



# New York Main Tier RPS Impact & Process Evaluation



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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 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

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progress as of 2008 stands at 119% of its 2009 target, with expected total production of 62,226 MWh<sup>1</sup>, 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<sup>2</sup>.

As of 2007<sup>3</sup>, 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.<sup>4</sup> 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<sup>5</sup>. 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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<sup>1</sup> New York State Renewable Portfolio Standard Performance Report, Program Period ending June 2008, NYSERDA, September 2008, page 12.

<sup>2</sup> Notice of State Rule-Making, No. 03-E-0188SA19, October 1, 2008.

<sup>3</sup> 2007 is the most recent year for reported data on EO 111 and the voluntary market.

<sup>4</sup> 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.

<sup>5</sup> \$558.5 was committed as of June 2008, but this amount has since decreased due to recent project cancellations.

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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.

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- 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,<sup>6</sup> 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.

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<sup>6</sup> 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.

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### **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).

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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.<sup>7</sup> 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.<sup>8</sup> 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

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<sup>7</sup> 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.

<sup>8</sup> 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.

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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<sup>9</sup> 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

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<sup>9</sup> NYPA's contributions can be counted toward support of Executive Order 111 or voluntary market growth.

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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.

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Cost estimates include the following:

- The actual and projected procurement costs of the RPS attributes for Main Tier and Maintenance Tier resources.<sup>10</sup>
- 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.

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<sup>10</sup> 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**

<b>Market Actor</b>	<b>Targeted Completions</b>	<b>Actual Complete</b>	<b>Percent Complete</b>
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%
<b>Total</b>	<b>65</b>	<b>68</b>	<b>105%</b>

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.

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### **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<sup>11</sup> evaluation for its evaluation methodology and the RPS Best Practices<sup>12</sup> in formulating and developing its recommendations presented in Chapter 7.

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<sup>11</sup> 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).

<sup>12</sup> “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,<sup>13</sup> 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<sup>14</sup>
- Voluntary Markets
- Long Island Power Authority
- New York Power Authority<sup>15</sup>

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

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<sup>13</sup> 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)

<sup>14</sup> Executive Order 111 requires New York state agencies to procure 10% by 2005 and 20% of their electricity from renewable sources by 2010.

<sup>15</sup> NYPA's contributions are accounted for in the baseline, and in EO 111 or voluntary markets, depending the type of activity.

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RPS targets.<sup>16</sup> 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.<sup>17</sup>

## 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.

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<sup>16</sup> 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.

<sup>17</sup> 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**

<b>SEP Forecast 2013 182,866,999 MWh</b>		
<b>RPS Policy Element</b>	<b>2013 Target (MWh)</b>	<b>% of 2013 Load Forecast</b>
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%
<b>Total Renewables</b>	<b>45,716,750</b>	<b>25%</b>

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**

<b>RPS Policy Element</b>	<b>2013 Target (MWh)</b>	<b>% of Total Renewables Target (45,716,750 MWh)</b>
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**

<b>Program Year</b>	<b>Main Tier</b>	<b>Customer Sited Tier *</b>	<b>EO 111</b>	<b>Voluntary Market</b>	<b>Combined</b>
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
<b>Main Tier Targets:</b>	1,121	2,326	3,549	4,768	6,012	7,298	8,557	9,854
<b>Progress toward Annual Targets:</b>	582	583	841					
<b>Progress as % of Annual Targets:</b>	52%	25%	24%					
<b>Expected Progress toward annual Targets from Facilities under Contract</b>								
<b>Progress toward Annual Targets:</b>			2,639	2,947	2,878	2,878	2,850	2,850
<b>Progress as % of Annual Targets:</b>			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.

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## **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<sup>18</sup>, 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.<sup>19</sup> 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.

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<sup>18</sup> Order on Customer-Sited Tier Implementation, Case 03-E-0188.

<sup>19</sup> 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](http://www.dps.state.ny.us/CST_OP_02-12-07.pdf).

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**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.<sup>20</sup> 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<sup>21</sup> 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. )

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<sup>20</sup> 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.

<sup>21</sup> 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)<sup>22</sup>**

	<b>RPS 2004 Order</b>	<b>CST Operating Plan 2007</b>	<b>Expected Energy Production June 2008</b>
<b>Total Overall</b>	<b>100,855</b>	<b>52,878*</b>	<b>62,226</b>
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.

<sup>22</sup> RPS Program Performance Report, June 2008, p. 12

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**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.

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Targets for EO 111 are 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,<sup>23</sup> 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

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<sup>23</sup> Report is found at: [http://www.nyserda.org/pdfs/Executive Order 111 SFY 06-07.pdf](http://www.nyserda.org/pdfs/Executive%20Order%20111%20SFY%2006-07.pdf)

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“15 x 15”).<sup>24</sup> 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.<sup>25</sup> 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.<sup>26</sup>

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 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.<sup>27</sup> 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 additional 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.

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<sup>24</sup> State of New York Public Service Commission, “Order Establishing Energy Efficiency Portfolio Standard and Approval Programs,” June 2008. pg. 3.

<sup>25</sup> 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.”

<sup>26</sup> La Capra/SEA Cost Study. Pg. 6.

<sup>27</sup> La Capra/SEA RPS Cost Study Update, Pg. 6.

**Table 7**  
**Main Tier RPS Targets by Year and Scenario**

Year	Cumulative (MWh)			Incremental (MWh)		
	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	<b>3,490,270*</b>			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.

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## 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,<sup>28</sup> 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

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<sup>28</sup> 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)

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## **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).<sup>29</sup> 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

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<sup>29</sup> KEMA Consulting and EDGR, Inc., “NYSERDA Main Tier RPS Economic Benefits Report,” November 14, 2008. Hereafter, “KEMA Main Tier Economic Benefits Report.”

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### **RPS Scenarios**

As part of the assessment of macroeconomic impacts, NYSERDA considered the following scenarios based on a 2006 study by La Capra Associates.<sup>30</sup>

- 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.<sup>31</sup> 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.<sup>32</sup> 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

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<sup>30</sup> 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."

<sup>31</sup> Scenario 1 included three wind projects (totaling 174 MW) that subsequently cancelled in 2009.

<sup>32</sup> More background on IMPLAN can be found at [www.implan.com](http://www.implan.com).

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- 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.<sup>33</sup> 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

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<sup>33</sup> 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:<sup>34</sup>

*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)<sup>35</sup> 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	<b>All</b>	<b>4,066,553</b>	<b>80,852,940</b>	<b>\$2,064,621,293</b>	<b>\$25.39</b>
Scenario 2: 25% by 2013	<b>All</b>	<b>5,266,252</b>	<b>105,325,040</b>	<b>\$2,627,132,184</b>	<b>\$24.94</b>
Scenario 3: 30% by 2015	<b>All</b>	<b>10,995,279</b>	<b>219,905,580</b>	<b>\$6,006,979,054</b>	<b>\$27.32</b>

<sup>34</sup> See Appendix A: Page 4-8

<sup>35</sup> 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.

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- 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.

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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):<sup>36</sup>

- **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.<sup>37</sup> 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.<sup>38</sup>

### **Total Economic Impacts.**

An IMPLAN input-output economic model of NYS was used to measure the multiplier effects (henceforth termed the indirect effects<sup>39</sup>) 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

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<sup>36</sup> 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.

<sup>37</sup> 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.

<sup>38</sup> 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%.

<sup>39</sup> 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**

<b>Scenario</b>	<b>Analysis Interval</b>	<b>Direct Project Benefits (\$m)</b>	<b>Indirect Impacts (m\$)</b>	<b>Total Impacts (m\$)</b>
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 annual 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**

<b>Annual</b>	<b>First Three Solicitations</b>	<b>25% by 2013</b>	<b>30% by 2015</b>
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**

<b>Over Facility Life</b>	<b>First Three Solicitations</b>	<b>25% by 2013</b>	<b>30% by 2015</b>
Direct Job Years	6,492	8,298	19,607
Direct Payroll	\$501,788,643	\$635,533,210	\$1,481,422,272
<i>Avg. Compensation per Job</i>	\$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
<i>Avg. Compensation per Job</i>	<b>\$53,139</b>	<b>\$52,892</b>	<b>\$51,570</b>
<b>Total Job Years</b>	<b>22,676</b>	<b>28,528</b>	<b>64,808</b>

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<sup>40</sup>**  
**Total Economic Impacts for Scenario 1: First Three Solicitations, 2005 – 2028**

	2005	2006	2007	2008	2009	2015	2028	Total (2005-2028)
<b>Jobs</b>								
Direct	100	595	677	756	305	223	44	6,492
Indirect	428	1,670	1,860	1,827	813	529	67	16,184
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>2,583</b>	<b>1,118</b>	<b>752</b>	<b>111</b>	<b>22,676</b>
<b>Labor Income (2006\$ mil)<sup>41</sup></b>								
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
<b>Total</b>	<b>\$34.2</b>	<b>\$130.9</b>	<b>\$157.5</b>	<b>\$157.8</b>	<b>\$76.4</b>	<b>\$44.4</b>	<b>\$6.2</b>	<b>\$1,362</b>
<b>Output (2006\$ mil)</b>								
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
<b>Total</b>	<b>\$108.0</b>	<b>\$409.7</b>	<b>\$465.3</b>	<b>\$464.6</b>	<b>\$216.6</b>	<b>\$142.5</b>	<b>\$18.7</b>	<b>\$4,248</b>

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.

<sup>40</sup> 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.

<sup>41</sup> 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<sup>42</sup>**  
**Total Economic Impacts for Scenario 2: 25% by 2013, 2005 – 2028**

	2005	2006	2007	2008	2009	2010	2011	2015	2028	2029	2030	<i>Total (2005- 2030)</i>
<b>Jobs</b>												
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
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>2,903</b>	<b>1,722</b>	<b>1,412</b>	<b>1,233</b>	<b>957</b>	<b>316</b>	<b>205</b>	<b>104</b>	<b>28,528</b>
<b>Labor Income (2006\$ mil)</b>												
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
<b>Total</b>	<b>\$34.2</b>	<b>\$130.9</b>	<b>\$157.5</b>	<b>\$177.8</b>	<b>\$114.1</b>	<b>\$85.1</b>	<b>\$73.3</b>	<b>\$56.1</b>	<b>\$17.9</b>	<b>\$11.7</b>	<b>\$5.9</b>	<b>\$1,705</b>
<b>Output (2006\$ mil)</b>												
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
<b>Total</b>	<b>\$108.0</b>	<b>\$409.7</b>	<b>\$465.3</b>	<b>\$519.6</b>	<b>\$319.9</b>	<b>\$259.3</b>	<b>\$233.3</b>	<b>\$186.3</b>	<b>\$62.5</b>	<b>\$43.8</b>	<b>\$22.3</b>	<b>\$5,424</b>

<sup>42</sup> 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.

**Table 15<sup>43</sup>**  
**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)
<b>Jobs</b>																				
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
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>3,396</b>	<b>2,804</b>	<b>3,331</b>	<b>3,586</b>	<b>3,189</b>	<b>3,274</b>	<b>2,791</b>	<b>2,789</b>	<b>2,256</b>	<b>1,615</b>	<b>1,504</b>	<b>1,296</b>	<b>1,051</b>	<b>836</b>	<b>622</b>	<b>321</b>	<b>64,805</b>
<b>Labor Income (\$mil)<sup>*</sup></b>																				
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
<b>Total</b>	<b>\$34</b>	<b>\$131</b>	<b>\$157</b>	<b>\$208</b>	<b>\$181</b>	<b>\$204</b>	<b>\$220</b>	<b>\$194</b>	<b>\$198</b>	<b>\$165</b>	<b>\$162</b>	<b>\$129</b>	<b>\$91</b>	<b>\$85</b>	<b>\$73</b>	<b>\$58</b>	<b>\$45</b>	<b>\$33</b>	<b>\$17</b>	<b>\$3,812</b>
<b>Output Required (\$mil)</b>																				
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
<b>Total</b>	<b>\$108</b>	<b>\$410</b>	<b>\$465</b>	<b>\$607</b>	<b>\$512</b>	<b>\$600</b>	<b>\$650</b>	<b>\$586</b>	<b>\$610</b>	<b>\$539</b>	<b>\$549</b>	<b>\$453</b>	<b>\$329</b>	<b>\$310</b>	<b>\$269</b>	<b>\$220</b>	<b>\$177</b>	<b>\$134</b>	<b>\$67</b>	<b>\$12,574</b>

<sup>43</sup> 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.

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## **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.<sup>44</sup>*

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.<sup>45</sup> 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).

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<sup>44</sup> 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)

<sup>45</sup> 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.

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### **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;<sup>46</sup> 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 (CO<sub>2</sub>), \$3,250 per ton for nitrogen oxides (NO<sub>x</sub>), and \$11/ton for sulfur dioxide (SO<sub>x</sub>).

**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.<sup>47</sup> Economic output can be defined as a representation of, “the value of industry production.”<sup>48</sup> 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).”<sup>49</sup> 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

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<sup>46</sup> 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.

<sup>47</sup> The period includes a project development period for each solicitation and an assumed operating life of 20 years, staggered according to the solicitation schedule.

<sup>48</sup> IMPLAN Glossary ([www.implan.com](http://www.implan.com)), accessed January 23, 2009.

<sup>49</sup> Ibid.

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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:<sup>50</sup>

*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*

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<sup>50</sup> 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.

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*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.*<sup>51</sup>

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 (NO<sub>x</sub>, SO<sub>x</sub>, and CO<sub>2</sub>) 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).<sup>52</sup>

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<sup>51</sup> 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.

<sup>52</sup> <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).<sup>53</sup>
- 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.<sup>54</sup> 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<sup>55</sup>, 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.<sup>56</sup> 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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<sup>53</sup> [http://www.epa.gov/cleanenergy/documents/eGRID2007V1\\_1\\_year05\\_SummaryTables.pdf](http://www.epa.gov/cleanenergy/documents/eGRID2007V1_1_year05_SummaryTables.pdf)  
Accessed February 9, 2009.

<sup>54</sup> 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).

<sup>55</sup> Assume a 5% discount rate from 2005.

<sup>56</sup> See the CA Standard Practice Manual.

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

<b>Year</b>	<b>GSP Added</b>	<b>Price Suppression</b>	<b>Environmental</b>	<b>Total Benefits</b>	<b>Total Costs</b>	<b>Net Cash Flow</b>
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
<b>Total</b>	<b>\$803,643,913</b>	<b>\$2,001,305,943</b>	<b>\$128,620</b>	<b>\$2,805,078,475</b>	<b>-\$442,051,781</b>	<b>\$2,363,026,694</b>

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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.<sup>57</sup> 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.

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<sup>57</sup> 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).

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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.<sup>58</sup> The need in 2012 results from a statewide capacity deficiency as well as a zonal deficiency resulting from transmission constraints.*

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

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*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.<sup>59</sup>*

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,

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<sup>59</sup> 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.

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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.*

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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.<sup>60</sup>*

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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<sup>60</sup> 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.

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**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.<sup>61</sup>*

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

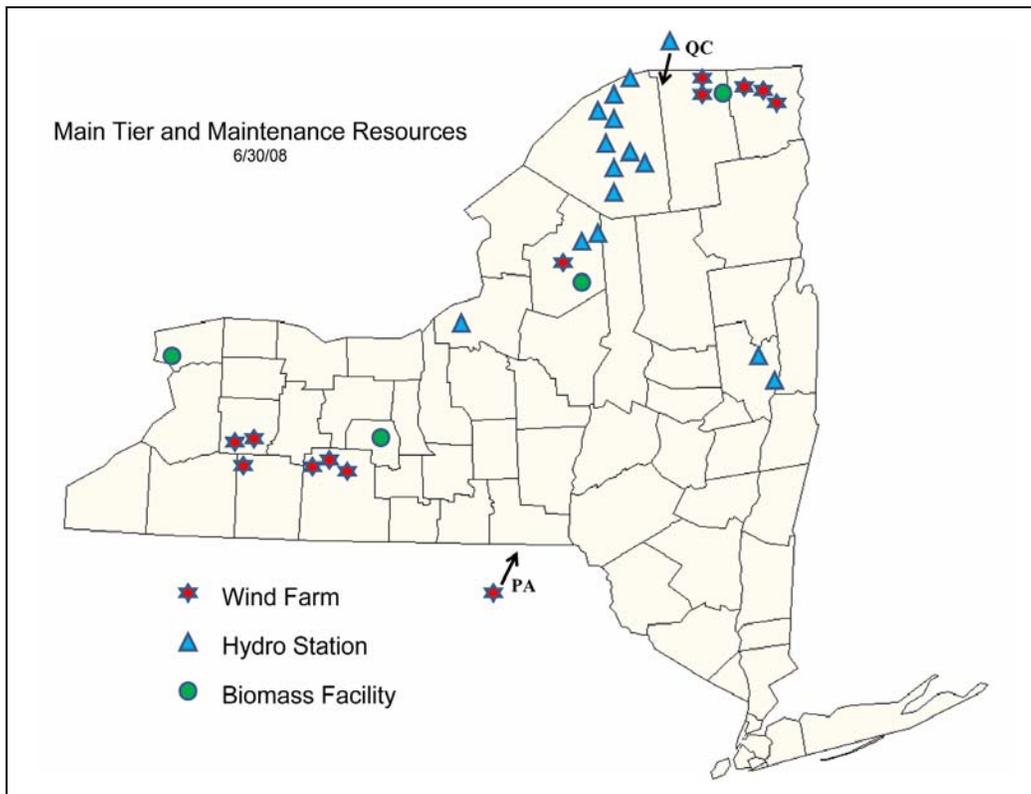
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<sup>61</sup> Integration of Wind Into System Dispatch. NYISO, October 2008.

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

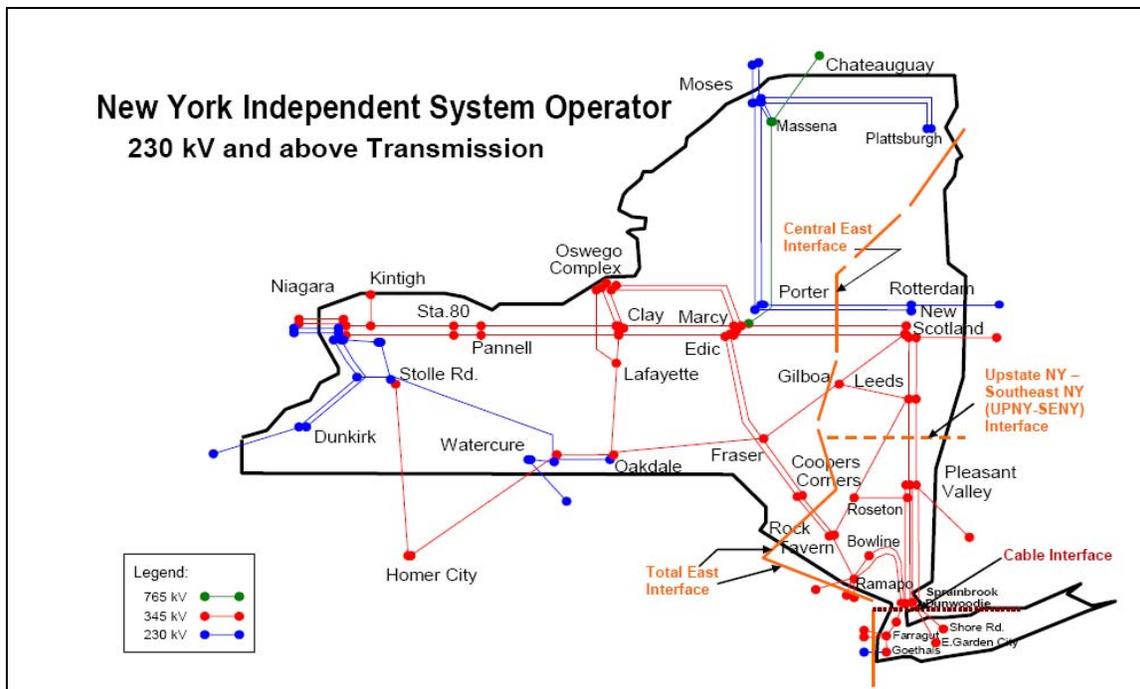
**Transmission and Distribution.** Locating renewable resources close to load centers is another means of increasing the value and efficacy of the renewable resource. Renewable resources, however, are sited based on many criteria, including specific and optimized technical conditions. For example, wind 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 be physically located downstate, and then operated locally to keep the lights on in New York City and Long Island.<sup>62</sup>*

<sup>62</sup> Fuel Diversity in the New York Electricity Market, NYISO, October 2008. Page 1-2.

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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

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in that petroleum is responsible for less than 2% of its electricity generation.<sup>63</sup> 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.<sup>64</sup>

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.*<sup>65</sup>

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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<sup>63</sup> US Energy Information Administration, Annual Energy Review, 2008.

[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=NY](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=NY)

<sup>64</sup> New York City is a known exception but is far from the renewable resource generation points anyway.

<sup>65</sup> Fuel Diversity in the New York Electricity Market, NYISO White Paper, October 2008. Page 1-2

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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.<sup>66</sup>*

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.<sup>67</sup> 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.

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<sup>66</sup> Ibid.

<sup>67</sup> 2008 NYSERDA Performance Report, Page 9.

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**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.<sup>68</sup> 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 NO<sub>x</sub>, SO<sub>x</sub>, and mercury as well as carbon from fossil fuel production.<sup>69</sup> 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.

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<sup>68</sup> 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.

<sup>69</sup> 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*

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*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.

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## 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:<sup>70</sup>

- 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,<sup>71</sup> 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.

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<sup>70</sup> 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)

<sup>71</sup> 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)

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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

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groups of consumers should bear the program's costs.”<sup>72</sup> 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.”<sup>73</sup> 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.*<sup>74</sup>

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

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<sup>72</sup> 2004 Order, p. 48.

<sup>73</sup> 2004 Order, p. 49.

<sup>74</sup> NYSERDA Website, “Main Tier.” [www.nyserdera.org/rps/mainTier.asp](http://www.nyserdera.org/rps/mainTier.asp)

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- 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:<sup>75</sup>

- 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.

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<sup>75</sup> 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.<sup>76</sup>

**Table 17**  
**RPS Main Tier Eligible Electric Generation Sources**

<b>Category</b>	<b>Source</b>	<b>Other Requirements</b>
<b>Biomass</b>	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	
<b>Liquid Biofuel</b>	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.
<b>Hydroelectric</b>	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.
<b>Tidal/Ocean</b>	Tidal turbine	
	Ocean wave turbine	
	Ocean current wave turbine	
	Ocean thermal pumped storage hydro, powered by tidal	
<b>Wind</b>	Wind turbines	

<sup>76</sup> 2005 Order, Appendix B

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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:<sup>77</sup>

- 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*

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<sup>77</sup> 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**

<b>Approach</b>	<b>Preference</b>
<b>RFP:</b>	<b>Six developers expressed definite support for the RFP approach.</b> This includes four wind developers and two biomass developers. One additional biomass developer described the approach as “acceptable.”
<b>Auction:</b>	<b>Five developers expressed definite support for the auction approach.</b> Of the five expressing definite support, four were biomass developers. The other develops hydro, wind, and biomass power projects.  Additional input from other developers: <ul style="list-style-type: none"> <li>• 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.”</li> <li>• Two stated that the auction would not work in this market, without providing any rationale.</li> <li>• One wind developer suggested this would be appropriate for existing facilities only (e.g. Maintenance Resources and co-firing facilities).</li> </ul>
<b>Standard Offer:</b>	<b>Four developers expressed definite support for a standard offer.</b> Of these, three develop wind and one develops biomass. Other comments included: <ul style="list-style-type: none"> <li>• Two wind developers said standard offer for small projects only (less than 20 MW) would be appropriate.</li> <li>• One biomass developer suggested a sliding scale.</li> <li>• One biomass developer suggested that a standard offer is good for developers but not for ratepayers.</li> <li>• One wind developer said a standard offer is appropriate, but for new facilities only.</li> </ul>

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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

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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. One 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<sup>78</sup> 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

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<sup>78</sup> October 19, 2006

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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.*

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*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.<sup>79</sup>*

**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.<sup>80</sup> 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:<sup>81</sup>

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
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<sup>79</sup> NYSERDA Solicitation #1168.

<sup>80</sup> The cost containment mechanism in some states may take the form of an alternative compliance fee.

<sup>81</sup> The benefits are adapted from the actual data categories requested by NYSERDA.

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- 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:<sup>82</sup>

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<sup>82</sup> See Appendix A: Page 4-8

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*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

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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.<sup>83</sup>

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.<sup>84</sup>

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

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<sup>83</sup> 2006 Order, Page 17 (January 26, 2006).

<sup>84</sup> 2004 Order, page 23.

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discussed in Section 5, they tend to provide superior economic benefits because purchases of in-state 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.<sup>85</sup>

**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

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<sup>85</sup> NYISO, prepared statement to the KEMA Evaluation Team.

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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

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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.<sup>86</sup> 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

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

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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

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supporting new project development within New York's borders because it levelizes the delivery requirements.<sup>87</sup> 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:<sup>88</sup>

- 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.

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<sup>87</sup> The monthly delivery requirement essentially gave an economic advantage to external facilities.

<sup>88</sup> 2005 Order, p. 5-6.

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- 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.<sup>89</sup>

**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.<sup>90</sup> 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.

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<sup>89</sup> 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.nyserra.org/rps/mainTierParticipation.asp>

<sup>90</sup> For a 100 MW wind farm with a 30% capacity factor bidding 100% of its output, this would be approximately \$1.6 million.

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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.*

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*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**

<b>Contract Years</b>	<b># of Developers Who Gave This Response</b>
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**

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

**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

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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.

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### **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.

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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.

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## 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.<sup>91</sup> 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.”<sup>92</sup> 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

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<sup>91</sup> Case 03-E-0188, *supra*, Order Approving Implementation Plan, Adopting Clarifications, and Modifying Environmental Disclosure Program (issued April 14, 2005) (April 2005 Order).

<sup>92</sup> Case 03-E-0188. *supra*. Order on Customer-Sited Tier Implementation (issued June 28, 2006) (June 2006 Order).

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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.

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## SECTION 7

### KEY FINDINGS AND RECOMMENDATIONS

As part of the 2005 PSC Implementation Order,<sup>93</sup> 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.

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<sup>93</sup> 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)

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### **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.

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- 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.

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- 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,<sup>94</sup> 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).

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<sup>94</sup> 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.

