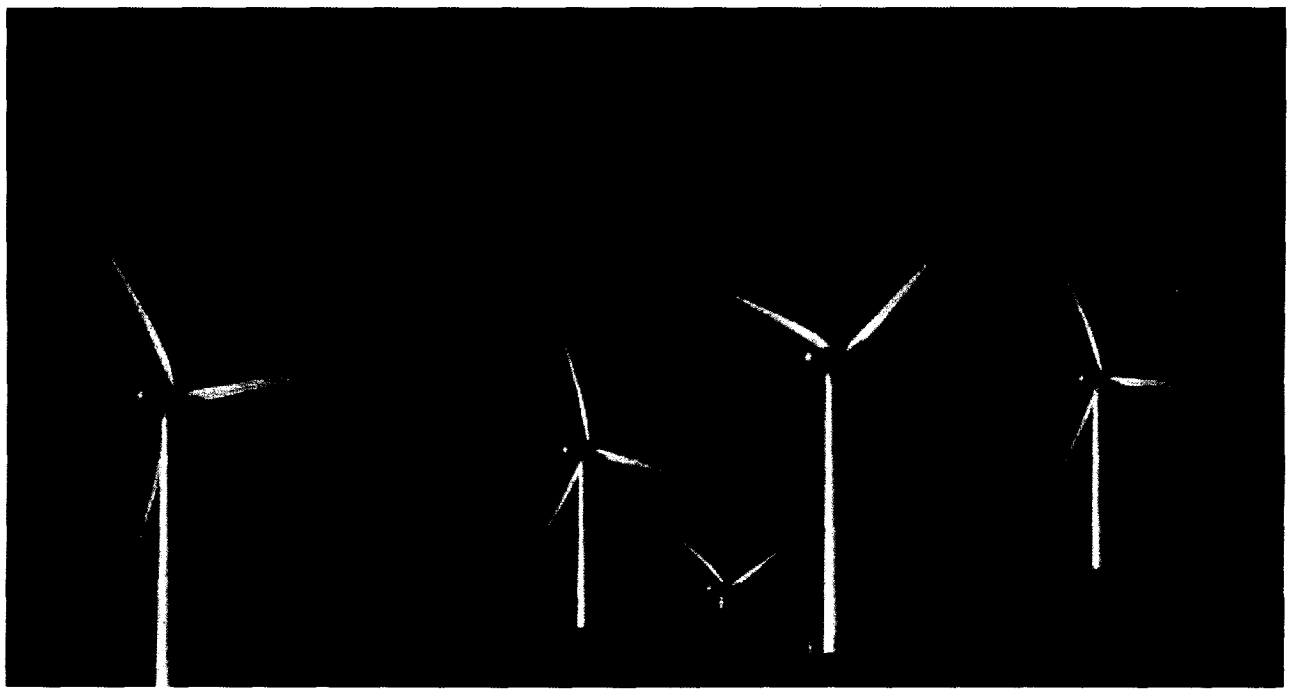
New York Main Tier RPS

Impact & Process Evaluation



Prepared for:

The New York State Energy Research and Development Authority, Albany, New York

Carole Nemore, Project Manager

Project Team:

KEMA Inc.

Liz Hicks, Rick Fioravanti, Josh Kessler, and Nellie Tong

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ABSTRACT

New York's Renewable Portfolio Standard (RPS) program, designed to increase the State's retail electricity mix from a baseline of 19% to 25% by 2013, has been in effect since 2004. NYSERDA is required to present the New York Public Service Commission an evaluation report of the program results through the end of 2008. The report is to be issued for public comment by March 31, 2009. In support of this evaluation effort, KEMA Consulting performed impact and process evaluation studies to help understand the program's progress toward RPS policy goals and to assess program delivery. This comprehensive report presents findings pertaining to these evaluation studies.

This report focused most heavily on the Main Tier component of New York's RPS, and program support and policy conditions for large-scale renewable energy in New York. This report summarizes data gathered on current program progress, projected program needs, economic benefits, policy and administrative efficacy. Where applicable, elements of the Customer Sited Tier of the RPS were included in this assessment, especially related to progress toward goals and briefly on program delivery. Results presented in the report are based on analysis of program data, findings from in-depth interviews with a wide range of market participants, as well as a review of primary and secondary data sources.

The assessment finds that on balance, the program is delivering considerable benefits to New York for its investment in renewable energy technologies. The Main Tier RPS program is highly cost-effective with a benefit-cost ratio exceeding 6 to 1. The program is being delivered according to policy and cost-effectively. Areas where the program could be most improved concerns actions—both administrative and policy measures— that the State could take to effectively reduce market uncertainty for long-term renewable energy investment in New York. While New York is generally tracking toward towards meeting the RPS goal under the original load forecast stated in the 2004 Order; three of the four program elements are not meeting their annual targets. One exception is the Customer-Sited Tier for which updated targets based on authorized funding levels have enabled NYSERDA to achieve 119% of its 2009 target by the end of 2008. The overall goal of 25% by 2013, however, cannot be met without considerable additional renewable energy procurement through the RPS Main Tier program.

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Section 1
EXECUTIVE SUMMARY

SCOPE AND PURPOSE

This report focuses primarily on the Renewable Portfolio Standard (RPS) Main Tier program, but also touches on the Customer-Sited Tier (CST) program, Voluntary Market, Executive Order 111 (EO 111), and activities in New York markets that are outside the purview of the New York State Public Service Commission (PSC). The intention of this report is to review the impacts of the RPS program as well as the process used to implement the program. The report also discusses a number of actions that the State could take to improve the efficiency, transparency, and fairness of the program—three stated goals—as well as suggesting additional ways that the program could be modified to more effectively promote new renewable energy development in New York State.

KEMA relied on quantitative indicators to assess progress toward program targets and to estimate the costs and benefits of the program. To assess the program implementation process, KEMA's approach relied primarily on qualitative indicators, supplemented by quantitative data where applicable.

KEY FINDINGS

Tracking toward RPS Targets

This report tracked the progress of four RPS elements toward targets set forth in the September 2004 Order from the New York PSC – the RPS Main Tier program, CST program, EO 111, and the Voluntary Market. This assessment finds that New York is tracking toward meeting the RPS goals under the original load forecast stated in the 2004 Order, but three of the four elements are not meeting their annual targets. The exception is the CST for which 2008 updated targets based on authorized funding levels have enabled NYSERDA to achieve 119% of its 2009 target by the end of 2008. Given that the Main Tier program accounts for the vast majority of the incremental target, the overall goal of 25% by 2013, however, cannot be met without considerable additional renewable energy procurement through the Main Tier.

The Main Tier program has completed three procurements of renewable attributes, and based on data current through June 2008, the total expected energy production associated with facilities under contract was 2,947,000 MWh, or 62% of the 2009 annual target and 31% of the 2013 Main Tier target. CST

progress as of 2008 stands at 119% of its 2009 target, with expected total production of 62,226 MWh[1], as a reflection of the revised funding level and the 52,878 MWh target which was stated in the CST Operating Plan and later modified through a rule-making proceeding before the PSC on October 1, 2008[2].

As of 2007[3], EO111 had achieved 83% of its 2007 target. The Voluntary Market had reached 59,603 customers but it is not possible to estimate MWh based on program tracking data. It is recognized however, that NYSERDA has no responsibility for achieving EO 111 or the voluntary market goals.

Economic Impacts, Benefits and Costs

The total economic impacts resulting from three Main Tier procurements to New York State is estimated to be about $4.2 billion over the average 20 year life of the facilities.[4] These estimates were developed taking into account direct economic benefits and broader economic benefits. First, the three completed Main Tier procurements together with Maintenance Tier resources will yield significant direct economic benefits into New York's economy that nearly quadruple the $560 million in committed Main Tier program expenditures[5]. Approximately $2.1 billion dollars over the 20-year life of the facilities is expected in direct economic benefits measured in jobs, taxes and local payments, in-state purchases, and land leases. When the effects induced on the broader economy are considered, the total economic benefits are more than $4.2 billion. If the 25% goal is increased to 30% by 2015 and is based upon post-Energy Efficiency Portfolio Standard (EEPS) load forecasts, the direct and total economic benefits for New York State could rise to $12.5 billion.

The Main Tier RPS program is highly cost-effective with a benefit-cost ratio exceeding 6 to 1. The specified benefits include direct benefits related to investment and wages in the New York State economy, electricity price suppression at the wholesale level, and environmental benefits in the form of specific avoided air pollution emissions. The specified costs include NYSERDA's cost to administer the program and the payments to developers under contract for RPS attributes.

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[1] New York State Renewable Portfolio Standard Performance Report, Program Period ending June 2008, NYSERDA, September 2008,page 12.
[2] Notice of State Rule-Making, No. 03-E-0188SA19, October 1, 2008.
[3] 2007 is the most recent year for reported data on EO 111 and the voluntary market.
[4] This assessment was based on the assumption that all of the 30 projects listed in the June 2008 performance report would enter commercial operation. Should projects fail to come online these benefits may be less.
[5] $558.5 was committed as of June 2008, but this amount has since decreased due to recent project cancellations.

With respect to other potential economic impacts, the impact on system reliability is likely a short-term net economic cost, in that the optimal sites for renewable resources are usually not well aligned with the transmission infrastructure. Project location should not be considered as a bid scoring criterion. Incorporating a bid scoring criterion based on project location might ultimately be undermined by efforts that improve price signals through enhanced performance data and market information exchanges, and simply add another layer of complication and potential ambiguity to award process. The impacts on the environment are beneficial in the long-run and in line with policy objectives.

Program Structure's Relationship to Policy Objectives (Process Evaluation)

On balance, KEMA's assessment is that the RPS program has achieved new renewable energy capacity in New York cost-effectively. Moreover, the program has attracted new renewable energy generation capacity into the state beyond the levels supported by the program. KEMA's assessment is that the program is being administered efficiently, and with due diligence concerning ratepayer funding risks. Nonetheless, funding levels at this time are inadequate to meet targets for 2013. In the 2004 Order, the PSC authorized a collection schedule that totals over $741 million; however, if all of the currently specified collections were dedicated to acquiring only the 2013 Main Tier target of 9.8 million MWh per year under 10 year contracts, contracted REC prices would need to average about $7 to $8 per MWh/REC—a rate well below market averages throughout New York, New England, and the average bid prices for the second and third solicitations. Additionally, the authorization process, since it is not regularly scheduled, does not foster a great deal of certainty in the marketplace. In nearly five years since the program was adopted, the PSC has issued two authorizations approving three main tier procurements, all of which were to be conducted before the end of 2007. The first authorization approved only the "fast track" procurement and the second authorization approved two procurements to be conducted through the end of 2007. The PSC has not authorized or publicly announced any other future procurement.

RECOMMENDATIONS

KEMA has identified the following recommendations for consideration by the PSC and NYSERDA.

Appropriate Targets and Goals

- In order to meet RPS goals, funding must be made available for additional Main Tier solicitations.
- New York should define any future RPS procurements and targets in accordance with forecasted cost requirements and take into consideration authorized funds. This approach would be congruent with how the CST targets and funding levels have been recast.
- Transforming percentage targets into annual goals for MWh and treating them as hard targets will contribute to market certainty.

- The voluntary market does not appear to be meeting its RPS policy goal of meeting 1% of total load. New York State may wish to engage in discussions with both Green Power Providers along with the distribution utilities to identify program changes that will increase the participation of this market segment.

Program Effectiveness

- Improving market certainty for renewable energy developers is important. Authorizing additional funds on a periodic basis for the procurement of hard targets will contribute to bolstering market certainty for developers.

- NYSERDA should consider issuing a "standard offer" for smaller projects—perhaps from 1MW to 10 MW—which could be issued at any time but perhaps most appropriately immediately following awards from a competitive solicitation if a balance of available funding remains.

- New York should consider moving from a procurement system where only attributes from one physical generator are eligible as a means of contract compliance to a product-based system over time—one where a Renewable Energy Credit (REC) associated with the electric generation of any otherwise eligible RPS resource can be substituted for compliance purposes.

- New York should consider alternative forums for working with wind and demand response providers to develop new solutions to transmission and distribution congestion issues. A starting point for this may be facilitated meetings on future transmission impacts, participation in the day-ahead market and assignment of dispatch base-points for wind operators.

- NYSERDA should continue to offer long term contracts and consider flexibility to extend contract term offers beyond the current maximum of 10 years.

- Consistent with its existing order,[6] New York State should formally recognize tradable Renewable Energy Credits (REC) as a means of compliance with the RPS and for encouraging growth in the voluntary green power markets. Adopting a regionally compatible REC tracking and trading system would advance voluntary REC market activity and facilitate environmental disclosure.

[6] Case 03-E-0188, Proceeding on a Motion of the Commission Regarding a Retail Renewable Portfolio Standard , Order Recognizing Environmental Attributes and Allowing Participation of Projects with Physical Bilateral Contracts, June 28, 2006.

Program Efficiency

- There should be a regular schedule with flexibility to conduct more frequent, and smaller, if warranted, solicitations with NYSERDA given the flexibility to issue a solicitation periodically, perhaps every six or twelve months. This will help greatly to reduce market uncertainty. This can only occur provided the funding is available on a schedule that supports such periodicity in procurement cycles. The solicitation schedule should be published as far in advance as possible again to increase market certainty.

- To respond with nimbleness to changing market conditions, NYSERDA should be allowed to make use of funding that may become available due to the suspension of contracts at the developer's initiation, or monies that may become available due to underperforming contracts.

- NYSERDA should maintain the practice of setting bid price ceilings based on current market conditions and keeping them confidential. A bid price ceiling exerts restraint and encourages the prudent expenditure of public funds. Confidentiality serves to avoid having bid prices drift toward the ceiling price over time.

- NYSERDA should implement a proposal review and award schedule process to demonstrate as much transparency as possible, including a clear schedule for award date, debriefing window, and what debriefings will (e.g., clarity of estimation and presentation of economic benefits) or will not cover (e.g., disclosure of the bid price will not be covered).

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Section 2
INTRODUCTION

POLICY GOALS AND OBJECTIVES

In September 2004, the New York Public Service Commission (PSC) issued an Order to establish retail Renewable Portfolio Standard (RPS). The 2004 Order also established the objectives of the RPS policy according to the following priorities:

- Increase supply of renewable energy
- Improve energy security and independence
- Economic benefits
- Improve environment
- Economic efficiency
- Administratively efficient and verifiable
- Compatible with competitive energy market

The Order required the State to increase the percentage of renewable energy in its retail electricity mix from 19% in 2004 to 25% by 2013, with specific annual procurement targets beginning in 2006. The Order established two tiers—a Main Tier for utility-scale renewable resources, and a Customer-Sited Tier (CST) for distributed resources—and also required that the voluntary renewable energy market account for a 1% share of the total mix. To meet RPS targets, the Order mandated the creation of a central-procurement program structure under which NYSERDA would procure the renewable attributes necessary to meet Main Tier and Customer-Sited Tier program targets.

To fund the program, the PSC authorized the Load Serving Entities (LSEs) to collect a surcharge from each retail electricity customer that pays the System Benefits Charge (SBC) based on the amount of energy that the customer consumes. The total amount authorized for collection was $741.5 million.

The RPS Program consists of two tiers, the Main Tier and the Customer-Sited Tier, both of which are administered by NYSERDA. Combined, the RPS Program tiers are responsible for the vast majority of the new, incremental, renewable resources needed to satisfy the 25% goal. The RPS Program has two targets, one for the Main Tier (which accounts for 98% of the RPS Program), and another for the CST (which accounts for 2% of the RPS Program.

Main Tier: The Main Tier is designed to stimulate the development and construction of large-scale renewable generation facilities that sell their electrical output into the wholesale power market administered by the New York Independent System Operator (NYISO). Under the Main Tier, NYSERDA does not procure energy, but rather offers to purchase renewable attributes produced by each facility under long-term contracts of ten years or three years for fuel-based technologies. Contracts to purchase these attributes are awarded through a competitive solicitation process. To be eligible to participate in a Main Tier competitive solicitation, a Bid Facility must commence commercial operation on or after January 1, 2003, or must first produce new or additional renewable energy after that date. This ensures that the new technologies are in addition to the renewable generating energy facilities already in existence within the state at the time the RPS was adopted.

Taking into account the contributions from all sectors needed to meet the goal, the Main Tier 2013 target (9.8 million MWh) is the vast majority of the total 14 million MWH incremental target.[7] Three procurements have been conducted thus far, and as of June 2008 a total of 30 facilities were awarded contracts under the Main Tier, and an additional two contracts were awarded under the Maintenance Tier.[8] The first procurement, RFP 916, was issued in late 2005, with contract awards in early 2006. The second, RFP 1037, was issued in late 2006, with contract awards made in early 2007. The third procurement, RFP 1168, was issued in the fall of 2007, with contract awards made in 2008. Despite it being the largest sector contributing to the goal, no further Main Tier procurements are authorized by the Public Service Commission at this time.

Customer-Sited Tier: The CST is intended to ensure that distributed sources of renewable energy continue to help diversify the State's energy mix, reduce the need for distribution system upgrades, and invest in emerging technologies that could have a major impact in the future. Eligible technologies include fuel cells, photovoltaics (PV), small wind projects (300 kW or less) and anaerobic digestion. Incentives are provided to project owners in the form of capacity buy-downs and expected production-based incentives. Incentive

[7] State of New York Public Service Commission. "Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard: Order Regarding Retail Renewable Portfolio Standard." Case 03-E-0188. Appendix D. Issued September 24, 2004. (The 14 million MWh includes an expected contribution of nearly 2 million MWh from the Long Island Power Authority, an entity not within the purview of the Public Service Commission.

[8] As stated in the June 2008 performance report, three contracts have been terminated. The Jordanville Wind Farm and the Criterion Wind Farm both due to failure to meet their commercial operation dates and the Jersey Atlantic Wind Farm whose contract was terminated at the request of the contractor.

structure and budget vary by technology. More than 62,000 MWh of renewable energy will be produced from projects that are either under current or pending CST contracts.

While NYSERDA is responsible for administering the Main Tier and CST, the 2004 RPS Order also established how other entities will contribute to the RPS 25% goal. The PSC set forth expectations for voluntary market growth, as well as state agency purchases of renewable energy purchasing in response to Executive Order (EO) 111. The targets for EO 111, the CST, and voluntary markets are small in comparison to those for the Main Tier. Though not under the jurisdiction of the PSC, LIPA and NYPA[9] were also expected to continue to take actions to increase renewable energy supply. Both entities are active in promoting both the wholesale and distributive renewable resources.

SCOPE AND PURPOSE OF 2009 REVIEW

This report focuses primarily on the Main Tier program, but also touches on the CST, voluntary market, EO 111, and activities in New York markets that are outside the purview of the PSC. The intention of this report is to review the impacts of the RPS as well as the process used to implement the program. The report also presents a number of actions that the State could consider to deliver a more effective and efficient program. .

Section 3 presents the methodology that KEMA employed to evaluate the RPS program, developed in consultation with NYSERDA staff. The section discusses data sources, indicators used to analyze program impacts, and qualitative methods used for assessing the program implementation process.

The Impact Analysis (Section 4) explores New York's progress toward meeting its renewable energy goals. The focus of the chapter is on whether NYSERDA has procured enough renewable attributes to meet the targets established by the PSC, particularly for the Main Tier, and whether it is on pace to procure enough attributes to meet the goal of 25% by 2013. This section also provides an overview of the State's "15 by 15" Energy Efficiency Portfolio Standard (EEPS), a program through which New York plans to reduce its energy consumption 15% below its baseline use by 2015. The Impact Analysis explores how forecast MWh targets will be affected by the EEPS (i.e. how much less incremental renewable energy will have to be

[9] NYPA's contributions can be counted toward support of Executive Order 111 or voluntary market growth.

added to reach a total of 25%) as well as an overview of impacts from a goal scenario of the EEPS policy coupled with a 30% RPS goal by 2015.

The Benefits and Costs section (Section 5) estimates the total economic impacts derived from the total capacity production (not just the capacity production under RPS contract), including multiplier induced impacts, to the New York state economy from the RPS Main Tier program, estimates a basic benefit-cost ratio, and reviews qualitatively the potential reliability and environmental impacts of the Main Tier RPS program.

The Implementation Assessment (Section 6) takes an in-depth look at the procedures that New York has used to implement the RPS program. The focus is on the Main Tier. The CST is discussed briefly as well. This portion of the report relied heavily on PSC Orders and qualitative data from stakeholder surveys. The section also relied on historical bid data and analyses that place the individual views of various stakeholders in a larger program context.

The Recommendations section (Section 7) summarizes alternative program design considerations for the New York RPS program based on the assessment conducted in all other sections of this study.

CURRENT POLICY CONTEXT

Several recent reports and Orders have contributed to the discussion of renewable energy policy in New York State. In February 2008 the Governor's Task Force on Renewable Energy released a report on the state of the renewable energy industry in New York and the potential expansion of the industry going forward. The Report recommended that the RPS goal be increased to 30% by 2015. The new goal was supported by a RPS Cost Study Update which was provided to the PSC in November 2008 to support and inform a request for additional funds to fully achieve the 25% RPS goal and to consider raising the RPS goal to 30% by 2015 given the forecasted costs. In June 2008, the State adopted the Energy Efficiency Portfolio Standard (EEPS) to cut its electricity usage 15% by 2015. The Governor's 2009 State of the State message reaffirmed this by proposing to meet 45 percent of New York's electricity needs through energy efficiency and clean renewable energy by 2015 (this goal combines the 30% RPS with the 15% EEPS). A State Energy Planning process is underway which will take into account the Governor's proposal. Also, while the RPS Cost Study Update was expected to serve as the basis for future RPS program budgets and annual procurement projections, the study did not account for the dramatic changes in economic conditions and financial markets which have occurred since it was initially conducted in 2007-08. Consequently, the Cost Study is currently being updated. Softening conditions in financial markets, the world economy, and changes in national energy policies stemming from the 2008 election outcome are likely to have impacts on the renewable energy market in New York.

