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068								
Contract Cost (2008 Increment)	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448						
Contract Cost (2009 Increment)	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669					
Contract Cost (2010 Increment)	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617	$22,239,617				
Contract Cost (2011 Increment)		$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222	$22,789,222			
Contract Cost (2012 Increment)			$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273	$26,739,273		
Contract Cost (2013 Increment)				$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	$28,326,850	
Subtotal Premium Cost (RPS Main Tier)	$ 78,333,802	$ 101,123,024	$ 127,862,297	$ 156,189,147	$ 156,189,147	$ 156,189,147	$ 138,838,080	$ 138,838,080	$ 112,212,632	$ 100,094,963	$ 77,855,346	$ 55,066,124	$ 28,326,850	
Anearobic Digester	$ 10,237,018	$ 5,591,865	$ 5,110,486	$ 5,254,919										
Small Wind	$ 648,560	$ 713,416	$ 706,282	$ 776,910										
PV	$ 24,110,285	$ 10,513,316	$ 9,608,270	$ 9,879,820										
Fuel Cell (Small)	$ 750,000	$ 761,834	$ 696,251	$ 715,929										
Fuel Cell(Large)	$ 4,000,000	$ 4,921,451	$ 4,497,784	$ 4,624,901										
Discretionary	$ 1,500,000	$ 1,500,000	$ 500,000	$ 500,000										
M&E Costs	$ 2,003,083	$ 1,245,034	$ 1,140,026	$ 1,174,272										
Subtotal Annual Base CST Costs	$ 43,248,946	$ 25,246,916	$ 22,259,099	$ 22,926,751										
Total Annual Main Tier & CST Costs	$ 121,582,748	$ 126,369,940	$ 150,121,396	$ 179,115,898	$ 156,189,147	$ 156,189,147	$ 138,838,080	$ 138,838,080	$ 112,212,632	$ 100,094,963	$ 77,855,346	$ 55,066,124	$ 28,326,850	
Maintenance Tier	4,124,798	4,124,798	4,124,798	4,124,798	3,480,439	1,920,000	480,000							
Collections Needed to Support Generation	$ 125,707,546	$ 130,494,738	$ 154,246,194	$ 183,240,696	$ 159,669,586	$ 158,109,147	$ 139,318,080	$ 138,838,080	$ 112,212,632	$ 100,094,963	$ 77,855,346	$ 55,066,124	$ 28,326,850	
Administrative Costs	$ 3,138,213	$ 3,261,170	$ 2,936,508	$ 3,047,363	$ 1,934,526	$ 2,050,597	$ 689,324	$ 478,040	$ 506,722	$ 537,126	$ 569,353	$ 603,514	$ 639,725	
Total Collections to Satisfy Program	$ 128,845,759	$ 133,755,908	$ 157,182,703	$ 186,288,060	$ 161,604,112	$ 160,159,744	$ 140,007,404	$ 139,316,119	$ 112,719,354	$ 100,632,089	$ 78,424,699	$ 55,669,638	$ 28,966,576	

25% Post EPS Case: Budget											
(all nominal dollars)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Main Tier Budget											
Contract Cost (2006 Increment)	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068					
Contract Cost (2008 Increment)	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448			
Contract Cost (2009 Increment)	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669		
Contract Cost (2010 Increment)	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	$10,302,902	
Contract Cost (2011 Increment)		$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041	$10,300,041
Subtotal Premium Cost (RPS Main Tier)	$ 66,397,087	$ 76,697,128	$ 76,697,128	$ 76,697,128	$ 76,697,128	$ 76,697,128	$ 59,346,060	$ 59,346,060	$ 32,720,612	$ 20,602,943	$ 10,300,041
Customer Sited Tier Budget											
Incremental to Operating Plan											
Anearobic Digester	$ 7,274,638	$ 2,273,637									
Small Wind	$ 648,560	$ 713,416									
PV	$ 13,677,112	$ 4,274,686									
Fuel Cell (Small)	$ 750,000	$ 309,760									
Fuel Cell(Large)	$ 4,000,000	$ 2,001,049									
Discretionary	$ 500,000	$ 500,000									
M&E Costs	$ 1,423,473	$ 523,161									
Subtotal Annual Base CST Costs	$ 26,850,310	$ 10,072,548									
Total Annual Main Tier & CST Costs	$ 93,247,397	$ 86,769,675	$ 76,697,128	$ 76,697,128	$ 76,697,128	$ 76,697,128	$ 59,346,060	$ 59,346,060	$ 32,720,612	$ 20,602,943	$ 10,300,041
Maintenance Tier	4,124,798	4,124,798	4,124,798	4,124,798	3,480,439	1,920,000	480,000				
Collections Needed to Support Generation	$ 97,372,195	$ 90,894,473	$ 80,821,926	$ 80,821,926	$ 80,177,567	$ 78,617,128	$ 59,826,060	$ 59,346,060	$ 32,720,612	$ 20,602,943	$ 10,300,041
Administrative Costs	$ 3,414,830	$ 3,555,964	$ 3,478,068	$ 3,622,996	$ 2,498,853	$ 919,363	$ 974,525	$ 648,591	$ 687,507	$ 728,757	$ 772,483
Total Collections to Satisfy Program	$ 100,787,025	$ 94,450,437	$ 84,299,994	$ 84,444,922	$ 82,676,420	$ 79,536,491	$ 60,800,585	$ 59,994,651	$ 33,408,119	$ 21,331,701	$ 11,072,524

30% Post EPS Case: Budget																	
(all nominal dollars)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Main Tier Budget															
Contract Cost (2006 Increment)	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068	$ 17,351,068									
Contract Cost (2008 Increment)	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448	$ 26,625,448							
Contract Cost (2009 Increment)	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669	$ 12,117,669						
Contract Cost (2010 Increment)	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354	$ 21,334,354					
Contract Cost (2011 Increment)		$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952	$ 24,222,952				
Contract Cost (2012 Increment)			$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899	$ 18,963,899			
Contract Cost (2013 Increment)				$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291	$ 16,958,291		
Contract Cost (2014 Increment)					$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	$ 29,049,948	
Contract Cost (2015 Increment)						$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709	$ 31,308,709
Subtotal Premium Cost (RPS Main Tier)	$ 77,428,538	$ 101,651,490	$ 120,615,389	$ 137,573,680	$ 166,623,628	$ 197,932,338	$ 180,581,270	$ 180,581,270	$ 153,955,822	$ 141,838,153	$ 120,503,800	$ 96,280,847	$ 77,316,948	$ 60,358,657	$ 31,308,709
Customer Sited Tier Budget															
Incremental to Operating Plan															
Anearobic Digester	$ 10,237,018	$ 5,517,050	$ 4,749,087	$ 4,608,738	$ 4,086,432	$ 3,845,509									
Small Wind	$ 648,560	$ 713,416	$ 706,282	$ 776,910	$ 854,601	$ 940,061									
PV	$ 26,715,765	$ 10,372,656	$ 8,928,801	$ 8,664,931	$ 7,682,938	$ 7,229,976									
Fuel Cell (Small)	$ 750,000	$ 751,642	$ 647,015	$ 627,894	$ 556,735	$ 523,911									
Fuel Cell(Large)	$ 4,000,000	$ 4,855,606	$ 4,179,714	$ 4,056,192	$ 3,596,506	$ 3,384,467									
Discretionary	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 500,000	$ 500,000									
M&E Costs	$ 2,081,247	$ 1,228,758	$ 1,061,404	$ 1,033,697	$ 923,178	$ 874,184									
Subtotal Annual Base CST Costs	$ 45,932,590	$ 24,939,128	$ 21,772,303	$ 21,268,362	$ 18,200,390	$ 17,298,109									
Total Annual Main Tier & CST Costs	$ 123,361,128	$ 126,590,618	$ 142,387,692	$ 158,842,042	$ 184,824,018	$ 215,230,446	$ 180,581,270	$ 180,581,270	$ 153,955,822	$ 141,838,153	$ 120,503,800	$ 96,280,847	$ 77,316,948	$ 60,358,657	$ 31,308,709
Maintenance Tier	4,124,798	4,124,798	4,124,798	4,124,798	3,480,439	1,920,000	480,000								
Collections Needed to Support Generation	$ 127,485,926	$ 130,715,416	$ 146,512,490	$ 162,966,840	$ 188,304,457	$ 217,150,446	$ 181,061,270	$ 180,581,270	$ 153,955,822	$ 141,838,153	$ 120,503,800	$ 96,280,847	$ 77,316,948		
Administrative Costs	3,414,830	3,555,964	3,478,068	3,622,996	2,498,853	2,648,784	2,807,711	2,591,769	2,747,275	728,757	772,483	818,832	867,961	920,039	975,242
Total Collections to Satisfy Program	$ 130,900,756	$ 134,271,380	$ 149,990,558	$ 166,589,836	$ 190,803,310	$ 219,799,231	$ 183,868,981	$ 183,173,038	$ 156,703,097	$ 142,566,911	$ 121,276,282	$ 97,099,679	$ 78,184,910	$ 61,278,697	$ 32,283,951

Attachment 5

CUSTOMER-SITED TIER INPUTS & CALCULATIONS
(14 pages)

Customer Sited Tier Inputs

	2009 Funding Level (Millions)								
Anaerobic Digestor	$ 3.67	23.2%							
Small Wind	$ 1.50	9.5%							
PV	$ 6.90	43.7%							
Fuel Cell (small)	$ 0.50	3.2%							
Fuel Cell (large)	$ 3.23	20.4%							
Total	$ 16	100.0%							
MWh Customer Sited Tier									
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	
25% with Reference Load		52,878	92,687	119,131	143,840	169,788			
25% with 15x15		52,878	82,182	93,280	93,280	93,280			
30% with 15x15		52,878	93,638	119,736	142,743	165,587	186,420	206,595	
Incremental MWh Customer Sited Tier									
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
25% with Reference Load			39,809	26,445	24,708	25,949			116,910
25% with 15x15			29,304	11,097	-	-			40,402
30% with 15x15			40,760	26,098	23,007	22,844	20,834	20,175	153,717
Discount Rate	10%								
100 MW PV Scenario									
Incentive ($/kW)	$ 3,000								
PV Capacity Factor	0.15								
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	
Incentive ($/kW)	$3,600	$3,600	$ 3,600	$ 3,240	$ 2,916	$ 2,624	$ 2,362	$ 2,126	
MW PV/year	0	25	25	25	25	0	0	0	
MWh PV/year	-	32,850	32,850	32,850	32,850	-	-	-	
Cumulative MWh from PV	-	32,850	65,700	98,550	131,400	131,400	131,400	131,400	
Total Cumulative from Operat	-	32,850	65,700	98,550	131,400	131,400	131,400	131,400	
Cost of PV	$ -	$ 90,000,000	$ 90,000,000	$ 81,000,000	$ 72,900,000	$ -	$ -	$ -	
300 MW PV Scenario									
Incentive ($/kW)	$ 3,000								
PV Capacity Factor	0.15								
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	
Incentive ($/kW)	$ 3,600	$3,600	$ 3,600	$ 3,240	$ 2,916	$ 2,624	$ 2,362	$ 2,126	
MW PV/year	25	25	25	25	50	50	50	50	
MWh PV/year	32,850	32,850	32,850	32,850	65,700	65,700	65,700	65,700	
Cumulative MWh from PV	32,850	65,700	98,550	131,400	197,100	262,800	328,500	394,200	
Total Cumulative from Operat	32,850	118,578	151,428	184,278	249,978	315,678	381,378	447,078	
Cost of PV	$ 90,000,000	$ 90,000,000	$ 90,000,000	$ 81,000,000	$ 145,800,000	$ 131,220,000	$ 118,098,000	$ 106,288,200	
Incremental (beyond PV) Customer Sited Tier with PV									
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	
25% with Reference Load			-	-	-	-			
25% with 15x15			-	-	-	-			
30% with 15x15			-	-	-	-	-	-	

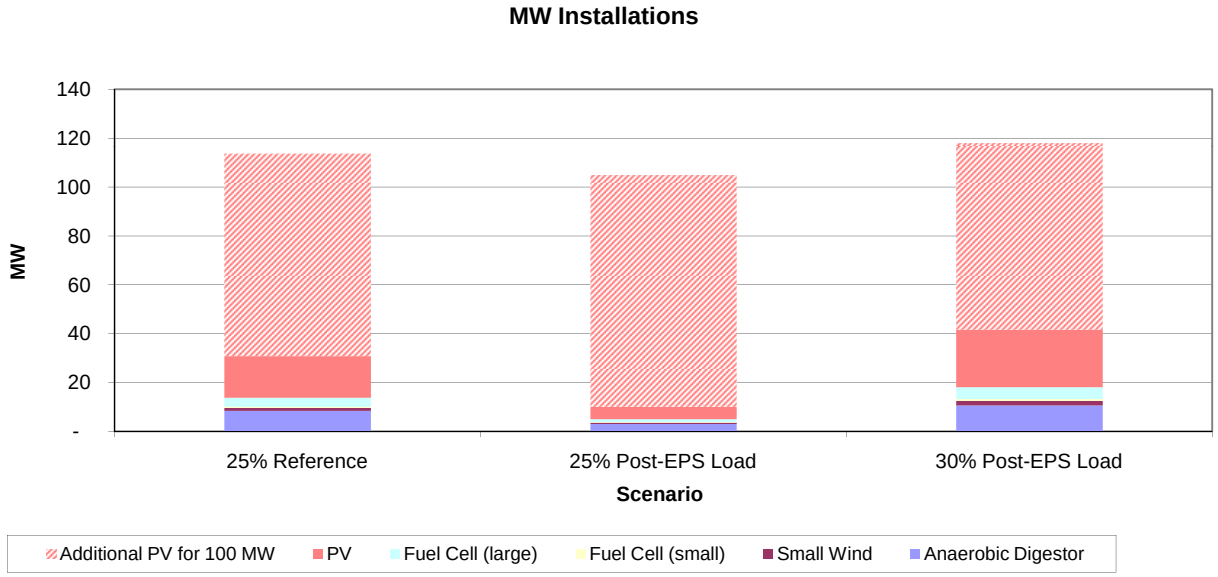
Customer Sited Tier- Graphs and Tables for the Report

Summary of Customer Sited Tier Program Costs, included Anaerobic Digestors in NYPA

	With Aggressive PV	Without Aggressive PV	Difference
25% Reference	$393.8	$104.1	$289.7
25% Reduced Load	$351.9	$35.9	$316.0
30% Reduced Load	$423.1	$135.2	$287.9