**Appendix A**  
**ECONOMIC BENEFITS REPORT**

# NYSERDA Main Tier RPS Economic Benefits Report



Prepared for:

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Josh Kessler and Lisa Petraglia  
Agreement Number 10429

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### **ABSTRACT**

NYSERDA is required to present the New York Public Service Commission (PSC) with an evaluation report of the NYS RPS 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, Inc. and its affiliates (the KEMA Team) were selected to report on the economic benefits to NYS resulting from in-state spending on renewable energy projects. Benefits from direct project spending are measured as well as those that accrue indirectly as a result of increased economic activity in the state. This report will help the PSC and other policy-makers to understand how effective the program has been at spurring economic development within the state, and what level of short-and long-term benefits can be expected in the future. This work will be a stand-alone report, with key findings included in a more comprehensive impact assessment report submitted to NYSERDA at a later date.

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## Section 1

### EXECUTIVE SUMMARY

#### SCOPE

This report analyzes the economic impacts or effects associated with expenditures on renewable energy facilities' construction & operations in New York for facilities supported by the RPS Main Tier and Maintenance Resources program. It used a discrete set of economic measures that covered the facility's construction phase and over the life of the facility. The construction phase was estimated to last for three years (herein referred to as short-term) and the "over the life of the facility" phase was estimated to last 20 years (herein referred to as long-term). The economic benefits or effects of these measures were analyzed at two levels – the direct benefits or effects in the economy resulting from the facilities were calculated, and the indirect or multiplier effects were modeled (using an IMPLAN input/out model) throughout other sectors of the economy. The results are explained for three scenarios:

- First Three Competitive Solicitations (RFP 916, RFP 1037, RFP 1168)
- 25% RPS Goal by 2013 Using the Post-EEPS Load Forecast
- 30% RPS Goal by 2015 Using the Post-EEPS Load Forecast

The economic measures were estimated and reported by the developers in response to the second and third solicitations issued by NYSERDA for the RPS Main Tier program. KEMA verified the estimates' accuracy, assessed them for credibility, and extrapolated economic measures for facilities from the first competitive solicitation which lacked developers' estimates of economic benefits.

The direct and indirect effects were calculated for the short and long-term economic measures:

#### 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)

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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

The report does not include the price suppression effects of the RPS Main Tier program on wholesale electricity prices and potential ratepayer savings after netting out the RPS surcharge paid. It does not include all of the ancillary benefits, such as air quality improvements or health impacts, nor any indirect costs by diverting these funds from spending in other sectors.

## **RESULTS**

### **Benefits – Direct & Indirect**

This report provides an assessment of the total economic benefits that result from NYSERDA's Renewable Portfolio Standard (RPS) Main Tier program. These benefits include direct project benefits as well as the indirect—or *multiplier induced*—benefits to New York's economy. The results were modeled for the three scenarios. One scenario covered the RPS Main Tier and Maintenance Resources program progress made to date, as well as two potential scenarios for NYSERDA's Main Tier<sup>95</sup> RPS Program going forward. The analysis interval was extended over the 20-year life of a facility.

- First Three Solicitations – Analysis interval 2005-2028
- 25% RE by 2013 – Analysis interval 2005-2030
- 30% RE by 2015 - Analysis interval 2005-2034

Direct benefits reported by developers of wind, hydropower, and biofuel generation facilities include both short-term and persistent long-term impacts. Short-term impacts primarily result from construction jobs and compensation to municipalities, abutting property owners, and others. Long-term impacts are jobs tied

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<sup>95</sup> Hereinafter Main Tier includes Maintenance Tier resources.

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.

Table 1 shows within each scenario the *total direct economic benefits* (reported by developers in dollars per megawatt-hour (MWh) of RE generation)<sup>96</sup> associated with the nameplate capacity of the facility.

**Table 1**  
**Direct Economic Benefits by Scenario (\$ per MWh)**

	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
First Solicitations	<b>All</b>	<b>4,042,647</b>	<b>80,852,940</b>	<b>\$2,064,621,293</b>	<b>\$25.54</b>
25% by 2013	<b>All</b>	<b>5,266,252</b>	<b>105,325,040</b>	<b>\$2,627,132,184</b>	<b>\$24.94</b>
30% by 2015	<b>All</b>	<b>10,995,279</b>	<b>219,905,580</b>	<b>\$6,006,979,054</b>	<b>\$27.32</b>

As Table shows, based on the existing resources contracted to date through the first three solicitations, \$25 in total direct benefits is produced as a result of project expenditures in New York for every MWh of renewable energy that is generated for the RPS.

**Direct Benefits, by Technology Type**

The direct benefits from large scale wind, repowered hydropower, biofuels, and landfill gas facilities vary considerably. 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 either the 25% or 30% projected scenarios, would have the highest direct economic benefits (about \$50 per MWh). Hydropower projects, which are repowering upgrades, have the lowest direct economic benefit per MWh.

<sup>96</sup> The direct benefits exclude any consideration of the RPS' potential impacts on electricity prices.

Table 2 breaks out the total direct benefits from Table by technology, showing within each scenario the *direct economic benefit* by wind, hydro, biofuels and landfill gas.

**Table 2**  
**Direct Economic Benefits by Technology (\$ per MWh)**

	Resource	New Renewable Energy Production (MWh/yr)	Total Direct \$ (Construction to end of facility life)	Total Direct \$ per MWh
First Three Procurements	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
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
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

### **Total Economic Benefits**

An IMPLAN input-output economic model of NYS was used to measure the *multiplier effects* (henceforth termed the indirect effects<sup>97</sup>) 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 businesses and the associated jobs created (especially in the service sectors) as a result of this public investment in RE technologies. The results were modeled for the three scenarios, one covering RPS Main Tier program accomplishments made to date as well as two potential scenarios going forward. The analysis interval extended over the 20 year life of a facility. The total economic impact from the three scenarios of the RPS Main Tier and Maintenance resources are shown in Table 3. The total dollars of impact represent total NYS output.

**Table 3**  
**NYS Total \$ Output (i.e., Total Economic Benefits)**

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

### **Short and Long-Term Effects of Total Economic Benefits**

Table 4 shows the total short-term (the construction phase - first 3 years) and long-term spending (life of the facility over 20 years) effects, by scenario.

**Table 4**  
**Short and Long-term Facility Spending**

<b>Scenario</b>	<b>Short Term (m\$)</b>	<b>Long Term (m\$)</b>	<b>Total (m\$)</b>
First 3 Solicitations	\$1,377	\$2,871	\$4,248
25% by 2013	\$1,671	\$3,752	\$5,423
30% by 2015	\$3,455	\$9,119	\$12,574

<sup>97</sup> NYSERDA's reference to *indirect* is different from what I-O models refer to as the indirect impact. 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.

As Table (above) indicates, the long-term phase for all three scenarios of NYSERDA’s Main Tier RPS is associated with creating the majority of the state’s economic impacts. This should not be surprising since the interval spans 20 years from the staggered introduction of RE facilities coming on-line. On-going payments by these RE generators to municipalities (in the form of PILOTs) infuse state and local governments with additional revenues that stimulate the economy through government spending. As biofuel projects are relied upon more to help meet future Main Tier RPS generation targets, on-going fuel purchasing (predominantly for woody biomass) creates significant economic impacts. While PILOT payments continue to account for a significant percentage of total program benefits, the impact from biofuel projects increase in the later years of the program as biofuel begin to claim a larger share of the RE generation mix. Table 5 shows the percentage allocation of long term spending among different outputs.

**Table 5**  
**Allocation of Total Impacts Due to Long-term Spending**

Scenario	Role in Output (\$) Impacts				
	On-going Payroll	PILOT \$	Fuel Purchases	Land-lease\$	Other O&M\$
First Three Solicitations	20%	32%	23%	7%	18%
25% by 2013	20%	29%	25%	7%	19%
30% by 2015	20%	25%	<b>33%</b>	5%	17%

**Jobs**

Annual jobs created in NYS from the RPS Main Tier projects are tied to a short-term (construction) phase assumed to average three years in duration, and the long-term operations phase of a facility, assumed to last for the twenty year life. These are shown in Table 6.

**Table 6**  
**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 direct jobs to construct and operate the RE facilities tend to be in well-paying occupations. Table shows *average yearly compensation per job* for each scenario based on the direct jobs and associated indirect job creation (along with an assumed level of labor compensation) over the analysis interval. For

comparison, the State's average annual employee compensation is \$62,797<sup>98</sup>. The results shown in Table confirm that energy-sector jobs are well paying. (The average reflects the initial presence of construction payroll as well.) The lower average annual compensation per job among the indirect jobs created reflects in part the large role that household spending (by RE facility workers spending their wages in New York) exerts in the added economic value. Households tend to purchase goods and services from lower-wage sectors, such as retail. *Note:* the reference to job years is customary when discussing employment changes over a time-span. Three construction jobs that are in effect for one year are the equivalent of three job years. A single job that persists for three years also represents three job years.

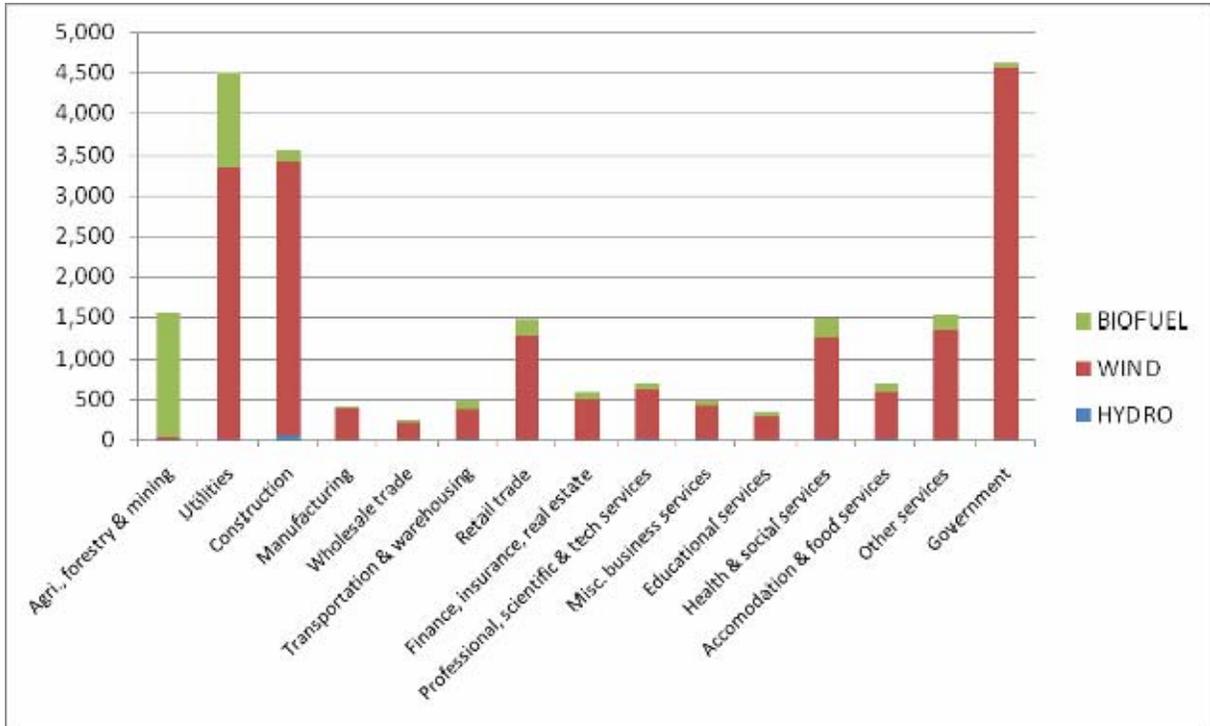
**Table 7**  
**Main Tier RPS Impacts on Average Annual Worker Compensation**

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

Total job (year) impact results above reflect a job multiplier effect between 3.3 and 3.5 across all scenarios analyzed, that is total jobs ÷ direct jobs. The industry allocation of the total jobs created, shown in Figure 1 for the First Three Main Tier Solicitations, emphasizes (a) the initial requirement for Construction activities to build (retrofit) RE facilities, (b) the long-term persistence of added O&M workers in the Power Generation & Supply (Utilities) sector, (c) additional state and local Government activities supported by payments in lieu of taxes (PILOTs) or similar payments remitted by RE facilities, and (d) jobs in Forestry and Logging related to the fuel requirements of biofuel facilities (primarily for woody biomass). These employees in the construction, utilities, government, and forestry sectors in turn spend their wages on local goods and services, providing a stimulus to local business and creating new indirect jobs, especially in the service sectors. Wind projects are responsible for the majority of total job impacts (though the Forestry & Logging jobs are solely attributed to biofuels).

<sup>98</sup> As a shown in the IMPLAN NYS Model calibrated to 2006 data.

**Figure 1**  
**Total Job Impacts by Industry - First Three Solicitations, 2005-2028**



**Conclusion**

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

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. 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, PILOTs or state and local taxes trigger the largest total economic impacts.

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Most of the benefits from existing wind projects are created through payroll benefits, while biomass is producing most of its economic benefits from both payroll and the purchase of fuel from in-state feedstocks. Overall, many of the 900 jobs being created directly and indirectly from the existing contracted facilities will be well-paying. Average salaries for jobs at the facilities are \$77,000 (in 2006 \$) and for \$53,000 for indirect jobs. Moreover, most of the jobs are long-lasting. The direct payroll benefits from existing contracted facilities will be more than \$500 million over the life of the facilities, and if other sectors are factored in, the total payroll infusion into the state's economy would be over \$1.3 billion. In a 30% RPS by 2015 scenario, the total economic benefits would be more than \$12 billion over the next 29 years. The total jobs are considerably higher – more than 2,300 jobs would be created throughout the economy. The direct payroll effect would be \$1.4 billion, and nearly doubling to \$2.3 billion when considering the total payroll effect throughout the economy.

While wind will continue to be the largest share of renewable energy facility growth, biofuels are expected to grow even more proportionately in the future, up to 19% of the incremental target in the 25% by 2013 scenario and up to 27% of the incremental target in the 30% by 2015 scenario.

Under all scenarios the RPS will bring significant benefits to other traditionally important economic sectors such as forestry and agricultural sectors as well. Clearly, the economic benefits to New Yorkers are considerable.

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## Section 2 INTRODUCTION

The purpose of this study is to measure the impacts to the New York economy that result from in-state on projects that are awarded with contracts under the Main Tier and Maintenance Tier of NYSERDA's Renewable Portfolio Standard (RPS). These include benefits that are accrued from direct project spending as well as indirect spending due to the increased economic activity in the state (the multiplier effect). This study is only intended to address economic benefits to the state's economy that result from in-state spending, not net impacts which would also include electricity price suppression, program costs, and intangible effects (e.g., reduced greenhouse gas emissions, clean air and water, visual/landscape impacts, etc.). Impacts are estimated for existing contracts and for two potential future scenarios, as follows:

1. First Three Solicitations - Renewable energy investments and generation since program inception (in 2005) through the third RPS procurement issued late 2007 (last round of awarded contracts on-line for 2009)
2. 25% by 2013 - a projected continuation of RPS contracts to achieve a goal of 25% renewable generation by 2013 based upon the post-Energy Efficiency Portfolio Standard (EEPS) load forecast
3. 30% by 2015- a projected continuation of RPS contracts to achieve a goal of 30% renewable generation by 2015 post-EEPS load forecast.

The total economic impacts were measured for the bundle of contracted (or anticipated) projects in wind, biofuel<sup>99</sup> (retrofits), and hydro (upgrades) technologies for generating electricity. The direct effects of these projects which trigger the additional economic activity include the following:

- Short-term construction stimulus (jobs and other construction purchases "in-state")
- One-time transfers to abutters and payments in lieu of taxes (PILOT)
- Longer-term annual facility operations, including:
  - added jobs at the renewable energy (RE) generating facility
  - fuels purchases for biofuel facilities
  - other O&M purchases

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<sup>99</sup> Under the projected RPS scenarios, the technology mix will also include a small role for biomass in the form of land-fill gas.

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- on-going PILOT and land-lease payments

Given the project scope and the economic model (IMPLAN) chosen, considerations for potential electric price reductions to NY ratepayers as a result of increased renewable energy (RE) production were not identified for the modeling effort. The potential negative economic impacts due to the collection of RPS charges from customers were also not considered.

This study is performed over a time interval which accommodates the assumed 20 year (or more) average life of these facilities (from 2006 to an end-period ranging from 2028 to 2034), which themselves come on-line in a staggered fashion based on when they were contracted and construction was completed.

The remainder of this report is organized as follows:

- Chapter 3 describes NYSERDA's Main Tier (& Maintenance –tier) RPS programs and its goals.
- Chapter 4 presents the direct effects (also referred to as the direct economic benefits) of the RE projects that have been selected and contracted under the first three solicitations (offered to date).
  - Chapter 4 also includes the results of a data credibility assessment.
- Chapter 5 presents the total economic impacts resulting from the direct effects described in Chapter 4.
- Chapter 6 presents the projected direct effects for scenarios 2 and 3.
- Chapter 7 presents the resulting total economic impacts.
- Chapter 8 presents the conclusions from this study.
- Three appendices provide additional documentation for this analysis and report:
  - Background on the IMPLAN model and how it was used for this application.
  - A description on how additional O&M costs were identified by technology.
  - The raw data spreadsheets of the direct economic benefits.

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### Section 3

#### OVERVIEW OF NYSERDA'S RPS PROGRAMS TO DATE

This section presents an overview of NYSERDA's RPS Programs and a brief summary of the acquisition processes to date. The following summary from NYSERDA provides an overview of its RPS programs to date:

“On September 24, 2004 the New York State Public Service Commission (PSC) issued an order adopting a Renewable Portfolio Standard (RPS), with the goal of increasing the proportion of renewable energy used by New York consumers from the then current 19.3% to at least 25% by 2013. The RPS was adopted to address the energy, economic, and environmental objectives of New York State by integrating environmentally responsible energy technologies in the electricity supply portfolio.

NYSERDA was authorized by the NY PSC to administer the RPS and major investor-owned utilities were to collect funds from ratepayers to be administered by NYSERDA for the purpose of achieving an RPS target set at 25% of retail consumption. This funding approach assures that all contributing ratepayers pay a pro rata share for the public benefits resulting from the RPS program. These funds have allowed for New York to commit \$741 million through 2013 to implement the RPS program under a two-tiered approach, the Customer Sited Tier and the Main Tier<sup>100</sup>.”

The customer-sited tier is not the focus of the current study.

#### SUMMARY OF MAIN TIER PROGRAM ACTIVITIES AND RPS REQUIREMENTS

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 competitive solicitations for NYSERDA to purchase renewable attributes (Renewable Energy Certificates (REC)) produced by each facility under long-term contracts of up to ten years. To be eligible to participate in a Main Tier competitive solicitation, a Bid Facility must have first commenced commercial operation on or after January 1, 2003, or must first produce new or incremental

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<sup>100</sup> “The Expected Economic Impacts of Renewable Generators Participating in the New York Renewable Portfolio Standard Program,” NYSERDA *draft* document July 31, 2008

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REC after that date. This ensures that the new technologies are in addition to the renewable generating energy facilities already in existence within the state.

As of spring 2008, NYSERDA had conducted three competitive Main Tier solicitations. The first competitive Main Tier solicitation (RFP 916) was issued in 2005 as a sealed bid pay-as-bid Request for Proposal (RFP). In this solicitation, bidders were awarded contracts based on price alone. No other factors were taken into account to determine selection or with respect to the ultimate level of award in the resulting contract. NYSERDA's second (RFP 1037) and third (RFP 1168) Main Tier competitive solicitations were completed in early 2007 and early 2008, respectively. Unlike the first Main Tier solicitation, awards in the second and third solicitations were based on two evaluation components: (1) price, weighted at 70%; and (2) the ability of the bidder to demonstrate economic benefits to New York State created by the construction and operation of the bid facility, weighted at 30%. For NYSERDA and its proposal evaluation panel to assess the second evaluation component, bidders were instructed to submit a report for each bid facility addressing 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 and consumption of goods and services.<sup>101</sup>

The three competitive Main Tier solicitations have resulted in contracts with 28 in-state Main Tier facilities.<sup>102</sup> Of the 28, 21 are operating or fully constructed and awaiting interconnection. The remaining 7 are either in construction or in late stages of development and are expected to be operating by the end of 2009. Total program funding commitments from the three competitive Main Tier solicitations is approximately \$548.6 million.

In addition to the 28 in-state facilities under contract from the three competitive solicitations, NYSERDA has contracts with two "maintenance resources." These facilities were in operation prior to 2003, and have successfully petitioned the PSC for RPS funding due to financial hardship. These two maintenance facilities represent a combined capacity of 39 MW and are under contract for 259,238 MWh per year. NYSERDA has committed \$33.9 million to these two facilities.

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<sup>101</sup> The text of the first three competitive solicitations can be found online at: [www.nyserda.org/rps/pastSolicitations.asp](http://www.nyserda.org/rps/pastSolicitations.asp).

<sup>102</sup> Out of state facilities do not provide any economic benefits to New York. Therefore the capacity, energy and funding figures relating to the two out of state facilities have been purposely omitted.

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For purposes of this report, capacity, energy, and funding commitments of the two maintenance resources have been added to the Main Tier totals and their associated economic benefits have been included as retained benefits from ongoing activities. Furthermore, all capacity and energy above that which is under contract with NYSERDA is included in this study.

Table shows the total capacity, energy, and funding commitments for the Main Tier and Maintenance Tier facilities that are used in this report:

**Table 8**  
**Capacity, Energy, and Funding Summary<sup>103</sup>**

	<b>Total MW</b>	<b>Total MWh</b>	<b>Funding Commitments (\$m)</b>
Main Tier Solicitations	1,301	3,783,409	\$548.6
Maintenance Resources	39	259,238	\$33.9
<b>Total</b>	<b>1,340</b>	<b>4,042,647</b>	<b>\$582.5</b>

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<sup>103</sup> 2008 Performance Report, pg. 5

Table 9 below lists all in-state projects contracted by NYSERDA (as out-of-state projects were not included for purposes of calculating economic benefits), along with the technology and the county in which each project is located.

**Table 9  
Facilities under RPS Program Contracts**

<b>Bid Facility</b>	<b>Resource</b>	<b>County</b>
AES Greenidge, LLC	Biomass	Yates
Chateaugay Biomass	Biomass	Franklin
Lyonsdale Biomass	Biomass	Lewis
Niagara Generating Facility	Biomass	Niagara
Allens Falls	Hydro	St. Lawrence
Browns Falls	Hydro	St. Lawrence
Colton	Hydro	St. Lawrence
Eagle	Hydro	Lewis
East Norfolk	Hydro	St. Lawrence
Effley Hydro	Hydro	Lewis
Higley	Hydro	St. Lawrence
Norfolk	Hydro	St. Lawrence
Norwood	Hydro	St. Lawrence
Oswego Falls	Hydro	Oswego
Piercefield Hydro	Hydro	St. Lawrence
Raymondville	Hydro	St. Lawrence
Sherman Island	Hydro	Saratoga
Cohocton Wind Farm	Wind	Steuben
Dutch Hill Wind Farm	Wind	Steuben
Maple Ridge Windpower	Wind	Lewis
Noble Allegany Windpark	Wind	Allegany
Noble Altona Windpark	Wind	Clinton
Noble Bliss Windpark	Wind	Wyoming
Noble Chateaugay Windpark	Wind	Franklin
Noble Chateaugay Windpark II	Wind	Franklin
Noble Clinton Windpark I	Wind	Clinton
Noble Ellenburg Windpark	Wind	Clinton
Noble Wethersfield Windpark	Wind	Wyoming
Wind Farm Prattsburg	Wind	Steuben

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## POTENTIAL INCREASE IN RPS GOAL

The RPS program as established by the Public Service Commission (PSC) in its September 24, 2004 order set a target of having 25% of retail load served by renewable energy by 2013.<sup>104</sup> With respect to Main Tier resources, the order resulted in a Main Tier program target of 9.85 million MWh. There is an expectation by the PSC that the RPS goal will also be met with contributions from other sectors, including: renewable energy facilities in existence prior to the RPS, and similar procurement activities conducted by the Long Island Power Authority, New York Power Authority, State entities complying with Executive Order 111, the RPS Program's Customer-sited Tier, and the voluntary market. Derived Main Tier targets accordingly reflect this expectation.

In June 2008, New York enacted an Energy Efficiency Portfolio Standard (EEPS) that seeks to reduce forecast energy use by 15% by 2015 (or, "15 x 15").<sup>105</sup> As a result of the EEPS, the total level of annual electricity consumption in New York is expected to decrease significantly, from 162 million MWh in 2006 to 152 million MWh by 2015.<sup>106</sup>

On the basis of a target of 25% renewable energy by 2013 and an updated load forecast for 2013 adjusted by the EEPS, the RPS Main Tier program target is expected to be reduced to 4.57 million MWh of renewable attributes.<sup>107</sup> Of that total, NYSERDA has already contracted for about 3.49 million MWh, leaving only an additional 1.1 million MWh to be procured to meet the 25% by 2013 goal.

The PSC is considering the adoption of an expanded RPS goal of 30% renewable energy by 2015. Based on the post-EEPS load forecast for 2015 with this 30% target, the RPS Main Tier program would need to have a total of 10.1 million MWh of renewable attributes, leaving an additional 6.5 million MWh to be procured in the future.

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<sup>104</sup> State of New York, Public Service Commission, "Order Regarding Retail Renewable Portfolio Standard," September 2004.

<sup>105</sup> State of New York Public Service Commission, "Order Establishing Energy Efficiency Portfolio Standard and Approval Programs," June 2008. pg. 3.

<sup>106</sup> 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."

<sup>107</sup> La Capra/SEA Cost Study. Pg. 6.

Interestingly, the current as-ordered Main Tier target of 9.85 million MWh associated with a 25% goal by 2013, increases slightly to 10.1 million MWh should the target be expanded to 30 % by 2015 under an updated load forecast adjusted for the Post-EEPS.

Table 10 shows these new targets, by year. The “Post-EPS” columns predict Main Tier RPS procurement levels under the 25% by 2013 and 30% by 2015 program scenarios. For the remainder of this report, only the Post-EEPS scenarios are examined.