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Section 3
APPROACH

INDICATORS FOR EVALUATION

In evaluating the program's impacts, KEMA relies on quantitative indicators to assess progress toward program targets and to estimate the costs and benefits of the program. In assessing the program implementation process, KEMA's approach relies primarily on qualitative indicators, supplemented by quantitative data where applicable.

RPS Impact Analysis

Progress toward Program Targets and 25% by 2013 Goal (Section 4). The primary indicator for this RPS impact analysis is whether the Main Tier program is meeting its targets, and whether the program is on schedule to meet the 25% by 2013 goal. These are relative targets because they are percentages of retail load, and not absolute MWh targets. The Customer-sited Tier Operating Plan, adopted in 2007 set absolute targets for the program through 2009 based on the allocated funds and the targets were later updated in 2008 through a SAPA petition process to reflect available funding.

RPS Economic Impacts, Benefits, and Costs (Section 5). The second set of indicators is an assessment of the total economic impacts, benefits and costs to New York State ratepayers over the lifetime of the installed facilities. The assessment of economic impacts considered job growth, and direct payments into the economy from investment in renewable resources as well as indirect effects related to the added jobs, spending and investment.

Additionally, a benefit-cost (or cost-effectiveness) ratio was developed and presented in this Section. Based on the data on economic impacts, the benefits to New York are computed in terms of value-added dollars for presentation in comparison to the costs. The components of the benefits for this cost-effectiveness estimate are as follows:

- Economic benefits – direct benefits due to in-state spending that adds value to the New York State economy in terms of additional Gross State Product (GSP).
- Electricity price suppression – decreased wholesale electricity prices due to the addition of renewable resources into the state's energy mix.
- Environmental benefits – monetized values of avoided air pollution emissions based on offsetting conventional electricity generation due to the added renewable energy supply.

Cost estimates include the following:

- The actual and projected procurement costs of the RPS attributes for Main Tier and Maintenance Tier resources.[10]
- Program administration costs for the Main Tier and Maintenance Tier.

Additionally, other potential impacts are assessed and presented but not quantified. These include an assessment of the available literature and interview data on potential reliability impacts to the NYISO system, and potential environmental impacts due to the construction and long-term operation of the renewable energy facilities.

Program Structure's Relationship to Policy Objectives (Process Evaluation - Section 6)

This section evaluates program and policy processes to assess whether the program is being administered in a way to achieve program goals and in a manner that is fair, efficient, and transparent. The assessment is based in large part on stakeholder feedback with respect to the policy as defined in the series of PSC Orders governing the program. In some cases, where survey responses fall into two or more basic categories, KEMA categorizes responses and quantifies these data.

[10] Due to variations in production, actual costs may be less than contractually encumbered.

DATA SOURCES

Stakeholder Interviews

KEMA conducted primary research through a series of interviews with stakeholder in the New York renewable energy market. Table 1 shows how many interviews were held with members of each stakeholder group:

Table 1
Market Actor Interview Targets and Completions

Market Actor	Targeted Completions	Actual Complete	Percent Complete
NYSERDA staff members			
Main Tier	4	4	100%
Customer-site Tier	3	3	100%
Renewable energy developers			
Bidders	21	18	86%
Non-participating Developers	6	9	150%
Trade association representatives	5	6	120%
Green power marketers	7	7	100%
Municipalities with renewable energy projects	9	11	122%
Distribution Companies & NYISO	8	8	100%
LIPA & NYPA	2	2	100%
Ratepayer interest groups	0	0	0%
Total	65	68	105%

In some cases, there were multiple respondents on the phone. In other cases, KEMA conducted multiple interviews or follow-up interviews with members of the same organization.

In consultation with NYSERDA, KEMA developed separate interview guides for each stakeholder group to focus on information that members of each group would be best able to provide. In many cases, KEMA probed respondents on specific issues beyond the interview guide during the interview to gain more information on new topics that came to light, or eliminated questions that provided little valuable insight. In conducting the in-depth interviews, the discussion format was that of a conversation among peers which put respondents at ease and allowed them to speak more freely, guided by skilled interviewers. This approach provided flexibility to interviewers as they sought the most valuable information that particular interviewees could provide. It also provided flexibility to respondents in providing information that they believed would be most relevant for program evaluators.

Secondary Sources

In performing this analysis, KEMA reviewed a variety of New York-specific program reports, solicitations, market studies, and PSC Orders. These reports provided the data necessary to design appropriate stakeholder surveys, assess program impacts, and determine whether the program is making progress toward its stated goals and objectives. In particular, program reports such as the RPS Cost Study and RPS Performance Reports provided the data necessary to perform quantitative analyses of program impacts.

NYSERDA provided KEMA with access to bid forms and weighted bid price data. Self-reported economic benefits data—by the bidders—was relied on heavily in KEMA's assessment of total economic benefits. KEMA conducted an assessment of the credibility of the developers' self-reported data on economic benefits of the facilities and concluded that the data were credible (See Appendix B).

Finally, KEMA also reviewed and incorporated findings of other evaluation studies such as the Wisconsin Focus on Energy[11] evaluation for its evaluation methodology and the RPS Best Practices[12] in formulating and developing its recommendations presented in Chapter 7.

[11] Goldberg, Miriam et al. of KEMA, Interim Benefit-Cost Analysis: FY 07 Evaluation Report for the Focus on Energy Statewide Evaluation. Presented to the WI Division of Energy (February 26, 2007).
[12] "Recommended Principles And Best Practices For State Renewable Portfolio Standards," Prepared By The State / Federal RPS Collaborative for the Clean Energy States Alliance (CESA), January 2009.

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Section 4

PROGRESS TOWARD TARGETS AND 25% BY 2013 GOAL

As part of the 2005 PSC Implementation Order,[13] monitoring and evaluation (M&E) activities in a 2009 expanded report were to address the following process issues, including:

- An overview of program status
- An assessment of the program's success in achieving program goals and objectives

BACKGROUND

In September 2004 the New York Public Service Commission (PSC) issued an Order adopting New York's Renewable Portfolio Standard (RPS). This Order called for an increase of renewable energy in the State's retail electricity mix from a baseline of approximately 19.3% in 2003 to 25% by 2013 and set specific renewable energy supply targets for each year from 2006 to 2013. The following program elements combined were expected to meet the 25% renewable energy target by 2013 set forth by the New York PSC.

- Baseline of Existing Resources
- RPS Main Tier Program
- RPS Customer-Sited Tier Program
- Executive Order 111[14]
- Voluntary Markets
- Long Island Power Authority
- New York Power Authority[15]

The Order laid out a two-tier, central-procurement RPS compliance program to be administered by NYSERDA -- the Main Tier and Customer-Sited Tier Programs. The New York PSC also set forth expectations that the Voluntary Market (*i.e.,* New Yorkers who voluntarily purchase retail renewable energy), and Executive Order 111 (*i.e.,* required procurements by state agencies), would contribute to the

[13] State of New York Public Service Commission, "CASE 03-E-0188 – Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard," April 14, 2005, p. 46-48. (2005 Order)
[14] Executive Order 111 requires New York state agencies to procure 10% by 2005 and 20% of their electricity from renewable sources by 2010.
[15] NYPA's contributions are accounted for in the baseline, and in EO 111 or voluntary markets, depending the type of activity.

RPS targets.[16] LIPA though not under the jurisdiction of the PSC, and the New York Power Authority (NYPA) are both expected to increase their respective renewable energy supplies and will contribute to the RPS through procurements in both main tier-type technologies and customer-sited tier-type technologies. [17]

TARGETS

This section reviews progress toward targets set forth in the Order approving a Renewable Portfolio Standard, issued by the New York Public Service Commission on September 24, 2004. The new RPS goal was expressed as a percentage of load forecasted for 2013 which at that time was expected to be 182,866,999 MWh. Consequently the 25% RPS goal for 2013 was set at 45,716,750 MWh, of which a substantial portion was already in place.

At the time that forecasts were calculated (2003), the pre-existing baseline resources, consisting primarily of large hydropower facilities at Niagara Falls and on the St. Lawrence River, comprised approximately 19% (or 31,543, 624 MWh) of the RPS goal. Thus, the new incremental amount needed to achieve the RPS Goal was targeted at 14,173,126 MWh, representing an additional 5% approximately of new renewable resources. It was understood that pre-existing baseline resources, existing State programs such as Executive Order 111 and the Voluntary Market, and the progress being made by LIPA and NYPA to procure renewable energy resources, combined, would not achieve the total new increment needed. Consequently, a new two-tiered RPS Program was created to be administered by NYSERDA to procure most of the new increment needed. The RPS Main Tier Program consists of large to medium-scale electric generation facilities that deliver their electrical output into the wholesale power market administered by the New York Independent System Operator (NYISO). The second tier, the RPS Customer-Sited Tier Program (CST), consists of smaller, "behind-the-meter" resources that produce electricity for use on-site: solar photovoltaic, small wind, fuel cell, and anaerobic digester technologies.

[16] Expectations for growth in renewable energy sales through the voluntary market and through Executive Order 111 procurements are included in the 25% overall renewable energy target for 2013, and are also included in the "increment target" value in the Public Service Commission's RPS Order. State of New York Public Service Commission. "Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard: Order Regarding Retail Renewable Portfolio Standard." Case 03-E-0188. Issued September 24, 2004.

[17] State of New York Public Service Commission. "Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard: Order Regarding Retail Renewable Portfolio Standard." Case 03-E-0188. Issued September 24, 2004.

Table 2 shows the expected contributions of the sectors toward the 25% renewable energy goal, as anticipated in the RPS Order, for the year 2013.

Table 2
RPS Policy Elements Contribution to 2013 Targets, MWh

SEP Forecast 2013 182,866,999 MWh		
RPS Policy Element	**2013 Target (MWh)**	**% of 2013 Load Forecast**
Baseline Resources	31,543,624	17%
RPS Main Tier Program	9,854,038	5%
RPS CST Program	201,130	<0.1%
LIPA	1,933,720	>1%
Voluntary Market	1,828,670	1%
EO 111	355,568	0.2%
Total Renewables	**45,716,750**	**25%**

Source: Targets derived from the Order Regarding Retail Renewable Portfolio Standard, New York Public Service Commission, Appendix D, Sept. 24, 2004.
*Incremental Target does not include the Baseline Resources

Under the 25% by 2013 goal, baseline resources, expressed as a percentage, are forecasted to decrease from 19.3% to about 17% of the State's retail load, though their actual amounts will largely remain the same. The RPS Program, *i.e.*, the Main Tier and Customer-Sited Tiers combined, accounts for approximately 5% of the new renewable resources. LIPA is expected to contribute 1%, the voluntary market is expected to contribute 1%, and Executive Order 111 is expected to account for approximately 0.2% of the total retail sales in 2013.

In Table 3 below, the 2013 targets for all the elements contributing to the RPS goal are expressed as a percentage of the total MWh needed to reach the 25% of statewide load forecast RPS goal,,or 45,716,750 MWh.

Table 3
RPS Total Renewable Resources and Incremental Targets

RPS Policy Element	2013 Target (MWh)	% of Total Renewables Target (45,716,750 MWh)
Baseline Resources	31,543,624	69%
RPS Main Tier Program	9,854,038	22%
RPS CST Program	201,130	0.4%
LIPA	1,933,720	4%
Voluntary Market	1,828,670	4%
EO 111	355,568	1%

*Incremental Target excludes Pre-Existing Baseline Resources

The incremental target is the new renewable energy needed to meet the 25% goal, minus pre-existing resources in the baseline. The Main and Customer-Sited Tier Targets for 2013, when combined ("RPS Program Target") equal 10,055,168 MWh of the new or incremental procurements needed to meet the goal (beyond the baseline resources). Of the new renewable resources expected to be met through the RPS Main and Customer-Sited Tiers Programs, 98% of the RPS Program will be realized through Main Tier procurements.

It is important to note that while the 2004 RPS Order established the 25% renewable energy goal by 2013 as a compliance goal, the respective sectors' targets are considered fungible over time and across program sectors. The 2004 RPS Order also set forth annual targets which were intended to serve as guides along the path toward goal attainment. The annual targets are shown in Table 4 below.

Table 4
RPS Energy Targets, in Megawatt hours (MWh), 2006 - 2013

Program Year	Main Tier	Customer Sited Tier *	EO 111	Voluntary Market	Combined
2006	1,121,247		282,812	228,584	1,657,902
2007	2,326,171		314,579	457,167	3,148,405
2008	3,549,026		346,366	685,751	4,656,828
2009	4,767,994	52,878*	378,174	914,335	6,113,381
2010	6,012,179		410,002	1,142,919	7,691,088
2011	7,297,746		391,857	1,371,502	9,212,186
2012	8,556,710		373,712	1,600,086	10,706,631
2013	9,854,038		355,568	1,828,670	12,239,406

Source: Targets and load forecast derived from the Order Regarding Retail Renewable Portfolio Standard, New York Public Service Commission, Appendix D, Sept. 2004. Target does not include LIPA. *New CST target, changed by the PSC and further adjusted by the RPS Cost Study Update in 2008.

In 2007, the Customer-Sited Tier energy production target was revised as was the terminal date for compliance. The new 52,878 MWh energy target and the change in the CST Operating Plan terminal date to 2009 represented a reasonable assessment of what program resources could achieve given the $45 million of authorized funding.

Main Tier

The Main Tier is the largest program component in the incremental amount needed and overall it is responsible for approximately 5% of the 2013 load forecast. Achievement of RPS program Main Tier target is governed by the schedule and timing of authorized funding.

In Table 5 below, the RPS Main Tier progress made to date is expressed in two ways. The first section of Table 5 below shows actual progress made based on actual production of on-line facilities. The bottom section of the Table shows total expected energy production from all facilities under contract. Actual production under contract was 582,082 MWh in 2006 and 583,452 MWh in 2007. Facilities under contract were expected to produce 2,639,000 MWh in program year 2008, or 74% of the program year target of 3,549,000 MWh; but actual production invoiced toward the 2008 target as of the time of this report was 841,267 MWh or 24% of the 2008 target . Contract provisions allow projects under the last Main Tier procurement to delay their on-line date to December 1, 2009. A majority of projects chose this option, thus reducing actual progress for 2008; however, these projects are expected to be fully delivering contract quantities by the end of 2009. Based on three completed procurements and accounting for associated data current through June 2008, the total expected energy production associated with facilities under contract was 2,947,000 MWh, or 62% of the 2009 annual target and 31% of the 2013 Main Tier target. At present no additional solicitations are scheduled.

Table 5
Main Tier Progress to Date (GWh), 2006-2008

	2006	2007	2008*	2009	2010	2011	2012	2013
Main Tier Targets:	1,121	2,326	3,549	4,768	6,012	7,298	8,557	9,854
Progress toward Annual Targets:	582	583	841					
Progress as % of Annual Targets:	52%	25%	24%					
Expected Progress toward annual Targets from Facilities under Contract								
Progress toward Annual Targets:			2,639	2,947	2,878	2,878	2,850	2,850
Progress as % of Annual Targets:			74%	62%	48%	39%	33%	29%

*Year to date—does not include all production/delivery to date due to lag in invoicing/verification.

Source: "RPS Program Progress," Jan. 14, 2009 and *New York State Renewable Portfolio Standard Performance Report*, Sept. 2008. Targets derived from the September 24, 2004 PSC RPS Order, Appendix D.

Customer-Sited Tier

Explanation of CST Targets. The September 2004 Order established the goal of the CST program to achieve two percent of the total RPS incremental megawatt-hour (MWh) target. Based on the September 2004 Order and information provided by Staff, the cumulative CST target through 2013 was set initially at 201,130 MWh. In its June 28, 2006 Order[18], the Commission established new capacity and energy targets for the Customer-Sited Tier through 2009 only, authorized incentive funding of $45 million, and directed the development of a Customer-Sited Tier Operating Plan ("CST Plan") for solicitation of customer-sited renewable resources.[19] NYSERDA developed a Customer-Sited Tier (CST) Operating Plan dated February 12, 2007 that set forth the specific CST programs to be implemented under the RPS Program through 2009, the expected funding levels for each program, the payment methods for each program, the timing of various procurement methods, and other pertinent program design and operational details. The technologies initially included in the CST program were photovoltaic systems, fuel cells, small wind facilities, and anaerobic digesters. Based upon the CST Operating Plan funding allocations established by the Commission, the initial estimate of the cumulative MWh expected to be under contract (funding encumbered) through 2009 was approximately 50,733 MWh, which was subsequently revised to 52,878 MWh. The energy production target of 52,878 MWh and the CST Operating Plan terminal date of 2009 represented a reasonable assessment of what program resources could achieve given the $45 million of authorized funding.

The RPS CST Program began accepting applications for incentives in 2007 for each of the four eligible technologies (Anaerobic Digester Gas-to-Electricity Program; Fuel Cell Program; PV Incentive Program; and the Small Wind Program). Incentives are provided to eligible project owners in the form of capacity buy-down and/or expected production-based incentives depending on the technology. Eligible technologies are offered funding support through an open enrollment, first-come, first-served solicitation process. Subsequent competitive solicitations may be issued at NYSERDA's discretion to reach underserved customers, to stimulate the adoption of new technologies, and to build and support renewable markets.

[18] Order on Customer-Sited Tier Implementation, Case 03-E-0188.
[19] The CST Plan was released in February 2007 and can be found at http://www.dps.state.ny.us/CST_OP_02-12-07.pdf.

CST Funds. Within months of rolling out new CST programs, market demand for PV and ADG systems exceeded authorized funding, even after re-allocation of discretionary program funding. [20] In 2008, NYSERDA requested that program funding allocated to the Main Tier component of the RPS program but unused, be re-allocated to the CST to keep pace with market demand in the PV and anaerobic digester program areas.

The Commission, in an order dated October 28, 2008, approved the re-allocation of $47 million from uncommitted Main Tier funding resources to the CST program. Of this amount, the anaerobic digester program received $7.6 million and the PV program $20.6 million, leaving $15.1 million for discretionary use and $ 3.7 million for system performance monitoring. This brought total funding of the CST programs to $92 million.

CST Progress. In June 2008, the RPS Annual Performance Report reported that expected production from pending contracts as of June 2008 would exceed the total operating target for the CST program. Based on total encumbered contracts[21] effective through June 2008, this tier was expected at that time to achieve 119% of its 2009 goal. As of June, 2008, capacity associated with actual installations and installations pending contracts together are 11 MW which accounts for 94% of the Operating Plan's 2009 target of 11.7 MW.)

[20] Discretionary Funds may be used at NYSERDA's discretion to supplement allocated funding for: (1) resource categories for which demand clearly exceeds their allocations; (2) eligible technologies that, in NYSERDA's judgment, would benefit from an increased allocation; and (3) for new technologies that the Commission determines to be eligible for CST support. At the beginning of each calendar year, each technology resource category will start with a new annual allocation and with access to the discretionary pool as directed by NYSERDA throughout the funding year.

[21] Encumbered includes actual contracts and commitments.

Expected energy production from PV installations was at 86% of the 2009 CST technology-specific target, fuel cells at 27%, small wind at 4% and ADG at 209%, resulting in the program achieving 119% or 62,226 MWh of the 52,878 MWh annual target. The target history and expected results are displayed in Table 6 below.

Table 6
Customer-Sited Tier 2009 Targets and Achievement (in MWh)[22]

	RPS 2004 Order	CST Operating Plan 2007	Expected Energy Production June 2008
Total Overall	**100,855**	**52,878***	**62,226**
Solar Photovoltaics	n/a	4,533	3,445
Fuel Cells	n/a	18,700	4,994
Anaerobic Digester Biogas	n/a	25,700	53,625
Small Wind	n/a	3,945	162

Source: "RPS Program Performance Report, June 2008

*Corrected by the RPS Cost Study Update

Other Policy Elements

Other programs or state entities contributing toward achievement of the RPS 25% by 2013 Policy goal are: Executive Order No. 111, the New York Power Authority, the Long Island Power Authority, and the voluntary market. EO 111 was first issued in 2001, was continued by Governor Paterson, and called for a percentage of electricity in state buildings to come from renewable energy -- 10% by 2005 and 20% by 2010. EO 111 has been in effect for 8 years and by 2007, it reached 83% of its annual 2007 target, which is the latest date for which reported data are available. The Voluntary Market came into effect shortly after the Commission restructured the State's electricity industry to a competitive retail choice in 1999. It was not possible to estimate the voluntary market's MWh progress based on available data. NYPA's contributions are incorporated into progress made by other sectors such as baseline, the Voluntary Market, and EO 111. LIPA is not under the jurisdiction of the New York PSC, but has separately taken initiatives to increase its percent of renewable energy among its total electricity mix. NYSERDA has no responsibility for achievements made by any of these other elements.

[22] RPS Program Performance Report, June 2008, p. 12

Voluntary Markets. The Voluntary Market comprises New York's electricity customers' non-mandated purchase of renewable energy, offered by competitive electricity supply companies or regulated utility/distribution company programs. In its Sept. 2004 Order, the New York Public Service Commission set a target for 1% of the State's electricity supply to come from the Voluntary Market.

The voluntary market reached approximately 59,603 customers enrolled in renewable power programs as of September 2007 among 19 different green power marketers or providers actively serving the voluntary market in New York.

While the target for the voluntary is relatively small (1% of the statewide load forecast for 2013), the progress made in the voluntary market and the Main Tier program are interrelated by two Main Tier program components – contract suspension and partial bid capacity limits. While the level of voluntary market activity in New York is slight, these provisions have potential implications for long term goal setting and progress reporting.

Long-term RPS contracts or portions of these contracts between developers and NYSERDA can be suspended by developers electing to redirect REC sales into New York's retail markets, thereby reducing Main Tier program procurement volume. If contracts are suspended for sales to in-state voluntary markets, KEMA recommends that Main Tier progress reports should reflect that those sales were retained for the RPS goal.