MW Installations

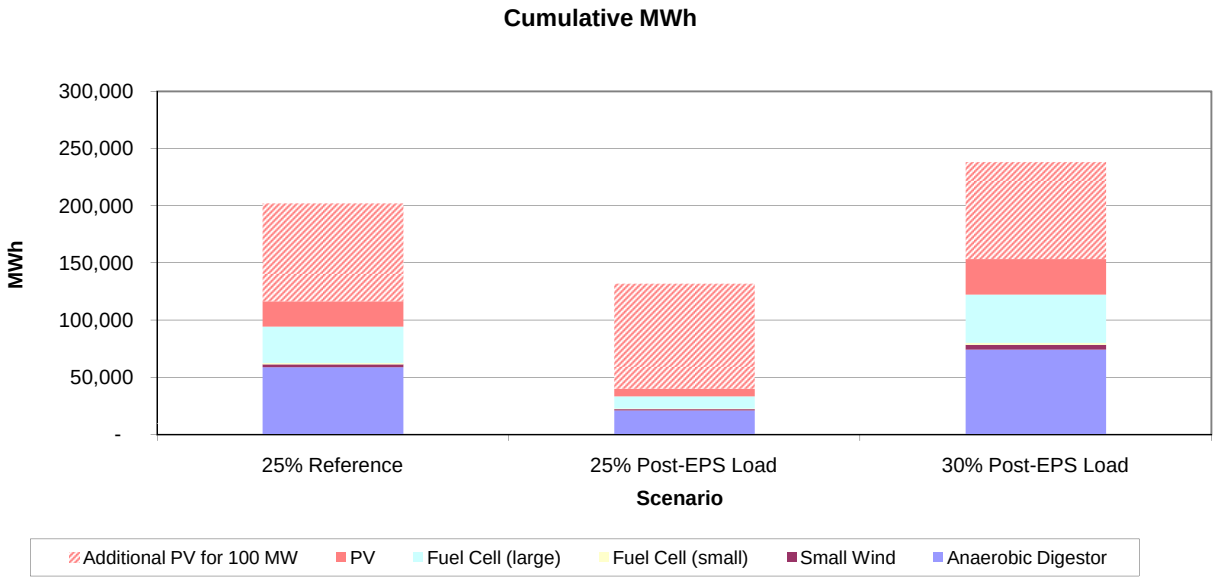
	25% Reference	25% Post-EPS Load	30% Post-EPS Load
Anaerobic Digestor	8,450	3,080	10,659
Small Wind	1,123	508	1,867
Fuel Cell (small)	585	212	771
Fuel Cell (large)	3,609	1,200	4,814
PV	17,002	5,119	23,640
Additional PV for 100 MW	82,998	94,881	76,360



Customer Sited Tier- Graphs and Tables for the Report, Continued

Cummulative MWh

	25% Reference	25% Post-EPS Load	30% Post-EPS Load
Anaerobic Digestor	59,216	21,585	74,700
Small Wind	2,460	1,113	4,089
Fuel Cell (small)	1,281	464	1,689
Fuel Cell (large)	31,613	10,514	42,175
PV	22,340	6,726	31,063
Additional PV for 100 MW	85,486	91,824	84,592



Summary Table of Costs by Resource

	25% Reference	25% Post-EPS Load	30% Post-EPS Load
Anaerobic Digester	$ 26.2	$ 9.5	$ 33.0
Small Wind	$ 2.8	$ 1.4	$ 4.6
PV	$ 343.8	$ 333.9	$ 357.5
Fuel Cell (small)	$ 2.9	$ 1.1	$ 3.9
Fuel Cell (large)	$ 18.0	$ 6.0	$ 24.1
Total	$ 393.8	$ 351.9	$ 423.1

Customer Sited Tier - Supply Details for the Model Calculations

Resource Type	Capacity Factor	Project Life 2010	Project Life 2011	Project Life 2012	Project Life 2013	Project Life 2014	Project Life 2015	Max kW 2010	Max kW 2011	Max kW 2012	Max kW 2013	Max kW 2014	Max kW 2015
Anaerobic Digestor	0.8	15	15	15	15	15	15	3,302	2,261	2,276	2,319	2,319	2,319
Small Wind	0.25	20	20	20	20	20	20	242	266	293	322	354	390
PV	0.15	20	20	20	20	20	20	9,018	13,527	20,291	30,436	45,654	68,480
Fuel Cell (small)	0.25	10	10	10	10	10	10	150	200	400	600	800	1000
Fuel Cell (large)	1	10	10	10	10	10	10	800	1000	1200	1400	1600	1800
Resource Type w/NYPA													
Anaerobic Digestor (w/NYPA)	0.8	15	15	15	15	15	15	3,302	3,512	3,526	3,569	3,569	3,569
Small Wind	0.25	20	20	20	20	20	20	242	266	293	322	354	390
PV	0.15	20	20	20	20	20	20	9,018	13,527	20,291	30,436	45,654	68,480
Fuel Cell (small)	0.25	10	10	10	10	10	10	150	200	400	600	800	1,000
Fuel Cell (large)	1	10	10	10	10	10	10	800	1,000	1,200	1,400	1,600	1,800
Cumulative Potential KW													
Anaerobic Digestor (w/NYPA)								3302	6814	10340	13909.47	17,479	21,048
Small Wind								242	508	801	1123.122	1,477	1,867
PV								9,018	22545	42836	73271.25	118924.88	187405.31
Fuel Cell (small)								150	350	750	1350	2,150	3,150
Fuel Cell (large)								800	1800	3000	4400	6,000	7,800

Customer Sited Tier - Supply Details for the Model Calculations, Cont.

Resource Type	$/kW 2010	$/kW 2011	$/kW 2012	$/kW 2013	$/kW 2014	$/kW 2015	$/MWh 2010	$/MWh 2011	$/MWh 2012	$/MWh 2013	$/MWh 2014	$/MWh 2015
Anaerobic Digestor	$ 3,100	$ 3,100	$ 3,100	$ 3,100	$ 3,100	$ 3,100	$ 29	$ 29	$ 29	$ 29	$ 29	$ 29
Small Wind	$ 2,680	$ 2,680	$ 2,412	$ 2,412	$ 2,412	$ 2,412	$ 61	$ 61	$ 55	$ 55	$ 55	$ 55
PV	$ 3,600	$ 3,240	$ 2,916	$ 2,624	$ 2,362	$ 2,126	$ 137	$ 123	$ 111	$ 100	$ 90	$ 81
Fuel Cell (small)	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 228	$ 228	$ 228	$ 228	$ 228	$ 228
Fuel Cell (large)	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 57	$ 57	$ 57	$ 57	$ 57	$ 57
Resource Type w/NYPA												
Anaerobic Digestor (w/NYPA)	$ 3,100	$ 3,100	$ 3,100	$ 3,100	$ 3,100	$ 3,100	$ 29	$ 29	$ 29	$ 29	$ 29	$ 29
Small Wind	$ 2,680	$ 2,680	$ 2,412	$ 2,412	$ 2,412	$ 2,412	$ 61	$ 61	$ 55	$ 55	$ 55	$ 55
PV	$ 3,600	$ 3,240	$ 2,916	$ 2,624	$ 2,362	$ 2,126	$ 137	$ 123	$ 111	$ 100	$ 90	$ 81
Fuel Cell (small)	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 228	$ 228	$ 228	$ 228	$ 228	$ 228
Fuel Cell (large)	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 57	$ 57	$ 57	$ 57	$ 57	$ 57
Cumulative Potential KW												
Anaerobic Digestor (w/NYPA)												
Small Wind												
PV												
Fuel Cell (small)												
Fuel Cell (large)												

Customer Sited Tier - Supply Details for the Model Calculations, Cont.

Resource Type	Cost Rank 2010	Cost Rank 2011	Cost Rank 2012	Cost Rank 2013	Cost Rank 2014	Cost Rank 2015	MWh/yr added 2010	MWh/yr added 2011	MWh/yr added 2012	MWh/yr added 2013	MWh/yr added 2014	MWh/yr added 2015	MWh/year ranked higher 2010	MWh/year ranked higher 2011	MWh/year ranked higher 2012	MWh/year ranked higher 2013	MWh/year ranked higher 2014	MWh/year ranked higher 2015
Anaerobic Digestor	1	1	1	1	1	1	23,142	15,847	15,949	16,251	16,251	16,251	-	-	-	-	-	-
Small Wind	3	3	2	2	2	2	530	583	641	705	776	854	30,150	24,607	15,949	16,251	16,251	16,251
PV	4	4	4	4	4	4	11,850	17,774	26,662	39,993	59,989	89,983	30,680	25,190	27,103	29,220	31,043	32,872
Fuel Cell (small)	5	5	5	5	5	5	329	438	876	1,314	1,752	2,190	42,530	42,964	53,764	69,213	91,031	122,856
Fuel Cell (large)	2	2	3	3	3	3	7,008	8,760	10,512	12,264	14,016	15,768	23,142	15,847	16,591	16,956	17,027	17,104
Resource Type w/NYPA																		
Anaerobic Digestor (w/NYPA)	1	1	1	1	1	1	23,142	24,610	24,712	25,014	25,014	25,014	-	-	-	-	-	-
Small Wind	3	3	2	2	2	2	530	583	641	705	776	854	30,150	33,370	24,712	25,014	25,014	25,014
PV	4	4	4	4	4	4	11,850	17,774	26,662	39,993	59,989	89,983	30,680	33,952	35,866	37,983	39,806	41,635
Fuel Cell (small)	5	5	5	5	5	5	329	438	876	1,314	1,752	2,190	42,530	51,727	62,527	77,976	99,794	131,618
Fuel Cell (large)	2	2	3	3	3	3	7,008	8,760	10,512	12,264	14,016	15,768	23,142	24,610	25,354	25,719	25,790	25,867
Cumulative Potential KW																		
Anaerobic Digestor (w/NYPA)																		
Small Wind																		
PV																		
Fuel Cell (small)																		
Fuel Cell (large)																		

Operating Plan Allocation Scenario Calculation

Operating Plan Allocation Scenario

			MWh/$ spent					
	Capacity Factor	Historical Funding	2010	2011	2012	2013	2014	2015
Anaerobic Digestor	0.8	23%	0.000525099	0.000525099	0.000525099	0.000525099	0.000525	0.000525
Small Wind	0.25	9%	7.75789E-05	7.75789E-05	8.61988E-05	8.61988E-05	8.62E-05	8.62E-05
PV	0.15	44%	0.000159399	0.00017711	0.000196789	0.000218654	0.000243	0.00027
Fuel Cell (small)	0.25	3%	1.38608E-05	1.38608E-05	1.38608E-05	1.38608E-05	1.39E-05	1.39E-05
Fuel Cell (large)	1	20%	0.000358162	0.000358162	0.000358162	0.000358162	0.000358	0.000358
Total		100%	0.0011	0.0012	0.0012	0.0012	0.0012	0.0013

Scenario 1: 25% with Reference Load

	2010	2011	2012	2013
Incremental MWh Required	39,809	26,444	24,709	25,948
Incremental MWh Achieved	39,809	26,444	24,709	25,948
Total MWh	116,910			
Spending Estimate	$ 55,209,059	$ 24,073,970	$ 22,001,546	$ 22,623,356
Actual Spending	$ 39,745,863	$ 22,501,882	$ 20,619,074	$ 21,252,479
NPV (2007)	$ 70,030,037			
Total Cost	$ 104,119,299			
25% with Reference Load MWh/year				
Anaerobic Digestor	23,142	12,641	11,553	11,880
Small Wind	530	583	641	705
PV	8,800	4,264	4,330	4,947
Fuel Cell (small)	329	334	305	314
Fuel Cell (large)	7,008	8,622	7,880	8,103
25% with Reference Load New Capacity kW/year				
Anaerobic Digestor	3,302	1,804	1,649	1,695
Small Wind	242	266	293	322
PV	6,697	3,245	3,295	3,765
Fuel Cell (small)	150	152	139	143
Fuel Cell (large)	800	984	900	925
25% with Reference Load New Capacity $/year				
Anaerobic Digestor	$ 10,237,018	$ 5,591,865	$ 5,110,486	$ 5,254,919
Small Wind	$ 648,560	$ 713,416	$ 706,282	$ 776,910
PV	$ 24,110,285	$ 10,513,316	$ 9,608,270	$ 9,879,820
Fuel Cell (small)	$ 750,000	$ 761,834	$ 696,251	$ 715,929
Fuel Cell (large)	$ 4,000,000	$ 4,921,451	$ 4,497,784	$ 4,624,901

Scenario 2: 25% with 15x15				
	2010	2011	2012	2013
Incremental MWh Required	29,304	11,098	(0)	(0)
Incremental MWh Achieved	29,304	11,098	-	-
Total MWh	40,402			
Spending Estimate	$ 31,318,603	$ 9,788,411	$ -	$ -
Actual Spending	$ 26,350,309	$ 9,572,548	$ -	$ -
NPV (2007)	$ 26,335,556			
Total Cost	$ 35,922,857			
25% with 15x15 MWh/year				
Anaerobic Digestor	16,445	5,140	-	-
Small Wind	530	583	-	-
PV	4,992	1,734	-	-
Fuel Cell (small)	329	136	-	-
Fuel Cell (large)	7,008	3,506	-	-
25% with 15x15 New Capacity kW/year				
Anaerobic Digestor	2,347	733	-	-
Small Wind	242	266	-	-
PV	3,799	1,319	-	-
Fuel Cell (small)	150	62	-	-
Fuel Cell (large)	800	400	-	-
25% with 15x15 New Capacity $/year				
Anaerobic Digestor	$ 7,274,638	$ 2,273,637	$ -	$ -
Small Wind	$ 648,560	$ 713,416	$ -	$ -
PV	$ 13,677,112	$ 4,274,686	$ -	$ -
Fuel Cell (small)	$ 750,000	$ 309,760	$ -	$ -
Fuel Cell (large)	$ 4,000,000	$ 2,001,049	$ -	$ -

Scenario 3: 30% with 15x15								
	2010	2011	2012	2013	2014	2015		
Incremental MWh Required	40,760	26,098	23,007	22,844	20,833	20,175		
Incremental MWh Achieved	40,760	26,098	23,007	22,844	20,833	20,175		
Total MWh	153,717							
Spending Estimate	$ 61,175,229	$ 23,751,879	$ 20,445,661	$ 19,841,435	$ 17,592,816	$ 16,555,598		
Actual Spending	$ 42,351,343	$ 22,210,370	$ 19,210,899	$ 18,734,665	$ 16,777,213	$ 15,923,925		
NPV (2007)	$ 85,530,850							
Total Cost	$ 135,208,414							
30% with 15x15 MWh/year								
Anaerobic Digestor	23,142	12,472	10,736	10,419	9,238	8,693		
Small Wind	530	583	641	705	776	854		
PV	9,751	4,207	4,023	4,338	4,274	4,469		
Fuel Cell (small)	329	329	283	275	244	229		
Fuel Cell (large)	7,008	8,507	7,323	7,106	6,301	5,930		
30% with 15x15 New Capacity kW/year								
Anaerobic Digestor	3,302	1,780	1,532	1,487	1,318	1,240		
Small Wind	242	266	293	322	354	390		
PV	7,421	3,201	3,062	3,302	3,253	3,401		
Fuel Cell (small)	150	150	129	126	111	105		
Fuel Cell (large)	800	971	836	811	719	677		
30% with 15x15 New Capacity $/year								
Anaerobic Digestor	$ 10,237,018	$ 5,517,050	$ 4,749,087	$ 4,608,738	$ 4,086,432	$ 3,845,509		
Small Wind	$ 648,560	$ 713,416	$ 706,282	$ 776,910	$ 854,601	$ 940,061		
PV	$ 26,715,765	$ 10,372,656	$ 8,928,801	$ 8,664,931	$ 7,682,938	$ 7,229,976		
Fuel Cell (small)	$ 750,000	$ 751,642	$ 647,015	$ 627,894	$ 556,735	$ 523,911		
Fuel Cell (large)	$ 4,000,000	$ 4,855,606	$ 4,179,714	$ 4,056,192	$ 3,596,506	$ 3,384,467		