**Table 10  
Main Tier RPS Targets by Year and Scenario**

Year	Cumulative (MWh)			Incremental (MWh)		
	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

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## Section 4

### DIRECT ECONOMIC BENEFITS FROM MAIN TIER SOLICITATIONS THROUGH 2008

This chapter presents data compiled from developers' applications under NYSERDA's first three RPS Main Tier procurement. This data was self reported by developers, recorded by NYSERDA, and verified for accuracy by KEMA. Before the additional economic impacts associated with these projects were calculated, KEMA completed a credibility assessment on the resulting data. This data was then used throughout this report. The data describe the direct "economic" benefit (*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. 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 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.

Table 11 through Table 14 present a summary "view" of these direct economic impacts. The data are presented in constant 2006 dollars<sup>108</sup> and reflect adjustments for the timing of the three solicitations. Appendix III contains the comprehensive data in the format compiled by NYSERDA. A discussion of the characteristics of the different direct economic benefits follows in the next section.

One additional caveat must be noted before presenting the summary view of the direct economic impacts. An additional component of direct economic impact has been added by the consultant team after discussion with NYSERDA staff and La Capra Associates, which co-authored the Cost Study Update. The component, called "Annual O&M spending –Other," is a long-term component, and the values assigned represent either (a) a reclassification (for wind and biofuel) of dollar amounts reported in developers' applications (from short-term 3-year spending), or (b) an estimate (specifically, for hydro projects) where the information was missing. Appendix II presents the method (using the La Capra technology-specific fixed/variable O&M costs) to identify the omitted spending to cover routine replacement of equipment during normal operations.

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<sup>108</sup> The base year of the NYS IMPLAN model used for this analysis is currently set to 2006.



**Table 11**  
**RPS Direct Benefit \$ by Resource and Spending Component, 2006\$**

	3 Year Construction Payroll	Initial PILOT Payments	Initial Payments to Other Impacted Landowners	3 Year Construction Purchases	Cumul. L-T Term Payroll	Cumul. L-T PILOT Payments	Cumul. L-T Land Lease	Cumul. Fuel Expense	Cumul. L-T Other Annual O&M	Total
Wind	\$159,699,332	\$13,831,068	\$9,330,281	\$359,205,388	\$255,294,449	\$361,396,505	\$188,703,484	\$0	\$317,964,887	\$1,665,425,393
Hydro	\$2,916,498	\$0	\$0	\$1,210,537	\$0	\$0	\$0	\$0	\$17,971,190	\$22,098,225
Biofuel	\$1,852,663	\$66,000	\$0	\$15,469,786	\$82,025,702	\$4,854,347	\$0	\$254,994,936	\$17,834,241	\$377,097,675
<b>Total</b>	<b>\$164,468,492</b>	<b>\$13,897,068</b>	<b>\$9,330,281</b>	<b>\$375,885,710</b>	<b>\$337,320,151</b>	<b>\$366,250,851</b>	<b>\$188,703,484</b>	<b>\$254,994,936</b>	<b>\$353,770,318</b>	<b>\$2,064,621,293</b>

**Table 12**  
**RPS Projects' Direct Benefits (\$ and \$-per MWh, 2006 Basis)**

Resource	New Renewable Energy Production (MWh/yr)	Total Direct \$ (from Construction to end of facility life)	Total Direct \$ per MWh
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
<b>Total</b>	<b>4,066,553</b>	<b>\$2,064,621,293</b>	<b>\$25.39</b>

**Table 13**  
**Direct Benefits by County, 2006\$**

<b>County</b>	<b>Total Direct \$ (from Construction to end of facility life)</b>
Allegany	\$108,686,180
Clinton	\$444,448,284
Franklin	\$335,395,539
Lewis	\$486,099,036
Niagara	\$75,162,697
Oswego	\$1,129,519
Saratoga	\$3,525,356
St. Lawrence	\$8,995,883
Steuben	\$254,618,093
Wyoming	\$304,685,275
Yates	\$33,950,774
<b>Total</b>	<b>\$2,064,621,293</b>

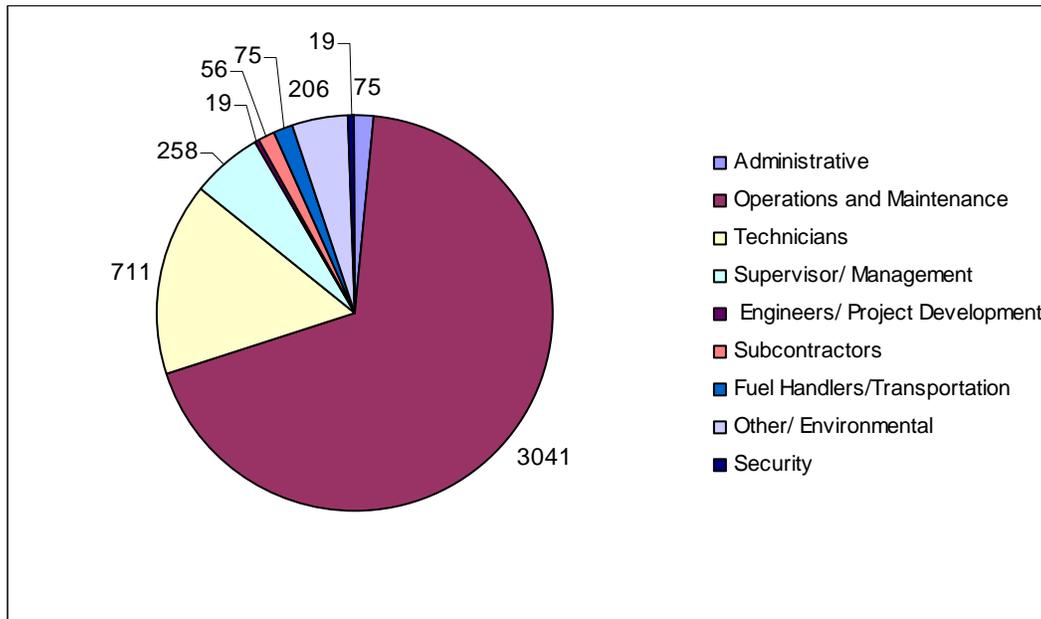
Table 14 shows, for each Main Tier technology, the direct jobs required, either in the initial 3-year construction interval or the annual facility operations jobs (expected to persist for 20 years).

**Table 14**  
**RPS Direct Employment by Resource**

<b>Resource</b>	<b>3-Year Construction Jobs</b>	<b>Cumul. L-T Jobs (over 20 years)</b>	<b>Total Job Years</b>
Wind	1,980	3,320	5,301
Hydro	42	0	42
Biofuel	9	1,140	1,149
<b>Total</b>	<b>2,031</b>	<b>4,460</b>	<b>6,492</b>

Figure 2 shows the allocation of the \$2.064 billion of direct economic benefits (cumulative through 2028) into the various short-term and long-term categories. The long-term payroll, PILOT payments, land-lease/fuel (biomass/biofuel) payments, and other annual O&M expenses comprise the majority of the direct benefit dollars over the 20-year facility life span. The immediate 3-year construction phase adds a significant amount to this total with respect to (non-labor) expenditures on construction goods and services. The on-going payroll supports 4,460 job-years related to the operations of the facilities. Nearly 70% of the positions have O&M functions, 16% as technicians, and another 6% in managerial functions. The remaining job categories are described in the table below.

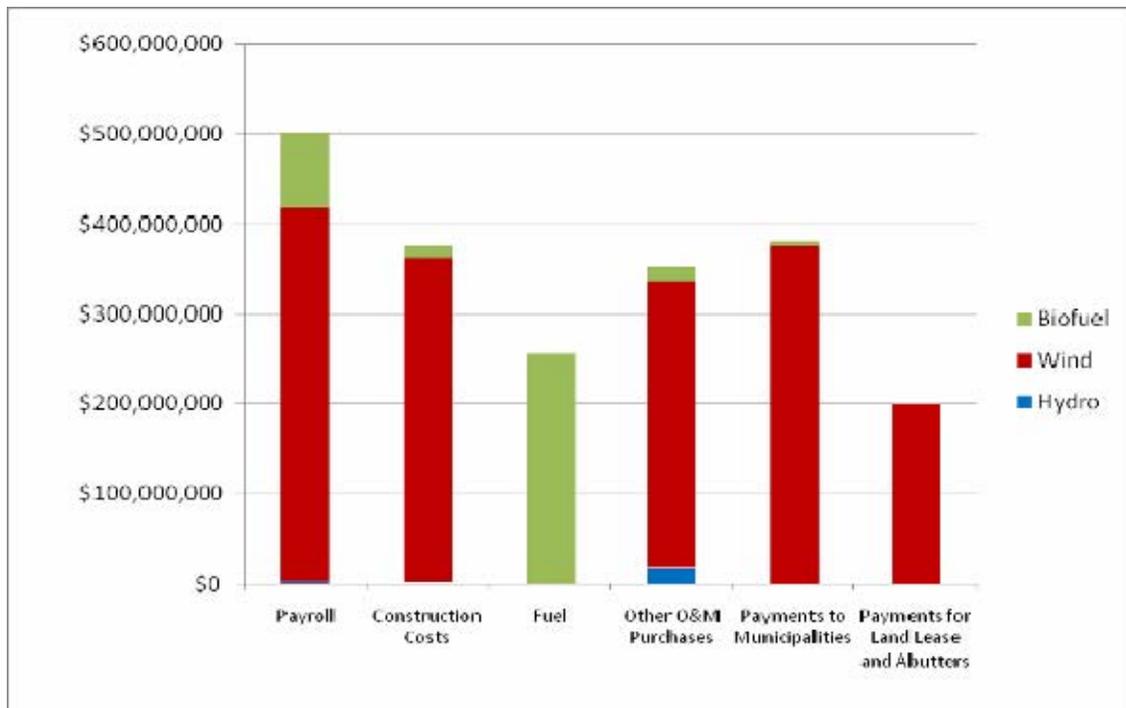
**Figure 2**  
**Type of Long-term Jobs in the RE Power Generation & Supply Sector**



\* Job percentages tabulated NYSERDA, *Entire RPS Direct Benefits JUL 31 2008 working version.xls*.

Figure 3 portrays each technology’s pattern of direct economic benefits (\$), in particular how the spending is committed to the NYS economy. Fuel purchases are solely associated with biofuel facilities and will stimulate forestry-logging activity in the State. Since attributes from wind projects comprise the majority of the RE generation targets, and they are new facilities (constructed after 2004), this technology contributes the majority of direct payroll, other construction spending, payments to municipalities, and O&M spending.

**Figure 3**  
**Categories of Direct Benefit \$ by Resource, 2006\$**



**Discussion of Direct Economic Benefits from Main Tier Projects**

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

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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.

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The relative roles of the three Main Tier technologies over the first three solicitations are as follows (in-state projects only):<sup>109</sup>

- **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 26.8 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 67 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.<sup>110</sup> Since Lyonsdale Biomass was chosen through the second Main Tier solicitation, NYSERDA has information on its retained economic benefits to the state.

### **Contractual Obligations**

A key piece of the standard NYSERDA contract is that winning bidders from the second and third solicitations must demonstrate that at least 85% of the expected total benefits from their projects are actually achieved. All RPS attribute sellers who submitted bids under the second and third RFPs are required to submit reports with documentation demonstrating the actual economic benefits that resulted from the construction and operation of their facilities. This report should include sufficient records and documents relating to employment, purchases, and other payments necessary to demonstrate the economic benefits created by each bid facility. Sellers with a Contract Delivery Term of three years are required to submit such report within 60 days of the first anniversary of the Commercial Operation Date. Sellers with a Contract Delivery Term greater than three years will be required to submit the report within 60 days of the third anniversary of the Commercial Operation Date.

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<sup>109</sup> These figures do not match the figures presented in Section 3 that show the totals from the first three solicitations, as the figures presented in this section only include in-state projects.

<sup>110</sup> 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.

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Should the contractor fail to demonstrate that at least 85% of the benefits have been achieved, NYSERDA may reduce the Bid Price payable for the remainder of the Contract Delivery Term. Such reduction in the Bid Price payable for the remainder of the Contract Delivery Term will be made by an amount equal to the percentage shortfall of the economic benefits actually demonstrated compared to the Expected Total Dollars included in the Bid Proposal.<sup>111</sup>

### **Credibility Assessment of Estimated Direct Economic Benefits**

A “Credibility Assessment” was conducted on the Direct Economic Benefits reported by participating developers in their solicitation responses. The study explores the extent to which the self-reported solicitation data from winning bidders are credible and reliable sources for estimating the economic benefits associated with the program. Specifically, the study was designed to:

- Assess the extent to which the solicitations collect the necessary data on Economic Benefits for appropriate data-driven decision-making.
- Characterize the extent to which developer-reported benefits in the interviews compare with solicitation data and the bidders’ surveys.

Besides the solicitation data, the study drew on surveys and interviews with RPS stakeholders as well as reports from NYSERDA, RPS consultant, and other industry sources. One key piece of the Credibility Assessment was a comparison of self-reported from winning bidders with data from three other sources:

- A pre-construction report on the expected benefits from the Maple Ridge Wind Farm<sup>112</sup>
- A follow-up interview to verify estimated benefits data from a wind farm operated by a Main Tier bidder.
- A report based on the verified economic impacts from wind farms constructed in Michigan<sup>113</sup>

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<sup>111</sup> NYSERDA, Renewable Portfolio Standard Program Purchase of Renewable Energy Attributes Request for Proposals (RFP) No. 1168, Fall 2007.

<sup>112</sup> Hale, Kevin of the New York State Energy Research and Development Authority, “Major Impacts of Utility-Scale Wind Projects in New York,” December 2005.

<sup>113</sup> National Renewable Energy Laboratory, “Economic Benefits, Carbon Dioxide Emissions Reductions, and Water Conservation Benefits from 1,000 MW of New Wind Power in Michigan,” June 2008. DOE/GO-102008-2564.

The following table (Table 15) shows the findings from this comparison of average lifetime benefits from wind projects, on a per-MWh basis:

**Table 15**  
**Comparison of Lifetime per-MWh Economic Benefits**

<u>Data Set</u>	<u>RPS Projects (1037 &amp; 1168)</u>	<u>Maple Ridge Case Study</u>	<u>Developer Estimates</u>	<u>Michigan Case Study</u>	<u>Maple Ridge % of RPS</u>	<u>Developer % of RPS</u>	<u>Michigan % of RPS</u>
<b>Short-term Impacts (Total)</b>	<b>\$8.21</b>	<b>\$4.24</b>	<b>\$4.65</b>	<b>\$8.47</b>	<b>52%</b>	<b>57%</b>	<b>103%</b>
Short-term Jobs	\$2.53	\$0.81	\$1.50	n/a	32%	59%	n/a
Short-term PILOT & Fees	\$0.27	\$0.00	\$0.00	n/a	0%	0%	n/a
Construction (3-year Non-payroll Purchases)	\$5.22	\$3.05	\$3.05	n/a	58%	58%	n/a
Payments to Abutters	\$0.18	\$0.38	\$0.10	n/a	207%	54%	n/a
<b>Long-term Impacts (Total)</b>	<b>\$17.70</b>	<b>\$5.95</b>	<b>\$10.54</b>	<b>\$17.88</b>	<b>34%</b>	<b>60%</b>	<b>101%</b>
Long-term Jobs	\$4.58	\$1.02	\$2.30	\$9.13	22%	50%	199%
PILOT	\$5.96	\$2.89	\$4.24	\$6.09	48%	71%	102%
Fuels (Biomass) & Land Lease	\$2.70	\$2.04	\$4.00	\$2.66	76%	148%	99%
Other O&M (in addition to fuel, lease, PILOT and long-term labor costs)	\$4.45	n/a	n/a	n/a	n/a	n/a	n/a
<b>Total 20-Year Benefits</b>	<b>\$21.46</b>	<b>\$10.19</b>	<b>\$15.19</b>	<b>\$26.35</b>	<b>47%</b>	<b>71%</b>	<b>123%</b>



This study also provides a comparison of the range of high, low, and average self-reported benefits from all winning bidders, including biofuel and hydro developers as well as wind. These can be found in the following tables, reported on both a per-MWh and per-MW basis:

**Table 16**  
**Range of Lifetime per-MWh Economic Benefits from All Winning Bidders**

<b>Impact</b>	<i>Low</i>	<i>High</i>	<i>Average</i>	<i>Low</i>	<i>High</i>	<i>Average</i>	<i>Low</i>	<i>High</i>	<i>Average</i>
<b>Short-term Impacts (Total)</b>			<b>\$ 1.93</b>			<b>\$ 2.07</b>			<b>\$ 8.21</b>
Short-term Jobs	\$ -	\$ 0.25	\$ 0.20	\$ -	\$ 82.02	\$ 1.46	\$ 0.63	\$ 3.85	\$ 2.53
Short-term PILOT & Fees	\$ -	\$ 0.02	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ 0.38	\$ 0.27
Construction (3-year Non-payroll Purchases)	\$ 1.13	\$ 2.46	\$ 1.72	\$ -	\$ 5.41	\$ 0.61	\$ 3.43	\$ 6.89	\$ 5.22
Payments to Abutters			\$ -			\$ -	\$ -	\$ 0.34	\$ 0.18
<b>Long-term Impacts (Total)</b>			<b>\$ 32.01</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>			<b>\$ 17.70</b>
Long-term Jobs	\$ 3.90	\$ 11.09	\$ 7.17	\$ -	\$ -	\$ -	\$ 3.33	\$ 6.37	\$ 4.58
PILOT	\$ -	\$ 0.88	\$ 0.34	\$ -	\$ -	\$ -	\$ 3.13	\$ 17.66	\$ 5.96
Fuels (Biomass) & Land Lease	\$ 9.66	\$ 39.36	\$ 22.01	\$ -	\$ -	\$ -	\$ 2.10	\$ 3.59	\$ 2.70
Other O&M (in addition to fuel, lease, PILOT and long-term labor costs)	\$ -	\$ 4.92	\$ 2.49	\$ 4.67	\$ 14.25	\$ -	\$ 0.50	\$ 7.20	\$ 4.45
<b>Total 20-Year Benefits</b>	<b>\$ 15.86</b>	<b>\$ 51.66</b>	<b>\$ 31.45</b>	<b>\$ -</b>	<b>\$ 82.27</b>	<b>\$ 2.07</b>	<b>\$ 18.01</b>	<b>\$ 30.77</b>	<b>\$ 21.46</b>

**Table 17**  
**Range of Lifetime per-MW Economic Benefits from All Winning Bidders**

<b>Impact</b>	<b>Low</b>	<b>High</b>	<b>Average</b>	<b>Low</b>	<b>High</b>	<b>Average</b>	<b>Low</b>	<b>High</b>	<b>Average</b>
<b>Short-term Impacts (Total)</b>			<b>\$564,149</b>			<b>\$307,414</b>			<b>\$879,396</b>
Short-term Jobs	\$187,726	\$369,030	\$282,074	\$0	\$8,350,808	\$153,707	\$251,374	\$540,203	\$444,679
Short-term PILOT & Fees	\$0	\$37,126	\$28,754	\$0	\$8,325,074	\$108,622	\$31,725	\$202,579	\$137,223
Construction (3-year Non-payroll Purchases)	\$0	\$2,538	\$1,347	\$0	\$0	\$0	\$0	\$22,132	\$14,769
Payments to Abutters			\$251,973			\$45,085	\$180,205	\$361,199	\$282,725
<b>Long-term Impacts (Total)</b>			<b>\$233,963</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>			<b>\$47,912</b>
Long-term Jobs	\$28,486	\$80,669	\$52,420	\$0	\$0	\$0	\$8,343	\$17,320	\$12,410
PILOT	\$0	\$6,387	\$2,477	\$0	\$0	\$0	\$8,224	\$44,267	\$16,136
Fuels (Biomass) & Land Lease	\$70,556	\$295,224	\$160,868	\$0	\$0	\$0	\$5,261	\$9,446	\$7,314
Other O&M (in addition to fuel, lease, PILOT and long-term labor costs)	\$0	\$36,903	\$18,198	\$22,303	\$55,931	\$0	\$1,252	\$21,308	\$12,052
<b>Total 20-Year Benefits</b>	<b>\$2,318,488</b>	<b>\$7,749,633</b>	<b>\$4,597,374</b>	<b>\$0</b>	<b>\$8,350,808</b>	<b>\$153,707</b>	<b>\$946,403</b>	<b>\$1,538,580</b>	<b>\$1,161,883</b>

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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.

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## Section 5

### TOTAL ECONOMIC IMPACTS FROM FIRST THREE SOLICITATIONS

An IMPLAN model of the New York state economy was applied to estimate the additional economic activity from the direct benefits of the Main Tier RPS projects, as described in Section 4. These added activities are termed *multiplier effects* and are the typical result from the *input-output* (I-O) economic analysis framework. The results are generated within a system that is calibrated to NYS economic data (through 2006). The IMPLAN model is in use in NYS and is among the set of analysis tools that NYSERDA staff use. The analysis builds from the data developers provided on applications regarding employment, payroll, and the amount of “in-state” expenditures that will occur during project construction and operations. For more detail about the IMPLAN economic model and how it was applied with the data of this study, refer to Appendix I at the end of this study.

This section presents the outputs of the IMPLAN model from the direct economic benefits data presented in Section 4. These IMPLAN modeled outputs represent the total economic benefits using the direct economic benefits data and the simulated multiplier effects. It is worth mentioning that the I-O analysis framework is time-path neutral. It provides a multiplier result calibrated to specific year (here 2006). The results articulated here for a specific out year (denoting end-of-facility life) make no assumption for how the underlying structure of the NY economy may change between now and say 2030.

The total economic impact for the first three solicitations of the Main Tier RPS program is presented below in Table 18 in terms of jobs, labor income, and output. Over the course of construction and operations of all RPS facilities, over \$4.2 billion in output, \$1.3 billion in labor income and 22,676 job-years are generated in New York. That represents a job multiplier effect of 3.5 and a labor income multiplier effect of 2.6.

**Table 18**  
**Total Economic Impacts from First Three Solicitations, 2005 – 2028**

	2005	2006	2007	2008	2009	...2015	...2028	Total (2005- 2028)
<b>Jobs</b>								
Direct	100	595	677	756	305	223	44	6,492
Indirect	428	1,670	1,860	1,827	813	529	67	16,184
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>2,583</b>	<b>1,118</b>	<b>752</b>	<b>111</b>	<b>22,676</b>
<b>Labor Income (2006\$ mil)*</b>								
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
<b>Total</b>	<b>\$34.2</b>	<b>\$130.9</b>	<b>\$157.5</b>	<b>\$157.8</b>	<b>\$76.4</b>	<b>\$44.4</b>	<b>\$6.2</b>	<b>\$1,362</b>
<b>Output (2006\$ mil)</b>								
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
<b>Total</b>	<b>\$108.0</b>	<b>\$409.7</b>	<b>\$465.3</b>	<b>\$464.6</b>	<b>\$216.6</b>	<b>\$142.5</b>	<b>\$18.7</b>	<b>\$4,248</b>

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.

\* 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.

In the first five years (2005 through 2009) most of the economic activity in the state is generated from construction of the renewable facilities while it also includes the beginning of facility operations in 2008 and 2009 (depending on the year of solicitation award). By 2010, construction for all facilities has ended and the impacts through 2027 represent solely the annual effects of operations and maintenance of all facilities. By 2028, some projects have exceeded their 20 year useful life and the few remaining contribute impacts through their last year of operation.

The economic impacts for the same concepts and years are shown below broken down by renewable technology including biofuel, hydro and wind power in Tables 19, 20, and 21 respectively. It is immediately apparent that wind is the primary contributor of economic impact in the RPS program. This is not surprising as wind projects are much more expensive to build and maintain than biofuel and hydro facilities. Also, all of the wind facilities are new while most of the biofuel and hydro projects involve pre-existing facilities that either expanded or converted operations for the program.

**Table 19**  
**Economic Impacts for Biofuel Facilities: First Three Solicitations, 2005 – 2028**

	2005	2006	2007	2008	2009	...2015	...2028	Total (2005-2028)
<b>Jobs</b>								
Direct	0	3	3	54	57	57	6	1,149
Indirect	0	71	77	195	136	129	11	2,818
<b>Total</b>	<b>0</b>	<b>74</b>	<b>80</b>	<b>249</b>	<b>193</b>	<b>186</b>	<b>17</b>	<b>3,967</b>
<b>Labor Income (2006\$ mil)*</b>								
Direct	\$0.0	\$0.6	\$0.6	\$4.4	\$4.1	\$4.1	\$0.3	\$84
Indirect	\$0.0	\$3.9	\$4.2	\$8.9	\$5.5	\$5.1	\$0.4	\$115
<b>Total</b>	<b>\$0.0</b>	<b>\$4.5</b>	<b>\$4.8</b>	<b>\$13.3</b>	<b>\$9.6</b>	<b>\$9.2</b>	<b>\$0.7</b>	<b>\$199</b>
<b>Output (2006\$ mil)</b>								
Direct (est.)	\$0.0	\$5.3	\$5.8	\$22.1	\$18.5	\$18.0	\$1.6	\$377
Indirect	\$0.0	\$8.9	\$9.7	\$31.3	\$24.7	\$23.8	\$2.2	\$506
<b>Total</b>	<b>\$0.0</b>	<b>\$14.2</b>	<b>\$15.4</b>	<b>\$53.5</b>	<b>\$43.2</b>	<b>\$41.8</b>	<b>\$3.8</b>	<b>\$883</b>

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.

\* See note from Table 18.

**Table 20**  
**Economic Impacts for Hydro Facilities: First Three Solicitations, 2005 – 2028**

	2005	2006	2007	2008	2009	...2015	...2028	Total (2005-2028)
<b>Jobs</b>								
Direct	0	11	14	14	3	0	0	42
Indirect	0	11	11	9	5	5	3	126
<b>Total</b>	<b>0</b>	<b>22</b>	<b>25</b>	<b>23</b>	<b>8</b>	<b>5</b>	<b>3</b>	<b>168</b>
<b>Labor Income (2006\$ mil)*</b>								
Direct	\$0.0	\$0.8	\$1.0	\$1.0	\$0.2	\$0.0	\$0.0	\$3
Indirect	\$0.0	\$0.5	\$0.6	\$0.7	\$0.4	\$0.3	\$0.2	\$8
<b>Total</b>	<b>\$0.0</b>	<b>\$1.3</b>	<b>\$1.5</b>	<b>\$1.7</b>	<b>\$0.6</b>	<b>\$0.3</b>	<b>\$0.2</b>	<b>\$11</b>
<b>Output (2006\$ mil)</b>								
Direct (est.)	\$0.0	\$1.2	\$1.4	\$1.7	\$1.1	\$0.9	\$0.6	\$22
Indirect	\$0.0	\$1.3	\$1.5	\$1.8	\$1.0	\$0.8	\$0.5	\$20
<b>Total</b>	<b>\$0.0</b>	<b>\$2.5</b>	<b>\$2.9</b>	<b>\$3.5</b>	<b>\$2.1</b>	<b>\$1.7</b>	<b>\$1.1</b>	<b>\$42</b>

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.