Another RPS program component also supports the voluntary market. Main Tier solicitations specify that the contracted bid quantity percentage cannot exceed 95% of a facility's production output and can be as low as 30% of the expected annual production of a bid facility. The intention of this program component is to help build the retail markets; consequently the non-contracted portion of a facility's output may be sold into any other markets, including the voluntary market in New York. Three wind projects with NYSERDA REC contracts are retaining 60% of their production for sale to other markets; however, since developers are not required to report on these sales, it is not known whether these RECs are being sold into New York's voluntary market or elsewhere.

Executive Order 111. Executive Order No. 111 pertains to all state entities with responsibility for purchasing energy are required to increase their purchase of energy generated from such technologies as: wind, solar thermal, PV, sustainably managed biomass, tidal, geothermal, methane waste and fuel cells. As in the case of the voluntary market segment, long-term contracts between developers and NYSERDA can be suspended for developers to redirect REC sales to EO 111 purchasers.

Targets for EO 111are expressed differently in the Executive Order and in the 2004 RPS Order. In EO 111 the goal is to purchase sufficient quantities of energy so that 10 percent of the overall annual electric energy requirement of buildings owned, leased or operated by State agencies and other affected state entities will be met through these renewable technologies by 2005, and to increase that to 20 percent by 2010. Many entities began procuring renewable power well ahead of the established starting date in State Fiscal Year 2005/06. Many of these projects were made possible through program offerings of the New York Power Authority (NYPA).

According to the EO 111 Annual Report for fiscal year 2006-2007, [23] 9.33% of the total electricity consumed by State entities was produced from renewable energy sources, which means the State entities in 2007 were close to meeting their 10% by 2005 target level. In terms of the RPS 2004 Order, at the close of program year 2007, the NYS Office of General Services reported that state agency purchases of clean energy pursuant to Executive Order 111 were estimated to be 261,000 MWh, or 83% of the 2007 RPS targets (314,579 MWh).

LIPA and NYPA. Long Island Power Authority (LIPA) and the New York Power Authority (NYPA) are not under the jurisdiction of the PSC, and therefore are not required to meet specific RPS targets. However, both have initiatives and programs that will impact RPS progress based on the 2004 Order.

To expand its renewable energy as part of its increase renewable energy as part of its overall electricity consumption mix, LIPA launched a 10-year (1999-2008), $355 million program to promote clean energy generation and energy efficiency. This Clean Energy Initiative (CEI) provides rebates for both end-use and wholesale generation projects. From 1999- 2006, the CEI (excluding R&D efforts but including efficiency programs) produced 175 MW of peak demand savings and 464 GWh of energy savings annually.

NYPA supports wholesale electric generation procurements, and has installed 28 customer-sited technologies in solar PV and 15 fuel cells that run on anaerobic digester gas. NYPA operations and programs may impact and contribute to the RPS under the following elements: baseline; voluntary market; and EO 111 procurements.

POTENTIAL INCREASE IN RPS GOAL

The New York policy environment is changing rapidly. In June 2008, New York enacted an Energy Efficiency Portfolio Standard (EEPS) setting a goal to reduce forecasted electricity use by 15% by 2015 (or

[23] Report is found at: http://www.nyserda.org/pdfs/Executive Order 111 SFY 06-07.pdf

"15 x 15").[24] Under the EEPS, annual electricity consumption in New York is expected to decrease from 162 million MWh in 2006 to 152 million MWh by 2015.[25] Given the 25% RPS target by 2013 is expressed as a percentage of load forecast, and if an updated load forecast for 2013 adjusted by the EEPS replaces the original RPS forecast used in the 2004 Order, the RPS Main Tier program target is expected to be reduced to 4.57 million MWh of renewable attributes.[26]

The 25% RPS target by 2013 essentially meant that an increment of approximately 5% of new renewable energy would need to be added to New York's pre-existing baseline of renewable energy resources. Moreover, the RPS Main Tier was expected to procure most of the new incremental amount. If the recommendation made by the Governor's Task Force on Renewable Energy is adopted, the RPS goal could be increased to 30% by 2015, commensurate with the goal year of the EEPS. If the 25% RPS is increased to 30%, it means an additional 5% or a doubling of the incremental target would be needed to the meet the new goal and it is expected that most of the total new increment would be realized from Main Tier procurements.

According to the RPS Cost Study Update (2008), if the 2013 load forecast is reduced by the EEPS, the 25% RPS target would decrease in relation to a reduction in the load forecast for 2013. As stated above, under a reduced load forecast for 2013, the 25% RPS Main Tier program target is expected to be 4.57 million MWh of renewable attributes, down from the original estimate of 9.85 MWh in 2004.[27] Moreover, if an expanded RPS goal of 30% renewable energy by 2015 is adopted, the RPS Main Tier program target would increase to a total of 10.1 million MWh of renewable attributes (based on the post-EEPS load forecast for 2015). Given that approximately 3 million MWh are already procured under the first three solicitations, this would leave an addition 1.5 million MWh to be procured in the future to meet the 25% goal by 2013 scenario, or an additional 7 million MWh to meet the 30% goal by 2015. Table 7 shows these new targets, by year. The "Post-EEPS" columns predict Main Tier RPS procurement levels under the 25% by 2013 and 30% by 2015 program scenarios.

[24] State of New York Public Service Commission, "Order Establishing Energy Efficiency Portfolio Standard and Approval Programs," June 2008. pg. 3.
[25] La Capra Associates & Sustainable Energy Advantage, LLC, "New York Renewable Portfolio Standard Cost Study Update – Main Tier Target and Resources," March 18, 2008. pg. 6. Hereafter: "LaCapra/SEA Cost Study."
[26] La Capra/SEA Cost Study. Pg. 6.
[27] La Capra/SEA RPS Cost Study Update, Pg. 6.

Table 7
Main Tier RPS Targets by Year and Scenario

	Cumulative (MWh)			Incremental (MWh)		
Year	Under Contract	Post-EEPS 25% Target	Post-EEPS 30% Target	Under Contract	Post-EEPS 25% Target	Post-EEPS 30% Target
2006	865,582			865,582		
2007	865,582			0		
2008	2,665,720			1,800,138		
2009	***3,490,270****			824,550		
2010		4,026,932	4,588,262		524,259	1,085,589
2011		4,570,699	5,867,057		543,767	1,278,795
2012		4,570,699	6,994,385		0	1,127,328
2013		4,570,699	8,113,747		0	1,119,362
2014			9,134,589			1,020,842
2015			10,123,157			988,568

Source: LaCapra/SEA RPS Cost Study Update (2008)

*The contracted amount used in the RPS Cost Study Update is now out-of-date. Current contracted amounts to date have been reduced to approximately 3 million MWh due to under-performance, contract suspensions, project terminations and project cancellations that have occurred since the RPS Cost Study Update was calculated.

In conclusion if the RPS goal remains unchanged at 25%, and the 2013 load forecast is updated by the reductions expected to be achieved by the EEPS, then the RPS Main Tier Program, with 3 million MWh of production already under contract, has attained approximately 66% of the final 2013 post-EEPS target.

Section 5

RPS ECONOMIC IMPACTS, BENEFITS & COSTS

This section of the report characterizes the economic impacts associated with expenditures on renewable energy facilities' construction and operation in New York for facilities supported by the RPS Main Tier and Maintenance Resources program. As part of the 2005 PSC Implementation Order,[28] monitoring and evaluation (M&E) activities in a 2009 expanded report were to address the following issues, including:

- To the extent possible, an assessment of program costs and benefits, including identification of cost/benefit ratios as appropriate, impacts of renewable resources developed through the RPS Program on the environment, energy security, economic development, and electric system reliability;
- Macroeconomic benefits accruing to New York as a result of implementation of the RPS Program, including the extent to which the RPS Program has advanced renewable resource technologies and attracted jobs and renewable resource generators, manufacturers, and installers to New York State (the macroeconomic study conducted by NYSERDA in 2004 could be expanded to address these issues).

This section is organized as follows:

- Summary of direct and total macroeconomic impacts from three NYSERDA procurements
- Presentation of Benefit-Cost Ratio, composed of the following subsections:
    - Economic impacts of the RPS program, including increased economic output, and value added impacts to the New York State economy (in terms of Gross State Product)
    - Program costs including expenditures to purchase Renewable Energy Credits (RECs) and for program administration
    - Specification and discussion of benefit-cost ratio estimate
    - Estimated potential price suppression benefits of avoided generation from conventional energy sources in addition to benefits specified above
- Review of other potential impacts, not quantified, including reliability and environmental impacts

[28] State of New York Public Service Commission, "CASE 03-E-0188 – Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard," April 14, 2005, p. 46-48. (2005 Order)

SUMMARY OF DIRECT AND TOTAL MACROECONOMIC IMPACTS FROM THREE NYSERDA PROCUREMENTS

The RPS Main Tier has committed substantial funding resources to support new generation from wind, biomass, and re-powered hydropower facilities, with wind predominating in number and size of facilities and estimated economic impacts. Together with Maintenance Tier resources, all of the contracted facilities will yield significant direct economic impacts totaling more than the direct funds committed.

Approximately $2.1 billion dollars over the 20-year life of the facilities is expected in direct economic impacts measured in jobs, taxes and local payments, in-state purchases, and land leases. Wind projects contribute 80% of these direct dollars, biofuel retrofits 18%, and hydro upgrades the balance. In the short-term, the greatest positive economic impacts come from "in-state spending" on construction materials and services, excluding construction wages. In the long-term, payments in lieu of taxes (PILOTs) or state and local taxes trigger the largest total economic impacts.

When the effects induced on the broader economy are considered, the total economic impacts are more than $4.2 billion. In addition, the direct and total economic impacts for New York State would be even greater if the 25% goal is increased to 30% by 2015 based upon post-Energy Efficiency Portfolio Standard load forecast. In the latter case, the total economic impacts to New York State are estimated would increase to about $12.5 billion.

The macroeconomic impacts, including indirect impacts induced through NYSERDA's programs, were assessed by KEMA Consulting in a separate study (complete report is included in Appendix A).[29] A summary of the key findings of this report is presented in the following order:

- Presentation of RPS Scenarios
- Summary of Direct Economic Impacts
- Summary of Total Economic Impacts

[29] KEMA Consulting and EDRG, Inc., "NYSERDA Main Tier RPS Economic Benefits Report," November 14, 2008. Hereafter, "KEMA Main Tier Economic Benefits Report."

RPS Scenarios

As part of the assessment of macroeconomic impacts, NYSERDA considered the following scenarios based on a 2006 study by La Capra Associates.[30]

- Scenario 1: First Three Competitive Solicitations (RFP 916, RFP 1037, RFP 1168). Scenario 1 is defined as all the contracts made under the first three competitive solicitations that occurred from 2005 – 2008.[31] Scenario 1 includes renewable energy investments and generation since program inception in 2005 through the third RPS procurement issued late 2007 and selected in 2008. The last round of awarded contracts will come on-line in 2009-10.
- Scenario 2: 25% RPS Goal by 2013 Using the Post-EEPS Load Forecast. Scenario 2 is defined as the projected continuation of current RPS contracts to achieve a goal of 25% renewable generation by 2013 based upon the post-Energy Efficiency Portfolio Standard (EEPS) load forecast.
- Scenario 3: 30% RPS Goal by 2015 Using the Post-EEPS Load Forecast. Scenario 3 is defined as the projected continuation of RPS contracts to achieve a goal of 30% renewable generation by 2015 post-EEPS load forecast.

These three scenarios form the basis of the assessment of the macroeconomic impacts, including direct and indirect impacts. The complete study is presented in Appendix A; an abridged version summarizing the key findings is presented in the section below titled: Total Macroeconomic Impacts.
The economic impacts or effects of these measures were analyzed at two levels: direct impacts and total impacts. Total impacts include direct impacts and indirect or *multiplier induced* impacts to New York's economy. Indirect or multiplier effects were modeled using an IMPLAN input/out model throughout other sectors of the economy.[32] The results for both levels of analysis are explained for three scenarios.

To estimate the direct and total effects for all three scenarios, the first step was to calculate the following short and long-term economic measures:

Short-Term measures:

- Jobs lasting up to 3 years such as construction, planning and engineering

[30] La Capra Associates & Sustainable Energy Advantage, LLC, "New York Renewable Portfolio Standard Cost Study Update – Main Tier Target and Resources," March 18, 2008. pg. 6. Hereafter: "LaCapra/SEA Cost Study."
[31] Scenario 1 included three wind projects (totaling 174 MW) that subsequently cancelled in 2009.
[32] More background on IMPLAN can be found at www.implan.com.

- Payments to municipalities that do not persist over the life of the facility
- Payments to abutting landowners or others that may be affected by the facility but that are not receiving payments from hosting the facility on their land
- Initial equipment or one-time capital expenditures (such as turbines or empowered upgrade equipment)

Long-Term measures, which are tied to the life of the facility's operations and include:

- Payroll
- Number of Jobs and their Duration described as Job Years
- Taxes or Payments in Lieu of Taxes to State and municipalities
- Fuel Purchases (for biofuels)
- Land Leases
- Other O&M in-state spending on equipment, supplies and services

Direct Economic Impacts.

The purpose of this section is to present the impacts to the New York economy that result from in-state projects contracted under the Main Tier and Maintenance Tier of NYSERDA's Renewable Portfolio Standard (RPS). The data describe the direct "economic" impact (also referred to as either direct impact or direct effect) expected from temporary construction activities, initial project payments to begin construction (to other impacted landowners and/or municipalities), and from annual operations of the completed facility.

Economic benefits reported through the RFP process by developers of wind, hydropower, and biofuel generation facilities include both short-term and persistent long-term impacts.[33] Short-term impacts primarily result from construction jobs and compensation to municipalities, abutting property owners, and others. Long-term impacts are jobs tied to facility operations and maintenance (O&M), state and municipal revenues (as taxes or payments in lieu of taxes), payments to land owners for land leases, fuel purchases for biofuel facilities, and in-state spending on equipment, supplies and services and other annual O&M expenses.

These self-reported data reflect technology-specific (i.e., wind, biofuel, or hydro) benefits, as the cost of developing, operating, and maintaining the three types of Main Tier technologies differs dramatically from

[33] All bidders were instructed and required to submit prospective economic benefits data along with their bid price as part of their response to the competitive solicitation.

one technology to another. Budgets vary by technology in terms of the emphasis on short-term and long-term requirements as well as specific expenditures within each phase. KEMA performed a credibility assessment on these self-reported data with the following conclusion:[34]

> *With a few minor exceptions, it was found that the data reported in these bids, after being modified by NYSERDA in a few cases of misinterpretations of bidding instructions, confirm that the Direct Benefits data is reliable and could serve as a basis for this and other analyses of the economic benefits that can be claimed from renewable energy development.*

Table 8 shows within each scenario the *total direct economic benefits* (reported by developers in dollars per megawatt-hour (MWh) of RE generation in the bids)[35] associated with the nameplate capacity of the facility.

Table 8
Direct Economic Benefits by Scenario ($ per MWh)

Scenario	Resource	New Renewable Energy Production (MWh/yr)	New Renewable Energy Production (MWh over 20 years)	Total Direct $ (Construction to end of facility life)	Total Direct $ per MWh
Scenario 1: First Three Solicitations	**All**	**4,066,553**	**80,852,940**	**$2,064,621,293**	**$25.39**
Scenario 2: 25% by 2013	**All**	**5,266,252**	**105,325,040**	**$2,627,132,184**	**$24.94**
Scenario 3: 30% by 2015	**All**	**10,995,279**	**219,905,580**	**$6,006,979,054**	**$27.32**

[34] See Appendix A: Page 4-8
[35] The direct benefits exclude any consideration of the RPS' potential impacts on electricity prices.

The direct benefits from large scale wind, re-powered hydropower, biofuels, and landfill gas facilities vary considerably. Table 9 breaks down the *direct economic benefit* by each technology for each scenario. On a per-MWh basis, biofuel projects are associated with larger direct economic benefits than wind ($39 versus $24 in the first three solicitations), and landfill gas projects, which are expected to play a role in the future under either the 25% or 30% projected scenarios, would have the highest direct economic benefits (about $50 per MWh). Hydropower projects, which are re-powering upgrades, have the lowest direct economic benefit per MWh.

Table 9

Direct Economic Benefits by Technology ($ per MWh of RE)

Scenario	Resource	New Renewable Energy Production (MWh/yr)	Total Direct $ (Construction to end of facility life)	Total Direct $ per MWh
Scenario 1: First Three Solicitations	Biofuel	486,145	$377,097,675	$38.78
	Hydro	75,986	$22,098,225	$11.06
	Wind	3,480,516	$1,665,425,393	$23.92
Scenario 2: 25% by 2013	Biofuel	681,377	$536,617,806	$39.38
	Hydro	548,680	$106,353,661	$9.69
	Wind	4,021,395	$1,969,273,616	$24.48
	Landfill Gas	14,800	$14,887,101	$50.29
Scenario 3: 30% by 2015	Biofuel	2,026,377	$1,695,726,691	$41.84
	Hydro	1,366,340	$256,393,340	$9.38
	Wind	7,565,562	$4,018,265,621	$26.56
	Landfill Gas	37,000	$36,593,402	$49.45

NYSERDA's second and third solicitations requested information on five specifically defined economic benefits categories: 1) long-term jobs, 2) short-term jobs, 3) payments to NY State and/or its municipalities, 4) payments for fuels and resource access, 5) and in-state purchases of goods and services.

- Long-term Jobs. The long-term jobs category represents jobs related to operation and maintenance of bid facilities in New York. These jobs, expressed as full-time equivalents, last more than three years. Bidders were instructed to describe the types of jobs (occupational classes assumed to occur within the Power Generation & Supply industry), and the expected average annual compensation (inclusive of fringe benefits) for all jobs.

- Short-term Jobs. Short-term jobs last less than three years, and are primarily related to construction and planning. For new facilities (primarily wind, all of which are new facilities), short-term jobs are largely in the construction sector, as well as a significant number in the engineering and consulting fields, and a few in the utility sector. Biofuel and hydro facilities contracted thus far are either maintenance resources or expansions of existing facilities; thus, the short-term jobs are more focused on planning and engineering than construction.

- Payments to NY State and Municipalities. The category of payments to NY State and/or its municipalities shows the new or increased local property tax revenues resulting from the project. These payments are made to school districts, cities, towns or other taxing jurisdictions in New York. In some cases, developers instead make Payments in Lieu of Taxes (PILOT) or form other compensatory agreements that serve as alternatives to taxing mechanisms. Bidders made note of whether these were one-time or annually recurring payments.

- Payments for Fuels and Resources/Land-leases. The payments for fuels and resource access category describes annual payments and compensation related to royalties, production-based payments, land-lease or land-use payments, and other forms of compensation to residents and companies in New York. These payments are associated with securing the rights to access, or in some cases directly acquiring, the land used to build renewable energy facilities. This category also includes purchases of biofuels from local suppliers.

- In-state Purchases. For the short-term, in-state purchases of goods category, bidders were instructed to describe and quantify the degree to which local and state economic activity will increase from construction-related purchases and/or rental of materials and equipment associated with the manufacture, assembly, transport, and construction of a bid facility that is sourced from within New York. This category includes, but is not limited to, gravel, steel, concrete, and mechanical equipment.

As of October 1, 2008, the relative shares and composition of the three Main Tier technologies over the first three solicitations were as follow (in-state projects only):[36]

- Wind: Thirteen wind farms will provide nearly 1,280 MW of renewable capacity, with new renewable energy production of 3.5 million MWh per year. As bidders had the option to offer only a percentage of their project's output, NYSERDA's contracts account for only 1,044 MW, or 82%, of the total 1,280 MW of new wind capacity.
- Hydropower: Fourteen upgraded hydropower projects will provide New York with 28.6 MW of new renewable capacity. New renewable energy production will amount to 99,892 MWh per year, of which 95% is supported by NYSERDA's contracts.
- Biofuel: Four projects will provide nearly 69 MW of renewable capacity, and 486,145 MWh of renewable energy production annually. Two facilities, Lyonsdale Biomass and the Chateaugay Power Plant both burn biofuels exclusively, and have entered the RPS program as Maintenance Resources.[37] Since Lyonsdale Biomass was chosen through the second Main Tier solicitation, NYSERDA has information on its retained economic benefits to the state.

The project data summary above is temporal in that contracts can be suspended for redirecting REC sales into retail markets, cancelled due to environmental or legal challenges, or dissolved due to financial hardship.[38]

Total Economic Impacts.

An IMPLAN input-output economic model of NYS was used to measure the multiplier effects (henceforth termed the indirect effects[39]) based on the direct dollars tied to in-state spending on Main Tier projects. The economic multiplier impacts are a result of direct expenditures to build (or upgrade), operate, and maintain a mix of renewable energy (RE) generating facilities. These multiplier effects reflect the stimulus to local

[36] These figures do not match the figures presented in Section 3 of Appendix A that show the totals from the first three solicitations, as the figures presented in this section only include in-state projects.
[37] These existing biomass facilities were determined by the PSC to be eligible as Maintenance Resources. These RPS Program contracts will support the retention of approximately 39 MW of in-state biomass capacity and involve approximately 259,000 MWh of annual renewable energy production. The retained economic benefits from these facilities are included in this report.
[38] As of March 1, 2009, Noble Chateaugay II*, Noble Allegany and First Wind's Prattsburgh projects were cancelled while under development, reducing NYSERDA's Main Tier investment and expected new capacity by 174 MW or about 13%.
[39] For the purposes of this document, the indirect will include both the wage spending effects (termed induced), and the supplier transaction (the traditional definition of indirect) effects.

businesses and the associated jobs created (especially in the service sectors) as a result of this public investment in RE technologies. The total economic impact from the three scenarios of the RPS Main Tier and Maintenance resources are shown in Table 10. The total dollars of impact represent total NYS output. The economic impacts of technologies in the customer-sited tier are not included in the analysis; so the total impacts reported here do not represent impacts resulting from the entire RPS program.