Customer-Sited Tier Analysis Inputs - Wind and Solar									
Small Wind and PV									
Small Wind									
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Number of Units		20	22	24	27	29	32	35	39
kW/year		200	220	242	266	293	322	354	390
Incentive/unit		$26,800	$26,800	$26,800	$26,800	$24,120	$24,120	$24,120	$24,120
Incentive/year		$536,000	$589,600	$648,560	$713,416	$706,282	$776,910	$854,601	$940,061
Incentive $/KW		$2,680	$2,680	$2,680	$2,680	$2,412	$2,412	$2,412	$2,412
Unit Costs $/MWH		$ 61	$ 61	$ 61	$ 61	$ 55	$ 55	$ 55	$ 55
Capacity Factor %	0.25								
Life in years :	20								
Annual energy MWH		438	482	530	583	641	705	776	854
Cumulative Energy MWH		438	920	1,450	2,033	2,674	3,379	4,155	5,009
10% incentive reduction starting in 2012									
PV		**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Incentive/kW		$4,000	$4,000	$3,600	$3,240	$2,916	$2,624	$2,362	$2,126
annual growth	50%								
average size/application	6kW								
Annual installations		668	1,002	1,503	2,255	3,382	5,073	7,609	11,413
Annual kW installed		4,008	6,012	9,018	13,527	20,291	30,436	45,654	68,480
Incentive/year		$16,032,000	$24,048,000	$32,464,800	$43,827,480	$59,167,098	$79,875,582	$107,832,036	$145,573,249
Incentive $/KW		$4,000	$4,000	$3,600	$3,240	$2,916	$2,624	$2,362	$2,126
Unit Costs $/MWH		$152	$152	$137	$123	$111	$100	$90	$81
Capacity Factor %	0.15								
Life in years :	20								
Annual energy MWH		5267	7,900	11,850	17,774	26,662	39,993	59,989	89,983
Cumulative Energy MWH		5267	13,166	25,016	42,790	69,452	109,445	169,434	259,417
assumes current limitations									
10% incentive reduction starting in 2010									

Customer-Sited Tier Analysis Inputs - Wastewater ADG without NYPA Installations											
Industrial /Waste Water ADG Projections (without NYPA Installations)											
	ADG Example	Cap Factor	0.8								
		kW	100	$1,000	per kW	$100,000		Total Incentive			
		kWh	700800	$0.10	per kWh	$70,080	per year	per kW			
					Total Incentives	$310,240	for 3 years	$3,102			
	Incentive/kW		$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	totals
	annual growth										
	average size/application										
	Annual installations		4	4	5	3	2	2	2	2	24
	Annual kW installed (from Table below)		263	397	1,493	409	381	381	381	381	
	Incentive/year		$814,225	$1,229,551	$4,629,118	$1,268,573	$1,180,714	$1,180,714	$1,180,714	$1,180,714	$12,664,323
	Incentive $/KW		$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	
	Unit Costs $/MWH		$29	$29	$29	$29	$29	$29	$29	$29	
	Capacity Factor %	0.8									
	Life in Years	15									
Projections of WWTP ADG Projects (at 145 WWTPS with existing ADs)											
		kWh/yr	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total WWTP**
Design Flow	**Number of**	**(25% eff.,**									
(MGD)	**Plants**	**80% CF)**									
<4.5	101	17,520,000	2	1	1	1	1	1	1	1	9
4.5 to <13	17	4,220,662	2	2	2	2	1	1	1	1	12
13 to < 75	14	18,859,330	0	1	1						2
75 to 310	13	124,884,751	0	0	1						1
Industrial	129	188,000,000	1	1	1	2	2	2	2	2	13
Totals		353,484,743	4	4	5	3	2	2	2	2	37
	kWh/yr per plant	Avg kW	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total kW**
<4.5	173,465	20	40	20	20	20	20	20	20	20	178
4.5 to <13	248,274	28	57	57	57	57	28	28	28	28	340
13 to < 75	1,347,095	154	0	154	154	0	0	0	0	0	308
75 to 310	9,606,519	1,097	0	0	1097	0	0	0	0	0	1097
Industrial	1,457,364	166	166	166	166	333	333	333	333	333	2163
Totals		kW	263	397	1493	409	381	381	381	381	4085
			Bolded facilities are in NYPA territory								
		Annual MWH	1841	2780	10465	2868	2669	2669	2669	2669	
		Cumulative MWH	1841	4620	15085	17953	20622	23291	25960	28630	

Customer-Sited Tier Analysis Inputs - Wastewater ADG with NYPA Installations

Industrial /Waste Water ADG Projections w/NYPA

	ADG Example	Cap Factor	0.8									
		kW	100	$500	per kW	$50,000		Total Incentive				
		kWh	700800	$0.10	per kWh	$70,080	per year	per kW				
					Total Incenti	$260,240	for 3 years	$2,602				
	Incentive/kW		$2,600	$2,600	$2,600	$2,600	$2,600	$2,600	$2,600	$2,600	totals	
	annual growth											
	average size/application											
	Annual installations		4	4	5	5	4	4	4	4	34	
	Annual kW installed (from Table below)		263	397	1,493	1,660	1,631	1,631	1,631	1,631		
	Incentive/year		$682,899	$1,031,236	$3,882,486	$4,315,037	$4,241,349	$4,241,349	$4,241,349	$4,241,349	$26,877,054	
	Incentive $/KW		$2,600	$2,600	$2,600	$2,600	$2,600	$2,600	$2,600	$2,600		
	Unit Costs $/MWH		$25	$25	$25	$25	$25	$25	$25	$25		
	Capacity Factor %	0.8										
	Life in Years	15										
Projections of WWTP ADG Projects (at 145 WWTPS with existing ADs)												
		kWh/yr	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total WWTP**	
Design Flow	**Number of**	**(25% eff.,**										
(MGD)	**Plants**	**80% CF)**										
<4.5	101	17,520,000	2	1	1	1	1	1	1	1	9	
4.5 to <13	17	4,220,662	2	2	2	2	1	1	1	1	12	
13 to < 75	14	18,859,330	0	1	1	**1**	**1**	**1**	**1**	**1**	7	
75 to 310	13	124,884,751	0	0	1	**1**	**1**	**1**	**1**	**1**	6	
Industrial	129	188,000,000	1	1	1	2	2	2	2	2	13	
Totals		353,484,743	4	4	5	5	4	4	4	4	47	
	kWh/yr per plant	Avg kW	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total kW**	
<4.5	173,465	20	40	20	20	20	20	20	20	20	178	
4.5 to <13	248,274	28	57	57	57	57	28	28	28	28	340	
13 to < 75	1,347,095	154	0	154	154	**154**	**154**	**154**	**154**	**154**	1076	
75 to 310	9,606,519	1,097	0	0	1097	**1097**	**1097**	**1097**	**1097**	**1097**	6580	
Industrial	1,457,364	166	166	166	166	333	333	333	333	333	2163	
Totals		kW	263	397	1493	1660	1631	1631	1631	1631	10337	
			Bolded facilities are in NYPA territory									
		Annual MWH	1841	2780	10465	11631	11432	11432	11432	11432		
		Cumulative MWH	1841	4620	15085	26716	38148	49580	61012	72444		

Customer-Sited Tier Analysis Inputs - Farm Based ADG Projections												
	Farm-based ADG Projections											
	ADG Example	Cap Factor	0.8					Equivalent				
		kW	300	$1,000	per kW	$300,000		Total Incentive				
		kWh	2102400	$0.10	per kWh	$210,240	per year	per kW				
					Total Incentives =	$930,720	for 3 years	$3,102				
	Year		**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**		
	Incentive/kW		$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	totals	
	Annual installations		9	12	15	16	17	18	18	18	123	
	Annual kW installed (from Table below)		1,190	1,431	1,809	1,852	1,895	1,938	1,938	1,938		
	Incentive/year		$3,689,000	$4,436,100	$5,607,900	$5,741,200	$5,874,500	$6,007,800	$6,007,800	$6,007,800	$43,372,100	
	Incentive $/KW		$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100	$3,100		
	Unit Costs $/MWH		$29	$29	$29	$29	$29	$29	$29	$29		
	Capacity Factor %	0.8										
	Life in Years	15										
Projections of Farm ADG Project Mix and Resulting kWs Estimates												
Dairy Farm												
size class	**Number of**	**Number of**										
	farms per class	**cows in class**		**Projected numbers of farms to be served by ADG for each year for each farm size class**								
			2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total Farms Served**	
1000+	40	64,831	3	3	4	4	4	4	4	4	30	
500 to 999	130	88,205	4	6	7	7	7	7	7	7	52	
200 to 499*	406	121,229	2	3	4	5	6	7	7	7	41	
Totals	576	274,265	9	12	15	16	17	18	18	18	123	
*most farms to be served by digesters in this size class are anticipated to have their manure treated in multi-farm digester projects												
				Projected kW for each year for each farm size class								
	Avg cows	**Avg kW in class**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total kW**	
1000+	1,621	236	708	708	944	944	944	944	944	944	7080	
500 to 999	679	99	396	594	693	693	693	693	693	693	5148	
200 to 499	299	43	86	129	172	215	258	301	301	301	1763	
Totals		kW	1190	1431	1809	1852	1895	1938	1938	1938	13991	
		new MWh	8,340	10,028	12,677	12,979	13,280	13,582	13,582	13,582		
		cumulative MWh	8,340	18,368	31,045	44,024	57,304	70,886	84,467	98,049	98,049	

Customer-Sited Tier Analysis Inputs - Fuel Cells										
Large Fuel Cells										
		2008	2009	2010	2011	2012	2013	2014	2015	
Number of Units		3	3	4	5	6	7	8	9	
kW/year		600	600	800	1000	1200	1400	1600	1800	
Incentive/unit		$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	
Incentive/year		$3,233,000	$3,233,000	$4,000,000	$5,000,000	$6,000,000	$7,000,000	$8,000,000	$9,000,000	$39,000,000
Incentive $/KW		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	
Unit Costs $/MWH		$ 123	$ 123	$ 114	$ 82	$ 82	$ 82	$ 57	$ 57	
Capacity Factor %	1	1	1	1	1	1	1	1	1	
Life in years :	5	5	5	5	7	7	7	10	10	
Annual Production MWh		1,314	1,314	1,752	2,190	2,628	3,066	3,504	3,942	
Cumulative Production MWH		1,314	2,628	4,380	6,570	9,198	12,264	15,768	19,710	
Small Fuel Cells										
		2008	2009	2010	2011	2012	2013	2014	2015	
Number of Units		10	10	15	20	40	60	80	100	
kW/year		100	100	150	200	400	600	800	1000	
Incentive/unit		$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	
Incentive/year		$500,000	$500,000	$750,000	$1,000,000	$2,000,000	$3,000,000	$4,000,000	$5,000,000	$15,750,000
Incentive $/KW		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	
Unit Costs $/MWH		$ 457	$ 457	$ 457	$ 326	$ 326	$ 326	$ 228	$ 228	
Capacity Factor %	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
Life in years :	5	5	5	5	7	7	7	10	10	
Annual Production MWh		219	219	329	438	876	1,314	1,752	2,190	
Cumulative Production MWH		219	438	767	1,205	2,081	3,395	5,147	7,337	
				Funding Based on Reasonable Expectation of Potential: 2010 thru 2015						$54,750,000

Attachment 6

RENEWABLE ENERGY TASK FORCE REPORT, FEBRUARY 2008
(50 pages)

Clean, Secure Energy and Economic Growth: A Commitment to Renewable Energy and Enhanced Energy Independence

The First Report of the Renewable Energy Task Force
to Lieutenant Governor David A. Paterson
February 2008

CLEAN, SECURE ENERGY AND ECONOMIC GROWTH: A COMMITMENT TO RENEWABLE ENERGY AND ENHANCED ENERGY INDEPENDENCE

THE FIRST REPORT OF THE RENEWABLE ENERGY TASK FORCE
TO LIEUTENANT GOVERNOR DAVID A. PATERSON
FEBRUARY 2008

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THE CHALLENGE

As population continues to grow and technology and industrial sectors continue to advance, society has created a new form of currency, energy. This currency affects nearly every aspect of our lives, from heating our homes and businesses, to powering our i-pods and computers, to driving ourselves to work and our children to school, and the cost of manufacturing the automobiles we drive to do so. All of these activities consume energy in some capacity, and as such have become the cost of doing business. We also have become enormously dependent upon fossil fuels to deliver this energy. This dependency has come with its own costs in the form of air pollution, respiratory disease and climate change.

Renewable energy and energy efficiency provide immediate alternatives to transition away from this dependence on fossil fuels, with numerous environmental, economic and societal benefits to our citizens. Renewable energy and improved energy efficiency reduce greenhouse gas emissions and additional pollutants released from traditional fossil-fueled power sources, thereby reducing our carbon foot print and reducing public health impacts related to exposures of particulate matter and smog. They also create market opportunities for new high-tech industries to locate in New York, increasing our workforce and training opportunities as well as economic growth.

New York is home to many resources, both financial and natural, which provide the State with a unique opportunity to position itself as a national leader in promoting and generating these technologies. We are home to the largest financial and capital investment centers in the world. New York is the fourteenth windiest state in the country, and has an abundance of natural hydro power, solar and biomass potential. The challenge is to maximize these resources by crafting policies that are environmentally balanced and economically sustainable for our state.

To successfully utilize these resources and achieve energy independence requires a modification of the way we live our lives, and public acceptance that each of us can make a difference in this effort. It will require consumers, policy makers, and businesses to collaborate and move forward with the same goal in mind. There is a growing consensus and demand from our citizens and public officials that we embark on this challenge, and we do not have time to waste.

The Lieutenant Governor's Renewable Energy Task Force offers this first report as a policy "roadmap" to address these many challenges we face in reducing our dependence on fossil fuels, stimulating investment in clean energy alternatives, and move toward a Clean Energy Economy here in New York State.

EXECUTIVE SUMMARY

Background

In June 2007, Governor Spitzer asked Lieutenant Governor David A. Paterson to chair and convene the first meeting of the Renewable Energy Task Force. Comprised of 20 members, this distinguished group of experts represents the broad array of stakeholders in the renewable energy field, including renewable energy and alternative fuel industries, environmental and agricultural communities, academia, local government, energy policy, green buildings, economic development, public utilities, as well as State government entities.

The Task Force was charged with three primary goals: 1) Identify barriers in New York State to wider deployment and installation of renewable energy; 2) Recommend policies, including financial incentives to overcome those barriers to attract clean industries to economically depressed regions of the state; and, 3) Identify future market areas where additional research and development investment is necessary. Following the first meeting of the Task Force in June, it was determined the Task Force would break out into four subcommittee areas:[1]

- *Renewable Fuels*: focusing on corn-based and cellulosic ethanol, biodiesel, butanol, liquefied biogas, hydrogen, and electric-based transportation;
- *Energy Efficiency*: focusing on electric, natural gas and oil efficiency (vehicle as well as building);
- *Renewable Electricity Central Generation:* addressing generation facilities selling into the wholesale electricity market, with specific focus on wind, sustainably produced biomass, hydropower, and tidal power; and,
- *Renewable Electricity Distributed Generation*: focusing on "customer-side" applications of solar photovoltaic (PV), solar thermal, sustainable biomass, anaerobic digesters, geothermal, small wind, small hydro (including kinetic power), and fuel cells.

Meeting regularly over several months, the Subcommittees worked to identify specific barriers that must be overcome, as well as areas in which New York has begun to develop effective strategies for meeting these goals. Other states' and countries' renewable initiatives were researched as "best practice examples." Presentations were provided by guest speakers knowledgeable in specific disciplines during subcommittee meetings, and significant issues, concerns and suggestions of stakeholders were also brought to these discussions through the respective Task Force members. In addition, each member was asked to submit a white paper outlining existing impediments and barriers to achieving these goals as well as recommended actions the State should consider to overcoming these challenges.

In September 2007, the Task Force held a public meeting at 7 World Trade Center and released their preliminary findings. In reaching these findings, dozens of recommendations were crafted by each subcommittee for consideration by the full Task Force. These recommendations

[1] Dr. Cornelius B. Murphy, Jr., Subcommittee Chair, Renewable Fuels; Ashok Gupta, Subcommittee Chair, Energy Efficiency; Carol E. Murphy, Subcommittee Chair, Central Generation; Gil Quiniones/Jenifer Becker, Subcommittee Chair, Distributed Generation.

were then vetted using the following criteria: 1) those which would generate the most renewable energy; 2) those with the most environmental benefit; and, 3) those with the least or nominal impact to ratepayers, taxpayers and consumers. Focus groups were also convened to address specific components of these recommendations: Financial Impact, Legislative and Regulatory Impact, and Workforce-Economic-Research Development/Public Education and Outreach.