\* See note from Table 18.

**Table 21**  
**Economic Impacts for Wind Facilities: First Three Solicitations, 2005 – 2028**

	2005	2006	2007	2008	2009	...2015	...2028	Total (2005- 2028)
<b>Jobs</b>								
Direct	100	581	660	688	245	166	38	5,301
Indirect	428	1,587	1,772	1,623	672	395	52	13,239
<b>Total</b>	<b>528</b>	<b>2,168</b>	<b>2,432</b>	<b>2,311</b>	<b>917</b>	<b>561</b>	<b>91</b>	<b>18,540</b>
<b>Labor Income (2006\$ mil)*</b>								
Direct	\$10.4	\$36.7	\$53.2	\$53.2	\$29.3	\$12.8	\$2.4	\$415
Indirect	\$23.8	\$88.5	\$97.9	\$89.7	\$36.9	\$22.1	\$2.9	\$738
<b>Total</b>	<b>\$34.2</b>	<b>\$125.2</b>	<b>\$151.1</b>	<b>\$142.9</b>	<b>\$66.2</b>	<b>\$34.9</b>	<b>\$5.3</b>	<b>\$1,153</b>
<b>Output (2006\$ mil)</b>								
Direct (est.)	\$44.5	\$165.8	\$188.1	\$181.2	\$88.1	\$56.2	\$8.1	\$1,687
Indirect	\$63.6	\$227.1	\$258.9	\$226.5	\$83.3	\$42.8	\$5.7	\$1,636
<b>Total</b>	<b>\$108.0</b>	<b>\$392.9</b>	<b>\$447.0</b>	<b>\$407.7</b>	<b>\$171.4</b>	<b>\$99.0</b>	<b>\$13.8</b>	<b>\$3,323</b>

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.

\* See note from Table 18.

Table 22 separates the itemized short-term (i.e. construction) and long-term (i.e. operations) impacts for all technologies in the RPS program (the results overlap each other in Table 18). This shows that the construction of facilities generates a larger incremental annual impact, although operation of facilities contributes more over the entire period of the program.

**Table 22**  
**Short and Long-Term Economic Impacts for All Technologies: First Three Solicitations,**  
**2005 – 2028**

	SHORT-TERM IMPACTS						LONG-TERM IMPACTS			
	2005	2006	2007	2008	2009	Total Short-Term	2005	2015	2028	Total Long-Term
<b>Jobs</b>										
Direct	100	595	677	577	82	2,031	0	223	44	4,460
Indirect	428	1,670	1,860	1,365	284	5,607	0	529	67	10,577
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>1,942</b>	<b>366</b>	<b>7,638</b>	<b>0</b>	<b>752</b>	<b>111</b>	<b>15,037</b>
<b>Labor Income (2006\$ mil)*</b>										
Direct	\$10.4	\$38.1	\$54.8	\$44.4	\$16.8	\$164	\$0.0	\$16.9	\$2.7	\$337
Indirect	\$23.8	\$92.9	\$102.7	\$75.2	\$15.3	\$310	\$0.0	\$27.5	\$3.5	\$551
<b>Total</b>	<b>\$34.2</b>	<b>\$130.9</b>	<b>\$157.5</b>	<b>\$119.7</b>	<b>\$32.0</b>	<b>\$474</b>	<b>\$0.0</b>	<b>\$44.4</b>	<b>\$6.2</b>	<b>\$888</b>
<b>Output (2006\$ mil)</b>										
Direct (est.)	\$41.9	\$165.0	\$185.8	\$138.2	\$32.7	\$564	\$2.6	\$75.1	\$10.3	\$1,522
Indirect	\$63.6	\$237.3	\$270.0	\$200.6	\$41.5	\$813	\$0.0	\$67.4	\$8.4	\$1,348
<b>Total</b>	<b>\$105.4</b>	<b>\$402.3</b>	<b>\$455.9</b>	<b>\$338.8</b>	<b>\$74.2</b>	<b>\$1,377</b>	<b>\$2.6</b>	<b>\$142.5</b>	<b>\$18.7</b>	<b>\$2,871</b>

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.

\* See note from Table 18.

Resulting impacts by the components of short-term and long-term spending are shown below in Tables 23 and 24. The direct spending for each category is across the entire set of Main Tier RPS projects over the respective intervals. Construction purchases represent the largest impact in the short-term while PILOT payments generate the largest impact in the long-term through government spending.

**Table 23**  
**Change in NYS Output: Impacts by Components of Short Term RPS Spending-  
 First Three Solicitations, Total Amount 2005-2009**

	<b>Construction Payroll</b>	<b>In-State Construction Spending</b>	<b>Payments to Other Impacted Landowners (one-time)</b>	<b>PILOT Payments (one-time)</b>	<b>Total</b>
<i>Direct Spending (2006\$mil)</i>	\$164.5	\$375.9	\$9.3	\$13.9	\$564
<i>Total Labor Income (2006\$mil)</i>	\$210.0	-	-	-	-
<i>Total Output (2006\$mil)</i>	\$298.5	\$1,034.2	\$9.3	\$34.5	<b>\$1,377</b>

Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Payments to other impacted landowners do not enter the IMPLAN multiplier model since these are compensations for productive capacity of land, aesthetics, noise, etc. Therefore, it was assumed that these payments did not lead to spin-off activity in the state economy.

**Table 24**  
**Change in NYS Output: Impacts by Components of Long Term RPS Spending- First Three Solicitations, Total Amount 2005-2028**

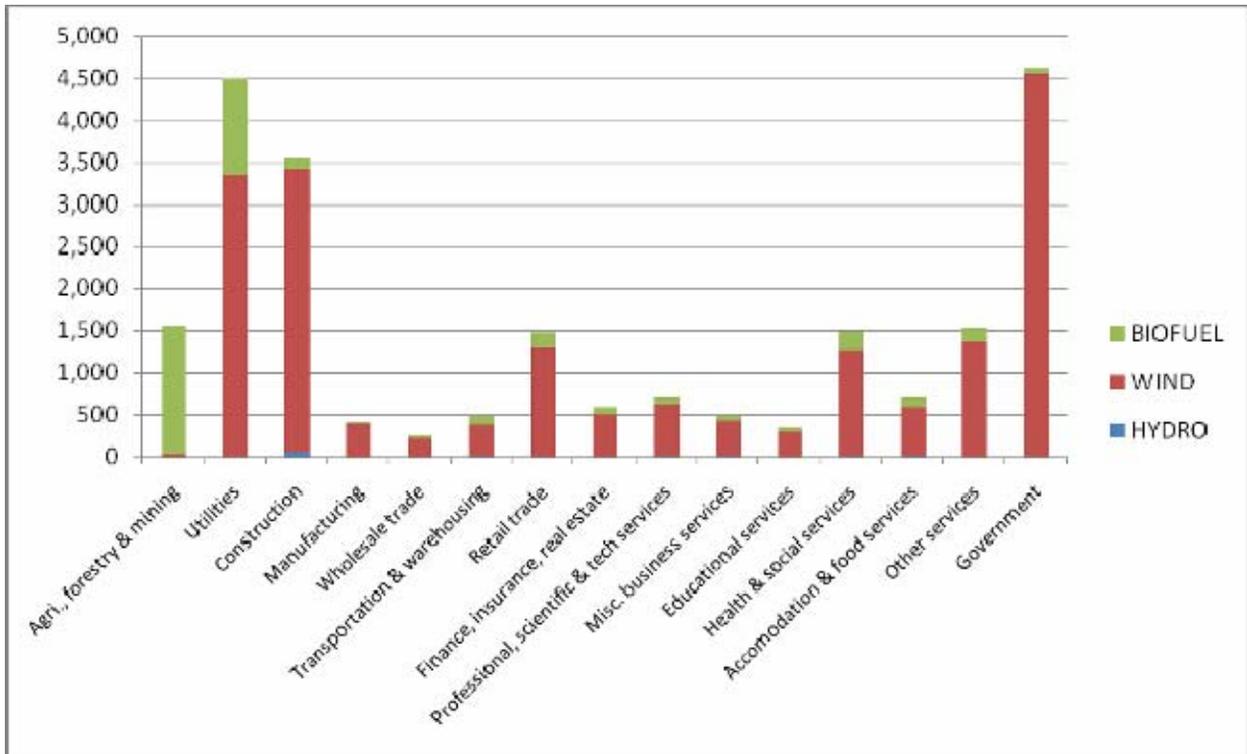
	<b>O&amp;M Payroll</b>	<b>PILOT Payments (on-going)</b>	<b>Fuels (on-going)</b>	<b>Land Lease (on-going)</b>	<b>Other O&amp;M Spending*</b>	<b>Total</b>
<i>Direct Spending (2006\$ mil)</i>	\$337.3	\$366.3	\$255.0	\$210.2	\$353.8	\$1,522
<i>Total Labor Income (2006\$ mil)</i>	\$421.8	-			-	-
<i>Total Output (2006\$ mil)</i>	\$586.6	\$910.4	\$650.7	\$210.2	\$513.0	<b>\$2,871</b>

Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Land Lease payments, representing a transfer of wealth, do not enter the IMPLAN multiplier model.

\*Other O&M spending includes purchases of supplies and services necessary for operation that were not included in the other components.

Figure 4 shows the job impacts by industry for each technology. The construction and operation associated with each technology affects the economy in noticeably different ways. This is due to the diverse set of requirements and, therefore, supplies and services that support each technology. The industries with the largest impact (in terms of jobs) are government, utilities and construction. Impacts on these industries mainly come through contributions of PILOT payments (short and long term) and direct jobs involving operations (i.e. utilities) and facility construction. Wind facilities contribute the most jobs to all industries--with the exception of agriculture, forestry and mining which supplies feedstock for biofuel facilities.

**Figure 4**  
**Total Job Impacts by Industry -First Three Solicitations, 2005-2028**



Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group.

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Many of the jobs generated from the Main Tier RPS program are high-paying and, therefore, contribute significant spending power to New York. Table 25 shows the average labor income per worker for the state. The utilities industry has the highest average income of any in the state. These jobs represented the second-highest impact in the chart above. Government and construction jobs also generate significant income while those industries that are affected by consumer spending (e.g. retail) tend to provide lower income.

**Table 25**  
**Average Income per Worker in New York State, 2006**

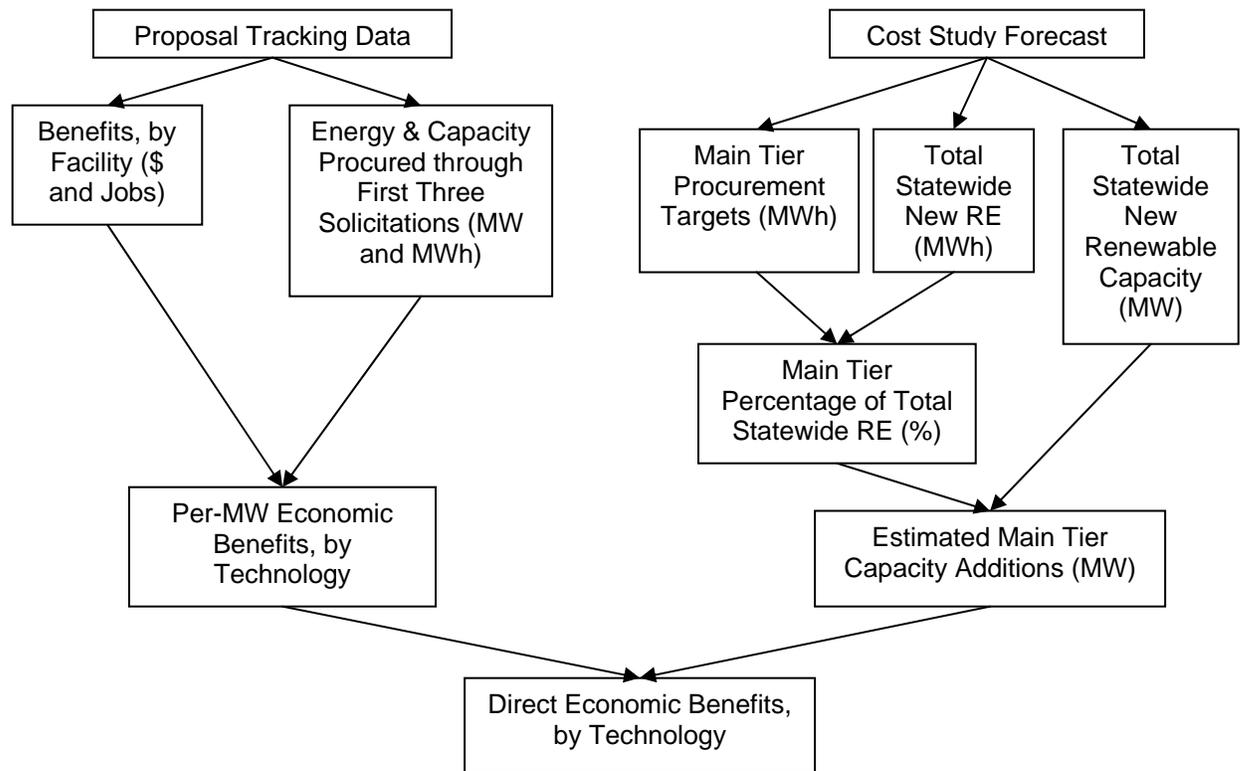
<b>Industry</b>	<b>Income/Worker</b>
Agric., forestry & mining	\$47,930
Utilities (Power Gen. & Supply)	\$144,506
Construction	\$56,940
Manufacturing	\$75,857
Wholesale trade	\$77,943
Transportation & warehousing	\$43,342
Retail trade	\$31,388
Finance, insurance, real estate	\$127,760
Professional, scientific & tech services	\$87,363
Misc. business services	\$58,367
Educational services	\$37,126
Health & social services	\$46,305
Accommodation & food services	\$24,812
Other services	\$52,698
Government	\$65,162
<b>State Average</b>	<b>\$62,797</b>

Section 6

**PROJECTED DIRECT ECONOMIC BENEFITS FOR THE FUTURE RPS MAIN TIER PROGRAM (25% BY 2013 OR 30% BY 2015)**

The direct economic benefits attributable to the RPS Main Tier program were modeled for both the 25% by 2013 and 30% by 2015 RPS scenarios, which are described in section 3. The basic methodology used to extrapolate the total benefits for each year (broken out by technology type) was to multiply the estimated RPS capacity additions by the estimated per-MW economic benefits from current RPS-funded projects. This methodology is described in greater detail below. The following flow chart (Figure 5) provides a visualization of each calculation step.

**Figure 5**  
**Flow Chart of Calculation to Estimating Future Direct Economic Benefits**



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## INPUT DATA REVIEW AND SPECIFICATION

As part of the forecast estimate and IMPLAN model development process, KEMA gathered data from a number of sources including NYSERDA program tracking data and other secondary sources.

### Data Sources

The direct economic benefits estimates drew on two sources of data:

- Proposal Tracking Data – NYSERDA compiled an internal data tracking tool based on proposal responses from winning bidders. Upon completion of an in-depth review of winning solicitation documents, the content of this program tracking tool was verified against the original solicitation response data. Verified data inputs included both project specification data and estimated economic direct benefits. Through this process, KEMA updated and adjusted specific values with respect to the timing of economic benefits received. KEMA also clarified the contribution of different projects to short- versus long-term estimated benefits.
- La Capra/SEA Cost Study – In March 2008, La Capra and Sustainable Energy Advantage submitted an updated RPS program cost study to account for changes in market conditions, the expected impacts of the Energy Efficiency Portfolio Standard (EEPS), and the potential of establishing a 30% RPS. The report projects Main Tier RPS solicitations for each program year, total new renewable capacity and generation expected to come online, and per-MWh market clearing prices for Main Tier resource environmental attributes. All are broken down by resource type. These data were used as additional input values in developing the forecasted direct economic benefits estimates.

### Capacity vs. Energy

Through the Main Tier program, NYSERDA procures “RPS Attributes.” Each attribute represents the benefits associated with 1 MWh of qualified renewable energy generation. However, for purposes of determining economic benefits, it is generally more valuable to think in terms of the total size of a project than the energy (or attributes) produced by the facility. In the case of a wind project—and the bulk of RPS-contracted attributes comes from wind—a facility that runs, on average, at 25% of its total potential output (or “capacity factor”) and produces essentially the same benefits as a facility running at 40% of its total potential output. Both projects require the same levels of spending on construction, land leases, equipment, and operations and maintenance. The same could be probably said for biofuel or hydro facilities.

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Therefore, it is more useful to think in terms of project size or capacity (measured in MW) than energy output or RPS Attributes (measured in MWh).

The exception to this capacity-based methodology is the fuel component of biofuel facilities. One of the major economic benefits from biofuel projects is that they require significant purchases of local fuels. A biofuel facility operating at 90% capacity factor requires significantly more fuel—and associated labor—than one operating at 60% capacity factor. Thus, benefits associated with future biofuel purchases, as well as the operations and maintenance of biofuel facilities, are estimated in terms of energy output, not capacity.

### **Per-MW and Per-MWh Benefits Results**

To calculate the total benefits for projects currently under contract with NYSERDA, we began by using the bid proposal data to calculate the total capacity, energy, and benefits from each renewable energy resource (i.e., wind, hydro, or biofuel). Based on the assumption that renewable energy facilities are being built in response to an RPS program, the subsequent analysis assumes that all capacity from all projects bid into the RPS was built as a result of the RPS. Therefore, this assessment assumes that the RPS program claims 100% of a given facility's direct economic benefits.

To determine the benefits associated with each MW of new wind, hydro, or biofuel capacity, we took the following steps, with a separate calculation for each technology:

- Determined the sum of the dollar benefits from all projects contracted to date by NYSERDA for each benefit category (i.e., determined separate figures for short-term jobs, PILOT, etc.).<sup>114</sup>
- Determined the sum of the total capacity and energy output of the contracted projects.<sup>115</sup>
- Divided each dollar benefits category by the total capacity of contracted projects to determine the per-MW and per-MWh benefits.<sup>116</sup>

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<sup>114</sup> Proposal Tracking Data

<sup>115</sup> Proposal Tracking Data

<sup>116</sup> Proposal Tracking Data

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It was necessary to calculate separate results for each benefits category and renewable technology because the values for those individual line-items could vary greatly depending on the technology. Biofuels, for example, provides significantly higher fuel/land lease payments than wind or hydro. Therefore, separate figures were calculated for short- and long- term jobs, annual O&M, payments to landowners, etc. to account for the varying benefits associated with each technology.

### **PROJECTED MAIN TIER CAPACITY ADDITIONS**

The La Capra/SEA Cost Study included projections, by year, of the amount of renewable energy attributes (measured in MWh) that NYSERDA will need to procure to meet its procurement targets for both the 25% and 30% RPS goals. The study also contained projections of the total amount of new statewide renewable capacity and annual energy production added each year through 2015, broken down by technology.

Because the Cost Study did not include technology-specific projections of Main Tier capacity and energy additions which are necessary to estimate economic direct benefits—only of the entire statewide renewable capacity/energy additions (i.e., including LIPA, the CST, and sales to other markets). To project the amount of new technology-specific generation built each year, we took the following steps (separately for the two RPS scenarios):

1. Subtracted the energy exported to other markets (much of which was landfill gas delivered to New England) to determine the new statewide renewable energy generation amount for each year.
2. Determined the percentage of new statewide renewable energy generation being procured by NYSERDA to meet the RPS.
3. Multiplied the statewide new generation and new capacity from each resource by this percentage to determine the incremental annual Main Tier RPS solicitations from each resource.

The results are shown in Tables 26 and 27:

**Table 26**  
**Main Tier RPS Energy Generation in GWh (2010-2015)**

Year		2010	2011	2012	2013	2014	2015
25% Post-EPS	Biomass	93.1	102.2				
	Hydro	214.0	234.8				
	LFG	7.4	7.4				
	Wind	272.9	268.0				
	<b>Total</b>	<b>524.3</b>	<b>543.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
30% Post-EPS	Biomass	110.8	118.7	117.5	117.7	618.1	457.3
	Hydro	254.8	272.9	270.0	270.5	198.2	0.0
	LFG	7.4	7.4	7.4	7.4	7.4	7.4
	Wind	786.2	958.3	810.0	801.6	197.8	531.3
	<b>Total</b>	<b>1,085.6</b>	<b>1,278.8</b>	<b>1,127.3</b>	<b>1,119.4</b>	<b>1,020.8</b>	<b>988.6</b>

**Table 27**  
**Main Tier Bid Capacity in MW (2010-2015)**

Year		2010	2011	2012	2013	2014	2015
25% Post-EPS	Biomass	13.3	14.5				
	Hydro	46.4	50.9				
	LFG	1.0	1.0				
	Wind	92.5	90.6				
30% Post-EPS	Biomass	15.9	16.9	16.8	16.8	89.4	74.5
	Hydro	55.2	59.1	58.5	58.6	39.0	0.0
	LFG	1.0	1.0	1.0	1.0	0.9	0.0
	Wind	269.7	329.1	277.7	274.8	68.4	197.6

**Estimation of Total Capacity Based on Contracts with NYSERDA**

From NYSERDA’s program tracking data, the values above only represent the amount of energy and capacity procured directly by NYSERDA to meet RPS targets, which is less than actual capacity. The results do not yet take into account the fact that (1) projects must be larger based on a 5% set-aside requirement and (2) some projects reserve a portion of their output for sales into other markets. Because the direct economic benefits from the Main Tier program are based on 100% of the capacity of all these projects—not just the contracted percentage—we have adjusted the future projections slightly consistent with NYSERDA’s internal tracking data. To do so, we estimated the adjustment factor by technology based on what was actually bid into the RPS.

The following table (Table 28) shows the percentage of total new statewide renewable energy capacity represented by current NYSERDA contracts:

**Table 28**  
**Adjustment Factor to Contracted Value by Technology**

Resource	Contracted % of Incremental MW	Effect on Total Annual Incremental Capacity
Biomass	95.0%	+5.3%
Hydro	95.0%	+5.3%
LFG	55.9%	+78.9%
Wind	84.5%	+18.3%

To adjust the projections of economic benefits going forward, we applied the inflation factor for each technology as appropriate to estimate the effective capacity by technology upon which the direct economic benefits would be based.

After estimating the capacity and energy procurement increases necessary to meet the RPS, we simply multiplied these figures by the per-MW benefits to determine the final direct benefits from the program. Results for each scenario are shown in Chapter 7. Biomass and landfill gas projects were analyzed separately from one another. Thus, a separate set of results are presented for both categories of biofuels.

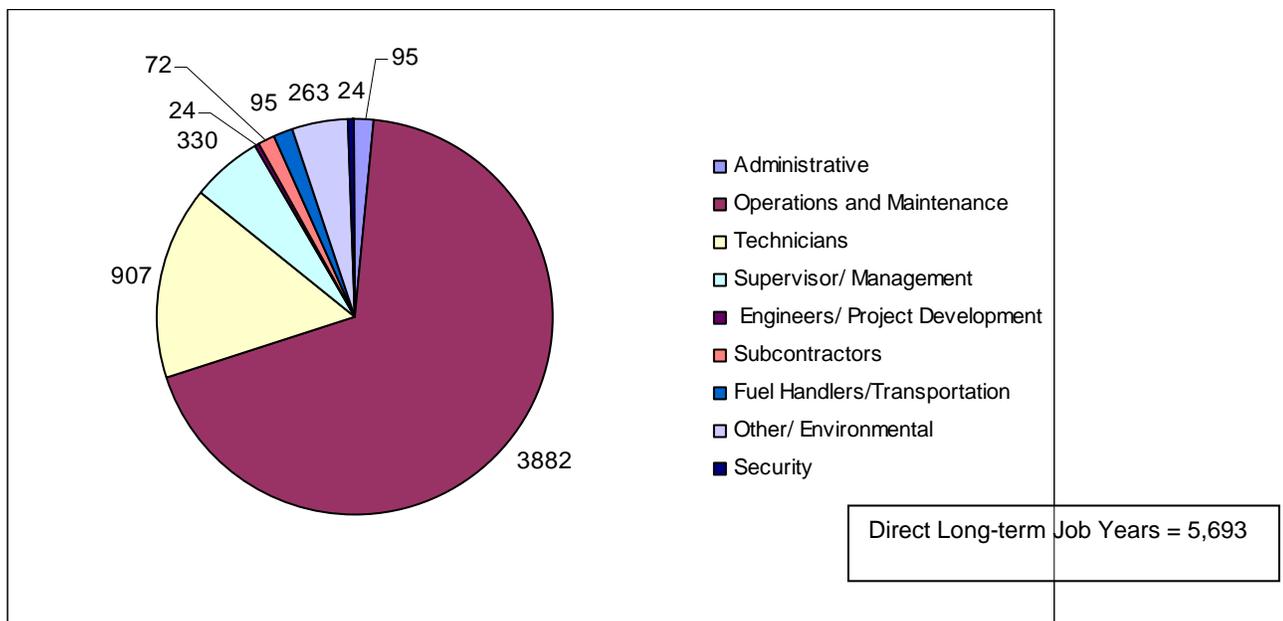
**PRESENTATIONS OF DIRECT BENEFITS FOR 25% BY 2013 AND 30% BY 2015 SCENARIOS**

Similar to the presentation in Chapter 4, various formats of the anticipated direct benefits for the 25% *Post-EEPS Goal by 2013*, and the 30% *Post-EEPS Goal by 2015* scenarios follow in Tables 29 and 30, as well as Figure 6 and Figure 7 (the exception is the presentation *by county*). Appendix III contains the basic spreadsheet format for the data (presented in 2006 dollar basis) depicting the years post 2009. Each scenario is a potential attenuation of the accomplishments achieved through the first three solicitations. For 25% by 2013, the 2013 target is fulfilled by solicitations that come on-line by 2011. For 30% by 2015, the entire time-frame from 2010 through 2015 is necessary to put the capacity in place for the 30% target.