Table 10

NYS Total Economic Impacts

Scenario	Analysis Interval	Direct Project Benefits ($m)	Indirect Impacts (m$)	Total Impacts (m$)
Scenario 1: First 3 Solicitations	2005-2028	$2,065	$2,183	$4,248
Scenario 2: 25% by 2013	2005-2030	$2,627	$2,796	$5,423
Scenario 3: 30% by 2015	2005-2034	$6,007	$6,567	$12,574

The analysis intervals by scenario include both a startup and operating period. As explained above, each scenario is based on assumptions of different incremental levels of renewable energy investment with differing investment schedules and projected loads. Despite these differences, each scenario holds constant the expected 20-year life of any given RPS-sponsored generation facility. Therefore, the analysis intervals differ by scenario based on differing assumptions of the incremental investment schedule during the startup period.

The incremental difference in total impacts between different scenarios is in large part explained by the projected mix of renewable energy technologies to meet RPS goals. Wind projects under both future scenarios still account for the largest share of total impacts created, but are lessened somewhat as biofuel projects are expected to play a larger role in meeting incremental goals of 19% of all renewable energy in Scenario 2, and 27% in Scenario 3 compared to 17% under the first three solicitations. Biofuel technologies tend to have greater per MWh direct and total economic impacts than either wind or hydropower (see Table 10 above and Appendix A).

The IMPLAN model estimated the number of jobs that would be created, expressed in job years (e.g., a construction jobs lasting three years is expressed as three job years) and as payroll or labor income. The estimates are linked to three scenarios: the existing three procurements, a 25% by 2013 goal that is fully achieved, or a 30% by 2015 goal scenario. In all cases, these outputs are significant. Annual jobs created in New York from the RPS Main Tier projects are tied to short-term, construction work, assumed to average three years, and the long-term operations phase of a facility, assumed to last over the 20-year life

of the facility. The direct annul jobs created in New York from the RPS Main Tier are shown in Table 11 below.

Table 11
Direct Annual Jobs Created in NYS from Main Tier RPS

Annual	First Three Solicitations	25% by 2013	30% by 2015
Short-term Jobs	677	857	1,764
Long-term Jobs	223	279	600

The jobs created to build and operate the renewable energy facilities are well-paying. The following table (Table 12) shows the average yearly compensation per job for each scenario based on the direct jobs and indirect jobs created over the life of the facility. Indirect jobs are not as well-paying, reflecting in part that household spending by renewable energy facility workers spending their wages in New York tends to purchase goods and services from lower-wage sectors, such as retail.

Table 12
Main Tier RPS Impacts on Average Annual Worker Compensation

Over Facility Life	First Three Solicitations	*25% by 2013*	*30% by 2015*
Direct Job Years	6,492	8,298	19,607
Direct Payroll	$501,788,643	$635,533,210	$1,481,422,272
Avg. Compensation per Job	$77,293	$76,589	$75,556
Indirect Job Year Impact	16,184	20,230	45,201
Indirect Payroll Impact	$860,000,000	$1,070,000,000	$2,331,000,000
Avg. Compensation per Job	**$53,139**	**$52,892**	**$51,570**
Total Job Years	**22,676**	**28,528**	**64,808**

Table 13 provides an in-depth view of the total economic impacts by scenario. The yearly economic impacts are calculated for each scenario. Over time, short-term economic impacts disappear and earlier projects complete their expected 20 year life-cycle before the end of the period of analysis. These factors explain why impacts decrease in out years.

Table 13[40]
Total Economic Impacts for Scenario 1: First Three Solicitations, 2005 – 2028

	2005	2006	2007	2008	2009	2015	2028	Total (2005-2028)
Jobs								
Direct	100	595	677	756	305	223	44	*6,492*
Indirect	428	1,670	1,860	1,827	813	529	67	*16,184*
Total	**528**	**2,265**	**2,537**	**2,583**	**1,118**	**752**	**111**	***22,676***
Labor Income (2006$ mil)[41]								
Direct	$10.4	$38.1	$54.8	$58.6	$33.6	$16.9	$2.7	*$502*
Indirect	$23.8	$92.9	$102.7	$99.2	$42.8	$27.5	$3.5	*$860*
Total	**$34.2**	**$130.9**	**$157.5**	**$157.8**	**$76.4**	**$44.4**	**$6.2**	***$1,362***
Output (2006$ mil)								
Direct *(est.)*	$44.5	$172.3	$195.3	$205.0	$107.7	$75.1	$10.3	*$2,086*
Indirect	$63.6	$237.3	$270.0	$259.6	$108.9	$67.4	$8.4	*$2,161*
Total	**$108.0**	**$409.7**	**$465.3**	**$464.6**	**$216.6**	**$142.5**	**$18.7**	***$4,248***

Table 14 shows that under Scenario 2, total impacts exceed $5,423 million—about $800 million more than under the current RPS. Under this scenario the goal is reached in 2011—ahead of schedule (which is 2013)—on account of the assumed additional renewable energy capacity and reduced projected load in 2013 from the prospective EEPS policy.

As shown in Table 15 in a 30% RPS by 2015 scenario the goal is reached by 2015. Total economic impacts would be more than $12 billion over the 29 year period, also due to the necessary added incremental investment to meet the goal and the reduced projected load from the EEPS. This impacts estimate in Scenario 3 exceeds the current policy by over $8 billion.

[40] NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Estimated direct "Output" includes payroll, PILOT payments, land leases, operations and maintenance spending, construction spending "in-state", fuel payments, and payments to other impacted landowners.

[41] For every dollar of economic output (sales) a portion represents labor income. The output impact and the labor income impact for any year should not be added together. They are both reported however to convey how individuals filling the impacted jobs are compensated.

Table 14[42]

Total Economic Impacts for Scenario 2: 25% by 2013, 2005 – 2028

	2005	2006	2007	2008	2009	2010	2011	2015	2028	2029	2030	*Total (2005-2030)*
Jobs												
Direct	100	595	677	851	496	445	381	285	106	62	31	*8,298*
Indirect	428	1,670	1,860	2,052	1,225	968	852	672	210	143	73	*20,230*
Total	**528**	**2,265**	**2,537**	**2,903**	**1,722**	**1,412**	**1,233**	**957**	**316**	**205**	**104**	***28,528***
Labor Income (2006$ mil)												
Direct	$10.4	$38.1	$54.8	$65.6	$47.7	$33.2	$28.5	$21.4	$7.3	$4.6	$2.3	*$636*
Indirect	$23.8	$92.9	$102.7	$112.2	$66.4	$51.9	$44.8	$34.6	$10.6	$7.1	$3.6	*$1,070*
Total	**$34.2**	**$130.9**	**$157.5**	**$177.8**	**$114.1**	**$85.1**	**$73.3**	**$56.1**	**$17.9**	**$11.7**	**$5.9**	***$1,705***
Output (2006$ mil)												
Direct *(est.)*	$44.5	$172.3	$195.3	$228.2	$151.2	$125.9	$116.7	$97.0	$32.3	$22.0	$11.2	*$2,652*
Indirect	$63.6	$237.3	$270.0	$291.4	$168.6	$133.4	$116.6	$89.2	$30.2	$21.8	$11.2	*$2,772*
Total	**$108.0**	**$409.7**	**$465.3**	**$519.6**	**$319.9**	**$259.3**	**$233.3**	**$186.3**	**$62.5**	**$43.8**	**$22.3**	***$5,424***

[42] NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Estimated direct "Output" includes payroll, PILOT payments, land leases, operations and maintenance spending, construction spending "in-state", fuel payments, and payments to other impacted landowners.

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Table 15[43]

Total Economic Impacts for Scenario 3: 30% by 2015, 2005 –2034

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2028	2029	2030	2031	2032	2033	2034	*Total (2005-2034)*
Jobs																				
Direct	100	595	677	981	800	1,018	1,103	980	959	819	845	702	523	479	412	333	263	194	103	*19,604*
Indirect	428	1,670	1,860	2,415	2,004	2,313	2,483	2,209	2,316	1,972	1,944	1,554	1,092	1,025	884	719	572	427	218	*45,201*
Total	**528**	**2,265**	**2,537**	**3,396**	**2,804**	**3,331**	**3,586**	**3,189**	**3,274**	**2,791**	**2,789**	**2,256**	**1,615**	**1,504**	**1,296**	**1,051**	**836**	**622**	**321**	***64,805***
Labor Income ($mil)																				
Direct	$10	$38	$55	$76	$71	$77	$83	$74	$73	$62	$64	$52	$38	$36	$31	$25	$19	$14	$8	*$1,481*
Indirect	$24	$93	$103	$133	$110	$128	$137	$120	$125	$103	$99	$77	$53	$50	$42	$34	$26	$19	$10	*$2,331*
Total	**$34**	**$131**	**$157**	**$208**	**$181**	**$204**	**$220**	**$194**	**$198**	**$165**	**$162**	**$129**	**$91**	**$85**	**$73**	**$58**	**$45**	**$33**	**$17**	***$3,812***
Output Required ($mil)																				
Direct	$44	$172	$195	$265	$232	$271	$297	$274	$288	$260	$268	$229	$164	$154	$132	$107	$84	$61	$32	*$6,053*
Indirect	$64	$237	$270	$342	$280	$328	$352	$311	$322	$279	$281	$224	$164	$156	$136	$114	$93	$73	$36	*$6,521*
Total	**$108**	**$410**	**$465**	**$607**	**$512**	**$600**	**$650**	**$586**	**$610**	**$539**	**$549**	**$453**	**$329**	**$310**	**$269**	**$220**	**$177**	**$134**	**$67**	***$12,574***

[43] Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Estimated direct "Output" includes payroll, PILOT payments, land leases, operations and maintenance spending, construction spending "in-state", fuel payments, and payments to other impacted landowners.

BENEFIT-COST RATIO

At present, a review of the literature reveals that standard methodologies do not exist for estimating the benefits and costs of RPS programs. In a 2007 report prepared by the Lawrence Berkeley National Laboratory (LBNL), after synthesizing and analyzing the methods and results of 28 RPS cost impact analyses (since 1998), one of the key findings is as follows:

> *The studies in our sample utilize a variety of modeling approaches, methods, and data sources to estimate state RPS costs and benefits. A standard cost template has not yet emerged. This is in part due to regional differences in state RPS policies and electricity markets, as different situations call for different modeling approaches. However, a more important factor may be the time and funding constraints imposed on individual studies. State RPS cost studies are typically done with limited budgets on short timeframes, and the sophistication and detail of the analysis may largely be a function of these factors.*[44]

Consequently, for this program evaluation report, developing an original methodology for assessing the costs and benefits of the RPS policy was necessary. Using a cost-benefit analysis that had been done for Wisconsin Focus on Energy program as a reference, a benefit-cost ratio was computed for current RPS commitments. [45] The scope took into consideration the broad quantifiable economic and environmental benefits, referencing the RPS objectives specified by the PSC, and compared those benefits to NYSERDA's cost to deliver those benefits. Using this approach, in consultation with NYSERDA staff, the key inputs for computing a basic Benefit-Cost Ratio are as follows:

- The quantifiable benefits of the RPS program objectives such as economic benefits, energy market competitiveness (expressed in price suppression terms), and environmental improvements.
- Program costs are related to contractual expenditure commitments to purchase RECs from participating developers and for program administration of the Main and Maintenance Tiers as stated in the 2007-08 RPS Annual Performance Report (by NYSERDA).

[44] Chen, Cliff et al., "Weighing the Costs and Benefits of State Renewables Portfolio Standards: A Comparative Analysis of State-Level Policy Impact Projects." March 2007. (LBNL-61580)

[45] KEMA's assessment is that the total economic benefits from current RPS commitments (Scenario 1) represent the only practical scenario for the benefit-cost analysis. Because the two prospective RPS scenarios (25% by 2013 and 30% by 2015) are not firm policy, the additional renewable resources have been simulated by other studies; however, no corresponding administrative costs are known.

Benefits Specification

This estimate includes three categories of benefits:

- Economic Benefits: Value added to the economy in terms of Gross State Product from developers' investments in renewable energy resource in New York State;
- Energy Market Competitiveness: Price suppression from adding low or zero marginal fuel cost electricity resources to the NYISO loading order used a rate of $1.92 per MWh for 2010, totaling approximately $323 million in electricity price savings in 2010;[46] and
- Environmental Improvement: Market transaction values of avoided emissions associated with conventional generation sources of carbon dioxide, nitrogen oxide, and sulfur dioxide. Environmental market values were derived from the New York Mercantile Exchange (as of 02-04-2009) at: $3.95 per ton for carbon dioxide (CO2), $3,250 per ton for nitrogen oxides (NOx), and $11/ton for sulfur dioxide (SOx).

Gross State Product (GSP). As presented above, the total economic impacts—expressed in terms of total economic output— are based on self-reported by winning bidders' from the first three procurements for the 2005 to 2028 period, and include wage and spending effects in addition to the direct investment of the project developers.[47] Economic output can be defined as a representation of, "the value of industry production."[48] The IMPLAN model also computes the value added by industry, and the value added across all impacted industries is the added Gross State Product) associated with those simulated output estimates. Value added is defined as, "[T]he difference between an industry's or an establishment's total output and the cost of its intermediate inputs. It equals gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported)."[49] Therefore, the computed GSP values are the sum of all value added activities resulting from the public expenditure from the RPS program.

For the benefit-cost analysis, the GSP is the relevant dollar concept for the direct economic benefit input in the numerator. Primarily, GSP is inclusive of all value added economic activities to the New York's state

[46] Stern, Frank and Nicole Wobus, Summit Blue Consulting. "Analysis of the Renewable Portfolio Standard's Price Effect on Natural Gas and Electricity." Prepared for NYSERDA, Draft Final Report Nov. 5, 2008. The analysis employed a regression analysis technique.
[47] The period includes a project development period for each solicitation and an assumed operating life of 20 years, staggered according to the solicitation schedule.
[48] IMPLAN Glossary (www.implan.com), accessed January 23, 2009.
[49] Ibid.

GSP, and net of the costs of the inputs to the state economy. Because GSP represents the net change in the state's income, the benefit to the state is just the portion of the revenues from the output that the state gets to keep given the public expenditure that triggered that increase in the first place. The added value in present value terms to New York State's economy, as expressed in GSP from 2005 through 2028, is over 1.2 billion dollars ($2006).

Price Suppression Impacts from the Added Electricity Supply. Renewable energy generation also has the potential to benefit ratepayers by reducing fuel consumption from conventional electricity generation sources. The Economic Benefits Report does not factor into its estimates the impact of price suppression on New York State's economy because the IMPLAN model does not have that functionality. Not only does price suppression represent a potential added incremental benefit to the RPS investment, but also the interactive effects of reduced electricity prices and economic development stimulated by the RPS program expenditure are not assessed in either this report or the Economic Benefits Report.

As part of a broader study on the current state of the market and how the program has changed market conditions since its inception, NYSERDA commissioned an analysis on the effect the Main Tier Program has had on natural gas and wholesale electricity prices in New York. This study states the following: [50]

> *Increased generation by renewable sources could suppress the prices of both of these commodities. In the case of natural gas, the suppression may arise from a reduction in demand for the fuel used for electric generation. In the case of electricity prices, the suppression may arise through the increase in supply of a resource with variable costs at or near zero. These are two separate issues.*
>
> *The analysis indicates that the effect on natural gas prices seen in New York is likely to be modest. This is primarily because of the large geographic market for natural gas relative to the scale of the RPS program, and the ability of natural gas to be stored and transported.*
>
> *The effects on electricity prices in New York are likely to be more significant than for natural gas, due to the more local nature of the electricity generation. [The] reduction in wholesale electricity prices in the year 2010 are likely to be approximately $2/MWh... Each MWh of renewable energy*

[50] Stern, Frank and Nicole Wobus, Summit Blue Consulting. "Analysis of the Renewable Portfolio Standard's Price Effect on Natural Gas and Electricity." Prepared for NYSERDA, Draft Final Report Nov. 5, 2008.

added has the effect of lowering electricity costs by approximately $100, significantly more than the $15 or more paid per MWh for the REC. This value is higher than was estimated in a recent study conducted by the New York Department of Public Service (DPS) of the incremental impacts after the second procurement. [51]

The wholesale electricity price suppression rate of $1.92/MWh is estimated for 2010 because it is assumed to be the first year in which resources from all three procurements are online and the expected output is known. This totals to about $323 million in electricity savings in 2010, assuming a total load of 168,435,000 MWh, excluding new renewable energy resources.

Because the price suppression benefits are specified for 2010 only, it is necessary to make assumptions regarding the price suppression effects prior to 2010 during the ramp-up period and for the period afterward. Price suppression benefits begin as soon as resources begin to come online (2006). After converting the $323 million of benefits listed above into $2006 ($293 million), price suppression values are retrocasted on a linear basis to 2006 to simulate a ramp-up period. For the purposes of this analysis, after peaking in 2010, the price suppression benefits are assumed to persist at that level for two years, and then are scaled down to zero on a linear basis over 10 years (to 2022) as overall load growth is assumed to require more conventional generation over time. In present value terms, this represents $2.8 billion ($2006) over a 17 year period (inclusive from 2006 through 2022).

Avoided Air Pollution Emissions from Conventional Generation. Quantities of key air pollutants (NOx, SOx, and CO2) associated with conventional electricity generation are traded on markets throughout the world as part of regulatory cap and trade mechanisms. These markets offer monetized values of pollutants as a proxy of the per ton benefit to New York State for the avoided emissions. Key inputs to estimate the benefits of avoided air pollution include the following:

- Future values ($ per ton for December 2009) on the New York Mercantile Exchange as of February 4, 2009 ($3.95 per ton for carbon dioxide, $3,250 per ton for nitrogen oxides, and $122/ton for sulfur dioxide).[52]

[51] The study also claimed that suppression rates could be higher because the first two procurements will avoid the highest cost resources on the supply curve.

[52] http://nymex.greenfutures.com/markets/ Accessed February 4, 2009.

- Most recent annual New York State emission factors (pounds per MWh in 2005) from EGRID for each of the three pollutants (828.33 lbs per MWh for carbon dioxide, 0.8867 lbs per MWh for nitrogen oxides, and 2.4531 lbs/MWh for sulfur dioxide).[53]
- Estimated renewable generation from 2006 to 2028 based on the 2008 NYSERDA Annual Performance Report.

By converting pounds to tons and multiplying those three values, the total benefit to New York State is nearly $129,000 in present value terms of the 2006 to 2028 time period.[54] This estimate, however, underestimates the value of these avoided emissions because they do not incorporate the value of natural resource damages (e.g., acid deposition) or avoided health care costs (e.g., asthma attacks).

Program Implementation Costs

The specified approach narrowly defines costs in terms of program administration and the value of contracted RECs. The June 2008 NYSERDA RPS Performance Report summarizes all past and planned program cost information—mostly REC purchasing commitments. The total costs from 2005 through 2019 are approximately $442 million in present value terms[55], and the three basic cost components are:

- NYSERDA administration less the M&V activities for the Customer Sited Tier.
- REC purchases for the three RFPs of the Main Tier and the Maintenance Tier.
- NY State Fees assessed against public authorities less that proportion associated with the CST.

Estimation and Discussion of Benefit-Cost Ratio Estimate

To estimate a benefit-cost ratio, an industry standard approach is used to estimate the net present value of those costs and benefits for the time horizon of the renewable technologies.[56] The present value of the benefits across 2005-2028 total over $2.8 billion, compared with program implementation costs of $442 million. This represents approximately a 6.34 benefit-cost ratio over the estimated life of the program. Table 16 summarizes the benefit and cost values for the New York RPS as described above.

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[53] http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2007V1_1_year05_SummaryTables.pdf Accessed February 9, 2009.

[54] In a WI Focus on Energy Benefit-Cost estimate, the value of similarly specified environmental benefits was also a relatively small part of the overall benefits. Goldberg, Miriam et al. of KEMA, Interim Benefit-Cost Analysis: FY 07 Evaluation Report for the Focus on Energy Statewide Evaluation. Presented to the WI Division of Energy (February 26, 2007).

[55] Assume a 5% discount rate from 2005.

[56] See the CA Standard Practice Manual.