This first report of the Renewable Energy Task Force reflects the findings and recommendations from these subcommittee and focus group meetings and has the consensus of the Task Force Members. The Task Force will continue its meetings and will be releasing subsequent reports as it begins implementation of these recommendations, and continues to identify methods and goals to increase renewable energy generation. The final report of the Task Force is due December 2008.

FINDINGS

The following are highlights of the Task Force's findings.

Renewable Portfolio Standard (RPS)

- A key driver in developing new renewable energy projects in the United States is the Renewable Portfolio Standard (RPS), a market-based policy that requires electric utilities and/or state entities to gradually increase their use of renewable energy resources. Current RPS funding of $782 million is not sufficient to meet New York's goal to obtain 25 percent of its electricity from renewable sources by 2013 and the timeline for the RPS program is not consistent with the State's long-term goals. New York's RPS is the State's largest and most significant policy for supporting increased renewable energy. Maintaining a firm commitment to its implementation will provide investors with confidence in New York's commitment to promoting renewable energy and promote a more robust marketplace for continued renewable energy development in the State.

Renewable Fuels

- The current shortage of widely accepted environmental and public health data relative to emissions and land use impacts associated with renewable fuel use in stationary and mobile applications, makes it difficult for policy makers to identify those specific renewable fuels which will prove to be most environmentally sustainable.
- No single renewable fuel can provide for all of New York's energy needs; state policies should be crafted that enhance environmental and economic performance from a range of fuels which optimize the state's resources.

Financial Incentives/Economic Development

- Financing renewable energy projects is often difficult, involving tax credits at both the state and federal levels, which vary depending upon many factors.
- The State has an opportunity to initiate long-term incentive programs, which will reduce risk and encourage investment in New York's solar industry.

Research and Development

- Long-term commitment to research and development will help develop and commercialize additional emerging renewable energy technologies as supported by existing state agencies and authorities to deliver reliable, clean energy to New York. Market development programs provide commercialization opportunities for products developed and tested by New York State research institutions and companies.

Oil Efficiency in Buildings

- Oil use in buildings in New York reached approximately 480 trillion BTU's annually, or 3.2 billion gallons, more than any state in the nation. Oil heating has been identified as a sector where short-term efficiency gains and benefits can be achieved.

Low Income Housing

- More than seven million New Yorkers, an estimated 2.9 million households, have incomes below 80 percent of the state median income (SMI) and are eligible to receive some form of public housing assistance. An estimated 2.2 million of these households have incomes below 60 percent of SMI and are eligible for energy and weatherization assistance. Most existing affordable rental housing renovations and new construction are built on a first-cost, least-cost basis, rather than life-cycle basis, resulting in high energy usage and waste. There is currently insufficient funding to serve all of these households.

Education, Green Jobs and Workforce Development

- A strong well-trained work force which can design, install and maintain renewable energy and fuel systems is paramount to the successful implementation and promotion of these technologies in New York. In addition, public education is critical for acceptance and awareness of these technologies.

Net Metering and Connecting Renewables to the Power Grid

- Because New York's law applies only to small residential customers, there are limited opportunities for non-residential customers to install on-site renewable generation and take advantage of net metering.
- Current utility interconnection procedures can be barriers to increased adoption of clean, on–site generation. Delays in responding to interconnection requests, issues surrounding network system connectivity, and obtaining permit approvals have, in some instances, collectively resulted in deterred investment in clean on-site generation.

Predictability and Coordination of State Policies/State Leadership

- New York must be committed to long-term renewable energy policy and should consistently administer that policy. Changes in regulations/rules and uncertain funding commitments can derail the development of renewable sources seeking to locate in New York. State entities directly involved in renewable development or review processes must ensure policies and programs are consistent and reinforce economic and environmental goals.
- "Leadership by Example" by State government is critical to help spur the acceptance of and investment in renewable energy technologies and energy efficiency. An evaluation of state facilities for their potential use of renewable technologies would demonstrate a strong commitment to our citizens, the private sector and other levels of government, and could help support advancement and greater use of renewable energy.

Local Governments/Municipalities

- Renewable energy installers and potential owners face a patchwork of widely differing local government permitting requirements as well as home owner association (HOA) restrictions, which create hurdles to the efficient and widespread installation of renewable energy systems such as PV, solar thermal and small wind.

SUMMARY RECOMMENDATIONS

The Task Force determined the 16 recommendations contained in this report are integral to a comprehensive policy Roadmap to move New York towards greater renewable energy development and greater energy independence. The following five recommendations comprise the central elements of this Roadmap.

- **Re-Commit to Meeting the State's Renewable Portfolio Standard Goal and Evaluate Raising Renewable Energy Target:**
  To instill investor confidence in the future renewable power markets in New York, and to ensure the State meets its renewable energy goals, full funding should be provided for the RPS program. The revised cost study currently underway at the Department of Public Service should provide the information necessary for the Public Service Commission to expeditiously authorize the collection of all funding needed to achieve New York's RPS goals.

- **Enhance and Expand New York's Existing Net Metering Law:**
  Net metering is a simple, low-cost program that allows electricity customers who operate their own on-site distributed generators to deliver excess power to their local utility, which then distributes it to other customers. New York's current net metering law contains size limitations and customer class exclusions that limit the growth of the renewable energy market in multiple ways. The Task Force calls for the Legislature to pass a new net-metering law this year to allow net metering for all customer classes where appropriate; increase size for projects eligible for net metering; and require detailed annual reporting by electric power companies to the PSC.

- **Invest in Clean Energy Businesses for Economic Growth:**
  New York currently invests in clean-tech industry initiatives through NYSERDA and the Empire State Development Corporation. In order to support New York's national leadership in clean-tech business growth, the State should continue to enhance and expand these collaborative clean-tech initiatives. The state should increase its funding commitment by a minimum of $400 million over four years through financial incentives to support technology clusters. In addition, the State should: increase opportunities for Minority and Women-Owned Businesses and businesses located in disadvantaged communities; enter into long-term state contracts for transportation and space heating fuels; and review public pension fund investment guidelines and state and local tax policies to stimulate investment.

- **Build a Sustainable Market for Solar Energy in New York State:**
  The Task Force recommends a comprehensive set of programs to address market needs along with an investment in public/private research to ensure that New York continues to capture the economic benefits of solar energy. Programs will focus on: creating incentives for solar system manufacturers to develop and distribute their products in New York; promoting cost-efficient systems; creating well-paying solar installation jobs; and creating incentives for both homeowners and businesses to choose solar photovoltaic and solar thermal energy. To jumpstart the growth of the solar industry in New York, the State should set a goal to install 100 MW of solar photovoltaic and 1,100 solar thermal systems statewide by 2011.

- **Develop a Strategy to Reap the Benefits of New York's Wind Energy Potential:** Wind energy offers the opportunity for clean, renewable power to be generated in New York State. The Task Force recommends that the state commit to realizing the potential of wind energy by addressing local siting and permitting issues, and conducting studies to address transmission and infrastructure limitations. New York has the most wind energy development potential in the northeast and mid-Atlantic region. The more than 5,000 MW of wind energy that has applied for interconnection to the grid shows the industry's interest in and commitment to New York, and the State should support project development and interconnection efforts.

Adherence to the following additional recommendations is essential to the comprehensive, fully-integrated implementation of the State's Roadmap to greater renewable energy development:

- **Develop Both a Renewable Fuels Roadmap and a Sustainable Biomass Feedstock Study:** The Task force believes that current state policy on renewable fuels is not adequate and that no single renewable fuel will answer the increasing energy needs of the State. New York should address critical concerns regarding the specific fuels we may use – both to solve our energy mandates, and to prioritize environmental, land-use and health concerns in policy-decision making. As a result of the Task Force initiative, the state is proceeding with an RFP for the development of the renewable fuels roadmap and feedstock study.

- **Expand Training Programs to Sustain a Green Collar Workforce:** Renewable energy research, development, and installation are emerging job growth sectors. We recommend that the State align and expand existing accredited training programs to recruit and develop an abundant supply of highly skilled workers who can design, install and maintain renewable energy and energy efficiency systems across the state. The state departments and agencies that provide workforce training programs – Department of Labor, NYSERDA, SUNY, and others – should collaboratively and immediately conduct an inventory of existing programs, and streamline or develop programs to suit the needs of the state's growing renewable energy sector. Governor Spitzer included $2 million in his Executive Budget for green collar workforce solar training at community colleges across New York.

- **Improve Overall Agency Consistency and Coordination:** The State should consider reconstituting the State Energy Planning Board to facilitate consistent policy and program implementation.

- **Use Creative Financing to Promote Investment in the Renewable Energy Industry:** The Task Force recommends that the State explore all alternative-financing mechanisms available to support its renewable energy and efficiency goals, such as a Clean Energy Bond Act initiative; and investment and production tax credits.

- **Expand Research and Development efforts for Renewable Energy:** The Task Force recommends that the state fund research for solar, bio-fuels, small wind, Combined Heat and Power/efficiency demonstrations, grid interconnection, energy storage, and end-use efficiency technologies by implementing multi-year research programs.

Included in this recommendation is the establishment of a Center for Advanced Technology, with a focus on the development and enhancement of processes and products involving renewable energy and bio fuel systems.

- **Reclaim a Leadership Role Through Building and Product Energy Performance:**
  A comprehensive building and product efficiency program in New York, combined with updated energy codes and low-income affordable housing programs, will provide a competitive advantage to New York as well as increased environmental and economic benefits.

- **Encourage the Use of Advanced Metering and Smart-Grid Technology:**
  The Public Service Commission should accelerate the implementation of advanced metering policies, which will allow consumers to remotely control their electric use, provide time sensitive monitoring of electricity use, and use price signals to increase consumer awareness of electricity use and reduce peak electricity consumption.

- **Build on Public and Private Educational Programs:**
  The role of education is critical in bringing about the transformational changes in, and public acceptance of, the clean energy sector. The State needs an aggressive statewide consumer educational campaign to increase market awareness.

- **Facilitate Interconnection Processes for Renewable Distributed Generation:**
  The Public Service Commission and the Long Island Power Authority should explore a more streamlined, transparent interconnection process for renewable distributed generation installations.

- **Expand Purchases of Renewable Energy by Local Governments:**
  In order to facilitate the utilization of green power at all levels of government, the State should identify and address any statutory or regulatory barriers to municipal government purchases of green power.

- **Create a Vehicle Efficiency/Vehicle Miles Traveled Working Group:**
  New York should create an interagency working group to develop a strategy to reduce vehicle miles traveled and increase vehicle efficiency, including through the greater use of car pooling.

INTRODUCTION

A CLEAN ENERGY GOAL

As we witness historic rising costs of oil, increasing unrest in oil producing countries, and an impending climate crisis, we are on the cusp of a revolutionary change in how we must view and use energy. While renewable energy technologies can be more expensive than conventional sources in the first instance, the environmental, economic growth, and public health benefits from their use justify the public investment. New York must take immediate steps to preserve its leadership in this movement, attracting these industries in-state to reap both the environmental and economic benefits of these technologies.

In light of this, New York State should move toward a Clean Energy Economy, with the vision of being a world-class leader in clean and efficient energy technology. The Governor and the Lt. Governor have articulated a goal of spurring the "innovation economy" in New York State. The clean energy sector will play a vital role in this vision. New York's businesses and institutions should produce the technology that can be exported throughout the world. Our citizens should have access to clean, efficient, reliable and affordable energy products and services, and be at the forefront of the transition towards a more environmentally sustainable energy future.

To fully realize this vision, New York will need to build upon its already comprehensive set of programs to enhance and transform the marketplace through appropriate policy initiatives, financial incentives, and consumer awareness, as well as continued investments in infrastructure and technology improvements. A comprehensive "repackaging" of existing programs combined with new and aggressive clean energy policy initiatives can put New York on an International stage with the most ambitious Clean Energy Goal in the world. This will require increased capital and R&D investments as well as better strategies for commercialization at the federal and state levels and by the private sector.

The benefits of these clean energy sector investments will be three-fold through: 1) economic growth opportunities throughout the state; 2) enhanced energy security and reduced volatility in energy prices, and, 3) reduced greenhouse gas emissions.

New York, as a large economy and an influential player on the national and world stage, has an important leadership role to play as we fulfill our obligations to future generations. Using our resources and intellectual capital to encourage development and adoption of clean power technologies is paramount for the state's environment, energy and economy.

The energy efficiency goals articulated in the Governor's "15x15" initiative are ambitious, and are necessary components of the transformation of our energy system in order to stabilize the climate and provide enhanced energy security. However, even with aggressive efficiency measures, New York needs to continue and expand its commitment to renewable energy.

Advancing renewable energy offers significant opportunities for New York to improve energy security and reliability as well as to create new businesses and jobs while reducing the public health and environmental impacts of energy use. Over the long-term, the potential for a range of renewable energy resources which are cost-competitive and can displace conventional

generation is expected to grow significantly. From the roofs of suburban office parks to the facades of skyscrapers to the acres of upstate farms, there are numerous opportunities to generate energy from clean, renewable sources. To keep pace with market trends and reduce our dependence on foreign energy sources, the State must address the significant challenges to greater use of renewable resources.

SECTION ONE
RENEWABLE PORTFOLIO STANDARD (RPS)

A key driver in developing new renewable energy projects in the United States is the Renewable Portfolio Standard (RPS), a market-based policy that requires electric utilities and/or state entities to gradually increase their use of renewable energy resources. Currently 25 states and the District of Columbia have enacted RPS policies that are collectively projected to result in more than 67,000 megawatts of new renewable energy capacity by 2020.[2]

In 2004, the New York State Public Service Commission (PSC) ordered implementation of an RPS to increase the amount of renewable power used in New York. Current RPS goals call for expanding the State's use of renewable resources from the then existing amount of approximately 19 percent (almost entirely from large-scale hydropower) to at least 25 percent by 2013. NYSERDA was designated by the PSC as the central procurement administrator for the RPS Program. To date, nearly 30 percent of this goal has been satisfied through NYSERDA contracts, state agency compliance with Executive Order 111,[3] and voluntary green power purchases by consumers.[4]

In the original instituting Order for the RPS, the Public Service Commission specified an annual collection schedule lasting through 2013 and totaling approximately $741.3 million.[5] Major investor-owned utilities collect these funds from ratepayers, and these funds are administered by NYSERDA for the purpose of achieving the RPS targets. Combined with estimated interest earnings of approximately $40.7 million, total specified collections and estimated interest is approximately $782 million. To date, approximately $574.5 million has been committed to projects, leaving approximately $207.5 million of the currently specified collections available for future program activity. Based on these estimates and commitments, the current RPS funding of $782 million will not be sufficient to meet New York's targeted 2013 goal.

The cost to achieve RPS program targets has exceeded specified collections for a number of reasons. Specified collections in the original Order were approximately half of the expected program costs as estimated at the time. The Public Service Commission, in an Order dated December 14, 2004, acknowledged that post-2013 collections would be required and indicated that a decision on establishing such collections would be deferred until the program was well under-way and more knowledge of program costs became known. In addition, unprecedented demand for wind turbines and the increased prices of raw materials necessary for their fabrication and project construction have significantly increased, thereby rendering program collections less effective. The Public Service Commission is currently conducting a cost study to assess the future needs to adequately fund the RPS.

A comprehensive assessment by the Public Service Commission of New York's RPS is scheduled for 2009. There are some aspects of the RPS which the Commission should consider

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[2] Lori Bird and Elizabeth Lokey. Interaction of Compliance and Voluntary Renewable Energy Markets, Technical Report NREL/TP-670-42096, October 2007.

[3] In August, 2007, Governor Spitzer reconvened the Executive Order 111 Advisory Council to address the use of renewables and energy efficiency at state agencies and authorities and their compliance with the Order.