**Table 21**  
**25% by 2013- RPS Projects' Direct Benefits (\$ and \$-per MWh, 2006 Basis)**

Resource	New Renewable Energy Production (MWh/yr)	New Renewable Energy Production (MWh over 20 years)	Total Direct \$ (from Construction to end of facility life)	Total Direct \$ per MWh
Biomass	681,377	13,627,540	\$536,617,806	\$39.38
Hydro	548,680	10,973,600	\$106,353,661	\$9.69
Wind	4,021,395	80,427,900	\$1,969,273,616	\$24.48
LFG	14,800	296,000	\$14,887,101	\$50.29
<b>Total</b>	<b>5,266,252</b>	<b>105,325,040</b>	<b>\$2,627,132,184</b>	<b>\$24.94</b>

**Figure 6**  
**25% by 2013- Type of Long-term Jobs in the RE Power Generation & Supply Sector**

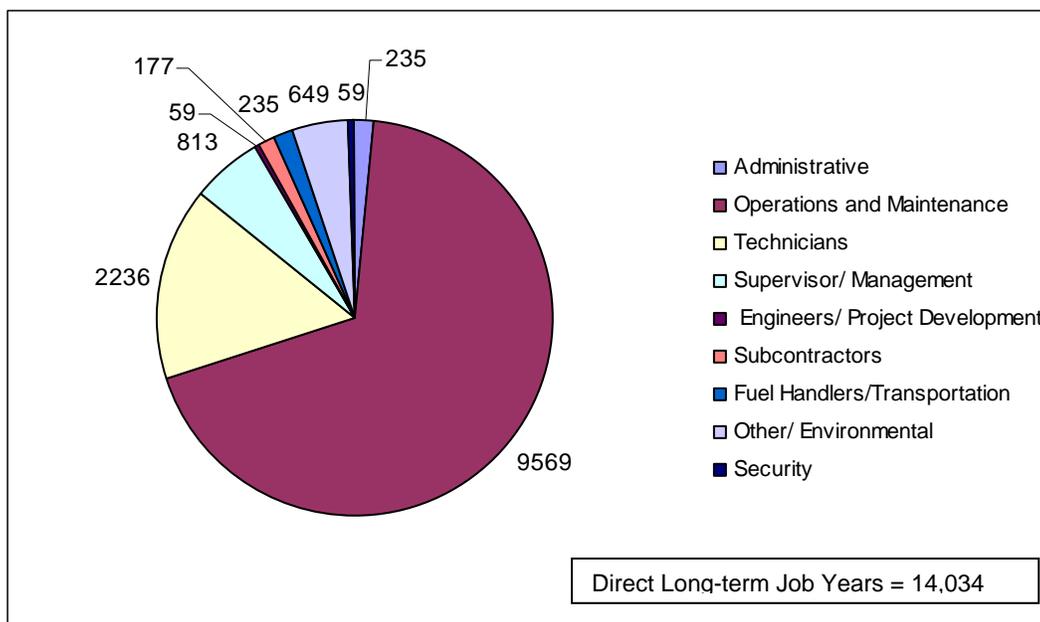


\* Job percentages tabulated by NYSERDA, *Entire RPS direct Benefits JUL 31 2008 working version.xls*.

**Table 30**  
**30% by 2015- RPS Projects' Direct Benefits (\$ and \$-per MWh, 2006 Basis)**

Resource	New Renewable Energy Production (MWh/yr)	New Renewable Energy Production (MWh over 20 years)	Total Direct \$ (from Construction to end of facility life)	Total Direct \$ per MWh
Biomass	2,026,377	40,527,540	\$1,695,726,691	\$41.84
Hydro	1,366,340	27,326,800	\$256,393,340	\$9.38
Wind	7,565,562	151,311,240	\$4,018,265,621	\$26.56
LFG	37,000	740,000	\$36,593,402	\$49.45
<b>Total</b>	<b>10,995,279</b>	<b>219,905,580</b>	<b>\$6,006,979,054</b>	<b>\$27.32</b>

**Figure 7**  
**30% by 2015- Type of Long-term Jobs in the RE Power Generation & Supply Sector**



\* Job percentages tabulated by NYSERDA, *Entire RPS direct Benefits JUL 31 2008 working version.xls*.



Section 7

**TOTAL ECONOMIC BENEFITS FROM THE PROJECTED RPS MAIN TIER PROGRAM  
(SCENARIOS 2 AND 3)**

This section presents the outputs of the IMPLAN model for the direct benefits data presented in Section 6. These IMPLAN modeled outputs represent the total economic benefits using the direct economic benefits data and the simulated multiplier effects.

**TOTAL ECONOMIC IMPACTS FROM 25% BY 2013**

The total economic impact of 25% by 2013 is presented below in Table 31 in terms of jobs, labor income, and output. The construction and operations of future RPS facilities in this scenario contribute over \$5.4 billion in output, \$1.7 billion in labor income and 28,528 job-years to the state over the period from 2005 through 2030. That represents a job multiplier effect of 3.4 and a labor income multiplier effect of 2.7.

**Table 31  
Economic Impacts for All Technologies -25% by 2013, 2005 – 2028**

	2005	2006	2007	2008	2009	2010	2011	2015	2028	2029	2030	Total (2005- 2030)
<b>Jobs</b>												
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
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>2,903</b>	<b>1,722</b>	<b>1,412</b>	<b>1,233</b>	<b>957</b>	<b>316</b>	<b>205</b>	<b>104</b>	<b>28,528</b>
<b>Labor Income (2006\$ mil)</b>												
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
<b>Total</b>	<b>\$34.2</b>	<b>\$130.9</b>	<b>\$157.5</b>	<b>\$177.8</b>	<b>\$114.1</b>	<b>\$85.1</b>	<b>\$73.3</b>	<b>\$56.1</b>	<b>\$17.9</b>	<b>\$11.7</b>	<b>\$5.9</b>	<b>\$1,705</b>
<b>Output (2006\$ mil)</b>												
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
<b>Total</b>	<b>\$108.0</b>	<b>\$409.7</b>	<b>\$465.3</b>	<b>\$519.6</b>	<b>\$319.9</b>	<b>\$259.3</b>	<b>\$233.3</b>	<b>\$186.3</b>	<b>\$62.5</b>	<b>\$43.8</b>	<b>\$22.3</b>	<b>\$5,424</b>

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.

\* 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 the impacted jobs are compensated

In the first seven years (2005 through 2011), current and future RPS facilities are under construction and projects begin operation; all RPS Main Tier projects currently under contract are on-line by 2009, and all future RPS projects are on-line by 2011. The annual impacts from 2012 to 2027 are identical since construction has ended and all facilities are operational. By 2028, projects from the first three solicitations start to surpass their useful life and in 2029 and 2030, facilities from the future RPS come off-line.

The economic impacts by renewable technology are shown below in Tables 32, 33, 34 and 35 with the addition of landfill gas which did not exist in the first three solicitations. As in the first three Main Tier solicitations (Table 18) wind power is the largest contributor of economic impact in the program. Landfill gas facilities generate the lowest impacts of any technology.

**Table 32**  
**Economic Impacts for Biofuel Facilities -25% by 2013, 2005 –2030**

	2005	2006	2007	2008	2009	2010	2011	...2015	...2028	2029	2030	Total (2005- 2030)
<b>Jobs</b>												
Direct	0	3	3	55	58	70	82	81	30	24	13	1,635
Indirect	0	71	77	211	169	188	201	184	66	55	29	4,010
<b>Total</b>	<b>0</b>	<b>74</b>	<b>80</b>	<b>265</b>	<b>227</b>	<b>258</b>	<b>283</b>	<b>265</b>	<b>96</b>	<b>79</b>	<b>41</b>	<b>5,646</b>
<b>Labor Income (2006\$ mil)*</b>												
Direct	\$0.0	\$0.6	\$0.6	\$4.5	\$4.4	\$5.2	\$6.0	\$5.8	\$2.0	\$1.7	\$0.9	\$119
Indirect	\$0.0	\$3.9	\$4.2	\$9.7	\$7.3	\$7.9	\$8.2	\$7.3	\$2.6	\$2.2	\$1.1	\$163
<b>Total</b>	<b>\$0.0</b>	<b>\$4.5</b>	<b>\$4.8</b>	<b>\$14.3</b>	<b>\$11.6</b>	<b>\$13.1</b>	<b>\$14.2</b>	<b>\$13.1</b>	<b>\$4.6</b>	<b>\$3.9</b>	<b>\$2.0</b>	<b>\$283</b>
<b>Output (2006\$ mil)</b>												
Direct (est.)	\$0.0	\$5.3	\$5.8	\$23.3	\$20.9	\$24.1	\$26.9	\$25.6	\$9.2	\$7.6	\$4.0	\$537
Indirect	\$0.0	\$8.9	\$9.7	\$33.3	\$28.8	\$32.7	\$36.0	\$33.9	\$12.2	\$10.1	\$5.3	\$719
<b>Total</b>	<b>\$0.0</b>	<b>\$14.2</b>	<b>\$15.4</b>	<b>\$56.6</b>	<b>\$49.7</b>	<b>\$56.8</b>	<b>\$62.9</b>	<b>\$59.5</b>	<b>\$21.5</b>	<b>\$17.7</b>	<b>\$9.2</b>	<b>\$1,256</b>

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.

\* See note from Table 31.

**Table 33**  
**Economic Impacts for Hydro Facilities -25% by 2013, 2005 – 2030**

	2005	2006	2007	2008	2009	2010	2011	...2015	...2028	2029	2030	Total (2005- 2030)
<b>Jobs</b>												
Direct	0	11	14	39	57	53	28	0	0	0	0	202
Indirect	0	11	11	27	42	51	43	23	22	18	10	608
<b>Total</b>	<b>0</b>	<b>22</b>	<b>25</b>	<b>66</b>	<b>99</b>	<b>105</b>	<b>71</b>	<b>23</b>	<b>22</b>	<b>18</b>	<b>10</b>	<b>810</b>
<b>Labor Income (2006\$ mil)*</b>												
Direct	\$0.0	\$0.8	\$1.0	\$2.7	\$3.9	\$3.7	\$1.9	\$0.0	\$0.0	\$0.0	\$0.0	\$14
Indirect	\$0.0	\$0.5	\$0.6	\$1.7	\$2.6	\$3.0	\$2.6	\$1.5	\$1.3	\$1.1	\$0.6	\$37
<b>Total</b>	<b>\$0.0</b>	<b>\$1.3</b>	<b>\$1.5</b>	<b>\$4.5</b>	<b>\$6.5</b>	<b>\$6.8</b>	<b>\$4.5</b>	<b>\$1.5</b>	<b>\$1.3</b>	<b>\$1.1</b>	<b>\$0.6</b>	<b>\$51</b>
<b>Output (2006\$ mil)</b>												
Direct (est.)	\$0.0	\$1.2	\$1.4	\$4.2	\$6.4	\$7.8	\$7.1	\$4.3	\$4.0	\$3.4	\$1.8	\$106
Indirect	\$0.0	\$1.3	\$1.5	\$4.5	\$6.7	\$7.9	\$6.7	\$3.7	\$3.5	\$3.0	\$1.5	\$96
<b>Total</b>	<b>\$0.0</b>	<b>\$2.5</b>	<b>\$2.9</b>	<b>\$8.7</b>	<b>\$13.0</b>	<b>\$15.7</b>	<b>\$13.8</b>	<b>\$8.1</b>	<b>\$7.5</b>	<b>\$6.4</b>	<b>\$3.3</b>	<b>\$203</b>

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.

\* See note from Table 31.

**Table 34**  
**Economic Impacts for Wind Facilities -25% by 2013, 2005 – 2030**

	2005	2006	2007	2008	2009	2010	2011	...2015	...2028	2029	2030	Total (2005- 2030)
<b>Jobs</b>												
Direct	100	581	660	753	375	313	266	201	74	35	18	6,398
Indirect	428	1,587	1,772	1,809	1,003	716	600	461	118	66	33	15,507
<b>Total</b>	<b>528</b>	<b>2,168</b>	<b>2,432</b>	<b>2,563</b>	<b>1,378</b>	<b>1,029</b>	<b>865</b>	<b>662</b>	<b>192</b>	<b>102</b>	<b>50</b>	<b>21,906</b>
<b>Labor Income (2006\$ mil)*</b>												
Direct	\$10.4	\$36.7	\$53.2	\$58.2	\$39.2	\$24.0	\$20.4	\$15.5	\$5.1	\$2.7	\$1.3	\$498
Indirect	\$23.8	\$88.5	\$97.9	\$100.3	\$55.7	\$40.0	\$33.5	\$25.8	\$6.5	\$3.6	\$1.8	\$864
<b>Total</b>	<b>\$34.2</b>	<b>\$125.2</b>	<b>\$151.1</b>	<b>\$158.5</b>	<b>\$94.9</b>	<b>\$64.0</b>	<b>\$53.8</b>	<b>\$41.2</b>	<b>\$11.6</b>	<b>\$6.3</b>	<b>\$3.1</b>	<b>\$1,362</b>
<b>Output (2006\$ mil)</b>												
Direct (est.)	\$44.5	\$165.8	\$188.1	\$200.0	\$122.7	\$92.5	\$81.5	\$66.5	\$18.5	\$10.4	\$5.1	\$1,994
Indirect	\$63.6	\$227.1	\$258.9	\$252.6	\$131.1	\$90.4	\$72.2	\$51.0	\$13.8	\$8.1	\$4.0	\$1,937
<b>Total</b>	<b>\$108.0</b>	<b>\$392.9</b>	<b>\$447.0</b>	<b>\$452.6</b>	<b>\$253.8</b>	<b>\$182.9</b>	<b>\$153.7</b>	<b>\$117.5</b>	<b>\$32.3</b>	<b>\$18.5</b>	<b>\$9.2</b>	<b>\$3,931</b>

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.

\* See note from Table 31.

**Table 35**  
**Economic Impacts for Landfill Gas Facilities -25% by 2013, 2005 – 2030**

	2005	2006	2007	2008	2009	2010	2011	...2015	...2028	2029	2030	<i>Total (2005- 2030)</i>
<b>Jobs</b>												
Direct	0	0	0	3	7	8	6	2	2	2	1	63
Indirect	0	0	0	5	10	12	9	4	4	4	2	105
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>17</b>	<b>20</b>	<b>14</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>167</b>
<b>Labor Income (2006\$ mil)*</b>												
Direct	\$0.0	\$0.0	\$0.0	\$0.1	\$0.2	\$0.3	\$0.3	\$0.2	\$0.2	\$0.2	\$0.1	\$4
Indirect	\$0.0	\$0.0	\$0.0	\$0.4	\$0.9	\$0.9	\$0.6	\$0.1	\$0.1	\$0.1	\$0.1	\$5
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.5</b>	<b>\$1.0</b>	<b>\$1.2</b>	<b>\$0.8</b>	<b>\$0.3</b>	<b>\$0.3</b>	<b>\$0.3</b>	<b>\$0.1</b>	<b>\$9</b>
<b>Output (2006\$ mil)</b>												
Direct (est.)	\$0.0	\$0.0	\$0.0	\$0.6	\$1.3	\$1.5	\$1.2	\$0.6	\$0.6	\$0.6	\$0.3	\$15
Indirect	\$0.0	\$0.0	\$0.0	\$1.0	\$2.0	\$2.4	\$1.7	\$0.7	\$0.7	\$0.7	\$0.3	\$19
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$1.6</b>	<b>\$3.3</b>	<b>\$3.9</b>	<b>\$2.9</b>	<b>\$1.2</b>	<b>\$1.2</b>	<b>\$1.2</b>	<b>\$0.6</b>	<b>\$34</b>

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.

\* See note from Table 31.

Tables 36 and 37 separate the short-term (i.e. construction) and long-term (i.e. operations) impacts for all technologies in the future RPS Main Tier program. As with the first three solicitations, construction of facilities generates a larger annual impact than the operation of facilities, although the operations contribute more over the entire period of the program.

**Table 36**  
**Short-Term Economic Impacts for All Technologies -25% by 2013, 2005 – 2011**

	2005	2006	2007	2008	2009	2010	2011	Total Short-Term
<b>Jobs</b>								
Direct	100	595	677	672	273	191	96	2,605
Indirect	428	1,670	1,860	1,582	681	361	181	6,762
Total	528	2,265	2,537	2,254	954	552	277	<b>9,367</b>
<b>Labor Income (2006\$ mil)*</b>								
Direct	\$10.4	\$38.1	\$54.8	\$51.4	\$30.8	\$14.1	\$7.1	\$207
Indirect	\$23.8	\$92.9	\$102.7	\$87.7	\$37.9	\$20.4	\$10.2	\$375
Total	\$34.2	\$130.9	\$157.5	\$139.1	\$68.7	\$34.4	\$17.3	<b>\$582</b>
<b>Output (2006\$ mil)</b>								
Direct (est.)	\$41.9	\$165.0	\$185.8	\$160.6	\$74.6	\$39.3	\$19.7	\$687
Indirect	\$63.6	\$237.3	\$270.0	\$231.7	\$100.0	\$54.7	\$27.4	\$985
Total	\$105.4	\$402.3	\$455.9	\$392.3	\$174.6	\$94.0	\$47.0	<b>\$1,671</b>

Source: NYSEERDA, 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.

\* See note from Table 7-1.

**Table 37**  
**Long-Term Economic Impacts for All Technologies -25% by 2013, 2005 – 2030**

	2005	...2015	...2028	2029	2030	Total Long-Term
<b>Jobs</b>						
Direct	0	285	106	62	31	5,693
Indirect	0	672	210	143	73	13,468
Total	0	957	316	205	104	<b>19,161</b>
<b>Labor Income (2006\$ mil)*</b>						
Direct	\$0.0	\$21.4	\$7.3	\$4.6	\$2.3	\$429
Indirect	\$0.0	\$34.6	\$10.6	\$7.1	\$3.6	\$694
Total	\$0.0	\$56.1	\$17.9	\$11.7	\$5.9	<b>\$1,123</b>
<b>Output (2006\$ mil)</b>						
Direct (est.)	\$2.6	\$97.0	\$32.3	\$22.0	\$11.2	\$1,965
Indirect	\$0.0	\$89.2	\$30.2	\$21.8	\$11.2	\$1,787
Total	\$2.6	\$186.3	\$62.5	\$43.8	\$22.3	<b>\$3,752</b>

Source: NYSEERDA, 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.

\* See note from Table 31.

The impacts by components of short-term and long-term spending are shown below in Tables 38 and 39. The direct spending for each category is across all projects in the RPS Main Tier program over their respective intervals. Construction purchases still represent the largest impact in the short-term while PILOT payments generate the largest impact in the long-term through government spending. Spending on fuels plays a larger role in this case than in the first three solicitations alone. This is due to the increasing role of biofuel technologies in meeting the next RPS target.

**Table 38**  
**Change in NYS Output: Impacts by Component of Short-Term Spending-**  
**25% by 2013, Total Amount 2005-2011**

	<b>Construction Payroll</b>	<b>In-State Construction Spending</b>	<b>Payments to Other impacted landowners (one-time)</b>	<b>PILOT Payments (one-time)</b>	<b>Total</b>
<i>Direct Spending (2006\$ mil)</i>	\$206.7	\$451.5	\$11.5	\$17.1	\$687
<i>Total Labor Income (2006\$ mil)</i>	\$263.8				
<i>Total Output (2006\$ mil)</i>	\$375.1	\$1,242.3	\$11.5	\$42.6	<b>\$1,671</b>

Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Payments to other impacted landowners do not enter the IMPLAN multiplier model since these are compensations for productive capacity of land, aesthetics, noise, etc. Therefore, it was assumed that these payments did not lead to spin-off activity in the state economy.

**Table 39**  
**Change in NYS Output: Impacts by Component of Long-Term Spending-**  
**25% by 2013, Total Amount 2005-2030**

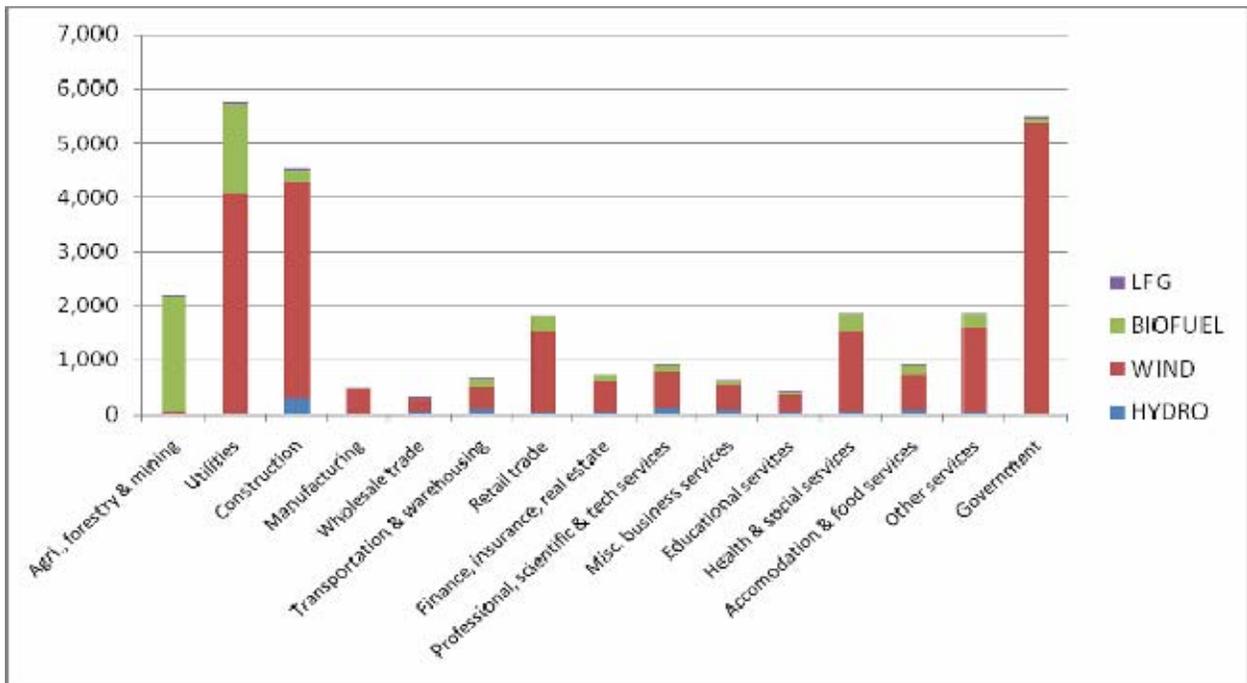
	<b>O&amp;M Payroll</b>	<b>PILOT Payments (on-going)</b>	<b>Fuels (on-going)</b>	<b>Land Lease (on-going)</b>	<b>Other O&amp;M Spending*</b>	<b>Total</b>
<i>Direct Spending (2006\$ mil)</i>	\$428.9	\$438.2	\$369.0	\$245.0	\$483.9	\$1,965
<i>Total Labor Income (2006\$ mil)</i>	\$536.4					
<i>Total Output (2006\$ mil)</i>	\$745.8	\$1,089.2	\$941.8	\$245.0	\$730.5	<b>\$3,752</b>

Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Land Lease payments, representing a transfer of wealth, do not enter the IMPLAN multiplier model.

\*Other O&M spending includes purchases of supplies and services necessary for operation that were not included in the other components.

Figure 8 shows the job impacts by industry for each technology. As in the first three solicitations, the industries with the largest impact (in terms of jobs) are government, utilities and construction. Impacts on these industries mainly come through contributions of PILOT payments (short and long term) and direct jobs involving operations (i.e. utilities) and facility construction. Wind is still the dominant technology in terms of impact; however, hydro and biofuel are becoming more prominent in this scenario when compared to the first three solicitations. This effect is noticeable when looking at the growth in agriculture, forestry and mining which is due to increasing supply requirements for biofuel feedstocks. Also, the distribution of job impacts in construction and utilities feature higher shares of biofuel and hydro, respectively, when compared to Figure 8.

**Figure 8**  
**Total Job Impacts by Industry -25% by 2013, 2005-2030**



Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group

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## **TOTAL ECONOMIC IMPACTS FROM 30% BY 2015**

The total economic impact of 30% by 2015 is presented below in Table 40 in terms of jobs, labor income, and output. The construction and operations of future RPS facilities in this scenario contribute over \$12.5 billion in output, \$3.8 billion in labor income and 64,805 job-years to the state over the period from 2005 through 2034. That represents a job multiplier effect of 3.3 and a labor income multiplier effect of 2.6.

In the first 11 years (2005 through 2015) current and future RPS facilities are under construction and begin operations. Current RPS Main Tier projects come on-line in 2008 and 2009 (first three solicitations). Future RPS projects from 25% by 2013 come on-line in 2010 and 2011 while those from 30% by 2015 become operational from 2012 through 2015. The annual impacts from 2016 through 2027 are identical since construction has ended and facilities from all scenarios are operational. By 2028, projects from the first three Main Tier solicitations start to surpass their 20-year useful life and in 2029 and 2030, facilities from 25% by 2013 of the future RPS come off-line. In the final four years (2031 through 2034) projects from 30% by 2015 of the future RPS program exceed their useful life.

The economic impacts by renewable technology are shown in Tables 40, 41, 42 and 43 for biomass, hydro, wind and landfill gas, respectively. As in 25% by 2013, wind is the largest contributor of economic impact and landfill gas is the smallest. However, biofuel technologies continue to exert a larger share of the economic influence of the RPS Main Tier Program in 30% by 2015.

**Table 40**  
**Economic Impacts for All Technologies -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)
<b>Jobs</b>																				
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
<b>Total</b>	<b>528</b>	<b>2,265</b>	<b>2,537</b>	<b>3,396</b>	<b>2,804</b>	<b>3,331</b>	<b>3,586</b>	<b>3,189</b>	<b>3,274</b>	<b>2,791</b>	<b>2,789</b>	<b>2,256</b>	<b>1,615</b>	<b>1,504</b>	<b>1,296</b>	<b>1,051</b>	<b>836</b>	<b>622</b>	<b>321</b>	<b>64,805</b>
<b>Labor Income (\$mil)</b>																				
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
<b>Total</b>	<b>\$34</b>	<b>\$131</b>	<b>\$157</b>	<b>\$208</b>	<b>\$181</b>	<b>\$204</b>	<b>\$220</b>	<b>\$194</b>	<b>\$198</b>	<b>\$165</b>	<b>\$162</b>	<b>\$129</b>	<b>\$91</b>	<b>\$85</b>	<b>\$73</b>	<b>\$58</b>	<b>\$45</b>	<b>\$33</b>	<b>\$17</b>	<b>\$3,812</b>
<b>Output Required (\$mil)</b>																				
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
<b>Total</b>	<b>\$108</b>	<b>\$410</b>	<b>\$465</b>	<b>\$607</b>	<b>\$512</b>	<b>\$600</b>	<b>\$650</b>	<b>\$586</b>	<b>\$610</b>	<b>\$539</b>	<b>\$549</b>	<b>\$453</b>	<b>\$329</b>	<b>\$310</b>	<b>\$269</b>	<b>\$220</b>	<b>\$177</b>	<b>\$134</b>	<b>\$67</b>	<b>\$12,574</b>

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.