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Table 16
Present Value ($2006) of Benefits and Costs (2005 to 2028)

Year	GSP Added	Price Suppression	Environmental	Total Benefits	Total Costs	Net Cash Flow
2005	$25,955,892	$0	$0	**$25,955,892**	**-$5,563,049**	$20,392,843
2006	$95,807,043	$61,523,810	$1,788	**$157,332,641**	**-$5,298,142**	$152,034,499
2007	$103,408,034	$117,188,209	$1,706	**$220,597,948**	**-$17,710,605**	$202,887,344
2008	$103,400,387	$167,411,727	$7,397	**$270,819,511**	**-$34,252,422**	$236,567,088
2009	$51,733,754	$212,586,319	$9,235	**$264,329,308**	**-$52,564,475**	$211,764,833
2010	$34,330,473	$229,277,040	$8,550	**$263,616,063**	**-$51,841,047**	$211,775,015
2011	$32,695,689	$218,359,085	$8,143	**$251,062,917**	**-$50,040,071**	$201,022,846
2012	$31,138,751	$207,961,034	$7,755	**$239,107,540**	**-$47,504,081**	$191,603,459
2013	$29,655,954	$178,252,315	$7,386	**$207,915,654**	**-$45,379,275**	$162,536,379
2014	$28,243,765	$150,901,430	$7,034	**$179,152,229**	**-$39,338,288**	$139,813,941
2015	$26,898,824	$125,751,192	$6,699	**$152,656,715**	**-$36,507,062**	$116,149,653
2016	$25,617,928	$102,654,034	$6,380	**$128,278,342**	**-$26,053,348**	$102,224,994
2017	$24,398,026	$81,471,456	$6,076	**$105,875,558**	**-$14,278,497**	$91,597,061
2018	$23,236,216	$62,073,490	$5,787	**$85,315,492**	**-$14,244,994**	$71,070,499
2019	$22,129,729	$44,338,207	$5,511	**$66,473,448**	**-$1,476,426**	$64,997,022
2020	$21,075,933	$28,151,243	$5,249	**$49,232,424**	**$0**	$49,232,424
2021	$20,072,317	$13,405,354	$4,999	**$33,482,669**	**$0**	$33,482,669
2022	$19,116,492	$0	$4,761	**$19,121,253**	**$0**	$19,121,253
2023	$18,206,183	$0	$4,534	**$18,210,717**	**$0**	$18,210,717
2024	$17,339,222	$0	$4,318	**$17,343,540**	**$0**	$17,343,540
2025	$16,513,545	$0	$4,113	**$16,517,657**	**$0**	$16,517,657
2026	$15,727,185	$0	$3,917	**$15,731,102**	**$0**	$15,731,102
2027	$14,978,272	$0	$3,730	**$14,982,002**	**$0**	$14,982,002
2028	$1,964,301	$0	$3,553	**$1,967,854**	**$0**	$1,967,854
Total	$803,643,913	$2,001,305,943	$128,620	$2,805,078,475	-$442,051,781	$2,363,026,694

Similar benefit components were recently used to estimate benefits and costs for the Focus on Energy Program in Wisconsin in which the benefit-cost ratio slightly exceeds 1.0.[57] Besides the scale of technologies supported (e.g., most are behind-the-meter technologies, similar to the CST for NYSERDA) key differences include the following:

- Both direct and indirect (wage and spending effects on) GSP values are included in the numerator in the WI study; these values were excluded from the NYSERDA estimate which reduces the estimated net economic benefits and the B-C ratio.
- The time horizon for the technologies extends over a 25 year period in the WI study instead of a 20 year period in this estimate, reducing the estimated net economic benefits to New York and the B-C ratio.
- Additional environmental externalities and non-energy benefits are specified besides avoided air pollution emissions in the WI study, reducing the estimated net economic benefits to New York and the B-C ratio.
- Price suppression effects are not included in the benefits estimates of the WI study, increasing the relative estimated net economic benefits to New York and the B-C ratio.
- Different discount rates (private versus social) are applied in the WI study depending on the combination of benefits specified; since the benefits are primarily derived from market estimates in the New York case (and not with any non-market societal benefit components), the presentation of different scenarios using social versus private discount rates is less meaningful.

OTHER POTENTIAL IMPACTS

The RPS Policy can have other potential impacts that are difficult to quantify. These impacts can represent either a net cost or benefit to the economy. This section presents those potential impacts in two broad categories:

- Reliability Impacts—relating to the potential for renewable resources to serve policy goals for electricity supply or complicate grid operations and/or cause transmission or distribution overloads.
- Environmental Impacts—relating to adverse or beneficial environmental attributes of developing and operating the various renewable energy technologies.

[57] Goldberg, Miriam et al. of KEMA, Interim Benefit-Cost Analysis: FY 07 Evaluation Report for the Focus on Energy Statewide Evaluation. Presented to the WI Division of Energy (February 26, 2007).

The net impact of the RPS policy on system reliability, based on a review of the literature, is likely to represent more of a cost than a benefit to the New York state economy in the short term. This finding is based on conditions beyond NYSERDA's control such as existing and aging transmission infrastructure and load centers located far from the generation centers and suitable feeding points. Increased wind developer participation in NYISO's interconnection, forecasting and market information systems could potentially enhance the value of dispatched capacity from renewable resources and mitigate any intermittency impacts in the long term. The magnitude and direction of all impacts combined, however, is unclear and will continue to be mitigated over the period of the installed generation resources' 20-year lifetime as transmission infrastructure is added. For example, population growth could increase closer to renewable generation resources bring load centers to the source. Storage technologies could become more commercialized, ameliorating the intermittency problem. Enhanced forecasting, modified dispatch rules, and other mitigation strategies for intermittency problems could also improve market information accuracy, reliability planning, and grid operations.

The net environmental impacts of the RPS policy are likely a net benefit to New York State. Indeed, the Generic Environmental Impact Statement (GEIS) from 2004 concludes as much for the three technologies of concern: Wind, biomass, and hydro. Moreover, a review of Draft Environmental Impact Statements for wind farm development projects in New York did not indicate any major exception taken with respect to the prospective GEIS impacts. The magnitude of those benefits in the long term, therefore, is likely tied closely to the efficacy of the renewable technologies themselves. As those renewable technologies perform to their expected potential and add generation effectively to the grid, the environmental impacts will increase in their net benefits to the economy.

Reliability Impacts

Electric grid system reliability has emerged as a significant issue in New York State. The New York Independent System Operator (NYISO) 2008 Comprehensive Reliability Plan argues that reliability is more likely to be related to transmission constraints than to insufficient capacity:

> *The 2008 Reliability Needs Assessment indicated that the forecasted system first exceeds the Loss of Load Expectation criterion in the year 2012.*[58] *The need in 2012 results from a statewide capacity deficiency as well as a zonal deficiency resulting from transmission constraints.*

[58] The industry standard is one day in ten years (http://www.caiso.com/1c8e/1c8ee01d439a0.html)

Therefore the need could be resolved by adding capacity resources downstream of the transmission constraints or by adding resources upstream of transmission constraints in conjunction with transmission reinforcement.[59]

A review of the literature revealed a number of recent key documents relating to renewable energy resources and their impacts on the transmission system in New York State. The overwhelming concern is for wind power because it represents, by far, the largest share of added capacity (93%) and expected production (85%) over the next 20 years from the three NYSERDA procurements. In a prepared statement to the study team, NYISO offered the following information:

The NYISO is updating the study it commissioned with NYSERDA, "The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations" prepared by GE Energy, March 4, 2005 (2005 Wind Study). The Updated Wind Study will assess system impacts from the higher penetration levels of wind plants that are currently proposed on the Interconnection Queue. This study will also analyze the potential impacts that could result from the clustering of many of these proposed projects in areas in the north and west of New York. The 2005 Wind Study commissioned by NYSERDA and the NYISO assumed a zonal distribution of wind plants across the entire State. The Updated Wind Study is scheduled to be completed in the first quarter of 2009.

While the NYISO is clear in raising its concern over future system reliability from adding projected wind power resources to the grid, when asked whether the RPS affected the grid's reliability or costs, NYISO responded as follows:

Integration of distributed generation and intermittent generation has not affected grid reliability. The costs of the wind forecasting system are defrayed by payments made by wind generators under a new Rate Schedule in the NYISO's tariff. Any other costs, including interconnection costs, are recovered in the NYISO's normal course of business.

On balance, the RPS has not clearly affected system reliability to date, other than through periods of reasonably predictable congestion at feedpoints in the grid. However, to enhance overall system reliability,

[59] NYISO 2008 Comprehensive Reliability Plan: A Long-Term Reliability Assessment of New York's Bulk Power System, Final Report, July 15, 2008. Pg. 3.1.

the transmission and distribution system will require additional infrastructure and market information will need to be more accurate and timely. NYISO offered the following comment on current market rules with respect to capacity values of renewable resource intermittency:

> *The NYISO's current Installed Capacity market rules and procedures appropriately accommodate the capacity values for intermittent renewable resources. Resources must follow certain procedures and provide pertinent information to the NYISO in order to qualify as Installed Capacity Suppliers. These requirements include Dependable Maximum Net Capability (DMNC) testing and maintenance schedule reporting.*

In both the short run and the long run, enhancing market information through the systems that support it, will likely offer the most promise for improved utilization of renewable resources and improving reliability. For example, a number of efforts are underway to enable wind developers to enter the NYISO day-ahead market. As an intermittent resource, performance and output of wind systems can be highly uncertain. With the monitoring and forecasting tools necessary to participate in the day-ahead market, a rich source of performance data on wind systems could have repercussions for long-term REC pricing and competition for funding—both among wind projects and across technologies—within New York state.

Interconnection. Interconnection protocols and requirements for renewable resources can represent a significant potential barrier to the contribution of those resources to system reliability. When asked how NYISO handles the impacts of renewable energy projects exceeding 1MW in their control area, NYISO believes it has been responsive to known barriers, including providing special exemptions for some intermittent resources without assigned dispatch base points:

> *Starting with its 2005 Wind Study the NYISO has worked to facilitate the high levels of wind plant interconnections and integrate wind plant operations into its competitive power markets. The NYISO has twice extended its NYCA-wide MW limits for special market rules and penalty exemptions for renewable intermittent resources, which now exempt up to 3,300 MW of intermittent resources (e.g., wind, solar and limited control run-of-river hydro) from financial penalties for failing to follow dispatch basepoints and allowing these resources to receive payment for all generation they deliver to the system.*

Developers consider interconnection procedures and rules to be a considerable barrier to dispatch and investment. From a recent study on the market conditions of the renewable energy market:

> *Developers voiced concern about the lengthy interconnection procedures followed by the NYISO, and noted some inconsistencies in requirements from one utility territory to the next. A review of the NYISO interconnection and cost allocation procedures indicates that standardized requirements are in place across the State, but that delays are still possible under certain circumstances, and that utilities may have opportunities to affect the process and produce results that may be disagreeable to developers. NYSERDA and the State are not in a position to change these procedures, but should recognize that they make the project development process more challenging.*[60]

From NYISO's perspective, their role in the interconnection process is properly implemented and is complex as they explain in a prepared statement:

> *The NYISO interconnection process is a standardized process that is open and nondiscriminatory. These rules and procedures are applied consistently throughout the New York Control Area. Attachment S of the OATT explicitly prescribes the cost allocation rules... Attachment S prescribes the cost responsibility between the Developers of the new interconnection projects and the Transmission Owners who own the facilities to which the projects will interconnect. The rules also allocate cost responsibility among the Developers of different projects. A Developer is responsible for the cost of the interconnection facilities that are required by its project, and facilities that would not be required but for its project. In accordance with the NYISO OATT and FERC precedent Transmission Owners are responsible for the cost of the facilities that are, without considering the impact of the Developer's project, required to maintain the reliability of the New York Transmission System.*

To the extent that they exist, complex and/or onerous interconnection procedures and rules can, nevertheless, present a barrier to effective utilization and development of renewable resources. A number of other load-serving entities support the view that an insufficient amount of effort is being dedicated to solving interconnection issues related, especially, to wind resources.

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[60] Stern, Frank, et al., Summit Blue Consulting. *New York RPS Market Conditions Assessment (Draft Final Report)*, Prepared for NYSERDA, December 1, 2008. Page S-12.

Intermittency. The intermittency of renewable resources, wind power in particular for New York State, is a major planning concern and could potentially affect area operating reserve requirements. One NYISO study states:

> *Wind capacity in New York is projected to grow to more than 1,200 MW by the summer of 2009. The projects currently under review in the interconnection queue indicate the potential for another 6,500 MW of wind capacity to be developed by 2011. Due to the location of these resources and their intermittent nature, this presents a new challenge for grid and market operations in New York. Many of the proposed wind plants are seeking to interconnect in concentrated clusters located in the northern and western regions of the state. These regions are supported by an existing transmission network that will not be capable of delivering all the potential wind output to the load centers in the southeastern regions of the state.*[61]

While intermittency introduces some economic costs to New York's economy from inefficient transmission operations due to the installed wind generation resources, as well as risk premiums associated with the RECs for a given resource, these costs are somewhat mitigated by market dynamics:

- Developers anticipate production intermittency and congestion and adjust their pricing of RECs accordingly.
- NYISO is responding with improved generation information systems, forecasting tools (including a wind forecasting system), and procedures to provide better market signals for market forces and risk mitigation strategies for outages or over-generation events.
- Additional transmission infrastructure, if built close to the installed renewable energy resource, can also mitigate intermittency impacts.

As alluded to earlier, providing appropriate market signals with respect to any measures that renewable plant operators can take to engage effectively in the wholesale power market will help mitigate risks associated with intermittency periods. The benefits of additional market information and resulting actions include better planning, enhanced project profitability, increased competitiveness for financing of high quality projects, insurance against displaced output from other proximate renewable resources, and achievement of policy goals of meeting renewable energy targets. Indeed, enhanced performance of intermittent renewable energy systems through better risk specification and mitigation strategies—the result

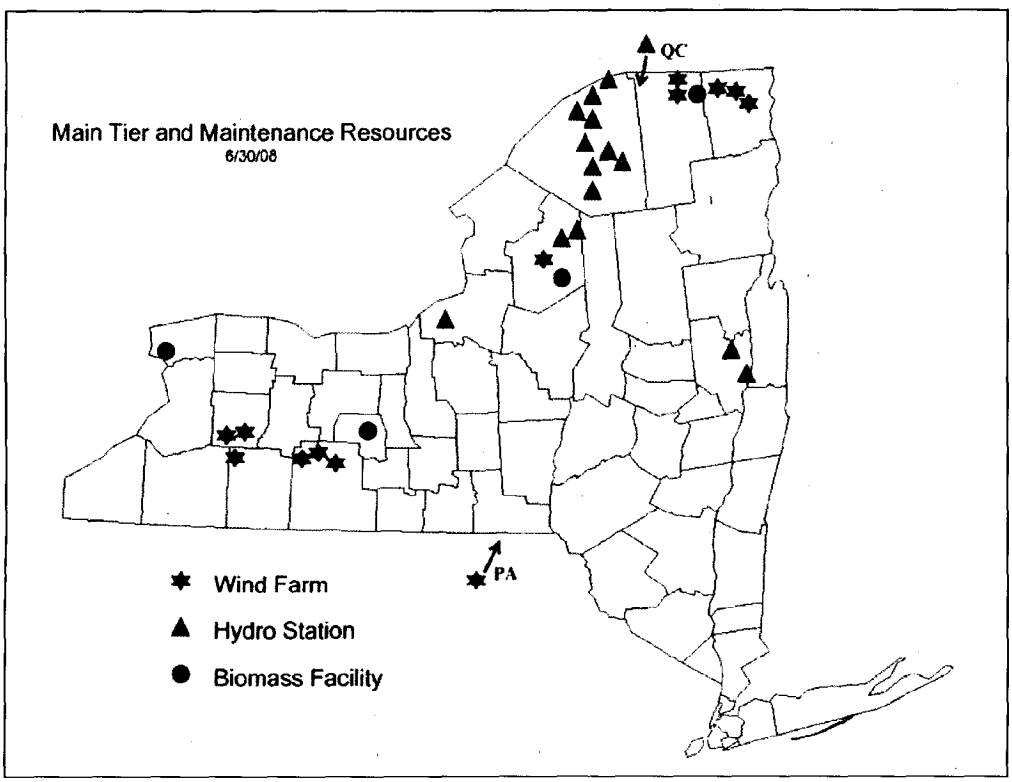
[61] Integration of Wind Into System Dispatch. NYISO, October 2008.

of better market signals—likely offers more short-term solutions for both load serving entities and developers than added transmission infrastructure.

Transmission and Distribution. Locating renewable resources close to load centers is another means of increasing the value and efficacy of the renewable resource. Renewable resources, however, are sited based on many criteria, including specific and optimized technical conditions. For example, wind resources are sited where a consistent wind blows; hydropower is generated in river catchments where the flow can be impounded; biomass facilities are often built close to abundant fuel supplies. Figures 1 and 2 each show a map of renewable resources in New York State and the transmission corridors respectively.

Figure 1

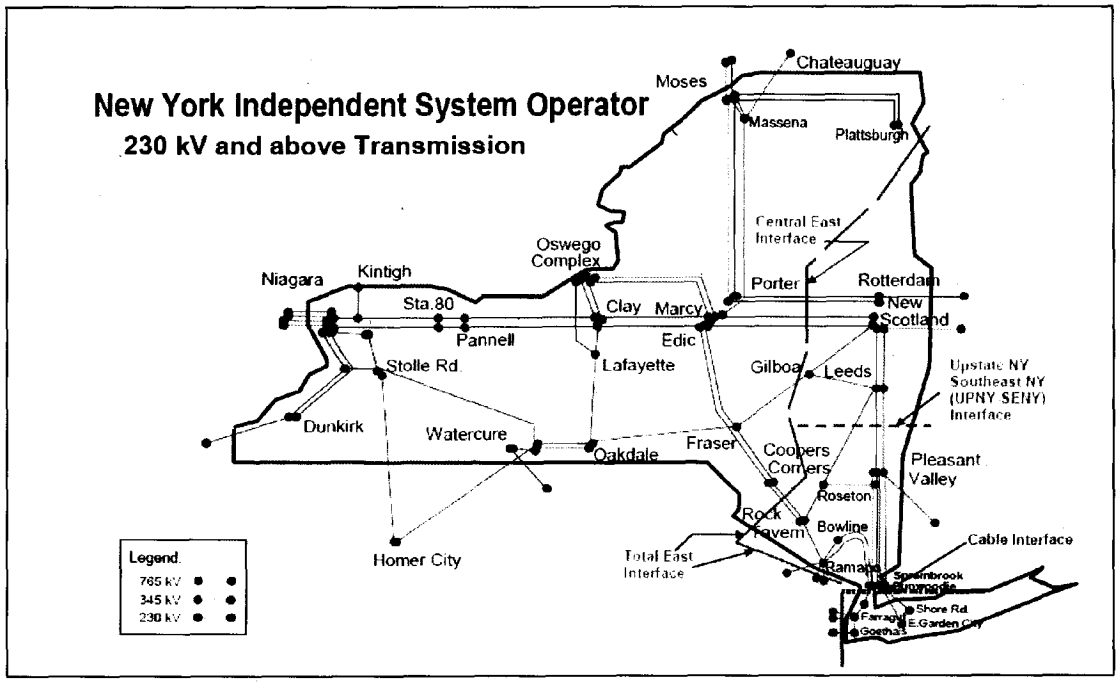
Main Tier and Maintenance Resources (June 30, 2008)



Source: NYSERDA 2008 Performance Report, Page 9.

Figure 2

Map of 230 kW and above Transmission



Source: NYISO 2008 Comprehensive Reliability Plan Final Report, page 5.1

As one study illustrates, these technical conditions, the operating renewable resources, and the load centers are not geographically aligned for effective delivery:

> *While most of the population and electric load is downstate, much of the state's lower-cost electricity supplies (hydroelectric, wind, nuclear) are located in the upstate zones. Typically, the NYISO cannot fully dispatch all low-priced power production facilities (such as wind) in the upstate region to meet downstate loads because of electrical overloading of the transmission system that would occur with the north-to south flows on the system. As a result, more expensive plants (gas-fired peaking plants, oil plants) must by physically located downstate, and then operated locally to keep the lights on in New York City and Long Island.*[62]

[62] Fuel Diversity in the New York Electricity Market, NYISO, October 2008. Page 1-2.

When asked specifically about potential transmission reliability benefits of the RPS policy, however, the NYISO declined to answer other than in the context of market dynamics:

> *The NYISO takes no position on this question except that the NYISO's LBMP-based energy market and its locational capacity market signal the benefits to the bulk power system of any generation or demand side technology.*

From the perspective of the NYISO, to realize the potential benefits to the transmission system would require increasing the market value of the renewable energy resource through complete delivery of the capacity generated from renewable resources that have a near-zero fuel cost.

Demand Impacts. Closely related to transmission and distribution issues, proximity of load centers can increase the utilization of renewable generation resources. When asked whether siting renewable resources close to load centers was important, NYISO underscored that, "The lack of adequate transmission, as mentioned above, can limit the ability of the NYISO to schedule all of a unit's output and this can reduce its profitability." Renewable electricity generation—especially wind power—can offer inexpensive load contributions, their impact on wholesale pricing is often not realized because of transmission constraints between the point of generation and New York's load centers. Since renewable generation resources are generally located far from load centers, they are not likely to contribute to peaking applications much, if at all. On the other hand, over the long 20 year period of the installed resources, if population grows into areas closer to these installed resources, this could possibly bring load centers closer to the resources themselves.

Fuel Diversity. Diverse portfolios, in general, are considered to be risk-mitigation strategies for when any given individual portfolio element is underperforming. In the case of energy supply, fuel diversity is often associated closely with energy independence as a potential policy goal of reducing risks associated with overdependence on any particular fuel source.

In recent years, the focus of fuel diversity concerns has been the most volatile energy source, namely petroleum. How an RPS policy can positively impact New York's dependence on volatile petroleum supplies and prices is unclear. Although New York is reasonably dependent on fuel oil for heating (33% of residential heating versus a 9% average nationally), broad-based fuel switching to electric heat from renewable generation raises other reliability concerns. Moreover, New York is fairly typical of other states

in that petroleum is responsible for less than 2% of its electricity generation.[63] Renewable resources already exceed petroleum as a percentage of all electricity fuels, and the remainder of petroleum-fired power plants is primarily used for peaking applications only.[64]

NYISO recently produced a white paper on the fuel diversity issue to explore what such a policy goal would actually be. The study raises the risk mitigation benefits of fuel diversity as one concern. Rent-seeking behavior is another concern—or, "...calls for greater fuel diversity are less an appeal to diversity as a goal in itself but rather an indirect statement by one group or another that there is not enough of his or her preferred fuel or power-generation technology in a system's mix." Additionally, the study refers to stakeholders' disappointment with current market conditions, or concerns for national security.

While the NYISO study does raise a legitimate fuel diversity concern for rapidly increasing dependence on natural gas as a generation fuel both nationally and regionally, the study largely defers the issue of fuel diversity to other system reliability issues within New York State itself.