[4] Does not include commitments associated with the third RPS Main-Tier procurement which was underway as of the publication date of this report.

[5] Order Regarding Retail Renewable Portfolio Standard, Case 03-E-0188.

revising during this assessment. These include increasing the target and setting goals beyond 2013, evaluating whether to raise the RPS surcharge in order to meet RPS goals, reevaluating the commercial and industrial customer exemption, as well as aligning New York's renewable energy certificate tracking system to that of neighboring states.

Thus far, New York's Renewable Portfolio Standard has been the State's primary vehicle of increasing the amount of renewable energy use. As other states across the nation enact their own renewable portfolio programs and "energy independence" incentives, New York must keep pace. As we compete in regional energy markets, New York needs to continue attracting private investment dollars, the additional instate energy infrastructure, environmental benefits and the economic boost that comes from clean-tech investment. By leveraging existing resources and the will of a growing renewable energy sector, New York can be a leader in this arena.

Renewable Energy Certificates (RECs) and Attribute Tracking

Electricity from renewable resources can be purchased from utilities or electric service providers and charged as part of a customer's electricity bill as "green power." Generally, this renewable electricity is not delivered to the customer's location, but rather generated and supplied to the grid that serves all customers in the region. In essence, green power customers pay for the benefit of displacing other conventional sources from the regional electric grid. Renewable Energy Certificates (RECs) carry the non-electricity attributes of such renewable power, such as avoided SOx, NOx and CO2 emissions which would be generated from the use of fossil fuel sources, as well as economic benefits. For each megawatt hour of renewable energy generated, one REC is created. In this sense, purchasing RECs has the same general environmental benefit as purchasing renewable electricity directly.

RECs are often central to the implementation of an RPS program. They are a flexible market instrument, playing a key role in stimulating the development of renewable energy, and assist in achieving articulated targets as well as determining compliance within an RPS program. These RECs can be bundled with commodity electricity and sold in the wholesale market, frequently used by utilities and marketers to sell green power to retail customers. RECs can also be "unbundled" and sold separately from commodity electricity, from a variety of renewable energy sources throughout the country and sold to customers nationally, or in a particular region to local customers.[6]

It is very important to track and verify the sale of RECs in order to ensure the credibility of the REC market. Since RECs are used to supply a large portion of programs in which electric suppliers have teamed with green power marketers, it can be difficult to distinguish REC products from other green power offerings. This is particularly true when REC products are supplied from renewable sources located in the same region in which they are marketed.[7]

[6] More than 20 companies offer certificate-based green power products to retail customers via the Internet, and a number of other companies market RECs solely to commercial and industrial customers: http://www.eere.energy.gov/greenpower/markets/certificates.shtml?page=1.
[7] Green Power Marketing in the United States: A Status Report (Tenth Edition); Lori Bird, Leila Dagher, and Blair Swezey; Technical Report NREL/TP-670-42502 December 2007.

Without tracking and verification, issues arise such as "double counting" the benefits of a REC, or using a single REC for more than one purpose by a single owner.

New York's current "tracking system" is the Environmental Disclosure Label (EDL) and conversion transaction system, designed to provide retail electric consumers with information regarding the generating fuel mix and air emission characteristics of the energy consumed in New York State. Attributes associated with renewable energy generation under this current program remain "bundled." This existing "conversion transaction" system for environmental disclosure labels was never intended to serve as a basis for tracking and trading RECs.

In a 2006 Order, the Public Service Commission found that unbundling energy from its environmental attributes, and marketing both energy and environmental attributes separately to customers could provide generators with greater market access and improve market liquidity.[8] Unbundling would also reduce financial risks to generators by allowing them to enter into multi-year RPS contracts for the sale of environmental attributes (RECs) to NYSERDA while simultaneously entering contracts for the sale of energy with load serving entities and/or end-use customers. The Commission also found that New York's EDL program could be successfully modified to accommodate unbundling and requested that NYSERDA and Department of Public Service staff issue a request for proposals to develop an attribute tracking system. The Order contemplated an automated electronic transaction system for attributes or RECs, similar to and compatible with, tracking systems in place in surrounding market regions. These REC tracking systems are flexible, transparent, and establish ownership of attributes, preventing double-counting of RECs for compliance purposes.

Since RECs are typically created once a generator sells a unit of energy into the grid, one of the challenges of a REC tracking system is how to accommodate smaller distributed renewable energy systems that do not sell energy into the grid. If such systems were allowed to participate in the REC market, this would provide an additional incentive for renewable distributed generation.

➢ RE-COMMIT TO MEETING THE STATE'S RENEWABLE PORTFOLIO STANDARD GOAL AND EVALUATE FEASIBILITY OF EXPANDING FUTURE TARGET

To instill investor confidence in the future renewable power markets in New York, and to ensure the State meets its renewable energy goals, additional funds must be provided for the RPS program. To date, the RPS has successfully attracted private investments and economic activity throughout upstate. Under the current RPS program, New York State has committed nearly $574.5 million towards renewable energy projects. The economic benefits associated with this new capacity will approach $1 billion over the next 20 years, excluding the impact of any economic spill-over or multiplier effects or energy price suppression effects.

[8]Order Recognizing Environmental Attributes and Allowing Participation of Projects with Physical Bilateral Contracts, Case 03-E-0188.

A renewed commitment to achieving the RPS should include the following:

- The revised cost study of the RPS now underway at the Department of Public Service should provide the information necessary for the Public Service Commission to expeditiously authorize the collection of all funding needed for full achievement of New York's RPS goals for both the main and customer-sited tiers of the RPS.
- The Public Service Commission should examine the feasibility and costs of expanding the RPS target from 25 percent to 30 percent by 2015.
- The State should support, as an interim goal, the installation of 100 MW of solar photovoltaic systems across New York by 2011. At that time, New York should examine whether and to what extent further incentives or other policy measures will be necessary to drive down the cost of solar energy, with the ultimate aim of achieving parity with retail price by 2017.
- State agencies and authorities should fully comply with and renew their commitment to achieving the ambitious goals of Executive Order 111, which will result in approximately 285 MW of renewable energy by 2010. State agencies and authorities should work closely with the New York Power Authority, the Dormitory Authority and NYSERDA to secure appropriate funding to meet this goal. The Long Island Power Authority should continue its commitment to contributing to the goal by working with municipalities, schools and other institutional customers.
- The New York Power Authority and Long Island Power Authority should continue their efforts to contribute to the RPS goal by encouraging their customers to incorporate renewable energy as part of a diversified energy supply portfolio.
- The State should develop an integrated companion tracking system to account for Renewable Energy Certificates (RECs) for distributed renewable generation technologies located on the customer side of the meter with the wholesale generation attribute tracking system currently being developed to support a regional REC market. This should be designed by NYSERDA, the Department of Public Service and the New York Independent Systems Operator by year-end 2008.

SECTION TWO
INCREASING OUR COMMITMENT TO PRIORITY RENEWABLE ENERGY SECTORS

New York State should lead the nation in developing renewable power sources. Wind power, solar energy and biofuels will all play a role in New York's energy future. While some clear obstacles exist to their quick and widespread deployment, including technological, regulatory and cost concerns, governmental policy at both the state and federal levels can help rather than impede market development. For example, the failure of the federal government to enact renewable tax credits for periods longer than a year or two has severely limited options to increase the manufacturing base for select renewable technologies here in New York.

It is essential that New York demonstrate its long-term commitment to the expansion of solar and wind power and biofuel production, and the growth of these industries in New York State. This will require carefully balanced and crafted policy initiatives to promote industry sectors, while simultaneously creating clean, diverse and reliable energy systems. Achieving our clean energy goals will improve New York's economy and environment, and will improve public health.

Solar Photovoltaic (PV) and Solar Thermal Development

The State should develop an aggressive solar PV and solar thermal program with the long-term objective of driving solar system costs towards parity with grid supplied electricity by the end of the next decade.

Lessons can be learned from the operation of solar incentive programs in New York, across the country, and globally. Meeting a goal of high market penetration will require multiple approaches to program implementation. Incentive programs, for both solar PV and solar thermal, should build on this experience and implement initiatives meeting the following principles: (1) Installation of high quality systems by qualified installers; (2) Promotion of systems that deliver high amounts of energy per incentive dollar provided; and (3) Comprehensive programs that bring solar installations together with investments in energy efficiency.

The principal barrier to widespread adoption of solar PV and solar thermal is its high cost which puts it out of reach for most residential and commercial customers. The State will need to provide market-pull mechanisms to help accelerate the movement to cost parity with the grid. The State has an opportunity to move to long-term incentive programs, which will reduce risk and encourage investment in the New York solar industry.

Solar thermal technology to heat water for both domestic and heating purposes is one of the oldest and most established renewable energy technologies available. It is also often the only viable renewable energy technology on many multifamily buildings. Solar thermal technology, while capable of providing significant energy, environmental and other benefits, is less frequently used in the United States than in other parts of the world to reduce the consumption of fossil fuels. This technology, as a replacement for fuels used to heat water and for space heating, has advanced over the last few years and should be aggressively pursued. As with

other solar technologies, barriers must be overcome regarding the deployment of solar thermal and the growth of the industry in New York. Without incentives, homeowners and businesses are reluctant to tackle the up-front costs of installing such systems.

➢ BUILD A SUSTAINABLE MARKET FOR SOLAR ENERGY IN NEW YORK STATE

New York supports environmentally sustainable and reliable energy systems that have the added benefits of supporting job growth in new and emerging technologies. Building an energy market with emphasis on renewable energy resources requires coordinated and sustained state policies and an environment conducive to investment.

State commitment to a comprehensive solar energy program will help mitigate energy price volatility in load pocket areas, and serve as a catalyst for economic development. By investing in a comprehensive program to establish a sustainable market for solar energy, New York State will build a foundation for other clean, distributed energy technologies.

Both public support and private investment are required to address the full range of technological and business growth issues and the long-term commitment to the development of solar energy technology, markets and workforce. The Task Force recommends a comprehensive set of programs to address market needs along with an investment in public/private research to insure that New York continues to capture the economic benefits of solar energy.

- **Market-pull mechanisms through incentives**: While costs are forecast to decrease over the next decade, the economics of solar will likely remain a barrier in the short-term, requiring that the State provide financial incentives and other support to businesses and residences to cost-share the initial capital investment. The State should support the installation of 100 MW of solar photovoltaic systems (as funded through an expanded RPS) and 1,100 solar thermal systems across New York by 2011.
- **Educate and train the labor force:** State support for workforce development and training is necessary to meet the needs of the growing solar design, manufacturing, installation, and maintenance markets in the State. New York should establish and expand existing training programs at public and private colleges and universities throughout the State. (See also Section 4.)
- **Expand and create solar energy business enterprises:** The confluence of policy, technology, and environmental conditions are drawing significant private investment in clean energy. The State should target programs that reward business innovation and stimulate the creation of new solar technology manufacturing capabilities in New York. Encouraging investments in early-stage start-up companies is an important component of this plan.
- **Invest for the future through research**: New York should build on the competitive advantage of our scientific and academic research institutions and help expand their role in renewable energy technology development. Investments in public/private research partnerships will serve as a strong foundation for future economic growth.

- **State agency leadership:** State agencies and authorities, including the New York Power Authority and the Long Island Power Authority, should cooperate and collaborate with one another to achieve their respective share of the RPS and Executive Order 111 goals, including a commitment equivalent to other state programs to foster solar PV and solar thermal technologies.

Wind Power Development

Wind power has recently experienced unprecedented growth in the United States. The American Wind Energy Association recently reported wind power development increased 45 percent in 2007.[9] During this period more than 5,000 MW of wind power were installed, with industry investments totaling $9 billion.[10] Project developers reported that the surge in demand for wind energy caused wind turbines sales to reach capacity.

According to the study, New York ranked 11th in the country for installed capacity through 2007. With market demand increasing at such dramatic rates, New York must take the necessary steps to increase its installed wind capacity. It must also take steps to attract manufacturing facilities to capture the full economic growth potential of this emerging industry.

Wind energy offers the opportunity for clean, renewable power to be generated in New York State. With the support of the RPS, it is anticipated that more than 1,000 MW of wind power generation will be up and operating in 2008. In addition to the environmental, public health and energy security benefits of this clean energy, these projects bring economic benefits to the local community. New York's RPS could support approximately 3,000 MW of wind power; more than 5,000 MW have applied for interconnection to the grid (a first step in the project development and interconnection process).

Increasing wind power development produces significant local economic benefits. Permanent jobs are created and host communities realize other economic benefits in the form of payments in lieu of taxes ("PILOT") agreements and other compensation. Specifically, landowners receive lease payments associated with the use of their land and compensation for various goods and services that are purchased during the development cycle.

Any large-scale generation and construction project may face local opposition, and siting wind facilities are no different. This opposition sometimes references historic preservation, environmental and aesthetic concerns. State and local authorities that share responsibility for, and/or have an interest or stake in, environmental assessment and permitting of new wind power generating facilities should work with stakeholders to establish and convey clear principles and methodologies or processes that will be applied consistently across the state. While NYSERDA, the Department of Environmental Conservation and the Department of Public Service have provided numerous resources to aid local authorities in their understanding

[9] Installations in the last quarter of 2007 alone surpassed the amount installed in all of 2006, from 2,454 MW to 2,930 MW. Cumulatively, these new projects account for approximately 30 percent of all new power-producing capacity brought on-line in the United States during 2007, providing the equivalent of enough power generation for 1.5 million homes. AWEA also estimates installation capacity during 2008 could meet the 2007 record. AWEA 2007 Market Report, January 2008.
[10] AWEA 2007 Market Report, January 2008.

of wind power and inform permitting authorities of the unique aspects of wind power, the time, costs, and most importantly, the uncertainty involved in securing permits, can frustrate project developers.

Fully realizing the potential of wind energy requires careful consideration of local siting and permitting issues, studies that address transmission and infrastructure limitations and, as with solar, a focused effort to capture the workforce development and business growth opportunities of a growing market.

➢ DEVELOP A STRATEGY TO REAP THE BENEFITS OF NEW YORK'S WIND ENERGY POTENTIAL

The following recommendations will facilitate further wind energy development in New York State.

- **Incentives for off-shore wind development:** The potential of New York's off-shore wind resources is approximately 5,000 MW. Off-shore installations have proven their feasibility in Europe and a number of companies are anxious to replicate that success here in the United States. While these projects are often difficult to site and more costly than on-shore projects, they have higher capacity factors and are situated closer to high load areas. Given the continuing rise in fossil fuel prices, investing in wind provides for greater stability in energy prices. The State should review the possibilities for siting wind off the shores of the Great Lakes and Long Island.
- **Community wind:** The RPS facilitates development of large grid-connected wind projects as well as smaller, single turbine, behind-the-meter installations. However, there is increasing interest in so-called "community wind" projects where projects under 10 MW in size are owned in part or whole by local institutions. Helping communities build wind facilities may require a separate program under the RPS.
- **Building in-state supporting infrastructure:**
  Manufacturing Facilities: New York has the most wind energy development potential in the northeast and mid-Atlantic region, and it has the transportation networks (rail and ship) and labor force required to support the manufacture of wind components and facilities. The wind industry is experiencing a shortage of turbines and a number of manufacturers have already announced or constructed new factories within the United States. Aggressive efforts should be made to attract renewable energy product and equipment manufacturers and research labs to New York through economic mechanisms such as development grants, investment and production tax credits, and other tax abatement.

  Workforce Development: The State should establish a collaborative wind research and training center to support the construction, operation and maintenance requirements of the wind industry. This center could be developed as a public/private partnership with existing university or industry endeavors in the clean energy arena. In addition, NYSERDA should expand the existing programs for installer certification to cover certification of workers for

construction, operation and maintenance jobs for large-scale, grid-connected wind energy projects.