\* See note from Table 31.



**Table 41**  
**Economic Impacts for Biofuel Facilities -30% by 2015, 2005 – 2034**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	...2028	2029	2030	2031	2032	2033	2034	<i>Total (2005- 2034)</i>
<b>Jobs</b>																				
Direct	0	3	3	55	58	73	88	106	123	199	260	256	205	199	186	171	156	142	65	5,167
Indirect	0	71	77	214	175	219	253	372	472	627	669	581	464	452	421	388	355	322	146	12,673
<b>Total</b>	<b>0</b>	<b>74</b>	<b>80</b>	<b>268</b>	<b>233</b>	<b>292</b>	<b>341</b>	<b>477</b>	<b>595</b>	<b>826</b>	<b>928</b>	<b>838</b>	<b>669</b>	<b>651</b>	<b>607</b>	<b>559</b>	<b>511</b>	<b>464</b>	<b>211</b>	<b>17,840</b>
<b>Labor Income (\$mil)</b>																				
Direct	\$0	\$1	\$1	\$5	\$4	\$6	\$7	\$8	\$10	\$15	\$19	\$18	\$15	\$14	\$13	\$12	\$11	\$10	\$5	\$377
Indirect	\$0	\$4	\$4	\$10	\$8	\$10	\$11	\$17	\$22	\$28	\$28	\$23	\$18	\$18	\$17	\$15	\$14	\$13	\$6	\$516
<b>Total</b>	<b>\$0</b>	<b>\$4</b>	<b>\$5</b>	<b>\$14</b>	<b>\$12</b>	<b>\$15</b>	<b>\$17</b>	<b>\$25</b>	<b>\$32</b>	<b>\$43</b>	<b>\$47</b>	<b>\$41</b>	<b>\$33</b>	<b>\$32</b>	<b>\$30</b>	<b>\$28</b>	<b>\$25</b>	<b>\$23</b>	<b>\$10</b>	<b>\$893</b>
<b>Output Required (\$mil)</b>																				
Direct	\$0	\$5	\$6	\$24	\$21	\$27	\$31	\$42	\$52	\$75	\$87	\$81	\$65	\$63	\$59	\$54	\$49	\$45	\$20	\$1,696
Indirect	\$0	\$9	\$10	\$34	\$30	\$37	\$43	\$60	\$74	\$104	\$118	\$107	\$85	\$83	\$78	\$71	\$65	\$59	\$27	\$2,273
<b>Total</b>	<b>\$0</b>	<b>\$14</b>	<b>\$15</b>	<b>\$57</b>	<b>\$51</b>	<b>\$64</b>	<b>\$74</b>	<b>\$102</b>	<b>\$126</b>	<b>\$179</b>	<b>\$205</b>	<b>\$188</b>	<b>\$150</b>	<b>\$146</b>	<b>\$136</b>	<b>\$125</b>	<b>\$115</b>	<b>\$104</b>	<b>\$47</b>	<b>\$3,969</b>

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.

\* See note from Table 31.



**Table 42**  
**Economic Impacts for Hydro Facilities -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)
<b>Jobs</b>																				
Direct	0	11	14	44	66	95	97	86	54	21	0	0	0	0	0	0	0	0	0	487
Indirect	0	11	11	30	49	82	95	98	86	71	56	56	54	51	41	30	18	7	0	1,465
<b>Total</b>	<b>0</b>	<b>22</b>	<b>25</b>	<b>74</b>	<b>115</b>	<b>177</b>	<b>191</b>	<b>184</b>	<b>140</b>	<b>93</b>	<b>56</b>	<b>56</b>	<b>54</b>	<b>51</b>	<b>41</b>	<b>30</b>	<b>18</b>	<b>7</b>	<b>0</b>	<b>1,952</b>
<b>Labor Income (\$mil)*</b>																				
Direct	\$0.0	\$0.8	\$1.0	\$3.1	\$4.6	\$6.6	\$6.7	\$5.9	\$3.7	\$1.5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$34
Indirect	\$0.0	\$0.5	\$0.6	\$1.9	\$2.9	\$4.9	\$5.6	\$5.9	\$5.2	\$4.4	\$3.5	\$3.5	\$3.4	\$3.2	\$2.5	\$1.8	\$1.2	\$0.5	\$0.0	\$90
<b>Total</b>	<b>\$0.0</b>	<b>\$1.3</b>	<b>\$1.5</b>	<b>\$5.0</b>	<b>\$7.5</b>	<b>\$11.4</b>	<b>\$12.4</b>	<b>\$11.8</b>	<b>\$9.0</b>	<b>\$5.9</b>	<b>\$3.5</b>	<b>\$3.5</b>	<b>\$3.4</b>	<b>\$3.2</b>	<b>\$2.5</b>	<b>\$1.8</b>	<b>\$1.2</b>	<b>\$0.5</b>	<b>\$0.0</b>	<b>\$124</b>
<b>Output Required (\$mil)</b>																				
Direct	\$0.0	\$1.2	\$1.4	\$4.7	\$7.3	\$12.2	\$14.4	\$15.4	\$14.3	\$12.5	\$10.4	\$10.4	\$10.1	\$9.5	\$7.6	\$5.5	\$3.4	\$1.4	\$0.0	\$256
Indirect	\$0.0	\$1.3	\$1.5	\$5.0	\$7.7	\$12.6	\$14.6	\$15.2	\$13.5	\$11.3	\$9.0	\$9.0	\$8.7	\$8.2	\$6.5	\$4.7	\$3.0	\$1.2	\$0.0	\$232
<b>Total</b>	<b>\$0.0</b>	<b>\$2.5</b>	<b>\$2.9</b>	<b>\$9.7</b>	<b>\$15.0</b>	<b>\$24.8</b>	<b>\$29.0</b>	<b>\$30.6</b>	<b>\$27.9</b>	<b>\$23.8</b>	<b>\$19.4</b>	<b>\$19.4</b>	<b>\$18.8</b>	<b>\$17.7</b>	<b>\$14.1</b>	<b>\$10.2</b>	<b>\$6.4</b>	<b>\$2.6</b>	<b>\$0.0</b>	<b>\$488</b>

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.

\* See note from Table 31.

**Table 43**  
**Economic Impacts for Wind Facilities -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)
<b>Jobs</b>																				
Direct	100	581	660	879	669	839	906	775	772	590	580	440	313	274	222	159	105	52	38	13,799
Indirect	428	1,587	1,772	2,166	1,769	1,995	2,116	1,718	1,740	1,260	1,210	907	565	513	415	296	196	96	71	30,802
<b>Total</b>	<b>528</b>	<b>2,168</b>	<b>2,432</b>	<b>3,044</b>	<b>2,438</b>	<b>2,834</b>	<b>3,022</b>	<b>2,494</b>	<b>2,511</b>	<b>1,850</b>	<b>1,790</b>	<b>1,348</b>	<b>878</b>	<b>787</b>	<b>637</b>	<b>455</b>	<b>300</b>	<b>148</b>	<b>110</b>	<b>44,602</b>
<b>Labor Income (\$mil)*</b>																				
Direct	\$10	\$37	\$53	\$68	\$62	\$64	\$69	\$59	\$59	\$45	\$44	\$34	\$23	\$21	\$17	\$12	\$8	\$4	\$3	\$1,061
Indirect	\$24	\$88	\$98	\$121	\$99	\$112	\$119	\$96	\$97	\$70	\$67	\$50	\$31	\$28	\$23	\$16	\$11	\$5	\$4	\$1,712
<b>Total</b>	<b>\$34</b>	<b>\$125</b>	<b>\$151</b>	<b>\$188</b>	<b>\$161</b>	<b>\$176</b>	<b>\$188</b>	<b>\$155</b>	<b>\$156</b>	<b>\$115</b>	<b>\$111</b>	<b>\$84</b>	<b>\$54</b>	<b>\$49</b>	<b>\$40</b>	<b>\$28</b>	<b>\$19</b>	<b>\$9</b>	<b>\$7</b>	<b>\$2,774</b>
<b>Output Required (\$mil)</b>																				
Direct	\$44	\$166	\$188	\$236	\$202	\$230	\$249	\$214	\$219	\$171	\$169	\$137	\$88	\$80	\$65	\$46	\$31	\$15	\$11	\$4,064
Indirect	\$64	\$227	\$259	\$303	\$241	\$276	\$291	\$232	\$231	\$161	\$152	\$106	\$69	\$63	\$51	\$36	\$24	\$12	\$9	\$3,968
<b>Total</b>	<b>\$108</b>	<b>\$393</b>	<b>\$447</b>	<b>\$539</b>	<b>\$443</b>	<b>\$506</b>	<b>\$540</b>	<b>\$446</b>	<b>\$450</b>	<b>\$332</b>	<b>\$321</b>	<b>\$242</b>	<b>\$157</b>	<b>\$143</b>	<b>\$116</b>	<b>\$83</b>	<b>\$55</b>	<b>\$27</b>	<b>\$20</b>	<b>\$8,033</b>

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.

\* See note from Table 31

**Table 44**  
**Economic Impacts for Landfill Gas Facilities -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)
<b>Jobs</b>																				
Direct	0	0	0	3	7	12	12	13	11	8	5	5	5	5	4	3	2	1	0	150
Indirect	0	0	0	5	10	17	19	21	18	14	9	9	9	9	7	5	4	2	0	261
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>17</b>	<b>29</b>	<b>32</b>	<b>34</b>	<b>28</b>	<b>22</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>11</b>	<b>8</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>412</b>
<b>Labor Income (\$mil)*</b>																				
Direct	\$0.0	\$0.0	\$0.0	\$0.1	\$0.2	\$0.4	\$0.4	\$0.5	\$0.5	\$0.5	\$0.4	\$0.4	\$0.4	\$0.4	\$0.3	\$0.2	\$0.1	\$0.1	\$0.0	\$9
Indirect	\$0.0	\$0.0	\$0.0	\$0.4	\$0.9	\$1.3	\$1.4	\$1.4	\$1.1	\$0.7	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.2	\$0.1	\$0.1	\$0.0	\$13
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.5</b>	<b>\$1.0</b>	<b>\$1.7</b>	<b>\$1.9</b>	<b>\$2.0</b>	<b>\$1.6</b>	<b>\$1.2</b>	<b>\$0.7</b>	<b>\$0.7</b>	<b>\$0.7</b>	<b>\$0.7</b>	<b>\$0.6</b>	<b>\$0.4</b>	<b>\$0.3</b>	<b>\$0.1</b>	<b>\$0.0</b>	<b>\$22</b>
<b>Output Required (\$mil)</b>																				
Direct	\$0.0	\$0.0	\$0.0	\$0.6	\$1.3	\$2.2	\$2.4	\$2.7	\$2.3	\$1.9	\$1.4	\$1.4	\$1.4	\$1.4	\$1.1	\$0.8	\$0.5	\$0.3	\$0.0	\$37
Indirect	\$0.0	\$0.0	\$0.0	\$1.0	\$2.0	\$3.4	\$3.7	\$4.0	\$3.3	\$2.6	\$1.6	\$1.6	\$1.6	\$1.6	\$1.3	\$1.0	\$0.6	\$0.3	\$0.0	\$48
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$1.6</b>	<b>\$3.3</b>	<b>\$5.6</b>	<b>\$6.2</b>	<b>\$6.6</b>	<b>\$5.6</b>	<b>\$4.5</b>	<b>\$3.0</b>	<b>\$3.0</b>	<b>\$3.0</b>	<b>\$3.0</b>	<b>\$2.4</b>	<b>\$1.8</b>	<b>\$1.2</b>	<b>\$0.6</b>	<b>\$0.0</b>	<b>\$84</b>

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.

\* See note from Table 31.

Tables 45 and 46 separate the short-term (i.e. construction) and long-term (i.e. operations) impacts for all technologies in the future RPS Main Tier program. The construction period generates a relatively smaller share of the total impacts than observed for the first three solicitations and 25% by 2013. The long-term period shows more impacts under 30% by 2015 since there are more facilities required to meet the 30% target and they operate over a longer time period.

**Table 45**  
**Short-Term Economic Impacts for All Technologies -30% by 2015, 2005 – 2015**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	<b>Total Short-Term</b>
<b>Jobs</b>												
Direct	100	595	677	803	577	728	733	541	451	220	143	<b>5,569</b>
Indirect	428	1,670	1,860	1,930	1,424	1,592	1,601	1,198	1,166	619	390	<b>13,878</b>
Total	528	2,265	2,537	2,732	2,001	2,320	2,335	1,739	1,618	839	533	<b>19,448</b>
<b>Labor Income (2006\$ mil)</b>												
Direct	\$10.4	\$38.1	\$54.8	\$61.4	\$54.0	\$54.8	\$55.2	\$41.0	\$34.9	\$17.5	\$11.4	<b>\$433</b>
Indirect	\$23.8	\$92.9	\$102.7	\$107.5	\$79.7	\$89.6	\$90.1	\$67.1	\$65.4	\$34.3	\$21.5	<b>\$775</b>
Total	\$34.2	\$130.9	\$157.5	\$168.8	\$133.8	\$144.4	\$145.3	\$108.1	\$100.3	\$51.9	\$32.9	<b>\$1,208</b>
<b>Output (2006\$ mil)</b>												
Direct (est.)	\$41.9	\$165.0	\$185.8	\$195.8	\$151.8	\$168.9	\$169.9	\$126.0	\$117.8	\$61.1	\$39.3	<b>\$1,423</b>
Indirect	\$63.6	\$237.3	\$270.0	\$281.5	\$208.9	\$237.2	\$238.7	\$178.6	\$169.2	\$89.6	\$57.2	<b>\$2,032</b>
Total	\$105.4	\$402.3	\$455.9	\$477.3	\$360.7	\$406.1	\$408.6	\$304.6	\$286.9	\$150.7	\$96.5	<b>\$3,455</b>

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.

\* See note from Table 31.

**Table 46**  
**Long-Term Economic Impacts for All Technologies -30% by 2015, 2005 – 2034**

	2005	...2015	...2028	2029	2030	2031	2032	2033	2034	<i>Total Long-Term</i>
<b>Jobs</b>										
Direct	0	702	523	479	412	333	263	194	103	<b>14,034</b>
Indirect	0	1,554	1,092	1,025	884	719	572	427	218	<b>31,323</b>
Total	0	2,256	1,615	1,504	1,296	1,051	836	622	321	<b>45,358</b>
<b>Labor Income (2006\$ mil)</b>										
Direct	\$0.0	\$52.4	\$38.2	\$35.5	\$30.5	\$24.5	\$19.3	\$14.2	\$7.5	<b>\$1,048</b>
Indirect	\$0.0	\$77.1	\$53.1	\$49.5	\$42.2	\$33.6	\$26.0	\$18.5	\$9.7	<b>\$1,556</b>
Total	\$0.0	\$129.5	\$91.3	\$85.1	\$72.7	\$58.2	\$45.4	\$32.7	\$17.2	<b>\$2,604</b>
<b>Output (2006\$ mil)</b>										
Direct (est.)	\$2.6	\$229.2	\$164.5	\$154.1	\$132.3	\$106.7	\$84.0	\$61.5	\$31.6	<b>\$4,630</b>
Indirect	\$0.0	\$223.5	\$164.5	\$156.1	\$136.4	\$113.5	\$93.0	\$72.6	\$35.7	<b>\$4,489</b>
Total	\$2.6	\$452.7	\$328.9	\$310.2	\$268.7	\$220.2	\$177.0	\$134.1	\$67.3	<b>\$9,119</b>

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.

\* See note from Table 31.

The impacts by components of short-term and long-term spending are shown below in Tables 47 and 48. The direct spending for each category is across all projects expected to fulfill the 30% by 2015 target and represents spending over the respective intervals. In the short-term, construction purchases remain the highest spending category. However, in the long-term period, the largest spending category is payments for fuel—a departure from results in 25% by 2013 and in the first three solicitations where PILOT payments represented the largest share. This reflects the growing share of biofuel projects in meeting the 30% target.

**Table 47**

**Change in NYS Output: Impacts by Components of Short-Term Spending  
-30% by 2015, Total Amount 2005-2015**

	<b>Construction Payroll</b>	<b>In-State Construction Spending</b>	<b>Payments to Other impacted landowners (one-time)</b>	<b>PILOT Payments (one-time)</b>	<b>Total</b>
<i>Direct Spending (2006\$ mil)</i>	\$433.4	\$924.8	\$26.0	\$38.9	\$1,423
<i>Total Labor Income (2006\$ mil)</i>	\$553.3				
<i>Total Output (2006\$ mil)</i>	\$786.7	\$2,545.5	\$26.0	\$96.7	<b>\$3,455</b>

Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Payments to other impacted landowners do not enter the IMPLAN multiplier model since these are compensations for productive capacity of land, aesthetics, noise, etc. Therefore, it was assumed that these payments did not lead to spin-off activity in the state economy.

**Table 48**

**Change in NYS Output: Impacts by Components of Long-Term Spending  
-30% by 2015, Total Amount 2005-2034**

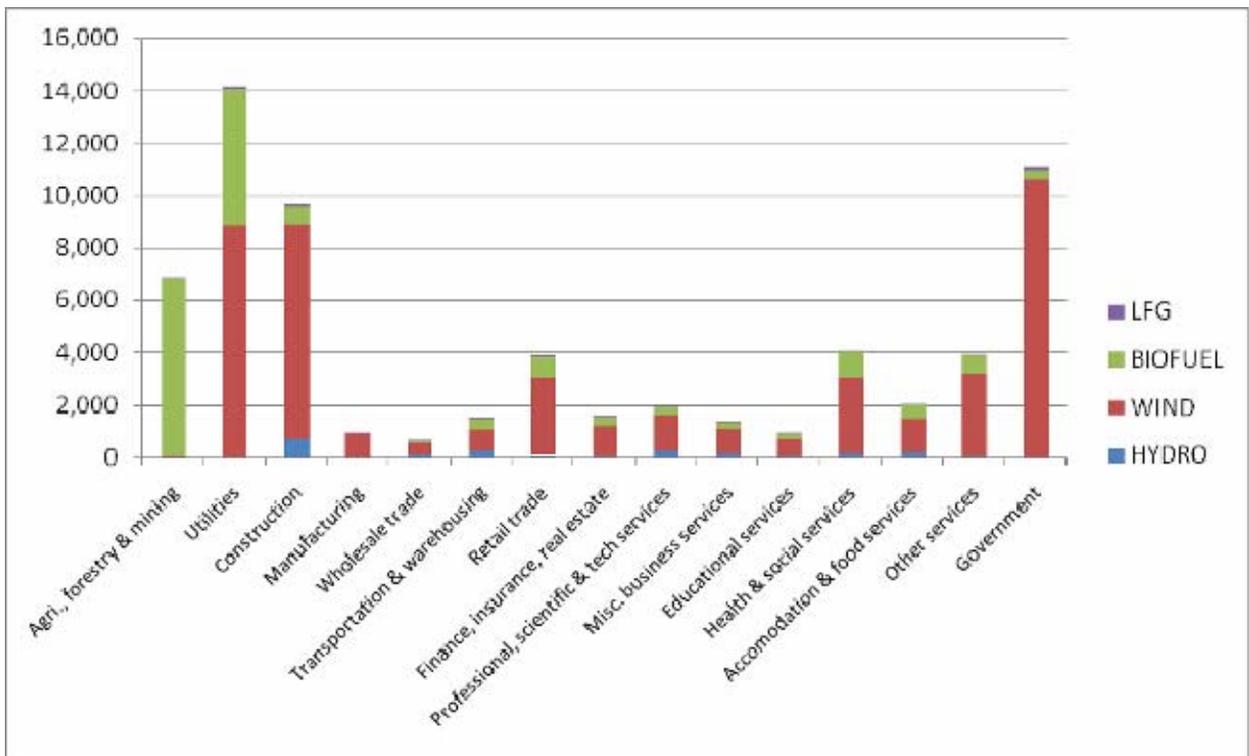
	<b>O&amp;M Payroll</b>	<b>PILOT Payments (on-going)</b>	<b>Fuels (on-going)</b>	<b>Land Lease (on-going)</b>	<b>Other O&amp;M Spending*</b>	<b>Total</b>
<i>Direct Spending (2006\$ mil)</i>	\$1,048.0	\$924.5	\$1,161.8	\$480.0	\$1,015.5	\$4,630
<i>Total Labor Income (2006\$ mil)</i>	\$1,310.7					
<i>Total Output (2006\$ mil)</i>	\$1,822.4	\$2,298.0	\$2,965.0	\$480.0	\$1,553.8	<b>\$9,119</b>

Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group. Land Lease payments, representing a transfer of wealth, do not enter the IMPLAN multiplier model.

\*Other O&M spending includes purchases of supplies and services necessary for operation that were not included in the other components.

Figure 9 shows the job impacts by industry for each technology for 30% by 2015. Consistent with impacts from first three solicitations and 25% by 2013, the industries with the largest impact (in terms of jobs) are government, utilities (power generation & supply) and construction. Wind still contributes the largest amount of jobs to most industries. However, biofuel technologies exhibit an increased share in the impacts by industry -- most notably in utilities.

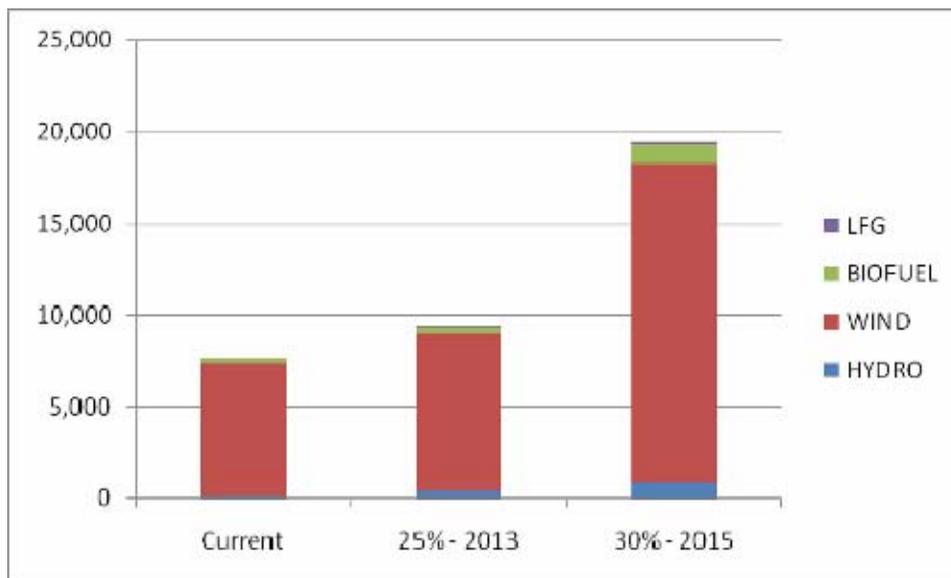
**Figure 9**  
**Total Job Impacts by Industry -30% by 2015, 2005-2034**



Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group.

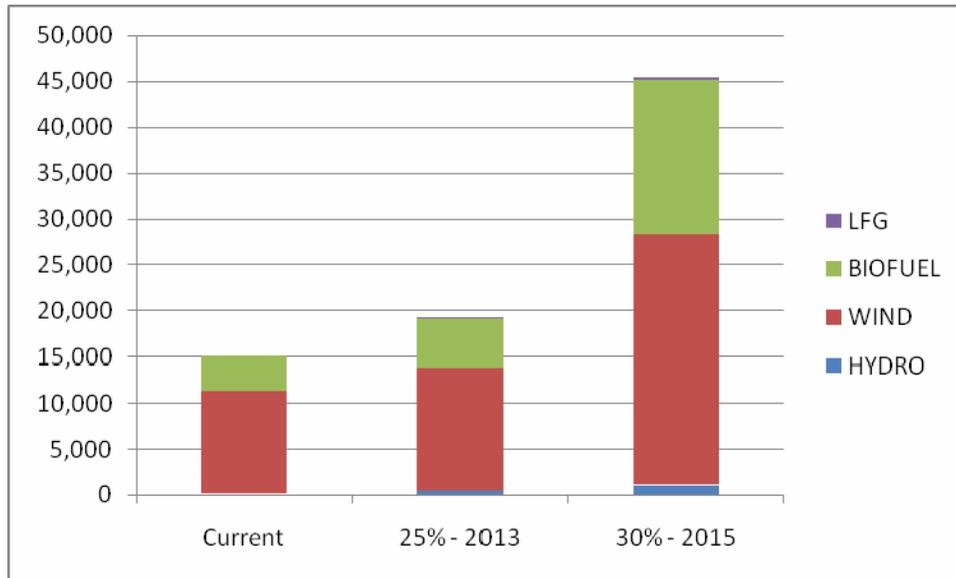
Figures 10 and 11 provide a comparison of the job impacts across scenarios for short-term and long-term periods. In the short-term, wind dominates the technologies in all scenarios due to the high cost of construction related to new wind farms. In the long-term impacts, while wind represents the majority of impacts, the increasingly important role of biofuel is readily apparent through its operations. It is also evident that the magnitude of total job impacts increases drastically in 30% by 2015 for the short and long-term periods. This is not surprising since the movement from 25% by 2013 to 30% by 2015) of renewable energy in New York requires a significantly larger construction effort and leads to a longer operational period with more facilities in every technology.

**Figure 10**  
**Total Short Term Job Impacts by Main Tier RPS Attainment**



Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group.

**Figure 11**  
**Total Long Term Job Impacts by Main Tier RPS Attainment**



Source: NYSERDA, IMPLAN. Calculations by KEMA and EDR Group.