> *New York State's overall electric system is actually more diverse than is typically thought. No one fuel is used to generate more than a third of the state's power, for example. In fact, the statewide generation mix could be viewed as more diverse and more balanced than many other states that are much more dependent on coal or nuclear or hydroelectric power...The statewide picture, though, does not represent different regions of New York's power market.* [65]

In a nutshell, statewide, New York State has a wide variety of fuel sources from which to generate electricity, including sizeable existing sources of hydropower. The geographical relationships, however, between generation and transmission within New York State are probably the most relevant concern for increasing renewable energy production in the long-term future. In the near term, enhanced performance of intermittent renewable energy systems through better market signals and the resulting risk specification and mitigation strategies likely offer more short-term solutions for both load serving entities and developers than added transmission infrastructure.

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[63] US Energy Information Administration, Annual Energy Review, 2008. http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=NY

[64] New York City is a known exception but is far from the renewable resource generation points anyway.

[65] Fuel Diversity in the New York Electricity Market, NYISO White Paper, October 2008. Page 1-2

As renewable energy investments and capacity contributions continue to increase measurably over the existing supply to meet policy goals, the issue of the appropriate mix of renewable energy technologies may become more salient—an issue not addressed in the NYISO fuel diversity white paper.

In-state/out-of-state supply. Related to the fuel diversity issue, New York is necessarily linked to adjacent stable energy markets, including Canada, PJM and ISO NE, and such linkages can be expanded. NYISO also argues in the fuel diversity white paper:

> *Both downstate and upstate regions of the state are proximate to regional wholesale markets (e.g., PJM, Eastern Canada, ISO New England or ISO-NE) with relatively similar market designs and inter-regional cooperation which offer the prospect for enhanced trade, should infrastructure developments reinforce the interconnections between the regions. While ISO-NE's electric system is highly dependent on natural gas, PJM's and Eastern Canada's are not.*[66]

In summary, New York is a diverse electricity market with significant regional cooperation and trading opportunities, but the transmission and market infrastructure to support added renewable energy installations are lagging behind current rates of development. Currently, this lag is causing some strain on the grid and will require innovative policy solutions and added investment in transmission infrastructure to mitigate potential outage risks that are forecasted for 2012.

Environmental Impacts

The net environmental impacts of the RPS policy are likely a net benefit to New York State. Indeed, the Generic Environmental Impact Statement (GEIS) from 2004 prospectively concludes as much for the three technologies of concern: Wind, biomass, and hydro. This is especially true since the funded hydropower and biomass facilities are largely upgrades rather than new facilities. NYSERDA estimates that the reduced emissions amount to approximately 2,600 tons of nitrogen oxides, 5,200 tons of sulfur dioxides, and 1.9 million tons of carbon dioxide per year.[67] The magnitude of those benefits in the long term, however, is tied closely to the efficacy of the renewable technologies themselves. As those renewable technologies perform to their expected potential and that generation is effectively added to the grid, the environmental impacts will increase in their net benefits to the economy.

[66] Ibid.
[67] 2008 NYSERDA Performance Report, Page 9.

Generic Environmental Impact Statement Projections. The most recent Generic Environmental Impact Statement (GEIS) on the Renewable Portfolio Standard was issued by the PSC in August of 2004.[68] The projections of energy produced are based in large part on an early cost study, rely on segmentations of the technologies (e.g., offshore wind, small wind, etc.) to estimate production and do not reflect current market progress. The GEIS addresses numerous renewable technologies, including the three technologies supported under the Main Tier procurements (wind, biomass, and hydropower) and reviews the RPS policy to ensure that appropriate environmental quality laws and procedures apply to ensure adequate protection of human health and the environment.

- Wind—Most of the added capacity from the three NYSERDA solicitations is from wind power. The most significant environmental benefit of wind power cited by the GEIS relates to the offset emissions of criteria air pollutants, namely NOx, SOx, and mercury as well as carbon from fossil fuel production.[69] Potential adverse impacts are regulated by a number of federal, state, and local authorities. Those potential impacts include the following:
    - Land use impacts related to construction projects more so than long-term operations because the wind turbine's footprint is small, but also to the outcome of land uses in between wind turbines.
    - Terrestrial and aquatic impacts relating to habitat alteration, destruction and runoff from short-term construction activities.
    - Avian impacts from bird and bat collisions with rotating blades, recognizing that modern turbines rotate more slowly, minimize these impacts in other ways, and the potential for such impacts is site-specific relative to migratory patterns and habitat.
    - Visual impacts related to the height, spread, and location which might impact the landscape vista.
    - Cultural resource impacts related to potential archaeological sites.
    - Noise impacts related to the sound of the turbines rotating if sited to closely to residential areas.
    - Transportation and soil erosion impacts related to short-term construction and long term operations, especially in rural areas where heavy equipment will be introduced.

[68] Final Generic Environmental Impact Statement in Case 03-E-0188—Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard. Prepared by NY DPS, Aug. 26, 2004.
[69] Note that firm protocols for estimating carbon reductions related to wind power in the NYISO territory are not clear.

- Biomass—Most RPS funded biomass facilities did not require construction activities having environmental impacts. Major potential impacts cited in the GEIS are for newly constructed facilities and a function of the technology employed. General impacts are related to construction activities, managing the energy feedstock, and odor abatement.
    - Air emissions related to combusted fuels including criteria pollutants for co-firing facilities.
    - Waste management impacts relating to fuel for waste to energy operations and solid waste, post–processing.
- Hydro—Hydropower impacts depend on location, type, and the operations of the facility. RPS awards to hydropower facilities are related to modifications and equipment upgrades rather than new construction; therefore, the major environmental impacts cited in the GEIS do not apply.

At a high level, the GEIS supported the notion that current regulatory regimes, if followed and complied with, would adequately protect human health and the environment for any hydroelectric, wind power, or biomass project. Additionally, any such project would follow, and need to meet, all permitting and environmental quality requirements by federal, state, and local laws. The GEIS also addresses the mitigation of potential impacts at two levels: 1) emissions reductions which do not pose any significant adverse impact; and, 2) site-specific impacts which could not be assessed at the time since specific projects had not yet been identified. With respect to potential environmental justice issues, this would be handled on a case by case basis because not all permits for potential renewable resource generation projects would trigger an environmental justice evaluation. The projects that would most likely incur some scrutiny include hydropower and biomass projects.

Finally, the GEIS concluded:

> *The Action of developing and implementing an RPS for electric energy retailed in New York State will result in environmental benefits in the form of emission reductions from fossil-fuel facilities that are expected to operate less than they would without an RPS policy. This would, in turn, contribute to air quality improvements and a reduction in a wide range of impacts to the physical environment and human health. Also, an RPS policy would likely provide incentives for the development and growth of a renewable energy industry in New York State, which would, in turn, benefit the New York State economy. The development of specific renewable energy projects, however, may result in both short- and long-term adverse effects on the environment affected as a result of construction and operation of the specific facilities. Consequently, once the details and locations of such specific facilities are determined, proposed projects will be assessed individually*

pursuant to appropriate federal, state and local licensing, permitting, and environmental review processes.

Assuming full compliance with environmental laws and regulations, the net impacts of RPS projects should be beneficial to the New York state economy. At the time of this study, nearly all RPS-supported renewable energy projects are either operating or being constructed without successful contest with respect to permitting or prospective environmental justice or injury claims. One notable exception is the Jordanville wind farm that was cancelled after the PSC ruled that 19 of its 68 turbines were not permitted due to legal environmental challenges from a neighboring municipality on historic preservation and cultural resource view shed protection grounds. A cursory review of publicly available Draft Environmental Impact Statements for wind farm development projects in New York did not indicate any major exception taken with respect to prospective GEIS impacts.

KEMA

Section 6

PROGRAM STRUCTURE'S RELATIONSHIP TO POLICY OBJECTIVES (PROCESS EVALUATION)

INTRODUCTION

In the 2004 Order, the PSC establishes the RPS targets (see Section 4) and the following RPS objectives, in order of priority:[70]

- Increase supply of renewable energy
- Improve energy security and independence
- Economic benefits
- Improve environment
- Economic efficiency
- Administratively efficient and verifiable
- Compatible with competitive energy market

As part of the 2005 PSC Implementation Order,[71] monitoring and evaluation (M&E) activities in a 2009 expanded report were to address the following process issues, including:

- An overview of program status;
- An assessment of the program's success in achieving program goals and objectives, including consideration of what renewable resources might have been added to the electric system with the RPS Program;
- Possible modifications to the list of eligible resources, if deemed appropriate;
- Possible modifications to the delivery requirement, if deemed appropriate;
- Input from stakeholders; and
- Additional recommendations for improving the RPS Program.

[70] State of New York Public Service Commission, "CASE 03-E-0188 – Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard," September 2004. p. 23. (2004 Order)
[71] State of New York Public Service Commission, "CASE 03-E-0188 – Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard," April 14, 2005, p. 46-48. (2005 Order)

In support of the evaluation of the above process issues, this assessment relies on information and data from PSC orders, NYSERDA procurement documents (e.g. RFPs, resulting contracts, and solicitation responses), stakeholder interviews and NYSERDA program tracking data and performance reports.

On balance, KEMA's assessment is that the RPS program has achieved new renewable energy capacity in New York cost-effectively and has leveraged program funds to encourage the growth of capacity beyond what is supported by the RPS payments. The RFP specifications developed by NYSERDA were designed, to allow facilities to commit less than 100% of their output to the RPS. KEMA's assessment is that the program is being administered efficiently, and with due diligence concerning ratepayer funding risks. Nonetheless, funding levels at this time are inadequate to meet targets for 2013. In the 2004 Order, the PSC authorized a collection schedule that totals over $741 million; however, if all of the currently specified collections were dedicated to acquiring only the 2013 MT target of 9.8 million MWh per year under 10 year contracts, contracted REC prices would need to average about $7 to $8 per MWh/REC—a rate well below market averages throughout New York, New England, and the average bid prices for the second and third solicitations. Additionally, the authorization process, since it is not regularly scheduled, does not foster a great deal of certainty in the marketplace. In nearly five years since the program was adopted, the PSC has issued two authorizations approving only three main tier procurements, all of which were to be conducted before the end of 2007. The first authorization approved only the "fast track" procurement and the second authorization approved two procurements to be conducted through the end of 2007. The PSC has not authorized or publicly announced any other future procurement.

The remainder of this section provides a comprehensive explanation of the Main Tier implementation and procurement process and discusses the major issues facing the program. This includes an assessment of the advantages and disadvantages of key program design aspects as well as concerns raised by market actors regarding the program's structure. The chapter also includes a discussion of the Customer-sited Tier (CST) and NYSERDA's activities with respect to the voluntary market. Additional recommendations for improving the RPS Program are included in Section 7.

MAIN TIER

According to the 2004 PSC Order Regarding Retail Renewable Portfolio Standard that established the RPS, various potential program structures were discussed. As stated in the order, "Central choices in the design of an RPS concern the overall structure, namely, whether procurement of renewable resources should be done through a centralized mechanism or by individual Load Serving Entities (LSEs), and which entities or

groups of consumers should bear the program's costs."[72] The central procurement approach varies significantly compared to the LSE compliance approach. Under a centralized mechanism, a state agency would request bids from renewable generation facilities to provide renewable energy "attributes" to meet the RPS targets. Under an LSE-based system, individual LSEs would be required to meet specified RPS targets. The PSC chose to endorse a "central procurement model, as one which maximizes early ventures and ease of procurement, while laying the basis for a certificates market."[73] Because NYSERDA was selected as the procurement agent, this approach necessarily unbundles the renewable energy generated from its attributes, requiring separate REC tracking.

NYSERDA was ultimately chosen as the state entity to implement this approach. According to the NYSERDA website:

> *The Main Tier consists primarily of medium- to large-scale electric generation facilities that will compete on the basis of price-to-sell NYSERDA RPS attributes. For a generating facility to be eligible for Main Tier program procurements, it must meet the generation type and fuel source eligibility requirements for the Main Tier Eligible Electric Generation Sources, as defined and clarified by the PSC in its June 28, 2006 Order (see the attachment to the Order). The PSC orders issued for Case 03-E-0188 are the controlling authority for all determinations of eligibility of projects participating in the NYS RPS.*[74]

As presented earlier, the RPS Program has issued three competitive solicitations between 2005 and 2008. The remainder of this section reviews the following aspects of the RPS program based on the experience of the first three solicitations:

- Eligibility Criteria
- RFP Approach
    - Solicitation schedule and expectations
    - Project selection process and criteria
        - Bid score weighting
        - Bid price scoring and maximum acceptable bid price
        - Inclusion and weight of economic benefits criteria

[72] 2004 Order, p. 48.
[73] 2004 Order. p. 49.
[74] NYSERDA Website, "Main Tier." www.nyserda.org/rps/mainTier.asp

    - Delivery assurance
    - Fuel Diversity
    - Project location
- Funding optimization
- Contractual obligations and options
    - Delivery requirements
    - Certification process
    - Economic benefits enforcement
    - Financial security
    - Substitute bid facilities
    - Contract duration
    - Suspension of performance
- Sales to Other Markets Set-aside
    - Barriers to entry
    - Meeting the voluntary market RPS requirements based on set-aside requirements
- Attribute Tracking
- Administrative Fairness and Transparency
    - Fairness
    - Transparency

Eligibility Criteria

The 2004 Order establishes the eligibility criteria for RPS implementation, including technology and vintage requirements. Over the three procurements, the Main Tier program has funded wind, biomass, and hydropower projects. The order also supports ocean power projects, although no eligible projects have come online to date. Solar, small wind, fuel cell, and anaerobic digester gas (ADG) projects are covered by the CST. As described in the 2005 PSC Implementation Order, there are three general requirements for each project under the Main Tier:[75]

- To be eligible, a generation facility must have first commenced commercial operation on or after January 1, 2003, except for certain Maintenance Resources.
- Eligibility is limited to the electricity sold in a retail sale in New York State made by a load-serving entity to a customer. Self-generation facilities are not eligible in the Main Tier.

[75] 2005 Order, Appendix B

- To be eligible, a generation facility must forego the receipt of any System Benefits Charge (SBC) funds commencing with the first period of generation related to the first receipt of RPS funds.

The following table (Table 17) shows specifically which resources are eligible for the Main Tier of the RPS:[76]

Table 17
RPS Main Tier Eligible Electric Generation Sources

Category	Source	Other Requirements
Biomass	Biomass direct combustion	Only electricity generated from the biomass portion of the fuel is eligible.
	Biomass combined heat & power	
	Biomass co-fired with existing fossil-fuel combustion	
Liquid Biofuel	Biomass liquefaction through acid or enzymatic hydrolysis (Ethanol)	Facilities utilizing adulterated biomass must demonstrate that all feedstock's that are not source separated in fact come from NYSDEC-permitted solid waste facilities that pay for NYSDEC-provided monitors to ensure that their biomass processing is consistently within their facility permits and conditions.
	Biomass etherification (Biodiesel, Methanol)	
	Biomass thermochemical pyrolysis (Bio-oil)	
	Biomass hydrothermal liquefaction	
	Liquid biofuel (from eligible sources of biomass feedstock) combined heat & power	
	Liquid biofuel (from eligible sources of biomass feedstock) co-fired with existing fossil fuel combustion	Only the electricity generated from the biomass portion of the fuel is eligible.
Hydroelectric	Hydroelectric upgrades	No new storage impoundment, eligibility limited to the incremental production associated with the upgrade.
	New Low-Impact Run-of-River Hydroelectric	Facility capacity limited to 30MW or less with no new storage impoundment.
Tidal/Ocean	Tidal turbine	
	Ocean wave turbine	
	Ocean current wave turbine	
	Ocean thermal pumped storage hydro, powered by tidal	
Wind	Wind turbines	

[76] 2005 Order, Appendix B

Modifications to the eligibility list were made in subsequent Orders: October 31, 2005, November 2, 2005, January 26, 2006, and July 2006. These Orders added or clarified "maintenance resources," anaerobic digesters, and resolved some issues associated with biomass fuel measurements.

RFP Approach

This section reviews the current RFP system, the changes that NYSERDA has made from one solicitation cycle to the next, stakeholder-reported advantages and disadvantages of the current approach, and changes that either have been considered or might be considered in the future. Within each topic, this report presents varying reported effects on different stakeholders, as well as different categories of projects and developers (wind vs. biomass or hydropower, large vs. small developers, upstate vs. downstate, etc.)

Once the issue of which entity would administer the RPS had been settled, another key question arose: What form of financial incentives should be offered to spur renewable energy development? According to the 2004 Order, approaches considered prior to the order establishing the RPS and leading up to the implementation order include:[77]

- Solicitation/request for proposals (RFP) – a system under which the state would secure contracts resulting from a competitive bidding process
- Standard financial offer – a standing offer to purchase RPS attributes at a set price
- Declining-clock auction (DCA) – an open-bid auction where bidding starts at a high price that is lowered in increments until the amount sought has been procured

The PSC ordered NYSERDA to pursue some combination of the RFP, standard offer, and DCA systems to meet the Main Tier requirements. NYSERDA ultimately chose to pursue the RFP approach at least until the initial years of the program (i.e. until the 2009 review).

During this study process, the following question was posed to both participating and non-participating developers:

> *The Public Service Commission's original implementation plan established three solicitation approaches: declining clock auction (DCA), a standard financial offer, and a sealed-bid RFP*

[77] PSC, "CASE 03-E-0188 – Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard," April 2005. p. 15.

system. Thus far, only the RFP approach has been used. Do you think that this is the most effective, appropriate method of meeting New York's RPS goals? Why/why not?

When possible, definite responses were counted and recorded. Table 18 presents a summary of those responses. Overall, respondents expressed a wide variety of opinions. No consensus emerged about which procurement process would be most appropriate and effective. Several who support standard offer methods note that they are most appropriate for small projects. Those who responded "Utility Compliance" provided this response without prompting by survey administrators.

Table 18
Summary of Procurement Preferences

Approach	Preference
RFP:	**Six developers expressed definite support for the RFP approach.** This includes four wind developers and two biomass developers. One additional biomass developer described the approach as "acceptable."
Auction:	**Five developers expressed definite support for the auction approach.** Of the five expressing definite support, four were biomass developers. The other develops hydro, wind, and biomass power projects. Additional input from other developers: • Four suggested the auction might be appropriate in a larger market for RECs but that threshold has not yet been reached. One explained, "A DCA would require...a lot more projects online. If in the future there are enough wind farms to compete for REC dollars, then a DCA would be better—but not right now." • Two stated that the auction would not work in this market, without providing any rationale. • One wind developer suggested this would be appropriate for existing facilities only (e.g. Maintenance Resources and co-firing facilities).
Standard Offer:	**Four developers expressed definite support for a standard offer.** Of these, three develop wind and one develops biomass. Other comments included: • Two wind developers said standard offer for small projects only (less than 20 MW) would be appropriate. • One biomass developer suggested a sliding scale. • One biomass developer suggested that a standard offer is good for developers but not for ratepayers. • One wind developer said a standard offer is appropriate, but for new facilities only.

From the in-depth interviews with program staff and stakeholders, KEMA's assessment is that overall, the RFP approach has been effective. Although KEMA also concludes that some improvements could be made in terms of regular solicitation authorization, scheduling and award, this would apply to any solicitation approach subject to the current program authorization structure. KEMA notes that alternative procurement methods are not particularly conducive to incorporating any consideration for economic benefits. Moreover, the direct economic benefits information collected through the solicitation process matches reasonably well with expected inputs to commonly used economic impact modeling tools (e.g., IMPLAN, JEDI, etc.) and what developers report as standard metrics from other states.

One particular question arises with respect to the role of the RFP approach within the central procurement model. Clearly, any number of procurement methods could be used in a central procurement approach; however, it is unclear that the market is large enough to support a robust competition that a declining clock auction would depend on for success.

KEMA's assessment is that the central procurement approach has worked well through RFPs for several reasons. As a public agency and a steward of public ratepayer funds, NYSERDA is better positioned to officiate on economic benefits considerations than load serving entities (LSEs). That developers consider the market as being too small for a DCA approach also suggests that individual RFP competitions between LSEs might reduce the bidder pool for each issuing LSE competition, and subsequently result in higher than optimal costs to ratepayers. Given that the renewable energy project planning, development, and marketing cycle is so costly and long, the central procurement approach also likely saves developers time and money by avoiding the situation of multiple competitive markets and customized response requirements under an LSE approach.

The rest of this section on the RFP approach presents an assessment based on stakeholder interviews on the following topics:

- Solicitation schedule and expectations
- Project selection process

Solicitation Schedule and Expectations. Two PSC Orders issued authorization for solicitations. The first authorization (2004) approved a "fast track" procurement and the second authorization (2006) specified two additional procurements for 2006 and 2007.

There were numerous concerns expressed about the lack of a long term programmatic solicitation schedule by all groups interviewed. Most of the concerns reflect on the irregularity of the solicitation schedule and

associated funding commitments. Clearly, an open enrollment program would allow more flexibility in timing, but it would be difficult to make that approach competitive for ratepayers' benefit.

Developers had numerous comments on the topic, illustrating the value of a regular solicitation schedule to their business risk profile. On developer summarized the concerns of many: "Need more certainty about the RFP schedule. Schedule should be once per year and go out for at least 5 years (ideally 10 years). This will provide developers with more certainty in their business planning / project development planning."

Because the project planning and development cycle is so long, as well as the time horizon for investment cost recovery, the concerns raised by developers can be summarized as follows:

- Funding Certainty—Developers want to plan on a specific level of available funding and the time in which it will be available.
- Frequency—Developers would like more opportunities to compete for funding, perhaps as frequent as every six months as market conditions dictate; however, annual competitions are expected.
- Regularity—Having a predictable schedule would also aid in the development planning process.
- Advance Notification—A long term commitment for regular, frequent, and certain funding levels would send a strong signal to project developers to focus on, and scope out, opportunities in New York.

Project Selection Process and Criteria. The 2004 Order established the parameters for the project selection process based on bid price through its fast-track authorization. A PSC Order in 2006[78] included consideration for Economic Benefits as 30% of the scoring weight, and 70% based on bid price. The 2006 Order requiring applicants to submit information on prospective economic benefits is also consistent with overall policy objectives of supporting new renewable energy development in New York State and compatible with the RFP selection process—as opposed to auctions or standard offers.