- **Facilitate permitting:** State agencies must strive to minimize, to the extent possible, the regulatory risk that affects the pace, scope and scale of wind energy development by enunciating long-term goals and eliminating regulatory impediments. Agencies must ensure that their policies and programs are consistent and mutually reinforce the goal of economically and environmentally sound wind energy development. Enactment of an Article X power plant siting law that includes wind should be a priority for New York.
- **Transmission issues:** New York transmission owners should reassess the need for electricity transmission and distribution system upgrades to support wind development and interconnection.

Renewable Fuels Development

Climate change, the depletion of petroleum resources, and energy security all contribute to the mandate that we find alternatives to traditional energy. At the same time, we must recognize that demand for energy is growing. New York State can be a leader in addressing these challenges in the area of renewable fuels.

The Task Force recognizes that policy initiatives involving the planning, building and implementing of a renewable fuels future for New York is complex. New York needs to address critical concerns regarding the specific fuels we may be using not only to make progress in meeting our future energy demands, but to position environmental, land-use and health concerns in the forefront in policy decision making.

New York consumes great quantities of petroleum to power our transportation system, to heat our buildings and to generate power. In 2006, the use of gasoline as a transportation fuel accounted for approximately 45 percent of New York's petroleum consumption, and the use of distillate fuel oil for heating oil and transportation fuels (diesel) accounted for an additional 28 percent of this consumption. [11] Since all of these fuels are imported to New York, a substantial portion of the energy expenditures in New York is directed out of state. A carefully crafted renewable fuel policy can reduce this loss, enhance the environment, and create economic opportunities for New Yorkers.

There are costs and benefits associated with each renewable fuel. By virtue of current technology, and state and federal tax policies, our renewable fuels infrastructure has been based largely on corn-to-ethanol and soybean-to-biodiesel production. With nearly 400 million gallons of corn-based ethanol and agriculture-based biodiesel capacity either in the planning or construction phase, these fuels have served as the starting point. However, the renewable fuels now available may not be as effective or beneficial as those available in the future.

The Task Force believes that current state policy on renewable fuels is not adequate and that no single renewable fuel will answer the increasing energy needs of New York. Rather, New York State needs policies based on the best environmental and economic performance of fuels that

[11] NYSERDA Patterns and Trends, January 2008

will optimize New York's resources. Renewable fuel production is particularly important to the agricultural and forestry industries in New York, and good policy decisions could ensure that these industries will benefit from expanded market opportunities.

New York first needs to assess critical environmental, capacity, technology, efficiency, and economic issues for renewable fuels. Of particular concern is the current shortage of widely accepted environmental and public health data relative to emissions and land use impacts associated with renewable fuel use in stationary and mobile applications. Environmental impacts particularly on local water and air quality, the land use impact from diversion of crops and the larger impact on the agricultural industry in light of food production to fuel production, must be examined. The assessment should provide policy makers with a better understanding of the possible consequences that increased use of renewable fuels may have on the environment and public health, and it should put forth a plan to mitigate impacts and create a national standard for production and use of such fuels.

It is also the consensus of the Task Force that New York should consider renewable fuels development on a continuum. The recent enactment of the federal Energy Independence and Security Act of 2007 increased the renewable fuel standard significantly, calling for this increase to be derived from advanced biofuels with specific carve-outs for cellulosic ethanol and biomass-based diesel. With this new mandate and the increase in the number of proposed facilities here in New York, there is a need to move expeditiously with assessing the appropriate policy, financial incentives, and economic development strategy. Biofuels producers are looking beyond grain-based production in order to capitalize on New York's more than two million acres of unproductive and marginal farmland with the potential for growing dedicated energy crops for cellulosic biofuels production. In addition, New York State has over 18.5 million acres of timberland that are being renewed at a rate greater than 3:1, meaning that low-grade timber can be harvested in a sustainable manner for producing energy.

As the development of cellulosic ethanol technology advances, New York should be prepared to transition from corn-based ethanol to a more environmentally sustainable source of renewable fuel within the next three to five years. This research is currently underway at several major research institutions right here in New York, focusing on regionally available feedstocks. In the short-term, New York should continue to support development of a robust distribution network for renewable fuels, which will serve as the foundation for a future in-state bio-refinery industry. As we prepare for this transition, New York should encourage construction of only those renewable fuel facilities that can demonstrate their processes will move us toward carbon neutrality. New York should move toward using performance-based standards and incentives that use competition to get the most out of renewable fuels.

If done properly, renewable fuels have the potential to play an important part in New York's economic future. The successful demonstration of renewable fuel production from dedicated cellulosic feedstocks such as willow, grasses and northern hardwoods for ethanol or less intensively farmed crops, such as soybeans for biodiesel production, will provide the potential for New York State to be one of the nation's leaders in the renewable fuel industry.

➢ **DEVELOP BOTH A RENEWABLE FUELS ROADMAP AND A SUSTAINABLE BIOMASS FEEDSTOCK STUDY**

The State should develop a Renewable Fuels Roadmap, with input from industry, environmentalists, academia and government.

The Roadmap should explore:

- The life-cycle environmental consequences including all upstream emissions and land use impacts (which are not part of current assessments) of expanding the development and deployment of renewable fuels;
- The development of best practices for supplying feedstocks on a sustainable basis;
- The current industrial and research base in New York that can participate in the renewable fuels market;
- The distribution infrastructure to bring fuels to market;
- An assessment of workforce and training needs;
- The financial resources necessary to build a sustainable renewable fuels industry; and,
- The economic development benefits to rural and agricultural regions of the State.

The State should also study sustainable biomass feedstocks to develop a detailed baseline of:

- The health, environmental (including air quality and climate impacts), and land use effects of the production and use of renewable fuels, the metrics of sustainable management, and models and measurement tools to assess management;
- Land use and resource condition, standing biomass and suitability for future bio-energy crops;
- Feedstock supply including identification, techniques for planting, harvesting, production, storage, transportation, and processing.

Increasing Economic Growth Through Clean-Tech Investment

The expansion of the renewable energy industry is highly correlated to the creation and maintenance of long-term markets and the support of incentives provided by state policy. Many states are now aggressively and successfully pursuing these industries by creating markets for clean energy, offering tax incentives to manufacturers and to developers, promoting the installation of new generation capacity, and funding these initiatives with grants, loans and bond funds.

Creative investment initiatives such as pension funds are widely being leveraged to increase investments in clean energy markets. For example, the California Public Employees' Retirement System (CalPERS) has committed $400 million to clean energy and technology investments,

concentrating on energy, water and material technologies, including products and services that reduce carbon emissions, conserve natural resources and improve energy efficiency.[12] The New York City Investment Fund's January 2007 report recommends that at least $150 million of the public pension fund should be invested in clean tech industries.[13]

New York should match these efforts to attract renewable energy product and equipment manufacturers in-state. Innovative financing mechanisms such as new State bonding initiatives and public pension fund investments, coupled with economic development grants, investment and production tax credits and other tax abatement incentives, will provide New York with the opportunity to effectively compete with other states and achieve significant growth in market penetration.

➢ INVEST IN CLEAN ENERGY BUSINESSES FOR ECONOMIC GROWTH

New York should align and expand existing state programs to invest in the clean energy sector through integrated public/private partnerships to increase renewable energy business activity in New York. The Task Force recommends the following initiatives:

- The State, through NYSERDA and the Empire State Development Corporation, currently invests in clean-tech industry initiatives. In order to position New York as a national leader in clean-tech business growth, we must continue to support, enhance and expand these collaborative clean-tech initiatives. New York should increase its funding commitment to these initiatives by a minimum of $400 million over four years through financial incentives to support technology clusters;
- The State should increase opportunities for Minority and Women-owned Business Enterprises and businesses located in disadvantaged communities via use of public funding requirements;
- The NYS Office of the Comptroller should review existing public pension fund investment guidelines and target modifications to foster increased investment in renewable energy industries while maintaining overall fund integrity;
- The State should examine state tax policies and work with local entities to review and coordinate tax policies necessary to stimulate investment (examples include: production tax credits for cellulosic-ethanol and biodiesel; tax credits for growing eligible feedstocks); and,
- The State should also consider entering into long-term contracts for transportation and space heating fuels to promote the use of biofuels.

[12] CalPERS Commits $400 Million Each to Cleantech, Emerging Market Ventures; Press Release, February 21, 2007.
[13] Cleantech: A New Engine of Economic Growth for New York State, January 2007; New York City Investment Fund; A Partnership for New York City Organization.

➢ USE CREATIVE FINANCING TO PROMOTE INVESTMENT IN THE RENEWABLE ENERGY INDUSTRY

- New York should explore all alternative financing mechanisms available to support its renewable energy/efficiency goals, including expanding the use of creative financing and innovative bonding initiatives, and introducing a Clean Energy Bond Act initiative to increase clean energy adoption statewide.

Increase National Leadership in Research and Development

The State's long term commitment to increased funding for research and development will help develop and commercialize additional emerging renewable energy technologies to deliver new supplies of reliable, clean energy. An important companion to technology research is the support of efforts to evaluate the environmental and economic performance of the programs. Market development programs provide commercialization opportunities for products developed and tested by New York research institutions and companies. NYSERDA shares the risk of product development and field-testing for innovative clean energy technologies as part of a broader power systems technology program.

The Task Force has focused on a few technologies that are of special interest to New York. There are "emerging" technologies that will likely become technically and economically mature within the next three years. Some of these technologies include, but are not limited to: combined heat and power (CHP), anaerobic digestion, kinetic hydro, bio-diesel and geothermal heat pumps. Further, there are projects at the research and development stage that will mature within the next five to ten years, including cellulosic ethanol, electrical energy storage, superconducting power cables, and heat pump water heaters.

New York is home to several public and private institutions that are leaders in the field of environmental and scientific research. Many of these institutions are currently exploring innovative ways of optimizing the use of our natural resources in environmentally sustainable methods. Increasing the support available to these institutions as well as attracting additional R&D to the state will further expand this resource base and increase our competitive advantage at the national level.

New York should expand research, demonstration and commercialization of all renewable energy sectors in the State to accelerate the introduction of emerging technologies. To ensure that New York's investments are being used most effectively, the success of these initiatives should be measured by periodic assessments of technologies ready for commercialization, as well as the number of new clean energy companies brought into New York. Support levels should be awarded based on these assessments, focusing on those technologies with the most positive impact and achievable results to enhance market development. Demonstration programs can typically produce results and information for both consumers and policy makers within one to two years of funding support. The benefits of these long-term investments will be realized over several years.

➢ EXPAND RESEARCH AND DEVELOPMENT EFFORTS FOR RENEWABLE ENERGY

The State should target additional research funding for solar, bio-fuels, small wind, CHP/Efficiency demonstrations, grid interconnection, energy storage and end use efficiency technologies by implementing multi-year research programs to:

- Research the environmental impacts, public health effects, system reliability and performance of renewable energy and energy efficiency technologies for buildings and transportation;
- Support technology development, process improvement, demonstration, and commercialization to help New York State firms increase their competitive advantages in technologies such as kinetic hydropower, energy storage, grid interconnection, and end-use efficiency;
- Support academic and industry research to foster intellectual collaboration in the development of renewable energy and end-use efficiency technologies;
- Establish a Center for Advanced Technology (CAT) with a focus on the development and enhancement of processes and products involving renewable energy and bio fuel systems; and,
- Provide to the Executive and Legislature annual reports on the progress of public and private investment in the development and commercialization of renewable technologies and industries.

SECTION THREE
ENHANCE EFFICIENCY IN BUILDINGS, CONSUMER PRODUCTS, PETROLEUM AND TRANSPORTATION

Strategies to improve energy efficiency are paramount to any overarching clean energy policy. At the onset of its creation, the Task Force was asked to identify potential measures to assist the State in achieving its "15 by 15" initiative. To that end, the Renewable Energy Task Force has concluded that energy efficiency should be viewed as the "first" energy source and certainly a renewable resource. The cleanest, most affordable kilowatt hour is the one not generated. Conservation of energy is imperative as technologies for renewable sources advance and come on-line. All cost-effective energy efficiency should be harvested and doing so will improve grid reliability, make New York more competitive by reducing energy costs, create new jobs by keeping energy dollars in-state and reduce emissions which adversely impact public health and cause global warming.

Building Efficiency, Energy Codes and Low-Income Housing

On-site consumption of energy in residential and commercial buildings accounts for a majority of the greenhouse gas emissions in New York.[14] This sector represents a key target area in which implementing green technology improvements can have dramatic and immediate results. Improving building performance operations through energy efficiency and weatherization efforts will provide immediate economic results. It will reduce overall net energy consumption, thereby reducing demand on over-burdened electrical grid systems. Reducing energy usage lowers consumer bills saving both taxpayers and rate payers money.

Decreasing emissions of particulate matter and the use of environmentally friendly building materials will reduce public health impacts by minimizing effects on acute respiratory diseases. Improving oil efficiency and incorporating green features and low-impact materials into building designs will provide public health as well as environmental and economic benefits. Most importantly, reducing our energy consumption will decrease greenhouse gas emissions, helping to curb the international challenge of climate change.

The New York State Energy Conservation Construction Code (Energy Code) is mandatory across New York State for all new construction and substantial renovation of residential and commercial buildings. The Energy Code is a component of the broad health and life safety buildings code and is linked to the International Energy Code Council (IECC) documents and update cycles for residential buildings, as well as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standards for commercial buildings. The NYS Department of State (DOS) administers and supports the Energy Code, while local municipalities and their code officials enforce it. Updates to the Energy Code must meet requirements set forth in Article 11 of the Energy Law. Any proposed changes to the Energy Code must be cost effective over a ten-year simple payback period.

[14] These buildings account for approximately 40 percent of New York's greenhouse gas emissions. If electricity used by these buildings but generated off-site is included, these buildings represent approximately 64 percent of New York's greenhouse gas emissions. NYSERDA estimates, using average retail electricity prices reported in Patterns and Trends, January 2008.

Just updated and now in effect , the 2007 Energy Code for commercial buildings is based upon the 2003 IECC and ASHRAE Standard 90.1-2001. There is currently a proposal to the Codes Council to amend the commercial standards to be based upon the 2006 IECC, which references ASHRAE 90.1-2004. Adopting the 2006 IECC commercial standards would save New Yorkers approximately $18.5 million in 2009 (the first full year in which it would be in effect) and eliminate 148 million pounds of CO2 in that year.[15] Furthermore, ASHRAE 90.1-2004 has been determined to provide cost-effective updates to the commercial standards of the Energy Code, with no increased costs to achieve compliance. Depending upon building type, adoption of these standards would provide energy use savings of between 3 and 10 percent over the 2007 Energy Code.[16] Training of code enforcement officials and enforcement of these codes will also ensure New York fully benefits from implementing these aggressive energy codes.

Further, in order for affordable housing policies to be effective, necessary public and private financial investment is needed to implement energy efficiency measures in affordable housing projects. More than seven million New Yorkers, an estimated 2.9 million households, have incomes below 80 percent of state median income (SMI) and are eligible to receive some form of public housing assistance.[17] Almost 2.2 million of these households have incomes below 60 percent of SMI and are eligible for energy assistance and weatherization programs.[18] Most low-income households live in older housing, often with inadequate insulation, vast air leakage, and inefficient heating systems and appliances. Sharp rises in residential energy prices have greatly increased the cost of housing and utilities for low-income households, especially the elderly and others with relatively fixed incomes. Without effective financial investment, lower income households and operators of affordable housing lack the necessary resources to address energy efficiency on their own.