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## Section 8 CONCLUSIONS

At a fairly high level, this analysis has yielded the following conclusions:

- For the first three solicitations, the cumulative direct dollars generated from RE projects, starting with construction and through the life of the facilities, is \$2.06 billion (in 2006\$). This amounts to \$25.39 per MWh of RE produced. Wind projects contribute 80% of these direct dollars of benefits, biofuel retrofits 18%, and hydro upgrades the balance.
- The job years for the 3-year construction interval are 2,031; for the associated 20-year operational phase for all facilities involved, the direct job years amount to 4,460.
- Lewis County is expected to receive 23% of the direct benefits (based on projects awarded, a mix of a large wind project, a large biofuel project, and two small hydro projects); Clinton 21% (all wind), Wyoming 15% (all wind) and Steuben County 12% (all wind).
- The total economic impacts by 2028 for the entire RPS are an extra 22,676 job years (an implied job multiplier of 3.5), cumulative labor income impacts of \$1.3 billion (an average compensation of \$60,000 per job) from \$4.24 billion of added business sales. Wind projects are responsible for generating the majority of the total economic impacts.
- Among the short-term, RPS projects trigger the greatest positive economic impacts by “in-state spending” on construction materials & services excluding the construction wages. In the long-term of facility operations, the PILOT payments, representing new revenues to State-Local governments, trigger the largest total economic impacts.
- Once operational, wind projects will create additional jobs, over and above the long-term jobs in power generation & supply (the Utilities sector) in the Government sector (average compensation of \$65,000 per job), due to increased revenue levels; for biofuel projects, added jobs most predominantly occur in the Forestry & Logging sector (average compensation of \$48,000 per job) where fuel feed stocks originate.

### **IMPACTS OF A PROJECTED RPS**

There are two “target RE generation” options for how the first three solicitations will continue: 25% RE by 2013 and 30% RE by 2015. For the 25% by 2013 scenario, the cumulative direct benefits would grow to \$2.6 billion, amounting to \$24.91 per MWh of RE produced. For the 30% by 2015 scenario, the cumulative direct dollars would grow to \$6.0 billion, amounting to \$27.32 per MWh of RE produced. In the 25% by 2013 scenario, 2,605 direct job years are created over the 3-year construction interval; for the associated 20-year operational phase for all facilities involved, the direct job years amount to 5,693. In the

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30% by 2015 scenario, 5,569 direct job years are created over the 3-year construction interval; for the associated 20-year operational phase for all facilities involved, the direct job years amount to 14,038. Total economic impacts on the statewide economy are as follows: by 2030 (25% by 2013), the number of extra job years are 25,528 (an implied jobs multiplier of 3.4) and cumulative labor income impacts are \$1.7 billion (an average compensation of \$59,600 per job) from \$5.4 billion of added business sales. For 30% by 2015 by 2034, the number of extra job years are 64,805 (an implied jobs multiplier of 3.3) and cumulative labor income impacts are \$3.8 billion (an average compensation of \$58,600 per job) from \$6.5 billion of added business sales.

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 RE goals of 19% in 25% by 2013, and 27% in 30% by 2015 compared to 17% under the first three solicitations.

In the short-term, “in-state spending” on construction materials and services, excluding construction wages, remains the largest source of total impacts for both scenarios. In the long-term of facility operations, the PILOT payments will trigger the largest total economic impacts under 25% by 2013 but for 30% by 2015, fuel purchases tied to the increased number of biofuel facilities will account for the largest share of total economic impacts created. A comparison of the total job impacts across all three RPS perspectives (current, 25% by 2013, or 30% by 2015) reveals the 30% Post-EEPS by 2015 target will create the largest additional job years (due to more direct spending and a longer time horizon to realize economic benefits). Wind technology is dominant across all three settings as the largest contributor to total economic impacts created, but the role of biofuels increases significantly under the 30% Post-EEPS by 2015 scenario.

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### **APPENDIX A – IMPLAN MODEL BACKGROUND AND MAPPING RPS DIRECT BENEFIT**

A New York state IMPLAN model (calibrated on 2006 data, the most recent available from IMPLAN) was chosen for this evaluation since it met the needs of developing an economic impact assessment from the direct aspects of the RPS projects. The IMPLAN impact system is an *input-output* (I-O) economic framework and is ideal for evaluating how changes in (\$) demand or sales for specific industries cycle further through a region's economy. This framework is not capable however of tracing out how the economy is affected if a price change (e.g. electric price changes as a result of RPS generation) were to be considered. At the time of this analysis, any potential price impacts as a result of the RPS had yet to be identified.

#### **ABOUT THE IMPLAN ECONOMIC ANALYSIS MODEL**

IMPLAN<sup>117</sup> is the most widely used analysis tool for measuring or estimating the economic impacts associated with openings, closings, expansion, contraction, and on-going operations of facilities –ranging from industrial plants to national parks. It shares three fundamental features also found in the other two commonly-used economic impact tools within the US (RIMS-II and REMI):

- It is based on the national input-output technology tables, developed by the US Dept. of Commerce, Bureau of Economic Analysis. This shows how each type of industry relies on a different mix of its own labor and supplies purchased from other industries.
- It is calibrated to reflect local economic patterns (of employment, payroll and business sales) occurring within specified counties (or sub-county areas). This shows a default on the extent to which local industries purchase goods and services from suppliers located within the same county.
- It distinguishes the direct effects from indirect and induced (spin-off) effects and measures them in terms of jobs, income, value added and business sales (output).

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<sup>117</sup> MIG IMPLAN, Stillwater, MN, is an interactive, hands-on model based on publicly-available data from the U.S. Dept. of Commerce and contains a complete set of state/county (sub-county) level economic accounts. It calculates output, employment, and income effects of changes in a region's economic activity

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Each IMPLAN model is calibrated by the vendor with region-specific industry data through the year 2006. Besides containing a NAICS code based industry database at the 3- and 4-digit levels (describing employment, sales, productivity, average compensation) the main capability of the IMPLAN model resides in its input-output core. The core combines the structure of relationships between industries, between industry and types of final demands arising in the region, the extent of local supply (or conversely *import dependence*) to meet local product demand, and the role of trade with the rest of the world.

The mechanism of multiplier analysis follows from the input-output relationships whereby the activity of facility construction and ultimate annual operation creates a) requirements for supplies for goods and services in various industries; and b) earnings for construction and power generation facility workers that become disposable income for use in the communities where they reside. A portion of the construction/O&M budgets creates additional local transactions for supplies, creating jobs and more household income. When the entire sequence is completed (and progressively more dollars leak away from the region under consideration) the **total** impact is identified (whether as *# of jobs*, *\$ of labor income*, *sales*, or *value-added*) based on a regional set of multipliers.<sup>118</sup>

### **HOW NYSERDA RPS DIRECT ECONOMIC BENEFITS ENTER THE IMPLAN SYSTEM**

NYSERDA's data collection of the RPS program's direct economic benefits (shown in Appendix III) depict more than the pure *direct* effect (from the impact modeling perspective) related to an initial construction phase, or a typical operational year for any of the involved facilities. The information collected and assembled from the developer surveys attempts to portray a *bill of goods* approach to facility construction or operation. This approach should describe what gets purchased from a construction budget (construction payroll, one-time abutter payments or PILOT payments, "In-state" construction purchases), or an annual O&M budget (payroll, land lease, fuel expense, PILOT payments). The more detail the better for assigning a spending stimulus within an impact model, and the extent to which *local purchases* ("In-state") will occur. Appendix II addresses the fact that not all of the annual O&M spending was captured through the developers' applications and we attempted to identify this component. We also rely on the information reported by developers<sup>119</sup> (or adjusted by NYSERDA) for the extent of "in-state" purchases.

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<sup>118</sup> We use a Type SAM multiplier which captures the effects of household wage re-spending, business-to-business transactions, and government transfers.

<sup>119</sup> A separate document was developed by KEMA for NYSERDA addressing the veracity of the application data.

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Typically it would suffice to either know the number of jobs (and the associated pay scale) to construct/operate a facility and assume the economic model has (a) a suitable construction sector that would trigger the right amount and an allocation for the non-labor dollars to assemble a wind farm; and (b) a representative power generation sector that would do the same using the long-term operational jobs. However, there are not accurate depictions within the available economic models for wind, hydro and biofuel facilities (construction or operation) since they are somewhat atypical of the average mix of electric power generating facilities that are represented in the underlying model data. In this instance, modeling from a *bill of goods* approach is preferable. Below we show how the components of reported economic benefits are mapped for entry into the IMPLAN model. Note the short-term construction payroll and other construction spending “in-state” were reported from applications as 3-year cumulative amounts. For the model analysis, these were re-stated as annual amounts for consistency with the rest of the data elements.

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**Table A.1**

**General Assignments of “Direct Project Benefits” under the RPS Main Tier**

<b>Direct Benefit Concept</b>	<b>Stimulates the NYS Economy through.....</b>
Payroll (short-term or Long-term)	household spending from take-home pay
"In-state" construction spending (non-labor)	Increase \$ of sales from select NYS industries (mapping is technology-specific, details shown below)
PILOT Payments (one-time or long-term)	State & Local government spending (50% Education; 50% other S/L spending)
Fuel Purchases (biofuels)	Increase \$ of sales from NYS logging & forestry operations (for LFG treat as a PILOT payment)
O&M <i>Other</i> expenses	Increase \$ of demand from select NYS industries (mapping is technology-specific, details shown below)
<i>No further impact considered</i>	
Land lease payments	<i>wealth transfer</i>
One-time abutter payments	<i>compensatory transfer for value of abutter property, aesthetics &amp; noise deterioration</i>

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### DETAILED ASSIGNMENT OF “IN-STATE” CONSTRUCTION SPENDING BY TECHNOLOGY

**Table A-2**

**Wind Technology Assignments**

IMPLAN sector	Sector description	<i>share of non-labor Construction budget</i>
39	Non-facility Construction	34.4%
333	Electric power & specialty transformer mfg	8.7%
339	Fiber optic cable mfg	4.1%
343	Miscellaneous electrical equipment mfg	7.5%
41	Other new construction	11.1%
484	Electronic equipment repair and maintenance	24.0%
439	Architectural and engineering services	7.9%
437	Legal services	0.6%
499	Other State & local government enterprises	1.7%

*Source: Initial data for budget shares sourced from NREL JEDI model for wind applications, and further adjusted by EDR Group to reflect significant leakage on the purchase of out-of-state turbines, towers and blades.*

**Table A-3**

**Hydro Assignments**

IMPLAN sector	Sector description	<i>share of non-labor Construction budget</i>
41	Other new construction	80.0%
485	Commercial machinery repair & maintenance	20.0%

*Source: New York Renewable Portfolio Standard Cost Study Update – Main Tier Target and Resources (La Capra Associates & SEA, 2008)*

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**Table A-4**  
**Biofuel Assignments**

IMPLAN sector	Sector description	<i>share of non-labor Construction budget</i>
41	Other new construction	85.0%
484	Electronic equipment repair & maintenance	15.0%

*Source: New York Renewable Portfolio Standard Cost Study Update – Main Tier Target and Resources (La Capra Associates & SEA, 2008)*

### DETAILED ASSIGNMENT OF “O&M SPENDING - OTHER” BY TECHNOLOGY

The assignments shown below to depict an additional aspect of long-term annual spending for the RPS facilities are entered into the IMPLAN modeling as *\$ of new demand*.

**Table A-5**  
**Wind Assignment**

IMPLAN sector	Sector description	<i>share of O&amp;M Other budget</i>
401	Motor vehicle & parts dealers	4.2%
484	Elec. Equip. repair & maintenance	7.1%
499	Other State & local government enterprises	0.0%
30	Power generation & supply	5.8%
427	Insurance carriers	20.1%
407	Gasoline stations	3.0%
404	Building material supply stores	42.4%
400	Warehousing & storage	15.9%

*Source: Data for budget shares sourced from NREL JEDI model for wind applications*

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**Table A-6**  
**Hydro and Biofuel Assignment**

	<i>share of O&amp;M Other budget</i>
Power Generation Supplies	
Real estate & rental	3.2%
Prof.- scientific & tech services	16.3%
Archit. & engin. Services	1.0%
Management services	0.3%
Admin. & waste services	3.3%
Educational services	2.9%
Accommodation & food services	3.9%
Finance & insurance	6.6%
Other services	0.03%
Utilities	0.3%
Information services	1.5%
Power generation and supply	0.04%
Construction	9.3%
Manufacturing	17.1%
Wholesale Trade	3.3%
Trans. & Warehousing	28.9%
Truck transportation	1.6%
Retail trade	0.4%

*Source: IMPLAN model intermediate input vector for Power Generation & Supply, adjusted to remove primary fuel input purchase (e.g. typically from the mining sector)*

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### **APPENDIX B – ESTIMATING OTHER O&M SPENDING FOR RPS FACILITIES**

NYSERDA's data collection from the developers' applications describes many aspects of a renewable power generation facility - from the short-term construction elements, as well as annual operational requirements upon completion. The long-term annual operational aspects included the payroll of the employees needed to operate the new –or-expanded facility, property taxes (in the form of PILOT payments), land lease payments, and fuel purchases for biofuel facilities. In addition to these items, each facility budgets for replacement components and installation services. This latter component of long-term facility spending is not evident in the majority of developer's applications, or were inconsistently allocated as short-term construction outlays (e.g., specific developer project applications, and biofuel applications typically included miscellaneous O&M spending in their accounting of short-term spending).

To have a complete account of the long-term annual O&M spending of the mix of renewable generation facilities the RPS has catalyzed, EDR Group estimated the total annual O&M requirements for hydro projects and deducted the reported components of long-term annual spending by a facility. The balance represents the replacement spending. For wind facilities (with the exception of Maple Ridge, for which no application data are available) and biofuel facilities, these dollar amounts were identified by reallocating specific line items out of 3-year construction spending and into a long-term spending category. For hydro facilities, the applications did not offer these data so we estimated the annual O&M spending using the method described below.

### **METHOD OF ESTIMATING TOTAL ANNUAL O&M SPENDING**

The New York Renewable Portfolio Standard Cost Study Update – Main Tier Target and Resources (La Capra Associates & SEA, 2008) contains technology-specific assumptions (Tables 15, 18, & 20) that identify annual Fixed (per kW) and Variable O&M \$ (per MWh) in 2007 dollars. Each project from among the first three solicitations was associated with its technology-specific resource block before the fixed and variable O&M cost was calculated. The sum of the fixed and variable O&M costs is the total annual O&M cost associated with a project.

For the first three solicitations, this added \$744,000 of annual spending from biofuel facilities, \$898,496 additional annual spending from hydro facilities, and \$15.9 million in additional annual spending from wind facilities. Twenty-five percent of (\$4.0m of the near \$16m) wind projects' *annual O&M Other* is the estimated amount for the Maple Ridge facility which is 2.5 times larger than the next largest wind projects for which application data are available. These amounts are shown as *Annual O&M Other* in all presentations of the direct economic benefits in Appendix III. These annual spending amounts will be

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considered in the economic multiplier modeling as *dollars of demand for O&M goods & services arising in NYS* and rely upon the economic model's *regional purchase coefficients (RPC's)* to determine how much of the demand will be filled by NYS businesses. This is a conservative approach whereby the implication is not to assume these additional dollars (or initially misallocated project dollars) convert 1:1 to a purchase from a NYS business, as some leakage (determined by the regionally calibrated industry-specific RPC) will occur. The extent of leakage in part relies upon how the general O&M spending is described in the applications to subsequently be mapped to a good or service from a specific industry.



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### APPENDIX C – RPS DIRECT BENEFITS DATA (\$ ARE 2006 BASIS)

#### SOLICITATIONS 1 THROUGH 3 (#916, 1037, AND 1168)

Projects contracted under 1168 contractually are required to be on-line by 2009.

#### First Three Solicitations: Based on Implementation of Current RPS Scenario

Resource	Nameplate Capacity	"Increment" RPS Renewable Capacity (MW)	New Renewable Energy Production (MWh/yr)	Bid Quantity (MWh/yr)	Bid Capacity (MW)
Biofuel	195	67	486,145	468,238	66
Hydro	241	27	99,892	95,863	101
Wind	1,258	1,258	3,480,516	2,844,772	1,022

(Table Continued)

Resource	Long-Term NYS Jobs			Payments to NYS and/or Municipalities		Payments for Fuels and Resource Access		In -State Purchases	In-State Purchases	Short-Term Employment of NYS Workers
	# Long Term Jobs	LT Jobs - Annual Total Dollars	PILOT - Annual Expected Total Dollars	Short term PILOTs and Fees	Fuels and land lease - Annual Expected Total Dollars	Payments to other impacted landowners	<u>Non-payroll</u> Purchases -3 years Expected Total Dollars - <b>Construction</b>	<b>Annual O&amp;M-OTHER</b> (in addition to fuel, lease, PILOT and long-term labor costs)	ST Job (years)- Number of New Jobs	ST Jobs - Expected Total Dollars
Biofuel	57	\$4,101,285	\$242,717	\$66,000	\$12,749,747	\$0	\$15,469,786	\$891,712	9	\$1,852,663
Hydro	0	0	0	0	-	-	\$1,210,537	\$898,560	42	\$2,916,498
Wind	166	\$12,764,722	\$18,069,825	\$13,831,068	\$9,435,174	\$9,330,281	\$359,205,388	\$15,898,244	1,980	\$159,699,332



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### 25% by 2013: 25% Renewable Generation Post-EEPS by 2013 (achieved by 2011)

The projected values below would build upon the schedule of renewable capacity and generation already in place (or under contract) for solicitations 1 through 3 shown above.

On-line		Nameplate Capacity (MW)	RPS-Attributable Capacity (MW)	RPS-Attributable Procurement (MWh)	Project MT Energy Procurement (MWh)	Projected Main Tier Capacity (MW)	Long-Term NYS Jobs		Municipalities		Access		Purchases	Purchases	NYS Workers	
							# Long Term Jobs	LT Jobs - Annual Total Dollars	PILOT - Annual Expected Total Dollars	Short term PILOTs and Fees	Fuels and land lease - Annual Expected Total Dollars	Payments to abutters	Non-payroll Purchases -3 years Expected Total Dollars - Construction	Annual O&M- OTHER (in addition to fuel, lease, PILOT and long-term labor costs)	ST Job (years)- Number of New Jobs	ST Jobs - Expected Total Dollars
2010	Biomass	39	13.5	93,075	93,075	13.3	12	\$ 829,363	\$ 49,082	\$ 13,347	\$ 2,578,259	\$ -	\$ 3,128,306	\$ 180,322	2	\$ 374,646
2011	Biomass	43	14.8	102,157	102,157	14.5	13	\$ 905,565	\$ 53,592	\$ 14,573	\$ 2,815,148	\$ -	\$ 3,415,734	\$ 196,890	2	\$ 409,069
	<b>BIOMASS subtot</b>	<b>82</b>	<b>28</b>	<b>195,232</b>	<b>195,232</b>	<b>28</b>	<b>24</b>	<b>1,734,929</b>	<b>102,674</b>	<b>27,919</b>	<b>5,393,407</b>	<b>-</b>	<b>6,544,040</b>	<b>377,213</b>	<b>4</b>	<b>783,715</b>
2010	Hydro	437	48.8	213,956	213,956	46.4	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,200,406	\$ 1,633,321	76	\$ 5,301,350
2011	Hydro	480	53.6	234,831	234,831	50.9	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,415,092	\$ 1,792,679	84	\$ 5,818,584
	<b>HYDRO subtot</b>	<b>917</b>	<b>102</b>	<b>448,788</b>	<b>448,788</b>	<b>97</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>4,615,498</b>	<b>3,426,000</b>	<b>160</b>	<b>11,119,934</b>
2010	LFG	2	1.8	7,400	7,400	1.0	1	\$ 77,050	\$ -	\$ -	\$ 154,100	\$ -	\$ 1,590,308	\$ 46,230	10	\$ 287,653
2011	LFG	2	1.8	7,400	7,400	1.0	1	\$ 77,423	\$ -	\$ -	\$ 154,847	\$ -	\$ 1,598,020	\$ 46,454	10	\$ 289,047
	<b>LFG subtot</b>	<b>4</b>	<b>4</b>	<b>14,800</b>	<b>14,800</b>	<b>2</b>	<b>2</b>	<b>154,473</b>	<b>-</b>	<b>-</b>	<b>308,946</b>	<b>-</b>	<b>3,188,328</b>	<b>92,684</b>	<b>21</b>	<b>576,700</b>
2010	Wind	114	113.7	272,879	272,879	92.5	15	\$ 1,154,300	\$ 1,634,035	\$ 1,484,545	\$ 853,213	\$ 843,727	\$ 32,482,557	\$ 1,437,661	179	\$ 14,441,439
2011	Wind	111	111.4	268,000	268,000	90.6	15	\$ 1,130,774	\$ 1,600,732	\$ 1,454,289	\$ 835,823	\$ 826,531	\$ 31,820,534	\$ 1,408,360	175	\$ 14,147,109
	<b>WIND subtot</b>	<b>225</b>	<b>225</b>	<b>540,879</b>	<b>540,879</b>	<b>183</b>	<b>30</b>	<b>2,285,075</b>	<b>3,234,767</b>	<b>2,938,834</b>	<b>1,689,036</b>	<b>1,670,259</b>	<b>64,303,091</b>	<b>2,846,021</b>	<b>355</b>	<b>28,588,548</b>



## Appendices

### 30% by 2015: 30% Renewable Generation Post-EEPS by 2015

Note that the values projected for 2010 and 2011 for the 30% scenario differ from what is projected in 25% by 2013. The reason for this is that the assumed *glides paths* by technology change depending on the ultimate renewable generation targets.

On-line		Nameplate Capacity (MW)	RPS-Attributable Capacity (MW)	RPS-Attributable Procurement (MWh)	Project MT Energy Procurement (MWh)	Projected Main Tier Capacity (MW)	Long-Term NYS Jobs		Municipalities		Access		Purchases	Purchases	NYS Workers	
							# Long Term Jobs	LT Jobs - Annual Total Dollars	PILOT - Annual Expected Total Dollars	Short term PILOTs and Fees	Fuels and land lease - Annual Expected Total Dollars	Payments to abutters	Non-payroll Purchases -3 years Expected Total Dollars - Construction	Annual O&M- OTHER (in addition to fuel, lease, PILOT and long-term labor costs)	ST Job (years)- Number of New Jobs	ST Jobs - Expected Total Dollars
2010	Biomass	47	16.1	110,836	110,836	15.9	14	\$ 987,620	\$ 58,448	\$ 15,893	\$ 3,070,234	\$ -	\$ 3,725,240	\$ 214,731	2	\$ 446,135
2011	Biomass	50	17.2	118,727	118,727	16.9	15	\$ 1,052,452	\$ 62,285	\$ 16,937	\$ 3,271,779	\$ -	\$ 3,969,783	\$ 228,827	2	\$ 475,422
2012	Biomass	50	17.1	117,512	117,512	16.8	15	\$ 1,047,112	\$ 61,969	\$ 16,851	\$ 3,255,178	\$ -	\$ 3,949,640	\$ 227,666	2	\$ 473,009
2013	Biomass	50	17.0	117,717	117,717	16.8	15	\$ 1,043,498	\$ 61,755	\$ 16,793	\$ 3,243,944	\$ -	\$ 3,936,009	\$ 226,880	2	\$ 471,377
2014	Biomass	265	91.0	618,101	618,101	89.4	77	\$ 5,567,813	\$ 329,508	\$ 89,600	\$ 17,308,771	\$ -	\$ 21,001,434	\$ 1,210,568	12	\$ 2,515,134
2015	Biomass	221	75.8	457,339	457,339	74.5	65	\$ 4,642,812	\$ 274,765	\$ 74,715	\$ 14,433,201	\$ -	\$ 17,512,389	\$ 1,009,452	10	\$ 2,097,285
	<b>BIOMASS subtot</b>	<b>682</b>	<b>234</b>	<b>1,540,232</b>	<b>1,540,232</b>	<b>230</b>	<b>142</b>	<b>10,210,624</b>	<b>604,273</b>	<b>164,315</b>	<b>31,741,971</b>	<b>-</b>	<b>38,513,823</b>	<b>2,220,020</b>	<b>22</b>	<b>4,612,419</b>
2010	Hydro	521	58.1	254,783	254,783	55.2	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,620,281	\$ 1,944,987	91	\$ 6,312,937
2011	Hydro	558	62.3	272,922	272,922	59.1	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,806,832	\$ 2,083,460	97	\$ 6,762,388
2012	Hydro	551	61.5	270,043	270,043	58.5	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,773,986	\$ 2,059,080	96	\$ 6,683,254
2013	Hydro	553	61.7	270,513	270,513	58.6	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,782,952	\$ 2,065,735	97	\$ 6,704,855
2014	Hydro	368	41.0	198,186	198,186	39.0	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,850,594	\$ 1,373,662	64	\$ 4,458,562
2015	Hydro	-	-	-	-	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	-	\$ -
	<b>HYDRO subtot</b>	<b>2,551</b>	<b>285</b>	<b>1,266,448</b>	<b>1,266,448</b>	<b>270</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>12,834,645</b>	<b>9,526,924</b>	<b>445</b>	<b>30,921,996</b>
2010	LFG	2	1.8	7,400	7,400	1.0	1	\$ 77,050	\$ -	\$ -	\$ 154,100	\$ -	\$ 1,590,308	\$ 46,230	10	\$ 287,653
2011	LFG	2	1.8	7,400	7,400	1.0	1	\$ 77,423	\$ -	\$ -	\$ 154,847	\$ -	\$ 1,598,020	\$ 46,454	10	\$ 289,047
2012	LFG	2	1.8	7,400	7,400	1.0	1	\$ 77,050	\$ -	\$ -	\$ 154,100	\$ -	\$ 1,590,308	\$ 46,230	10	\$ 287,653
2013	LFG	2	1.8	7,400	7,400	1.0	1	\$ 77,423	\$ -	\$ -	\$ 154,847	\$ -	\$ 1,598,020	\$ 46,454	10	\$ 289,047
2014	LFG	2	1.6	7,400	7,400	0.9	1	\$ 70,758	\$ -	\$ -	\$ 141,516	\$ -	\$ 1,460,449	\$ 42,455	10	\$ 264,164
2015	LFG	-	-	7,400	7,400	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	-	\$ -
	<b>LFG subtot</b>	<b>9</b>	<b>9</b>	<b>44,400</b>	<b>44,400</b>	<b>5</b>	<b>5</b>	<b>379,705</b>	<b>-</b>	<b>-</b>	<b>759,409</b>	<b>-</b>	<b>7,837,104</b>	<b>227,823</b>	<b>51</b>	<b>1,417,564</b>
2010	Wind	332	331.7	786,203	786,203	269.7	44	\$ 3,366,646	\$ 4,765,847	\$ 4,329,843	\$ 2,488,491	\$ 2,460,826	\$ 94,739,040	\$ 4,193,101	522	\$ 42,120,085
2011	Wind	405	404.7	958,264	958,264	329.1	53	\$ 4,108,497	\$ 5,816,016	\$ 5,283,938	\$ 3,036,838	\$ 3,003,076	\$ 115,615,079	\$ 5,117,063	637	\$ 51,401,375
2012	Wind	342	341.6	809,956	809,956	277.7	45	\$ 3,467,213	\$ 4,908,210	\$ 4,459,182	\$ 2,562,826	\$ 2,534,334	\$ 97,569,029	\$ 4,318,355	538	\$ 43,378,271
2013	Wind	338	338.0	801,591	801,591	274.8	45	\$ 3,430,754	\$ 4,856,598	\$ 4,412,292	\$ 2,535,876	\$ 2,507,685	\$ 96,543,050	\$ 4,272,945	532	\$ 42,922,130
2014	Wind	84	84.2	197,772	197,772	68.4	11	\$ 854,570	\$ 1,209,735	\$ 1,099,062	\$ 631,664	\$ 624,642	\$ 24,048,008	\$ 1,064,352	133	\$ 10,691,518
2015	Wind	243	243.0	531,261	531,261	197.6	32	\$ 2,466,731	\$ 3,491,920	\$ 3,172,462	\$ 1,823,309	\$ 1,803,039	\$ 69,414,982	\$ 3,072,271	383	\$ 30,861,247
	<b>WIND subtot</b>	<b>1,743</b>	<b>1,743</b>	<b>4,085,046</b>	<b>4,085,046</b>	<b>1,417</b>	<b>230</b>	<b>17,694,411</b>	<b>25,048,325</b>	<b>22,756,779</b>	<b>13,079,004</b>	<b>12,933,601</b>	<b>497,929,188</b>	<b>22,038,088</b>	<b>2,745</b>	<b>221,374,626</b>



**Appendix B**  
**CREDIBILITY ASSESSMENT**

# Credibility Assessment of New York's Renewable Portfolio Standard Main Tier Project Data.



Burlington, Massachusetts, October 20, 2008

## 1. INTRODUCTION AND BACKGROUND

As part of KEMA's Economic Benefits Assessment for the Impact Evaluation Study of New York's Renewable Portfolio Standard (RPS) Program, KEMA conducted a "Credibility Assessment" of the Direct Economic Benefits reported by participating developers in their solicitation responses. Since 2004, NYSERDA has conducted three solicitations to acquire renewable energy resources under the Main Tier of the RPS. The solicitations also require proposing developers to submit information on the expected economic benefits to be realized by New York State. The key economic benefits include the following:

- Short term project construction jobs and related in-state purchases
- Long term operations & maintenance (O&M) jobs and related in-state purchases
- Payments in Lieu of Taxes (PILOTS) to local municipalities
- Host payments to land owners

The solicitation responses represent a key source of data for monitoring the performance of New York's RPS program. This analysis assesses the extent to which the self-reported solicitation data from winning bidders are credible sources for estimating the benefits associated with the program.