The current RFP structure is designed to select projects that satisfy the RPS program's objectives of providing least-cost renewable energy while promoting economic development within New York State. To

[78] October 19, 2006

this end, NYSERDA created a bid scoring system to accommodate the PSC-ordered weight of bid price at 70% and the economic benefits at 30% based on the bidder's response to the RFP instructions.

Bid score weighting. The 70/30 scoring system provides an opportunity for each bidder to receive up to 100 points, 70 for bid price and 30 for economic benefits. Included in this system is a maximum acceptable bid price which essentially functions as a bid price ceiling and serves as an element of program cost containment. This maximum acceptable bid price is not disclosed for competitive bidding purposes as it is assumed that if it were, bids would migrate towards this price. This scoring system was implemented for the second and third procurements and is explained below:

Bid price: Bids will be sorted in ascending order by Bid Price (per MWh). The lowest Bid Price will receive the maximum points available for the Bid Price component (70 points). NYSERDA has developed a maximum acceptable Bid Price, and any Bid Price above the maximum acceptable Bid Price will receive zero (0) points. Points awarded to all other Bid Prices will be awarded in proportion to where the Bid Price falls within the range from lowest Bid Price to the maximum acceptable Bid Price. NYSERDA will not award a contract at a Bid Price above the maximum acceptable Bid Price.

Bid Proposals: will be scored on the ability of the Bid Facility to contribute positively to the economy of New York State in the categories listed in Section XII, subsection A (Submitting a Bid Proposal). A Technical Evaluation Panel (TEP), consisting of NYSERDA staff, PSC staff, and outside reviewers will evaluate and award points (up to 30 points) to Bid Proposals based on the degree to which each Bid Proposal demonstrates a contribution to the economic benefits categories listed in Section XII, Subsection A (Submitting a Bid Proposal). Only those economic benefits falling within the defined categories in Section XII (Submitting a Bid Proposal) will be considered for evaluation and in no instance will the TEP consider any indirect benefits created by a "multiplier effect," or other attribution method under which direct capital infused into the economy may create peripheral spending and jobs. NYSERDA reserves the right to reduce, for evaluation purposes only, the amount of dollars reported in Section 3(b) the Bid Proposal ("Payments to New York State and/or its Municipalities") by the amount of any benefits under any Empire State Development program, including the Empire Zones programs. Scoring on the basis of expected economic benefits will be conducted independently (without knowledge of bid prices) of Bid Price evaluation.

Selection: A ranking of Bid Proposals will be developed based on the combination of points awarded for Bid Price and points awarded on the basis of the economic benefits evaluation. Selection will be based on this final ranking, subject to NYSERDA's procurement target and available funds.[79].

Bid Price Scoring and Maximum Acceptable Bid Price. The bid price scoring system distributes the 70 available points to bidders from the lowest bid price up to and including the maximum acceptable bid price. The maximum acceptable bid price has been set using bid price data from previous solicitations. If a bid price is above the bid ceiling—which is determined using data from previous solicitations—it will receive no points for its bid price and therefore is almost guaranteed not to win. This knowledge adds downward price pressure to submit price-competitive bids to maximize points for bid scores and best utilize ratepayer funds. The use of a bid price ceiling as a cost containment mechanism is not uncommon and has been used in other RPS programs such as CA, MA, and CT.[80] Maximum acceptable bid prices have also been applied as a cost-containment mechanism to other procurement methods such as a standard offer or declining clock auction.

Inclusion and weight of economic benefits criteria. Promoting projects that provide significant economic benefits to New York State is a major objective of the program, therefore the inclusion of economic benefits criteria are appropriate. The emphasis on in-state spending may encourage developers to purchase more goods and services from within New York. The specific benefits categories include the following:[81]

Short-Term measures:

- Jobs lasting up to 3 years such as construction, planning and engineering
- Payments to municipalities that do not persist over the life of the facility
- Payments to abutting landowners or others that may be affected by the facility but that are not receiving payments from hosting the facility on their land
- Initial equipment or one-time capital expenditures (such as turbines or repowered upgrade equipment)

Long-Term measures:

- Jobs/Payroll

[79] NYSERDA Solicitation #1168.
[80] The cost containment mechanism in some states may take the form of an alternative compliance fee.
[81] The benefits are adapted from the actual data categories requested by NYSERDA.

- Taxes or Payments in Lieu of Taxes to State and municipalities
- Fuel Purchases (for biofuels)
- Land Leases
- Other O&M in-state spending on equipment, supplies and services

Most developers report that the economic benefits portion of the last two solicitations does not appear to be overly burdensome, and to date, the requirement has had no impact on the outcome of the awards. Many developers report that other states have similar economic benefits bid scoring requirements. This is particularly true for larger developers with extensive experience in New York State or elsewhere. Since larger developers have access to data on their own expenditures, they tend to report that the economic benefits portion of the RFP response is not overly burdensome. Some smaller developers, however, have expressed frustration with the process, suggesting that it is very time-consuming.

According to NYSERDA staff, based on an internal review of bids with and without the economic benefits scores, the economic benefits have had no effect thus far on determining which projects are awarded contracts. Bid price has effectively been the sole determinant in project selection, but this may not always be the case if bid prices converge in any given procurement.

Developers and trade associations expressed a general consensus that the 70-30 weighting was appropriate. Developers tend to understand the state's dual goals of ratepayer price protection and economic development. Of the 14 participating developers who responded to this question about the appropriateness of the scoring weights, ten expressed general support for the inclusion of economic benefits and the 70-30 weighting system, while only three disagreed. There was general consensus that price was significantly more important than economic development, though both factors add value.

A concern that the self-reported economic benefits data is unreliable was expressed by several parties; however, KEMA's review of past self-reported data upheld its use in the bidding process. For example, one developer said, "I'm not sure the information [on economic benefits] is very reliable... Everything is already incorporated into the bid price, which is a more efficient system." A Credibility Assessment, however, was performed by KEMA on the self-reported data with the following conclusion:[82]

[82] See Appendix A: Page 4-8

With a few minor exceptions, it was found that the data reported in these bids, after being modified by NYSERDA in a few cases of misinterpretations of bidding instructions, confirm that the Direct Benefits data is reliable and could serve as a basis for this and other analyses of the economic benefits that can be claimed from renewable energy development.

Other stakeholders, especially trade associations, expressed strong support for factoring economic development benefits into the selection formula. Stakeholders' preferences for the relative scoring weights vary. The following is a sampling of responses from stakeholders that support the inclusion of economic developments as a selection criterion:

From my point of view, the economic development benefits are very important. The local revenue aspect is important to the community, the ability for projects that help us deal with the peak is important, the overall help of diversifying our fuel is important.

Yes. It's ok. It seems to be a good balance. Lowering the cost of energy is better for everyone than economic development. Energy can outdistance any benefit that you get from economic development. It's just about right. I wouldn't go 50/50 or 100/0. This is the right zone. It's not inappropriate. So yes...70-30 is a reasonable balance.

Clearly, there exists a wide array of potential alternative weighting systems and scoring criteria for determining winning bidders. The current system is designed to best ensure that the winning bids simply represent a group of projects that provided significant in-state economic benefits at a low price. In the process of this evaluation, KEMA explored a number of alternative bid scoring systems and concluded that, given the 70%/30% weighting structure, the current scoring system is sound. The soundness of this system, however, is predicated on bid prices having a reasonable level of variability in any given procurement. KEMA believes this assumption is valid based on the principle that over time, the cost-effectiveness of projects will decline and REC prices will rise as potential renewable energy resources are exploited with more challenging technical conditions. Consequently, if the average bid ceiling rises over time and/or if bid prices trend lower, the likelihood of bid price convergence around the ceiling is minimal. Therefore, while disclosure of the bid ceilings **after** a procurement may support administrative transparency goals, it would clearly undermine successful structures and systems established and implemented by NYSERDA that have fomented robust competition among developers while simultaneously protecting ratepayer funding.

Delivery assurance. As the January 2006 Order specifies, contractual terms between NYSERDA and project developers include a number of measures to ensure that projects are delivered or penalties will

be assessed. Such penalties include potential forfeiture of security deposit for project termination, penalties for not meeting commercial operation milestone date (COMD), or pro-rated payments for failure to deliver on economic benefits or to meet project performance expectations.[83]

The current competitive process does encourage low bids and the standard contract provisions protect ratepayers and NYSERDA's risk from failed projects. Several respondent groups, however, expressed the desire for additional due diligence to assure that winning projects will be completed on time and delivering energy/attributes as scheduled, given the current procurement process. The concern is one of "defective pricing," in which a winning bidder cannot deliver on the project, crowding out other legitimate bidders for fixed funding levels who would have been next in line. One developer summarized the sentiment of many other losing bidders: "There should be a measurement of the developer's ability to actually complete a project and deliver the electricity promised." Potential reasons for project failure could potentially include bidder incompetence or overly leveraged risk taking. While the potential, and perhaps the motivation, exists for companies to defectively price projects due to incompetence or strategic market positioning despite the potential penalties; regardless, the current RPS implementation practices protect ratepayers by NYSERDA's retention of a contract security and the liberation of the associated funds for future resource acquisition.

Current RPS rules, however, offer no remedy for NYSERDA to re-inject unused funding back into the market to acquire replacement resources after a given solicitation process has ended. Additionally, the absence of this mechanism also reduces progress toward RPS targets and undermines to some extent the policy objectives of the RPS program in general.

Fuel diversity. The two highest priority objectives stated in the 2004 Order include increasing the supply of renewable energy and improving energy security and independence.[84]

Some have suggested that adopting additional selection criteria would be an effective way to increase Main Tier fuel diversity. For example, the data suggest that factoring economic benefits into the equation to a greater extent would be likely to promote more biomass use, as biomass projects tend to have higher economic benefits on a per MWh basis. (See Appendix A, Page 1-4, Table 2.) Biomass projects have two financial advantages that help them to compete with other technologies. First, as stated earlier and

[83] 2006 Order, Page 17 (January 26, 2006).
[84] 2004 Order, page 23.

discussed in Section 5, they tend to provide superior economic benefits because purchases of instate sources of fuels results in directly supporting another industry in New York. Second, biomass is a baseload technology; thus as one stakeholder mentioned, in comparison to other intermittent technologies, biomass plants are better able to take advantage of higher electricity revenues during on peak times and "to monetize the installed capacity value of the project." However, the commenter continued, "but this isn't enough to put [biomass technologies] ahead of wind project economics." Others have suggested that simply adding points to a bid score for underserved technologies would be another effective means of increasing fuel diversity; however, none suggested a method for doing so.

While the RPS is required to increase renewable technologies as a percentage of New York's electricity supply, the program is not designed to ensure that the mix of renewable technologies themselves will be diverse. Indeed, the solicitations have mostly resulted in wind projects; however, as Appendix A shows in the Macroeconomic Benefits Study, long-term benefits under enhanced RPS scenarios are driven more by biofuel technologies than by wind power. Arguably, if market pricing for generation from intermittent technologies such as wind is accurate and infrastructure is in place, other base load renewable energy technologies such as biomass should be able to better compete on bid price and economic benefits combined, and will diversify the renewable energy supply. Since wind technologies do not enter into the NYISO day-ahead market, however, accurate market pricing for wind generation is still ambiguous.[85]

Project Location. Numerous stakeholders offered comments on locational considerations as a scoring criterion for project award. Factoring locational considerations into the selection process could encourage more projects to be sited closer to appropriate feedpoints on the transmission system and reduce grid congestion. It could also encourage more renewable technologies to be sited closer to fossil fuel generation facilities for the purpose of offsetting pollution. On the other hand, it could add to development costs and place increasing strain on the RPS program budget, because the sites with the best resources are not necessarily the same as those that would allow coal-generated power to be offset or minimize negative impacts to the transmission system.

Certain technologies could be impacted compared to others with scoring criteria related to project location. For example, biomass technologies are considered baseline capacity, and can help improve grid reliability through its uninterrupted power supply. Conversely, wind power's intermittency—or the inability to know how much power is produced at any given time—can significantly increase grid

[85] NYISO, prepared statement to the KEMA Evaluation Team.

congestion as discussed in Section 5. However, some argue that this factor is already incorporated into the power price. For example, wind energy tends to be priced to include any potential negative impacts on the transmission system, suggesting that there is no need to further disadvantage wind for its intermittency. As stated above, however, it is not clear that the potential transmission impacts of wind power's intermittency are properly or fully signaled in the market for RECs.

For the most part it appears that existing market mechanisms account for all the factors above to some degree; however, market information could be further improved to accommodate these concerns—such as the proposed wind forecasting system by the NYISO. Additionally, it is still difficult to predict how much generation would be offset from various facilities, and what the associated GHG reductions might be. Therefore, incorporating a bid scoring criterion based on project location might ultimately be undermined by efforts to improve market information, and simply add another layer of complication and potential ambiguity to award process.

Funding Optimization.

The New York Public Service Commission Order in Sept. 2004 outlining the RPS issued a goal of 25% renewable energy by 2013 with individual RPS element (e.g., Main Tier, CST, EO111, etc.) targets by year. The specific language of the order, however, is inconsistent and the words "goal" and "target" are used interchangeably. Operationally, the 25% by 2013 goal is understood as a firm goal, and the individual elements have annual and final targets that compose the overall RPS goal. The targets are soft and fungible across years and RPS element.

The status of the 2013 RPS goal and the yearly targets—whether these are "hard" or "soft"—directly impact NYSERDA's administration of the program and stewardship of ratepayer funds. Hard targets represent firm, legally binding, time-bound and measurable targets that must be met irrespective of cost. Soft targets would imply that progress toward targets must be measurable, but fungible in terms of timing, funding levels, and subject to administrative discretion and prudence. Indeed, with respect to RPS policy goals, NYSERDA's charge is to optimize funding to develop renewable energy resources for maximum effect. Since funding can only be authorized by the PSC, NYSERDA has by default been operating under fungible yearly targets because funding is not aligned with targets. Without the provision of funding commensurate with targets, delivering on that overall goal of 25% by 2013 will not be possible.

From a policy perspective, the major advantage of a soft target approach is that New Yorkers do not risk paying exorbitant prices for renewable attributes or pay for any sort of compliance penalties. This risk is alleviated by the bid scoring system which incorporates a price ceiling and is further alleviated by a

competitive market in which there are, for the time being, an ample supply of potential projects and renewable energy resources.

A downside of a soft target approach is that, given the centralized procurement model, in which funding must be authorized by the PSC, funding has not been directly tied to reach targets based on realistic cost estimates. In other words, if the PSC does not allocate sufficient funds to meet the RPS Main Tier Program needs based on the results of the competitive bidding process, the RPS Main Tier Program will not deliver sufficient renewable energy supply to meet targets.[86] Indeed, this occurred under each of the three solicitations which sought to achieve the 2006, 2007, and 2008 annual targets.

Numerous market actors and stakeholders commented on the target issue with respect to how it impacts their perception of the market. Mostly, comments suggested that hard targets provide more certainty and better information for potential investors to assess the competition and the risk/reward ratio of bidding. Said one developer:

> *Having a soft target for the RPS program is not effective as a financial incentive to encourage project development...Business people can make decisions based on how much competition they think will be out there and how much confidence there is in the market.*

While the ambiguous targeting status does likely create uncertainty in the marketplace, the obligation to ratepayer prudence is paramount and remains a practical policy instrument. And if authorized funds are not commensurate with targets and actual program costs, the targets will, by default, be soft and will not be achieved.

Contractual Obligations and Options.

Contractual obligations for bidders are specified in the 2005 Order approving the Implementation Plan, the January 2006 Order authorizing additional solicitations, and the October 2006 Order which includes modifications to the delivery requirements.

On balance, the RPS program has a good record in terms of project completion and contractual fulfillment. Two projects were cancelled, unrelated to NYSERDA's conduct and without ratepayer risk. A third project

[86] For that matter, if the PSC did not authorize sufficient collections under a LSE structure, targets would not be met under either case.

never invoiced NYSERDA and was terminated by mutual agreement because the firm chose not to deliver on certain contract terms. It is important to note that while the standard contract does adequately protect ratepayers from risk; quite another issue is that the objective of the policy and ratepayer collections is to develop renewable energy resources for ratepayer benefit. In the event that a contract is underperforming, cancelled or terminated, and assessed penalties are paid, NYSERDA lacks the authority to recover disencumbered funds and penalty payments for new procurements. This lack of flexibility impedes the ability of the RPS Program to make progress toward overall policy goals to increase renewable energy production. Feedback and issues regarding the RPS program's contractual obligations are presented and assessed below for the second and third solicitations. These include:

- Delivery requirements
- Certification process
- Economic benefits reporting
- Financial security
- Substitute bid facilities
- Contract duration
- Suspension of performance

Delivery Requirements. Although it is possible for a facility to enter into contract with NYSERDA and be sited outside of the New York Control Area, all facilities are required to deliver electricity to the New York state control area (NYISO) on an hourly matching basis. This requirement levelizes the delivery requirements between in-state and external facilities and is fundamentally a consequence of having the wholesale market territory (administered by NYISO) coincide with the state's political boundary. At the same time, prospective projects are highly likely to be sited with New York State boundaries and result in significant economic benefits to New York State. Indeed, the objective of suppressing wholesale electricity prices, and the benefits to New York ratepayers, cannot be realized without delivery into the NYISO through the associated market information and delivery requirements on an hourly basis.

Under RPS solicitations 1037 and 1168, external facilities (defined as external to the New York control Area) have been required to deliver electricity on an hourly basis. This hourly matching requirement (as opposed to the monthly requirement which it replaced) has the practical effect of encouraging and

supporting new project development within New York's borders because it levelizes the delivery requirements.[87] As stated in the solicitation text:

> *During each hour in which an intermittent External Bid Facility generates Actual Eligible Production, the Seller must schedule and transmit from the control area of its location to the Delivery Point for end-use in New York, an amount of electricity, in MWh, equal to the Quantity Obligation during such hour. This Delivery Requirement will be applied to each hour during which the Bid Facility produces Actual Eligible Production; electricity delivered during any given hour will be recognized as delivered only during such hour; deliveries in excess of the Quantity Obligation during one hour will not be recognized, for purposes of this requirement, for delivery during any other hour. This rule applies to bilateral and NYISO spot market transactions. The Seller must demonstrate to the satisfaction of the PSC and/or NYSERDA that it is the financially responsible party for the transaction from the Bid Facility's local control area to the Delivery Point.*
>
> *Failure by any Seller to meet these delivery requirements for a minimum of 90% of the hours in which the Bid Facility produces Actual Eligible Production during any Contract Year will constitute a default under the RPS Standard Form Contract.*

While numerous developers expressed disappointment with this particular requirement, KEMA's assessment is that this reflects a lack of knowledge, and perception on behalf of the market participants rather than an intentional barrier to market entry and project development. Additionally without the hourly delivery requirement to the New York Control Area, New York would likely not realize the policy goals of price suppression or environmental improvement.

Certification process. The 2005 PSC Implementation Plan Order proposed that the following objectives be considered when establishing eligibility requirements and certification procedures:[88]

- Provide certainty to developers to minimize pre-development cost and risk due to uncertainty in potential eligibility.
- Minimize administrative burdens to generators and regulators.
- Minimize time requirements so as not to unduly slow the procurement process.

[87] The monthly delivery requirement essentially gave an economic advantage to external facilities.
[88] 2005 Order, p. 5-6.

- Ensure that only eligible projects are certified.
- Create an open and transparent process.
- Afford confidentiality to developers during the development process.

According to developers, the current process seems to achieve these goals. The provisional-certification process also helps to establish the bidder pool prior to solicitation. Wind and hydropower developers expressed few, if any, concerns about the certification process; however, developers of specific biomass technologies believe that the certification process for their technologies is too stringent.[89]

Economic benefits enforcement. According to the standard contract to procure RPS attributes, if the bidder's project fails to deliver on at least 85% of the economic benefits proposed during the bidding process, the bidder risks a reduction in contract value for the balance of the contract term. The contract also specifies that the review will not occur until at least three years after operation. Such a review has not yet occurred because the term to review has not yet been realized. At the time of this evaluation report, it is unclear how the contractors will verify their claimed economic benefits once the projects are constructed.

Financial security. The January 2006 Order establishes the majority of the financial security requirements that are vital to reducing the level of risk taken on by NYSERDA, and by extension, ratepayers. Without the requirement, developers could bid low prices, sign contracts, and determine later whether to fulfill their contractual obligations.

The security requirement is set at $6 per MWh multiplied by one year's bid quantity in the form of cash, certified funds, or a letter of credit.[90] If the bidder opts to terminate the contract before a certain date (October 1, 2008 under RFP 1168), then the bidder forfeits half of the contract security and is relieved from the contractual obligations to build the facility. Should a bidder determine that they can construct the facility but need additional time, the contract online date can be extended if such bidder posts an additional $3 per MWh multiplied by one year's bid quantity. If the completed facility comes online and begins delivering on time as planned, then the entire amount is returned. If the facility constructed is smaller than the size of the proposed bid facility, then a portion of the deposit is forfeited.

[89] See the "Qualifying Biomass Sources" section for further details. More details on the certification process can be found on the NYSERDA website at: http://www.nyserda.org/rps/mainTierParticipation.asp

[90] For a 100 MW wind farm with a 30% capacity factor bidding 100% of its output, this would be approximately $1.6 million.

While a small number of projects have failed to come online for various reasons, overall, this approach appears to have been successful at preventing frivolous bids. NYSERDA staff report that there have been cases where bidders thought that they could bring facilities online but failed to do so on time (or at all) and forfeited their security as a result.