Oil Efficiency

Energy consumption of fuel oil in buildings in New York State is substantial. Based on a three-year average, consumption reached approximately 480 trillion BTU's annually, or 3.2 billion gallons, more than any other state in the nation.[19] This energy use for the purpose of heating has been identified as a sector where improvement and benefits can be achieved in a fairly short time. When compared to some energy efficiency efforts which take many years or decades to establish, the infrastructure to address the building community and New York State facilities currently exists and can be implemented immediately.

Petroleum products are not a standard commodity produced in New York State, with 89 percent of the supply purchased from other states and foreign countries, which then must be transported via water and roadways.[20] Paying for a commodity from outside of New York State in this magnitude means billions of dollars are being funneled away from our economy. The recent historic mark of $100 per barrel magnifies this financial impact to New York. This is

[15] NYSERDA estimates, using average retail electricity prices reported in Patterns and Trends, January 2008.
[16] Analysis of Energy Saving Impacts of ASHRAE 90.1-2004 for the State of New York, prepared by Pacific Northwest National Laboratory, August 2007
[17] United States Census Bureau, American Community Survey, 2006 (Washington, D.C., 2006) http://www.census.gov/acs.
[18] Ibid.
[19] NYSERDA Patterns and Trends, January 2008.
[20] NYSERDA Patterns and Trends, January 2008.

money that could be kept in New York to support the in-state production of cleaner fuel technology such as bio-heat (similar to biodiesel) and support the State's economy. Additionally programs could be funded with this money to target a greater number of energy efficient construction projects and the manufacturing of high efficient equipment and systems. Based on oil usage data in New York State in 2006, 30 million tons of CO2 were released into the atmosphere by oil combustion in buildings.

The amount of energy that buildings consume associated with oil can be reduced through energy efficient rehab/renovation and new construction techniques, thereby reducing New York State's dependence on this product. This coupled with alternatives and additives to oil such as bio-heat, solar thermal water heating and dual-fuel capabilities creates a buffer from price spikes and fuel shortages. New York should also work collaboratively with the refining industry to stage the market development and supply of Ultra Low Sulfur fuel oil which will reduce particulate matter emissions from oil combustion.

Through the efforts of NYSERDA, New York continues to have some oil programs underway that target new and existing buildings in all sectors. Other programs include researching the use of Ultra Low Sulfur heating oil, support and development of the manufacturing of high efficient oil-fired equipment, oil equipment Clean and Tune program, and minimal sector based programs (i.e., Home Performance with ENERGY STAR® program). Additionally, the NYS Department of Housing and Community Renewal administers the Weatherization Assistance Program, which provides energy efficiency improvements to low-income New York residents. Further significant efforts to offset and avoid the financial and environmental impact of oil use will need to be implemented immediately.

Efficiency Standards for Consumer Products

Product standards (point-of-sale at the state level and point-of manufacture at the national level) offer a significant opportunity for cost-effectively decreasing energy use in New York. State standards also have been effective for framing national policy discussion, leading to strong national standards. When a national standard is established, states are preempted from enforcing state-level standards for the same product unless the federal government grants them a waiver from preemption. Currently, New York does not have any waivers from national standards. Generally state standards are established for products only where national standards do not exist. States may want to establish standards for products where national standards are out-of-date or not appropriate and seek waivers. In related activities, in order to decrease the State's energy use, New York has established energy efficiency purchasing standards and applied them to equipment purchased by state agencies in 18 product areas.[21]

In 2005, New York amended its Energy Law to authorize the development of appliance and equipment energy efficiency standards for 13 of the 14 product areas not regulated by federal law. Subsequently, Congress established federal standards for 10 of the 14 products,

[21] Article 5-108-a of New York's Energy Law calls for minimum energy efficiency standards for the following eighteen appliances and energy using products purchased by or for the state: fluorescent lamp ballasts, central air conditioners, room air conditioners, package terminal air conditioners, heat pumps, electric motors, refrigerators, freezers, refrigerator-freezers, water heaters, lamps, luminaries, dishwashers, clothes washers, clothes dryers, furnaces, boilers and chillers.

preempting State standards in these areas. New York is in the process of establishing standards through the regulatory process for the one remaining product in the 2005 law. As part of this effort, New York has participated with other states in developing a multi-state certification system. Also, New York is considering establishing efficiency standards for a number of additional products. Standards for one of the products, residential furnaces, would require a waiver of preemption from the federal government.

Enhancing product standards will also have significant environmental and public health benefits. By 2015, improved product standards resulting from State and federal legislative and regulatory activities could help remove more than 970,000 metric tons of CO2 annually, the equivalent of removing more than 780,000 automobiles from the road. [22]

Standards are likely to have the greatest impact if New York pursues activity at both the state and federal levels. Since many product markets are national, or even international, broader standards at the national level make sense. Historically, state activity has been critical to convincing the federal government to act and in helping identify appropriate standards levels for the federal government to consider.

Combined Heat and Power (CHP)

As its name implies, "cogeneration" or "combined heat and power" are integrated energy systems that create two forms of useful energy – electricity and heat – from a single source of fuel. In a combined heat and power application, the heat that would otherwise be dissipated from the on-site generator is recovered to provide the building's hot water or steam. In industrial applications, the heat can be used directly in the manufacturing process. Advances in "thermally activated technologies" have opened new markets for CHP where there is an on-site need for cooling (e.g., commercial office space) or humidity control (e.g., supermarkets).

As of 2004, New York State has approximately 5,795 MW of CHP installed capacity, most of which is at industrial sites.[23] Going forward, there is a technical potential for approximately 8,500 MW of new CHP over the next decade.[24] Approximately three-quarters of the remaining potential are in commercial office space, healthcare facilities, schools and other institutional buildings. Modeling forecasts in a Base Case scenario estimate 764 MW of CHP could be installed in New York State by the year 2012, whereas in the Accelerated Case scenario market penetration reaches nearly 2,200 MW during the same time frame.[25]

Due to its efficiency, CHP has been shown to reduce electricity use and net natural gas imports. Capturing the useful waste heat and utilizing it to displace existing, less-efficient gas

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[22] Based on projections of electric energy savings identified in the preliminary letter report, entitled "New York State Agencies and Authorities Energy Efficiency Programs", submitted to the Public Service Commission by NYSERDA on November 30, 2007, on behalf of the Clean Energy Collaborative under PSC Case 07-M-0548, and natural gas energy savings, prorated to 2015, identified in "Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards", Report Number ASAP-6/ACEEE-AO62, and the associated New York State summary of the "State-by-State Energy, Economic and Environmental Benefits from New Appliance and Equipment Efficiency Standards", Steven Nadel et al., published March 2006.

[23] Combined Heat and Power Installation Database; Energy and Environmental Analysis Inc., 1655 Fort Myer Drive, Arlington, VA 22209, http://www.eea-inc.com/chpdata/States/NY.html. Content Last Updated: 10/18/2007.

[24] NYSERDA, Combined Heat and Power Market Potential in New York State (2002).

[25] Ibid.

consumption at a facility conserves natural gas. Also, due to line losses apparent in a utility distribution system, generating electricity at the site enables greater electrical efficiency. All these efficiencies also result in net reduced natural gas imports to the state. The creation of a sustainable market for CHP is of critical importance to the economy and the environment. In addition, NYSERDA estimates that, under accelerated CHP penetration rates, over $800 million in user benefits (net present value) will be realized, 316 trillion BTU of energy will be saved, and 3.9 million tons of CO2 will be avoided annually.[26] In addition, CHP provides an expanded opportunity for economic development through distributed energy equipment and components production, engineering, construction, maintenance and project development.

➢ RECLAIM A LEADERSHIP ROLE THROUGH BUILDING AND PRODUCT ENERGY PERFORMANCE

A comprehensive building and product efficiency program in New York, combined with updated energy codes and low-income affordable housing programs, will provide a competitive advantage to New York as well as increased environmental and economic benefits. Where appropriate, New York should recommend legislation and where administratively possible implement initiatives to:

For Building Efficiency:

- Require benchmarking and/or energy audits of all residential and commercial buildings at the time of occupancy or upon a change in ownership or tenancy;
- Require periodic retro-commissioning of large commercial buildings;
- Expedite the Energy Code update process to better synchronize with the IECC process and schedule;
- Adopt IECC 2006, which incorporates ASHRAE 90.1-2004 for commercial buildings as soon as possible;
- Expand the application of the Energy Code to a larger portion of renovations and equipment replacements; and,
- Identify the necessary resources for training, enforcement, and regular review of potential code updates.

For Oil Efficiency: Establish a new Oil Efficiency Program for New York that would support energy use assessments, commercialization of energy-efficient heating equipment, efficient building construction and renovation. Funding of the program should be consistent with the funding levels for gas efficiency programs when expressed on a BTU basis. The Task Force will work with industry representatives to identify a long-term strategy to provide efficiency to this sector, and develop a reliable funding source. Once a funding source is secured, the State should implement a pilot oil efficiency program.

[26] Ibid.

For Efficiency Standards for Consumer Products: Pursue aggressive State product standards and pass legislation to establish a "best practices" program that will provide for a systematic and timely update to product standards. In addition, revise the Division of Housing and Community Renewal's Major Capital Improvements (MCI) requirements to only allow:

- For appliances or equipment for which an Energy Star rating applies, the installation of such appliances or equipment that are Energy Star certified; or
- When an Energy Star rating does not apply, the installation of appliances or equipment that meet an alternative standard developed by NYSERDA where feasible.

For Combined Heat and Power (CHP): Expand CHP applications in key target markets including schools, hospitals and institutions, supermarkets, colleges and universities, and commercial and industrial district energy parks. The State should also expedite the promulgation of distributed generation air permitting rules that recognize the combined thermal and electrical efficiency of such integrated energy systems and review utility standby rate design.

For Affordable Housing: Initiate the formation of an interagency working group to include the Office of Temporary Disability Assistance, the Housing Finance Agency, the Division of Housing and Community Renewal, the Department of Public Service, NYSERDA, the Office for the Aging, the Department of State, the Long Island Power Authority and the New York Power Authority. The working group should collaborate to increase energy efficiency in the low-income sector through improved and expanded program coordination, joint delivery with renewables, and implementation of best practices.

Petroleum and Transportation Efficiency

New York State is currently dependent on petroleum for a majority of its transportation needs. In 2006, the State's transportation sector was responsible for 38 percent of greenhouse gas production and 72 percent of petroleum use, the single largest sector in either category.[27] The combustion of fuel in the transportation sector also contributes to regional air pollution, helping to place New York City on the U.S. Environmental Protection Agency's non-attainment list for ozone, PM10, and PM2.5.

There has historically been little interest in improving energy efficiency in the light-duty vehicle market. Consequently, vehicle performance improvements have dominated the technological landscape. However, in December 2007, Congress passed and President Bush signed the Energy Independence and Security Act of 2007, which increases vehicle fuel economy standards for the first time in 30 years. While this Act is a starting point for higher levels of efficiency in automobiles, it is just that, a starting point. There are several steps New York can take to achieve greater system and product efficiency, which will further reduce our petroleum consumption while simultaneously reducing greenhouse gas and particulate matter emissions.

New York is unique in its use and dependence on taxis, transit buses, subways, and commuter rail and ferries. System improvements in more efficient public transportation can dramatically

[27] NYSERDA Patterns and Trends, January 2008

reduce energy use and carbon emissions. For example, capture and use of regenerative braking energy from electrified subway cars can reduce energy consumption used for traction power and reduce power costs by up to 30 percent. Energy storage systems can improve this by several percent, while at the same time also improving the overall system voltage levels.[28]

Dynamometer testing has shown a 20 percent fuel savings can be achieved on the NYC taxi cycle with low cost idle stop technology currently in development.[29] Traffic light signal upgrades at state and municipal-owned lights would alleviate time wasted at traffic signals, which result in tens of thousands of idling vehicle hours, wasting fuel and generating emissions.[30] Improvements in product efficiency, such as hybrid-electric drive trains, low rolling resistant tires, and engine idling reduction technologies would also reduce petroleum use per mile traveled.

Increasing support and public awareness of public transportation, in all areas of the State, will also be integral to New York reducing its energy usage. Innovative strategies to promote the use of public transportation, such as "Pay As You Drive" insurance programs, the use of "fee-bate systems" to encourage consumer purchasing of fuel efficient vehicles, and the facilitation of intermodal transportation options such as incentives or reduced fares for "Park 'n Ride" participation will provide much needed assistance to meet New York's transportation needs.

Recently, vehicle efficiency has improved through hybridization using expensive batteries. As battery costs decrease and battery life-cycle improves, the amount of electric storage capacity on-board commercially available vehicles will increase. Continued support of battery research and development is critical to transportation sector efficiency.

New York State should build upon existing policies and programs to further promote the efficient use of petroleum in the transportation sector. For example, New York law already prohibits heavy duty engine idling for more than five consecutive minutes. In addition, in 2004 New York was the first state to propose regulations that adopt California's aggressive greenhouse gas emissions regulations, which would effectively increase the fuel economy of vehicles in the State. Through NYSERDA, the State is also funding transportation efficiency projects in a variety of areas, including policy analysis, product development, and field validation.

[28]Louis T. Klauder and Associates, "New York City Transit Traction Power System Study and Energy Storage System Analysis"; Contract 4500117064 Final Report, April 20, 2007; Study co-funded by the New York Power Authority and New York State Energy Research and Development Authority.
[29]Idle stop prototype systems developed under two separate NYSERDA projects both demonstrated this effect under closely controlled dynamometer test procedures. Savings are less in driving cycles with fewer stop-go cycles.
[30]USDOT Report , Intelligent Transportation Systems for Traffic Systems Control, Deployment Benefits and Lesson Learned , www://its.dot.gov./ipodocs/reports

➢ VEHICLE EFFICIENCY/VEHICLE MILES TRAVELED WORKING GROUP

New York should initiate an interagency working group headed by the NYS Department of Environmental Conservation, with collaboration by the NYS Department of Transportation, NYSERDA, the Metropolitan Transportation Authority, the New York/New Jersey Port Authority, the Office of General Services, and other appropriate state entities to develop a strategy to reduce vehicle miles traveled (VMT) and increase vehicle efficiency. Such strategy should consider:

For Vehicle Miles Traveled:

- Development of an integrated plan to achieve a statewide target of a 10 percent reduction in Vehicle Miles Traveled (VMT) from projected levels in 10 years. Such a plan should consider, among other strategies, the facilitation of intermodal transportation options and support of local initiatives, incorporation of incentives for LEED-ND, and use of Location Efficient Mortgages.

For Vehicle Efficiency:

- The establishment of tire efficiency standards, development of a revenue neutral fee-based system and support of advanced technologies.

SECTION FOUR
CREATING A GREEN COLLAR WORKFORCE

The development of a successful clean energy economy in New York State will require a well-trained clean energy workforce to design, install and maintain these new technology systems. The quality of workforce training and maintenance of skilled industry jobs will be a key component in attracting clean-tech companies and building robust markets for renewable energy and energy efficiency technologies.

According to the National Association of Energy Services Companies, investments in the training of just building maintenance workers, superintendents, and engineers could improve the operations of sophisticated heating and cooling systems by as much as 10 percent. These small improvements would save millions of dollars in energy costs each year in large public, industrial, and commercial buildings.

There are two main reasons why renewable energy technologies offer an economic advantage: (1) they are labor-intensive, so they generally create more jobs per dollar invested than conventional electricity generation technologies, and (2) they use primarily indigenous resources, so most of the energy dollars can be kept at home.

According to a 2007 report released by the American Solar Energy Society, renewable energy industries today amount to nearly $1 trillion in revenue in the United States, generating more than $150 billion in tax revenue at the federal, state and local levels.[31] The report indicates that, by 2030 the renewable energy and energy efficiency industries could create 40 million jobs, and generate up to $4.5 trillion in revenue in the United States.[32] This will only be achieved, however, through adequate public policy initiatives (including a renewable portfolio standard), renewable energy incentives, public education, and research and development. These jobs will not be just engineering-related, but will include millions of new manufacturing, construction, accounting and management positions. Solar, wind, ethanol, fuel cells and energy efficiency are likely to be the largest areas of growth within the industry.

While the potential for growth in this sector is tremendous and could provide literally hundreds of thousands of new jobs, there are challenges which need to be addressed. A 2006 study from the National Renewable Energy Lab (NREL) identified the shortage of skills and training as a leading non-technical barrier to renewable energy and energy efficiency growth. The Study identified a number of critical unmet training needs, including lack of reliable installation, maintenance, and inspection services, the shortage of key technical and manufacturing skills, and failure of the educational system to provide adequate training in new technologies.[33] The American Public Power Association estimates half of current utility workers will retire within the next decade, leaving the United States without enough trained new workers to fill their places. In addition, the number of high school graduates with technical training has declined by 35 percent over the last decade, which further exacerbates this trend.[34]

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[31] Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century; American Solar Energy Society, 2007.
[32] Ibid.
[33] R. Margolis and J. Zuboy, Non-technical Barriers to Solar Energy Use: Review of Recent Literature, National Renewable Energy Lab, September 2006 (NREL/TP-520-40166).
[34] Workforce Planning for Public Power Utilities: Ensuring Resources to Meet Projected Needs, American Public Power Association, 2005.

The NYS Office of the State Comptroller estimates that the production of renewable energy to meet the State's RPS goal could generate up to 43,000 new jobs here in-state.[35] New York has begun to take steps to train a clean energy sector workforce through NYSERDA and select academic institutions.[36] However, if New York is going to bolster its energy efficiency and renewable energy initiatives to meet our set goals, the State must simultaneously bolster its effort to rapidly increase this sector to adequately meet both near- and long-term future demands. In addition, training initiatives within the state should be done through a collaborative effort to utilize training curriculums, existing facilities, ensure consistent training quality standards, and to track the workforce sector to identify those areas where more attention is needed.

➢ EXPAND TRAINING PROGRAMS TO SUSTAIN A GREEN COLLAR WORKFORCE

The State should align and expand existing accredited training programs to recruit and develop an abundant supply of highly skilled workers who can design, install and maintain renewable energy and energy efficiency systems in New York. A skilled workforce, combined with other quality assurance measures, will reinforce public trust of these technologies. The steps needed to accomplish this include:

- Directing the Department of Labor, with collaboration from NYSERDA, the State Education Department (SED), the State University of New York (SUNY) and the City University of New York (CUNY), and other appropriate entities, to immediately undertake an inventory of existing workforce training programs and streamline such efforts to utilize existing resources in the most optimal manner;
- Expanding existing NYSERDA programs for installer certification to maintenance and operation of large-scale renewables and additional small scale renewable technologies such as small wind, solar thermal, biomass and anaerobic digestion systems;
- Providing resources for New York's universities, community colleges, and other accredited training organizations to establish curriculum and training programs to re-train the existing workforce and to develop the skills of students entering the job market;
- Identifying strategies and best practices for retaining qualified green collar workers;
- Targeting residents of disadvantaged communities and MBE/WBE's; and,
- Directing the Department of Labor, with collaboration from NYSERDA, SUNY and CUNY, and other appropriate entities, to annually report to the Executive and the Legislature on green market workforce trends.

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[35] Energizing the Future: The Benefits of Renewable Energy for New York State, New York State Office of the State Comptroller, March 2005 (Report 12-2005).

[36] NYSERDA has programs for PV installer certification and curriculum accreditation, Energy Smart Students Program, and a $10 million Renewable Energy Technology Manufacturing Incentive Program. SUNY Delhi, SUNY Farmingdale, Hudson Valley Community College, and Bronx Community College offer PV training/installation workshops. HVCC provides the baseline training for the Building Performance Institute's (BPI) Building Analyst; Envelope, Heating, and Cooling Professional certifications; the HERS Rater certification process, basic computer training, trade-related math skills and sales/marketing training.

SECTION FIVE
CRITICAL PUBLIC POLICY INITIATIVES

Generating more renewable energy in New York will require significant investments and a signal from New York that the state is serious about welcoming these industries. Financial incentives will be key to this market growth. However, these incentives will have little impact unless accompanied by the removal of other barriers that impede the development of these industries in New York. Several of these policy initiatives can be implemented with little or no financial impact to the State.

Net Metering

Net metering is a simple, low-cost, method of encouraging customer investment in distributed renewable energy technologies. Net metering applies in cases where customers operate their own on-site distributed generators, thereby displacing some of their electricity requirements that would otherwise need to be procured and delivered by the local utility. At discrete times, these distributed generators may be capable of producing more energy than can be fully used on-site. This "excess" energy is essentially delivered back to the local utility, who then effectively delivers it to other customers on the grid. Essentially a customer's meter spins both forward, when it is drawing power from the grid, and backward, when exporting excess power from on-site generation. The meter is reset to zero annually (when the electric provider either bills for the net energy used or possibly pays the customer the wholesale power rate for net energy sent onto the grid). This arrangement is currently supported by the utilities' existing electric tariffs, wherein displacement of the customer's on-site loads are credited at the average volumetric tariff rate and excess generation is credited at the utility's applicable buy-back tariff rate, either a monthly average or an hourly market-based commodity service rate.

However, New York's current net metering law contains size limitations and customer class exclusions which limit the growth of the renewable energy market. For example, solar energy net metering applies only to small residential customers, limiting the cost-effectiveness of solar electric systems for entire classes, including commercial and institutional customers, typically with large buildings which could reap the benefits of such installations. Such limitations inhibit the widespread installation of large-size systems and they handicap our existing renewable energy industries who must compete against businesses from other states with more advantageous and generous policies.

> ➢ **ENHANCE AND EXPAND NEW YORK'S EXISTING NET METERING LAW**

New York State should enact a new net-metering law which:

- Allows net metering for all customer classes where appropriate, including residential, agricultural, commercial, industrial, municipal and non-profit;
- Increases the size for projects eligible for net metering up to 2 MW for specified renewable technology types;

- Provides for the periodic review and assessment of interconnection standards for net metered energy by the Public Service Commission; and,
- Requires detailed annual reporting by electric power companies to the Public Service Commission on net metering.

The State should also better market net metering opportunities and benefits to customers. This can be accomplished through a more targeted outreach campaign by the PSC and utilities.

Advanced "Smart-Grid" Technologies

As demand for electricity continues to grow across all sectors and electric transmission, distribution, and generation infrastructures become strained and difficult to expand, other initiatives will be required in order to maintain grid reliability. Existing infrastructure can be more fully utilized and electric energy reduced when electric end users are more informed of both time sensitive consumption and pricing of electricity. Smart-Grid technologies, which include the ability to remotely control consumer electric use, can also enhance the efficiency of the grid system. In order to achieve efficiencies in using the grid, advanced metering with time sensitive monitoring of electricity use and price signals in residential and commercial/ industrial customers will need to be implemented.

The State's largest customers already utilize advanced meters, which record electric usage on an hourly basis, that are then billed at hourly prices in response to the Public Service Commission 2006 Hourly Pricing Order. In 2006, the Public Service Commission directed New York utilities to file comprehensive plans for the development and deployment of advanced metering systems, where feasible and cost-effective, for the benefit of all customers. Utilities filed their advanced metering plans during the first quarter of 2007 and are currently being evaluated. NYSERDA currently offers interval meter incentives for multifamily buildings, as well as for commercial and industrial facilities participating in demand response programs by the New York Independent System Operator (NYISO) and utilities.

Advanced metering and smart-grid technologies will result in awareness of electric use and pricing, and reduce electricity peak consumption, which will mean less reliance on higher polluting power plants and reduced ozone levels. In addition, greater deployment of such technology will aid in the development of a more robust metering services industry, which will provide competition for utility metering services and which could aid in the development of a business model for ancillary services, such as data monitoring and tracking. Demand reduction capabilities and energy savings would provide a more reliable grid system in an economic climate where reliable electric power has become more and more critical. It is estimated that the use of advanced metering could result in up to a 20 percent reduction in energy use and up to a 10 percent reduction in peak load.

To advance the wider use of smart meters for mass market customers, it will be necessary to demonstrate positive net benefits. In addition, there are consumer challenges regarding the acceptance of dynamic electric pricing and implementation and use of the technology, as well as regarding the education of residential customers on the benefits of advanced metering/time-of-use rates.

➢ ENCOURAGE THE USE OF ADVANCED METERING AND SMART-GRID TECHNOLOGY

New York State should develop and move forward a plan to accelerate the comprehensive deployment of advanced metering throughout the State, which would not only enable increased participation in New York's demand response programs, but also provide information and feedback options for end-users, creating a powerful usage reduction tool in the mass market – an informed consumer with an energy use "dashboard."

- The Public Service Commission should accelerate the implementation of advanced metering policies, schedules and procedures to promote the rapid development of advanced metering by utilities and the further development of a variety of business models to provide advanced metering services in all sectors.

Utility Interconnection

At times, clean distributed generation installations can face a burdensome utility interconnection process, often involving a lengthy review and approval process. Issues of connecting to network systems and obtaining permit approvals through lengthy SEQRA review are also impediments to installation. The disincentives of large up-front costs in obtaining permits and approvals are barriers that must be eliminated to promote the adoption of renewable distributed generation. Utilities must ensure interconnection requests are handled in a timely manner and at reasonable costs.

➢ FACILITATE INTERCONNECTION PROCESSES FOR RENEWABLE DISTRIBUTED GENERATION

- The Public Service Commission and the Long Island Power Authority should explore a more streamlined, transparent interconnection process for renewable distributed generation installations. The process should be web-based and allow applicants to view the status of their applications. The state should help to identify solutions to overcome technical and other barriers to effective and timely interconnection.

Program Commitment and Coordination

The further development of renewable energy resources in New York will require significant, long-term commitments from private developers, financial institutions and the communities in which such facilities are located. New York must administer its renewable program giving full recognition that any sign of a faltering commitment to the program, whether real or perceived by the market, could derail the development of renewable resources in New York. For programs where significant, long-term financial commitments are necessary, uncertainty in policy and regulation will be their undoing.

➢ IMPROVE OVERALL AGENCY CONSISTENCY AND COORDINATION

It is imperative that those State entities directly involved in renewable resource development, or which have review responsibilities, ensure their policies and programs are consistent.

- The State should consider reconstituting the State Energy Planning Board (formerly under Article 6 of the State Energy Law) to facilitate this objective. In addition, the Board should conduct a comprehensive review of regulatory policies and practices to ensure the mutual goal of economically and environmentally sound renewable energy siting decision making is met and global climate change impacts are factored into the decision making process.

Empower Local Governments and Municipalities

Local Governments and Municipalities can play a critical role, becoming a key part of the solution to achieving the goals outlined in New York's clean energy agenda. Empowering these communities to purchase green power contracts will assist in the long-term goal of reducing energy costs, lowering greenhouse gas emissions, and promoting the concept of environmentally sustainable practices.

However, municipalities wishing to purchase green power are often reluctant to do so because of conflicting signals from the state as to whether this is permissible under current state "low bid" law, since green power typically costs more. Removing this barrier could serve to boost the market for green power both directly through municipal purchase, and indirectly as municipalities can serve as leadership models for the broader community and help raise public awareness.

➢ EXPAND PURCHASES OF RENEWABLE ENERGY BY LOCAL GOVERNMENTS

- The State should identify and address any statutory or regulatory barriers to municipal government purchases of green power. Specific guidance should be provided to allow a municipality the option to specify green power and conventional power as separate commodities.

Public Awareness and Educational Outreach

The renewable energy market is, in many ways, at its infancy in terms of breaking through public acceptance and knowledge base of its use. It is only over the course of the last few years that the majority of the general public has begun to fully understand the negative impacts of relying on fossil fuels. As often is the case, it takes dramatic events, such as rapidly increasing oil costs or the irrefutable evidence of advanced climate change, to force us to seek a change from the status quo. The role of education is critical in bringing about the transformational changes in, and public acceptance of, the clean energy sector.

New York has invested in public education on energy issues through the New York Energy Smart Communities Program. The Program presents energy seminars to local residents, small businesses, farmers, and others to increase awareness of opportunities to reduce energy consumption and green energy programs. However, confusion, misconceptions and skepticism of both energy efficiency programs and the reliability of green power sources still exist. New York has set ambitious goals through recently announced energy efficiency, green building, and increased renewable energy initiatives. To achieve these goals, it is imperative for New York to create an aggressive, statewide consumer education campaign, targeting K-12 education, as well as behavior-change messaging targeted at adults.

The Task Force believes the best place to begin this education and awareness for a sustainable environment is with school children and teachers. Sound practices taught as part of a comprehensive state-mandated K-12 curriculum incorporating climate change, green technologies, environmental sustainability and smart growth, will have a profound impact not only on furthering their secondary education, but further instilling the message within their communities.

In addition, an aggressive message campaign is needed to target the adult community. Consumers face barriers to energy efficiency and renewables through the lack of effective communication regarding available products and their cost effectiveness, as well as their overall net gain in terms of reducing energy costs and associated environmental benefits. Aggressive consumer education and better marketing will help to reduce consumer frustration and improve customer acceptance.

Local and municipal governments can play a vital role in promoting these initiatives, yet face similar awareness hurdles. Municipalities seeking to mandate advanced energy efficient and green building practices in new construction often have to learn from other municipalities as well as other states. This process is slow, inefficient, and can be confusing or discouraging to builders and contractors who promote and take advantage of these technologies. In addition, municipalities are often unaware of existing alternative funding mechanisms. Assisting them to identify and understand these mechanisms could help them take advantage of energy efficiency and renewable energy investments, such as bonding, bundling photovoltaics in energy performance contracts, power purchase agreements, and using clean fuel vehicles by their governments.

➢ BUILD ON PUBLIC AND PRIVATE EDUCATIONAL PROGRAMS

The State should build on the successful public and private renewable energy educational programs currently available by establishing an aggressive, statewide consumer education campaign to increase market awareness through:

- Directing the State Education Department (SED), in collaboration with NYSERDA, to develop and implement a K-12 education initiative introducing the concepts of renewable energy, climate change and sustainability;

- A consumer messaging campaign targeting renewable energy, conservation, energy efficiency, and consumer choice purchasing options;
- Development of a public education and promotional program to support the transition to renewable fuels;
- Coordinating campaigns within existing state promotional programs; and,
- Developing guidance for local municipalities by directing the New York State Department of State to lead an interagency effort to create a comprehensive toolkit for municipalities to help them promote the installation of renewable energy technologies and promote statewide consistency. This toolkit should include, among other resources, planning guidelines to encourage renewables in site design, model approaches for new construction, and model ordinances that will eliminate unreasonable barriers and protect resource access.

FUTURE VISION

Ours is a frank and urgent call for change in the way we consume and generate our energy. With our energy prices soaring, the security risks of petroleum dependence more prominent than ever, and the visible evidence of advanced climate change across the world, New York faces compelling reasons to put renewable technologies to use in large scale. As outlined throughout this report New York State has significant opportunities to advance these technologies, which will in turn improve our energy security, the reliability of our current energy infrastructure, and create numerous new business opportunities and green collar jobs of every level. Removing the barriers identified in this report will help to ensure these opportunities are not lost.

If our society is to begin addressing these critical challenges we face, New York must begin transitioning away from relying on conventional energy sources. Rather, we need to adequately educate our citizens to use and accept renewable resources as an integral part of a solution.

Transitioning our energy sources will take time, and this transition will not come without controversy. Further, no proposal outlined within this report will be the single solution for meeting this challenge. Taken together, however, these recommendations do provide a comprehensive strategy for New York to move forward with a new, stronger and brighter vision – *a clean energy vision*.

As the Task Force continues, we look forward to working collaboratively with all stakeholders involved to achieve this vision.