Substitute bid facilities. The standard contract also provides for a substitute bid facility in the event that a particular facility under contract cannot deliver on RPS attributes, another facility can serve as a surrogate. Overall, the ability to substitute bid facilities appears to have been an effective way of increasing flexibility for winning bidders. Bidders are allowed to substitute one bid facility for another, provided that an out-of-state facility is not substituted for an in-state facility. As stated in the solicitation language,

> *Where permitted by NYSERDA, such substitutions will be accomplished through a contractual modification; Contract Security must remain in place or be simultaneously replaced and under no circumstances will the Bid Quantity be increased. The Bid Quantity may be reduced. However, should the Bid Quantity be reduced, NYSERDA will retain a prorated amount of Contract Security if the Bid Capacity of the approved Substitute Bid Facility (or aggregate Bid Capacity if more than one Substitute Bid Facility) is less than the Bid Capacity associated with the Bid Facility included in the original contract.*

The purpose of this contract provision is to give developers more flexibility in meeting contract provisions should the facility that was proposed experience delays or severe challenges. Developers generally consider any form of flexibility to be a positive. The substitute facility is still held to the stated economic benefits of the original facility; and if they are less, the same contractual penalties would apply, regardless of whether it's an original or substitute facility.

Contract duration. According to the 2005 PSC Order, contract terms shall range from three years to ten years. According to developers, one significant advantage of the Central Procurement approach is that New York offers long-term, bilateral contracts to winning bidders, which helps enable developers to finance their projects. Some developers commented as follows:

> *The fact that the state does commit via the NYSERDA contract is beneficial to many projects, and a long-term contract commitment is key. This contradicts my point that I'd prefer to have the bilateral contract, but that is just because of the way that we look at and finance our projects. We don't necessarily need the long-term contracts, but others might. From that perspective, the NYSERDA contract is good.*

It was critical to have contracts in place for economics and for attracting other financing (equity).

The long-term REC contract isn't as essential to [us] as to some of the smaller players since we can finance project on our balance sheet. But to justify an investment to internal decision-makers at [our company] now, you still need to retire some of the project's risk through a REC contract. They must be high REC values because of the high risk and the great importance of the REC revenue stream to project economics. For others doing business in New York (doing the project finance model—lacking the same balance sheet resources [that we have]), a long-term contract for a significant volume of RECs is still absolutely essential as an anchor to get the project financed.

For all three solicitations, contract terms are ten years for all resources; except that biomass projects contracts can go for three years or up to ten years (in whole-year increments) to accommodate fuel feedstock risks for biomass projects. . Facilities are only eligible to receive RPS attributes for up to ten years, after which they are treated the same way as vintage facilities in existence prior to January 1, 2003. Key advantages cited for this approach are:

- For developers, a long-term contract provides a guaranteed revenue stream. This reduces the risk they take on and in turn helps them to get financing for their projects—and could conceivably improve the debt terms that they are able to negotiate. Even developers who finance their projects internally typically prefer to see a certain guaranteed level of revenue generation (i.e. through a long-term contract) to reduce the level of risk that they incur.
- From a policy perspective, the long-term contract system protects ratepayers in two ways:
    - Generally, it allows developers to offer lower bid prices than they would be willing to accept under short-term contracts, especially in a nascent market.
    - It also provides a hedge against rising REC prices over time. Through the first three solicitations, attribute prices in New York have compared favorably with REC prices in nearby states. By locking in these relatively low rates for ten years, NYSERDA protects ratepayers from potential price spikes.

One strong factor in support of NYSERDA's success in securing long-term contracts is its perceived credit-worthiness. Most developers tend to agree that NYSERDA is highly credit worthy. Only a few developers expressed concern over NYSERDA's credit-worthiness.

Developers suggest that the length or term of the contract will impact their bid price in a competitive solicitation. Four developers suggested that, typically, the longer the contract term, the lower their bid prices would be. Other developers stated their preferences for short-term contracts that would more closely

mirror recent market prices for RECs in adjacent states. It seems reasonable to assume that, in general, bidders will seek the maximum possible contract term available to them (as two of the four biomass projects did). This allows them to avoid the necessity of re-bidding and the risk of failing to win another contract.

Some developers argue they could be able to bring more projects online if New York allowed more flexible contract duration terms: "Flexibility is the key. For some projects, we want a 20-year contract; for others we want a 5-year contract.,. It's on a project-by-project basis. Having it fixed at a certain number of years is not a good thing. Ten years is better than three, but developers would like to have options." Future policy changes (e.g., expanded goals in later program years, additional Federal incentives) or market conditions (e.g., higher/lower turbine/electricity prices) could dramatically affect bid pricing. If market conditions improve over the original contract term, the greater the level of opportunity developers potentially forego. For a risk taking developer, this essentially means that the risk of higher attribute prices in later years of the contract diminishes the value of the contract's length. The key is to offer a maximum term at which developers feel comfortable projecting their market assumptions into the future and pricing their bids accordingly. While NYSERDA appears to have done so fairly successfully with the ten-year contract term, KEMA's assessment is that most developers are risk averse, suggesting that longer terms could be feasible and advantageous to all involved parties. When asked what their ideal contract terms would be, developers provided the following range of responses as shown in Table 19:

Table 19
Suggested Length of Preferred Contract Length for RECs

Contract Years	# of Developers Who Gave This Response
2	1 (biomass)
4	1 (wind)
8	1 (wind)
10	6 (2 biomass, 4 wind)
15	2 (biomass, hydropower)
20	5 (2 biomass, 3 wind)

The majority of responses (13 of 16) prefer longer contract lengths, with seven suggesting longer terms than current requirements, three suggesting that shorter terms would be more appropriate, and six suggesting ten years is ideal. It should be noted that these represent the optimal contract terms for the developers, not what they necessarily believe what is in the interest of ratepayers. For example, one

developer, who cited 20 years as optimal, also stated, "Ten years was reasonable. It was a good balance for rates. It was fair to both New York ratepayers and developers."

When asked about importance of the contracts to financing their projects, developers typically described renewable attribute or REC contracts as "critical" or "essential" to financing their projects. While the responses do not indicate a specific message about the contract term, they do suggest that these contracts are very important to development of the renewable energy market in New York.

The data presented in Table 20 below include responses from both participating and non-participating developers. Of those responding to the question, 72% indicated that REC contracts were critical to project financing.

Table 20
Importance of Long-Term REC Contracts for Project Financing Strategy

	Critical	Valuable, but projects might have been built regardless	Total
Biomass	3	2	5
Hydropower	0	1	1
Wind	10	2	12
Total	**13**	**5**	**18**

Suspension of performance. The standard contract offers developers the option to suspend their contract to deliver attributes if instead they are sold into the New York state voluntary market or to a public agency through EO 111. This provision not only supports New York's long term goals of creating a sustainable market but also offers developers an option to sell RECs at higher profits if market conditions allow. This contract suspension clause supports the short- and long-term viability of the REC and renewable energy market in New York State. Indeed, one developer has used this provision already.

Sales to Other markets Set-aside.

Main Tier solicitation requirements specify that no less than 30% and no more than 95% of a projects actual production can be bid for contract with NYSERDA. This range leaves at least 5% and as much as 70% available for sale to other customers, including clean energy marketers in New York State or sales to other states for RPS compliance or voluntary markets. The intended effect of this set-aside is that it has resulted in the development of more capacity of new resources than are supported with REC contracts. However, it is unclear whether the set-aside requirement is having the intended effect of fostering robust

voluntary markets in New York. The minimum five percent set-aside is likely to be too small to have that impact; plus the opportunity to sell into neighboring states' markets might be driving larger projects as well. Two program-related aspects of the set-aside are explored briefly here.

Barriers to market entry. Inclusion of a minimum 5% set-aside as a requirement potentially represents a barrier to entry for developers. Several bidders noted that they had difficulty in finding buyers for even 5% of their project output (or more, if applicable) that the RPS program requires be set aside for sale to voluntary or other markets. Many non-participating developers state that they are either uninterested in selling any set-aside quantity for a particular project, or their business model does not target voluntary market suppliers, precluding them from entering the New York market. Some suggested that it was costly to find buyers and sign contracts for such small quantities of renewable attributes, especially given the low prices they procure in green power markets.

Meeting the voluntary market RPS requirement based on set-aside requirements. It is unclear whether or not the voluntary market targets in the RPS policy can be met from current market conditions and the program set-aside structure. Green power marketers expressed agreement that supply for the voluntary markets is tight, but sufficient to meet current demand. The RPS, however, requires that 1% of all electricity sold statewide be supported by green power purchases, in addition to EO 111 which requires REC purchases through the voluntary market of 20% of state agency consumption. As discussed in Section 4, this target is considerably higher than current demand is tracking.

The policy goal of meeting one percent of the 25% RPS goal through voluntary market consumption is not well supported by the current policy and program structure and market. Of the 25% required to meet the RPS, about 6% is incremental (new) renewable generation and is in addition to the 19% of existing renewable generation in the baseline. From a production standpoint, if some or all of the generation existing prior to 2003 (the baseline) is sold into the voluntary market, then a considerable supply for RECs potentially exists. However, the pre-existing generation resources (primarily biomass and hydropower) are likely not as marketable as wind power; and new generation is more marketable than older generation—especially with respect to certification through ERT or Green-e. Therefore, assuming only the 6% incremental amount of new generation is marketable, and RPS projects sell 90% to 95% of their attributes to NYSERDA through Main Tier contracts to meet that goal, then only 0.3% to 0.6% of New York State's voluntary demand could be met through Main Tier projects—and that assumes the entire available set-aside green power supply is sold.

Attribute Tracking.

The January 2006 Order provides compelling reasons to transition away from the Environmental Disclosure Program (the EDP is fundamentally a consumer labeling process) which is the current accounting system used to track resource types. A certificate-based accounting system that tracks renewable energy credits or certificates (REC) in accordance with regional standards is recognized as preferable. Since the EDP is a tracking system for bundled transactions only, New York's EDP does not permit unbundled or REC only transactions since energy cannot be decoupled from the REC under the current system, making it impossible to market RECs outside of the NYISO. Additionally, the current tracking system cannot accommodate the data requirements for what consumers generally demand (e.g., Green-e certified RECs). Developers underscore the conclusions reached in the Order and cite the system as overly burdensome compared to others in the region.

Administrative Fairness and Transparency.

Overall, the program appears to be running fairly based on feedback to the evaluation team. The bid scoring system is appropriate, and bids were evaluated in a fair manner. As is NYSERDA's standard practice, for bidders who wish to receive a debriefing to discuss ways to improve their individual proposal, this opportunity is available to them.

Fairness. While losing bidders often complain about fairness in the selection process, the selection evaluation process is a standard practice used by NYSERDA, and it is similar to practices commonly employed by agencies in other states. NYSERDA staff expressed strong support for, and the intention of, evaluating projects on a level playing field, rather than favoring one project over another. As explained by NYSERDA staff members, all project proposals received in response to a RFP solicitation are evaluated by a technical evaluation panel (TEP). The TEP is composed of NYSERDA and external subject matter experts, of which the majority is external reviewers. The economic benefits are scored first—as the more subjective scoring portion of each bid—before the prices are revealed, to ensure against bias resulting from other bid scoring knowledge. Thereafter no further judgment is applied – The second step of the process scores the bids based on price which is mechanical and the result becomes a rank order of projects for contract award.

Transparency. Transparency in the solicitation process could be improved by measures addressed earlier, in terms of regular frequent solicitations and certainty of funding levels. If these objectives are met through the PSC authorization process, existing procedures for award notification and formal debriefings could be better implemented to ensure continued interest by renewable energy developers in the New York market.

While NYSERDA maintains that the opportunity for debriefings exist for all proposers, KEMA believes the bid ceiling price should remain confidential as a necessary and effective tool in the competitive solicitation process. Bidders are price seekers in terms of being able to procure contracts at competitive prices, although they do express some idea where the cap lies based on publicly available market data. Developers' views are mixed on whether or not the bid ceiling price should be published before the proposals are submitted or after the winners are selected. Some developers, however, commented that they would prefer to know the bid ceiling price. One stated, "I would prefer to see... the [bid ceiling] price. I believe in seeing a clear visible market price for RECs on which to base your market process. That is not done through the current RFP system. You see an average price not a [bid ceiling] price." On the other hand, contract awardees would not want the bid ceiling price shared with the public and therefore, the losing competition. If revealed, it is expected that bidders would shift future bid prices to the ceiling price to maximize their revenues at the expense of ratepayers and progress against targets (limited funding allocated to smaller pool of bidders/production) and the competitive process.

CST INCENTIVES APPROACH

As stated previously, NYSERDA also administers the Customer Sited Tier (CST) or "behind the meter" renewable energy technologies. To meet the CST targets, NYSERDA offers a mix of incentives based on capacity (MW) and energy output (MWh). In an Order subsequent to the 2004 Order, the New York State DPS and NYSERDA were required to develop, in consultation with stakeholders, an implementation and allocation plan for the CST funding.[91] In 2006, the PSC issued an order to, "establish parameters and principles that NYSERDA should use in developing an Operating Plan to implement the Customer-Sited Tier component of the RPS program."[92] The Order authorized NYSERDA to implement and fund CST solicitations through 2009 according to various specified requirements by technology.

The CST is a small part of the overall RPS policy in terms of both funding and the target. The section below focuses on an assessment of the incentives approach, including feedback from (two) Anaerobic Digester Gas (ADG), (three) photovoltaic (PV), and (two) small wind system installers. On balance the incentives approach to link capacity to incentive levels for the three technologies listed above is effective. Although installers say that standards could be improved for performance measurement, they generally embrace the concept of standardization in performance measurement and capacity-based incentives.

On balance, the incentives also seem to be appropriately specified to support the technologies. Each installer was also asked whether or not the incentives make a particular technology affordable. The responses vary greatly by technology, illustrating the different project economics and risk profile for each particular technology. The responses are generally positive with respect to the incentive levels; however, one common theme is that incentives are always a function of scale, the limitation of the funding caps, the net metering limits, and how the specified combination of scale, funding availability and net metering caps relate to each other, given the state of the technology. The sample of installers interviewed is very small; their comments are summarized as follows:

- Two ADG installers affirmed that the incentives make the projects affordable. Indeed, one installer said that business would be "impossible without it." Additionally, they felt the $1million maximum cap is more than adequate—even in excess of what is realistic; however, they see no

[91] Case 03-E-0188, supra, Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program (issued April 14, 2005) (April 2005 Order).
[92] Case 03-E-0188. supro. Order on Customer-Sited Tier Implementation (issued June 28, 2006) (June 2006 Order).

real advantage to the net metering provision because it just adds cost "through bartering" or lost fuel by flaming off excess methane that cannot be net-metered.

- PV installers comment that the incentives make those systems affordable; however, several installers commented that the incentive approach favors small systems and does not tap the potential for large scale commercial systems. Installers argue that per KW installed costs are lower as system size increases, and the current cap only supports the more expensive, customized systems. Installers also expressed some limited support for performance-based incentives.
- The two small wind installers interviewed are relatively less sanguine on the incentives overall. Similar to PV systems, one says the incentives favor smaller systems. Another comments that the maximum incentive is not adequate—especially given the limitations of the new net metering rule—because the economics do not work for projects over 100 KW. Wind installers believe that business will not be hindered through performance- or capacity-based incentives, as long as the incentives are based on "independent ratings" and incentives are not shifted away from helping to cover the up front costs and risks of the project. In the few interviews conducted, wind installers were particularly enthusiastic about the net metering revenues and their contribution to project economics and viability.

KEMA

SECTION 7
KEY FINDINGS AND RECOMMENDATIONS

As part of the 2005 PSC Implementation Order,[93] monitoring and evaluation (M&E) activities in a 2009 expanded report were to include recommendations for improving the RPS program. This section presents the key findings of this report and presents recommendations.

KEY FINDINGS

We categorize key findings in these areas:

- Progress toward goals
- Cost effectiveness
- Results of the process evaluation

Progress toward goals (Section 4):

KEMA's assessment of the progress toward goals is based primarily on PSC Orders and NYSERDA performance reports.

- Based on KEMA estimates New York is at approximately 74% of the year 2008 (annual) target for the Main Tier; no further procurements are planned, however.
- Based on the 2008 Cost Study, the potential resources in New York exist to meet goals. However, the Main Tier and Customer Sited Tier programs are not on track to meet the 2013 goal without more authorized funding for additional solicitations.
    - The 2008 Cost Study projects that biomass participation levels will increase.
    - Most resources to date are wind and low impact hydro.
- The Customer Sited Tier is making better progress toward targets than the Main Tier achieving 119% of the 2009 goal by the end of 2008. The CST program shows considerable demand, the Operating Plan in 2007 reduced targets from the 2004 Order, and additional funding was added in 2008 from unused Main Tier funds.

[93] State of New York Public Service Commission, "CASE 03-E-0188 – Proceeding on Motion of the Commission Regarding a Retail Renewable Portfolio Standard," April 14, 2005, p. 46-48. (2005 Order)

Cost Effectiveness and Macroeconomic Impacts (Section 5):

Key sources of data for the Macroeconomic Impacts and Cost Effectiveness estimates are from the 2008 Cost Study Update, bidders' data, an IMPLAN simulation of Macroeconomic Impacts, the PSC, NYSERDA documents, and a literature review of other studies.

- The New York RPS is highly cost-effective when considering direct economic benefits, price suppression benefits and specific environmental benefits combined.
- Technologies such as biomass that offer more longer-term employment in some cases contribute more to the local economy than other technologies such as wind.
- There is much inconsistency in the literature on what is an appropriate test for reviewing the cost effectiveness of an RPS.
- The impacts of the RPS on transmission system reliability are probably a net cost in the short-term; the impacts of the RPS on the environment are a net benefit in the long-term.

Findings from the process evaluation (Section 6):

The key sources of information from the process evaluation are PSC Orders and interviews with stakeholders. The majority of the process evaluation interviews were with developers. Other interviewees included: NYSERDA staff; stakeholders, green power developers, municipalities, LSEs, NYISO staff and distribution company staff.

- The New York RPS centralized procurement and RFP approaches are perceived as working well for the most part after the first three procurements.
- NYSERDA's stewardship of ratepayer funding has been prudent.
- Additional funding and additional procurements in the Main Tier will be needed to meet the long term goal for 2013.
- NYSERDA's process has achieved new MW in a cost effective manner in proportions greater than that which is being funded.
- The bid scoring system, including consideration for economic benefits, is appropriately weighted between price and benefits, and effective at attracting bids through the RFP process.
- NYSERDA's standard contract terms have been effective at weeding out defectively priced projects while protecting ratepayers.
- Long-term contracts are essential to program success and demanded by prospective bidders.
- Many developers would like to see more flexibility, public funding, and opportunities to do business in New York State.

- Most developers expressed concerns about market uncertainty especially as it related to scheduling of future solicitations.

RECOMMENDATIONS

KEMA has identified the following recommendations for consideration by the PSC and NYSERDA.

Appropriate Targets and Goals

- In order to meet RPS goals, funding must be made available for additional Main Tier solicitations.

- New York should define any future RPS procurements and targets in accordance with forecasted cost requirements and take into consideration authorized funds. This approach would be congruent with how the CST targets and funding levels have been recast.

- Transforming percentage targets into annual goals for MWh and treating them as hard targets will contribute to market certainty.

- The voluntary market does not appear to be meeting policy objectives. New York State may wish to engage in discussions with both Green Power Providers along with the distribution utilities to identify program changes that will increase the participation of this market segment.

Program Effectiveness

- Improving market certainty for renewable energy developers is important. Authorizing additional funds on a periodic basis for the procurement of hard targets will contribute to bolstering market certainty for developers.

- NYSERDA should consider issuing a "standard offer" for smaller projects—perhaps from 1MW to 10 MW—which could be issued at any time but perhaps most appropriately immediately following awards from a competitive solicitation if a balance of available funding remains.

- New York should consider moving from a procurement system where only attributes from one physical generator are eligible as a means of contract compliance to a product-based system over time—one where a Renewable Energy Credit (REC) associated with the electric generation of any otherwise eligible RPS resource can be substituted for compliance purposes.

- New York should consider alternative forums for working with wind and demand response providers to develop new solutions to transmission and distribution congestion issues. A starting point for this may be facilitated meetings on future transmission impacts, participation in the day-ahead market and assignment of dispatch base-points for wind operators.

- NYSERDA should continue to offer long term contracts and consider flexibility to extend contract term offers beyond the current maximum of 10 years.

- Consistent with its existing order,[94] New York State should formally recognize tradable Renewable Energy Credits (REC) as a means of compliance with the RPS and for encouraging growth in the voluntary green power markets. Adopting a regionally compatible REC tracking and trading system would advance voluntary REC market activity and facilitate environmental disclosure.

Program Efficiency

- There should be a regular schedule with flexibility to conduct more frequent, and smaller, if warranted, solicitations —with NYSERDA given the flexibility to issue a solicitation periodically, perhaps every six or twelve months. This will help greatly to reduce market uncertainty. This can only occur provided the funding is available on a schedule that supports such periodicity in procurement cycles. The solicitation schedule should be published as far in advance as possible again to increase market certainty.

- To respond with nimbleness to changing market conditions, NYSERDA should be allowed to make use of funding that may become available due to the suspension of contracts at the developer's initiation, or monies that may become available due to underperforming contracts.

- NYSERDA should maintain the practice of setting bid price ceilings based on current market conditions and keeping them confidential. A bid price ceiling exerts restraint and encourages the prudent expenditure of public funds. Confidentiality serves to avoid having bid prices drift toward the ceiling price over time.

- NYSERDA should implement a proposal review and award schedule process to demonstrate as much transparency as possible, including a clear schedule for award date, debriefing window, and what debriefings will (e.g., clarity of estimation and presentation of economic benefits) or will not cover (e.g., disclosure of the bid price will not be covered).

[94] Case 03-E-0188, Proceeding on a Motion of the Commission Regarding a Retail Renewable Portfolio Standard , Order Recognizing Environmental Attributes and Allowing Participation of Projects with Physical Bilateral Contracts, June 28, 2006.