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## 2. OBJECTIVES AND DATA SOURCES

The specific objectives of this study are follows:

- Assess the extent to which the solicitations collect the necessary data on Economic Impacts for appropriate data-driven decision-making.
- Characterize the extent to which developer-reported benefits in the interviews compare with solicitation data and the bidders' surveys.

Key data sources for this analysis include the following:

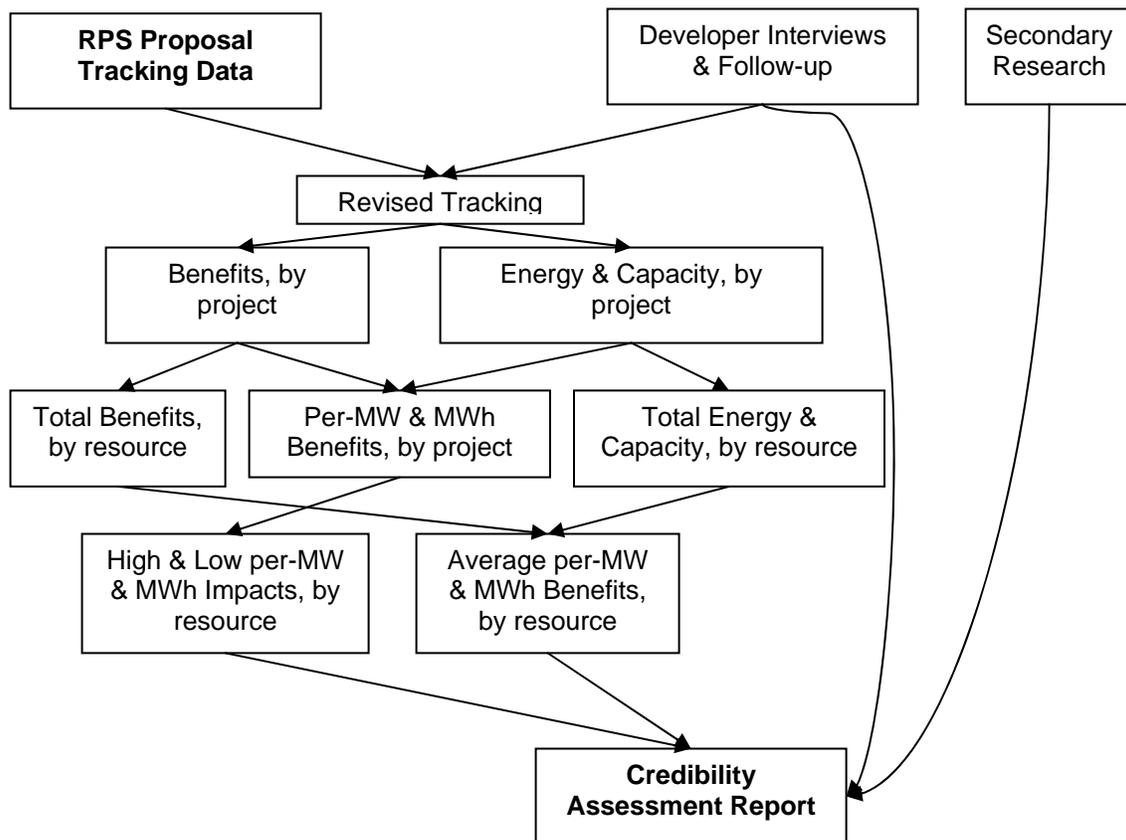
- Solicitation responses from developers
- Bidders' survey responses
- In-depth interviews with participating and nonparticipating developers
- RPS bidder proposal data tracking spreadsheets
- La Capra Associates & Sustainable Energy Advantage, LLC, "New York Renewable Portfolio Standard Cost Study Update – Main Tier Target and Resources," March 18, 2008. (Hereafter: "LaCapra/SEA Cost Study.")
- Hale, Kevin: New York Energy Research and Development Authority, "Major Economic Impacts of Utility-Scale Wind Projects in New York," December 2005. (Hereafter: "NYSERDA Wind Impact Study.")
- Follow up discussions with select developers, municipalities and land owners

### 3. APPROACH

The approach followed by the study team includes four steps:

- Review spreadsheet with RPS proposal tracking data and verify data inputs from solicitation responses, bidders' survey reports, and the Cost Study and modified and updated data inputs as appropriate
- Develop alternative values, where available, for the four key data indicators from participating and nonparticipating developers' response data
- Review secondary research sources for available data on the four key data indicators
- Follow up with selected developers to characterize data ranges of four key indicators

Figure 3.1 shows how different data inputs and sources were used to develop this analysis.



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#### **4. ASSESSMENT OF NYSERDA’S DATA-DRIVEN DECISION CRITERIA**

This section presents the results of KEMA’s assessment of the NYSERDA tracking data against the numerous data sources reviewed. First, NYSERDA’s program tracking were reviewed for inconsistencies and accuracy against the original solicitation data. The updated values for the four key indicators were subsequently compared to other data sources, including surveys, past reports, and a limited amount of secondary research as a check on their veracity and replicability for future performance monitoring efforts.

#### **REVIEW OF AWARDED PROJECT AND PROPOSAL TRACKING DATA**

As a first step in the credibility assessment, KEMA reviewed proposal tracking data used by NYSERDA against the original solicitation responses for all three procurements, and assessed the reliability of the self-reported data based on the first two bidders’ survey reports

#### **Summary of NYSERDA’s Renewable Energy Solicitations**

NYSERDA issued three solicitations over the 2004 to 2008 period. The scope and response to these three solicitations is briefly summarized below.

#### **RFP 916**

Through the first solicitation, which was conducted in late 2004, NYSERDA sought to procure approximately 1.4 million MWh of incremental renewable energy in 2006. The objective of this RFP was to secure supplies of RPS attributes sufficient to meet the 2006 RPS target, while leveraging the value of the Federal Production Tax Credit (PTC) before its scheduled expiration at the end of the year.<sup>120</sup> (For every MWh of electricity generated by a qualified renewable facility, the generator can sell 1 MWh of electricity as well as 1 MWh renewable/RPS attributes.)

The first Main Tier solicitation resulted in contracts for the development of 254 MW of additional renewable capacity at five facilities (two new wind facilities and three hydroelectric upgrades), from which NYSERDA would provide production incentives for 866,000 MWh per year. The total funding commitment associated with this

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<sup>120</sup> NYSERDA, “Request for Proposals (RFP) No. 916.

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solicitation is approximately \$173.6 million, and the weighted average production incentive awarded was \$22.90 per RPS attribute.<sup>121</sup>

### **RFP 1037**

The second Main Tier solicitation took place in early 2007, with facilities expected to come online by January 1, 2008. Unlike the first Main Tier solicitation, awards were based on two evaluation components: (1) the bid price, weighted at 70%; and (2) the ability of the bidder to demonstrate economic benefits to New York State created by the construction and operation of the bid facility, weighted at 30%. The solicitation was designed as a two-step process, consisting of: (1) an application step that pre-qualified bidders; and (2) a competitive bid proposal submission step.

The second solicitation resulted in NYSERDA awarding contracts to provide production incentives to 19 (originally 20, but one contract was terminated) new or upgraded facilities in New York for a total of 538 MW of renewable capacity and 1.8 million MWh of RPS attributes per year. NYSERDA selected two biomass, ten hydro, and eight wind projects (with one wind contract later terminated). The total funding commitment associated with this solicitation is approximately \$266.3 million, and the weighted average price awarded was \$15.52 per RPS attribute.<sup>122</sup>

### **RFP 1168**

The third solicitation took place in early 2008, seeking RPS attributes from facilities coming online by January 1, 2009. This solicitation largely followed the same structure as the previous RFP. On December 20, 2007, bidders representing 23 of the 24 facilities that had qualified submitted a total of 33 bid proposals (including alternate proposals for some facilities).

NYSERDA selected 11 of these facilities, including four hydro (upgrades), six wind, and one biomass-coal co-firing project. Successful bidders from this solicitation are expected to build 310 MW of new renewable capacity from which NYSERDA will provide production incentives for the first 824,550 MWh generated each year. The total funding commitment associated with this solicitation is approximately \$118.6 million, with a weighted average RPS attribute price of \$14.75.<sup>123</sup>

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<sup>121</sup> NYSERDA, “New York State Renewable Portfolio Standard – Performance Report – Program Period ending June 2008.” Sept. 2008. pg. 7. Hereafter: “2008 Performance Report.”

<sup>122</sup> 2008 Performance Report, pg. 7.

<sup>123</sup> 2008 Performance Report, pg. 8.

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## **Revisions to Tracking Data Based on Reviews of Solicitation Responses**

Revisions to the program tracking data (beyond those made by NYSERDA during the bid-scoring process) took two forms: Data entry errors and misinterpretations from the solicitation responses. KEMA's team did not find any egregious data entry errors in projected self-reported benefits and in most cases found reasonable variation in the self-reported benefits data. However, the KEMA project team did discover some potential inconsistencies in the prospective economic benefits reported by the developers that represent isolated incidences of reasonable misinterpretations in the definitions of the various benefit categories or intentional competitive strategic positioning. KEMA noticed a few inconsistencies in its review, although we only made one change as a result:

- One biomass developer reported a bid of 100% of the project's incremental renewable energy generation, as opposed to the 95% limit that is typically allowed by NYSERDA.<sup>124</sup> Our analysis assumed that the percentage of contracted biomass energy was 95% of total incremental energy. This had a very slight effect on our calculations of total biomass capacity that will be built in response to the RPS.

KEMA noted other outlying data points. These do not necessarily represent inconsistencies with program parameters, but they address developers' potential misinterpretations of RFP instructions that NYSERDA may wish to clarify in future solicitations:

- Three hydro facilities reported significantly higher levels of per-MW (and per-MWh) benefits than other projects, but KEMA confirmed that these values are most likely appropriate, and simply reflected competitive strategic positioning. In all three cases, KEMA believes it is likely that these represent genuine project costs. In two cases, the facilities were over 80 years old and required major equipment overhauls (repowering), including the purchase and installation of new turbines and other equipment. In the third case, a project that was over 100 years old required the replacement of existing wooden flashboards with a system of inflatable rubber flashboards. The developer that submitted all the winning hydro bids reported in interviews that their benefits estimates tended to be extremely conservative, as they believed (correctly) that their bids would compete favorably with wind and biomass on the basis of price alone, even if they scored very low on the 30% portion of the score based on economic benefits. KEMA verified the data reported on the bid forms and believe it is likely that these upgrades represent genuine project expenditures. Regardless, the average reported benefits from hydro projects were orders of magnitude lower than those reported by wind or biomass on a per-MWh basis.
- NYSERDA also already made certain adjustments to reported benefits from accepted wind projects during the bid scoring process, based on clear bidder misinterpretations of RFP instructions on guidelines for estimating benefits. Most notably, one developer initially reported the entire cost of their turbines as in-

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<sup>124</sup> It is unclear whether NYSERDA actually contracted for the entire 100% of project output or required the developer to set aside 5% for sale to other markets.

state benefits, when in fact only a few components were believed to be manufactured in New York. KEMA did not make further adjustments to those particular bids.

These variations in the solicitation responses reflect potential for restructuring and clarification in future solicitation documents and suggestions for potential modifications are itemized further below (See Section 6).

KEMA also notes that NYSERDA made assumptions on the prospective economic benefits for projects awarded under RFP 916 (based on projects accepted under RFP 1037). This is due to the fact that benefits for RFP 916 did not require an estimate of economic benefits. While KEMA did not make any changes to those projections, we did not include benefits data from the one wind project accepted under RFP 916 in our analysis of future project benefits. We did, however, include data from the biomass project accepted under 916 to reflect the appropriate weighting of different biomass fuels due to the smaller sample size of biomass compared with wind and hydro. The resulting adjustments yielded a fairly rich database of estimates of economic benefits resulting from those proposed and awarded projects. For the purposes of comparing the credibility of the prospective economic benefits within the solicitation responses to other sources and benchmarks, the following key economic benefit indicators were developed:

- Short term project construction activities
- Long term project maintenance activities
- Payments in Lieu of Taxes (PILOTS) to local municipalities
- Host payments to land owners

Tables 4.1 (dollars per MWh) and 4.2 (dollars per MW) summarize those values for each of those indicators by technology.



**Table 4.1  
Summary of Key Economic Benefits Indicators by Project (per MWh)**

<b>Resource</b>	<b>Biomass</b>			<b>Hydro</b>			<b>Wind</b>		
Number of Winning Bids	3			14			11		
Total 20-year Production (MWh)	7,162,900			1,997,840			50,713,660		
<i>All benefits are per MWh over 20-year project lifetime.</i>									
<b>Impact</b>	<i>Low</i>	<i>High</i>	<i>Average</i>	<i>Low</i>	<i>High</i>	<i>Average</i>	<i>Low</i>	<i>High</i>	<i>Average</i>
<b>Short-term Impacts (Total)</b>			<b>\$ 1.93</b>			<b>\$ 2.07</b>			<b>\$ 8.21</b>
Short-term Jobs	\$ -	\$ 0.25	\$ 0.20	\$ -	\$ 82.02	\$ 1.46	\$ 0.63	\$ 3.85	\$ 2.53
Short-term PILOT & Fees	\$ -	\$ 0.02	\$ 0.01	\$ -	\$ -	\$ -	\$ -	\$ 0.38	\$ 0.27
Construction (3-year Non-payroll Purchases)	\$ 1.13	\$ 2.46	\$ 1.72	\$ -	\$ 5.41	\$ 0.61	\$ 3.43	\$ 6.89	\$ 5.22
Payments to Abutters			\$ -			\$ -	\$ -	\$ 0.34	\$ 0.18
<b>Long-term Impacts (Total)</b>			<b>\$ 32.01</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>			<b>\$ 17.70</b>
Long-term Jobs	\$ 3.90	\$ 11.09	\$ 7.17	\$ -	\$ -	\$ -	\$ 3.33	\$ 6.37	\$ 4.58
PILOT	\$ -	\$ 0.88	\$ 0.34	\$ -	\$ -	\$ -	\$ 3.13	\$ 17.66	\$ 5.96
Fuels (Biomass) & Land Lease	\$ 9.66	\$ 39.36	\$ 22.01	\$ -	\$ -	\$ -	\$ 2.10	\$ 3.59	\$ 2.70
Other O&M (in addition to fuel, lease, PILOT and long-term labor costs)	\$ -	\$ 4.92	\$ 2.49	\$ 4.67	\$ 14.25	\$ -	\$ 0.50	\$ 7.20	\$ 4.45
<b>Total 20-Year Benefits</b>	<b>\$ 15.86</b>	<b>\$ 51.66</b>	<b>\$ 31.45</b>	<b>\$ -</b>	<b>\$ 82.27</b>	<b>\$ 2.07</b>	<b>\$ 18.01</b>	<b>\$ 30.77</b>	<b>\$ 26.75</b>



**Table 4.2  
Summary of Key Economic Benefits Indicators by Project (per MW)**

<b>Resource</b>	<b>Biomass</b>			<b>Hydro</b>			<b>Wind</b>		
Number of Winning Bids	3			14			11		
Total Capacity (MW)	49			27			937		
<b>Impact</b>	<i>Low</i>	<i>High</i>	<i>Average</i>	<i>Low</i>	<i>High</i>	<i>Average</i>	<i>Low</i>	<i>High</i>	<i>Average</i>
<b>Short-term Impacts (Total)</b>			<b>\$ 564,149</b>			<b>\$307,414</b>			<b>\$ 879,396</b>
Short-term Jobs	\$ 187,726	\$ 369,030	\$ 282,074	\$ -	\$8,350,808	\$153,707	\$251,374	\$ 540,203	\$ 444,679
Short-term PILOT & Fees	\$ -	\$ 37,126	\$ 28,754	\$ -	\$8,325,074	\$108,622	\$ 31,725	\$ 202,579	\$ 137,223
Construction (3-year Non-payroll Purchases)	\$ -	\$ 2,538	\$ 1,347	\$ -	\$ -	\$ -	\$ -	\$ 22,132	\$ 14,769
Payments to Abutters			\$ 251,973			\$ 45,085	\$180,205	\$ 361,199	\$ 282,725
<b>Long-term Impacts (Total)</b>			<b>\$4,679,264</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>			<b>\$ 47,912</b>
Long-term Jobs	\$ 569,717	\$1,613,384	\$1,048,396	\$ -	\$ -	\$ -	\$ 8,343	\$ 17,320	\$ 12,410
PILOT	\$ -	\$ 127,746	\$ 49,534	\$ -	\$ -	\$ -	\$ 8,224	\$ 44,267	\$ 16,136
Fuels (Biomass) & Land Lease	\$1,411,128	\$5,904,482	\$3,217,369	\$ -	\$ -	\$ -	\$ 5,261	\$ 9,446	\$ 7,314
Other O&M (in addition to fuel, lease, PILOT and long-term labor costs)	\$ -	\$ 738,060	\$ 363,964	\$22,303	\$ 55,931	\$ -	\$ 1,252	\$ 21,308	\$ 12,052
<b>Total 20-Year Benefits</b>	<b>\$2,318,488</b>	<b>\$7,749,633</b>	<b>\$4,597,374</b>	<b>\$ -</b>	<b>\$8,350,808</b>	<b>\$153,707</b>	<b>\$946,403</b>	<b>\$1,538,580</b>	<b>\$1,448,477</b>

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### **Assessment of Self-Reported Data Quality from Bidders' Surveys**

On balance, responses to two series of bidders' surveys (after the first and second solicitations, respectively) suggest that the proposed project data as inputs for this analysis are fairly reliable, insofar as the respondents expressed a generally clear understanding of the solicitations' requirements. From the bidders' surveys following the first and second solicitations, bidders underscore that the RFP requirements were generally clear.

Several respondents stated that the RFP and standard contract were clear and concise and the relative simplicity of the process facilitated expeditious action.<sup>125</sup>

Generally, the interviewees viewed the NYSERDA solicitation process in a favorable light, particularly the two-step process of certification and bid submission. The great majority of respondents characterized the process as fair, reasonably straightforward, and clear.<sup>126</sup>

Bidders with significant project development experience typically characterized the process as not overly burdensome, while some less-experienced developers—typically those building smaller projects—expressed some difficulty in estimating project benefits.<sup>7</sup>

Bidders' survey data are not available from the most recent, third solicitation (RFP 1168).

Those responding to the survey on the second solicitation were further asked about the prospective economic benefits reporting requirements. As stated earlier, the second solicitation (RFP 1037) included award criteria for prospective economic benefits resulting from the proposed project, and the third solicitation (RFP 1168) had very similar language for that particular component. Consistent with the general comments made in the bidders' surveys from the first and second solicitations, bidders in the survey for the second solicitation held generally positive views of the request for information on prospective economic benefits resulting from their proposed project:<sup>127</sup>

On the whole, those surveyed understood the approach, the associated requirements and purpose, and many expressed a favorable opinion of the approach.

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<sup>125</sup> New Energy Opportunities, Sustainable Energy Advantage, and LaCapra Associates for NYSERDA, "Survey of Past and Prospective Participants in NYSERDA Procurements of Attributes under New York's Renewable Portfolio Standard," May 10, 2005, pg. 10. (Hereafter: "First Bidders' Survey Report.")

<sup>126</sup> Sustainable Energy Advantage and New Energy Opportunities for NYSERDA, "Survey of Market Participants in Second NYSERDA Renewable Portfolio Standard Solicitation," August 7, 2007, pg. iv. (Hereafter: "Second Bidders' Survey Report.")

<sup>127</sup> The Second Bidders' Survey Report does include some respondents' requests for more clarity on how to develop the prospective economic benefits data.

More than half of those responding to these questions indicated that the inclusion of economic benefits in evaluation had little or no impact on their price or quantity bids.

When asked if a future change in the relative weight of economic benefits might impact their bids, most indicated that it would not.<sup>128</sup>

The Second Bidders' Survey Report does raise a few selected issues of interpretation in preparing their bids:

- Some had difficulty with estimating the proportion of balance-of-plant costs that were in-state.
- Uncertainty over how to treat items such as GE turbines, where GE is a New York company, but blades and gearboxes (for example) are manufactured overseas.
- Some firms headquartered in New York were unsure how to allocate general activities across their operations.

In summary, this review of the bidders' survey reports suggests that self-reported data from winners (including nameplate from both and economic benefits data from the second procurement), when correctly specified according to NYSERDA's instructions, were offered in good faith and can be relied on for subsequent analysis and the economic benefits modeling effort. The KEMA team's review does not find that bidders' responses to the economic benefits sections of the RFP are rife with overly optimistic assumptions or strategic intent. Indeed, the prospect of not meeting the contract delivery requirement of 85% of proposed economic benefits was also viewed favorably by most bidders, which they said caused them to claim those benefits more conservatively.<sup>129</sup> Moreover, feedback from developers indicates that the RFPs—as designed—have in fact encouraged significant targeting of renewable resource development in New York State, in so far as other very significant factors make project economics feasible.

#### **Assessment of Data Quality from In-Depth Interviews with Developers**

KEMA recently conducted in-depth interviews with developers, including losing bidders and nonparticipating developers, which largely covered the procurement process and not necessarily the economic impacts. Many respondents underscore the good-faith intent of the economic benefits data submission requirements. On balance, the 30% evaluation criteria does not pose a significant barrier to participation, the prospective economic benefits reporting requirement does not affect developers' bids. Although many developers report that generating those prospective values can be time-consuming, many state that the benefits categories as specified are clear and manageable. One developer with its headquarters in New York appreciates the competitive advantage it gives:

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<sup>128</sup> Second Bidders' Survey Report, p. 15.

<sup>129</sup> Second Bidders' Survey Report, p.19.

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We love that stuff because we may be the only NY State-based developer. We think that is a wonderful thing. We can point to benefits in the town where the project is located as well as support-based benefits in [the town where we are headquartered].

Several biofuels developers indicated that the economic benefits requirement provides them with a competitive advantage in the bidding process relative to wind developers, as biomass requires significantly greater O&M and fuel purchase activity. One developer stated:

We like that economic benefits [requirements] are considered because we feel that we get some advantage from it.

Several developers indicate that many states require similar prospective benefits computations and assessments:

RI is looking at job benefits versus construction prices.

In all states, [we] make estimates of economic benefits. Not difficult.

We note, however, that all of the data for wind projects is based on 11 projects from only two wind developers receiving awards under RFPs 1037 and 1168. Some developers, namely losing bidders and non-participants, indicated frustration with the economic benefits scoring system. Criticisms of the economic benefits estimation process fell into a few main categories:

It is somewhat subjective, leaving much up to the interpretation of individual bidders.

There is little transparency.

There is no verification process.

It can be burdensome, especially for small or first-time bidders.

Some specific comments included:

Economic benefits assessment is not an exact science. [It is] hard to say whether projects are really using apples to apples approaches in coming up with their estimates. That piece [coming up with benefits estimates] is open to some interpretation.

Not sure the information is very reliable. People are very good at spinning it. Not worth the effort that goes in on both sides (the developer and the state). Not much verification of ED benefits. It's all speculation.

How [the process] has been applied is not clear [or] fair. [I] assumed that projects that were built previously would no longer be awarded credit for the economic development benefits. [I] would like a better understanding of how these benefits were scored [and] weighted. [Knows that they represent 30% of the bid score, but wants to know what numbers represented what scores.]

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Yes, it was tough (probably a pain for small projects)... In theory, there will be some policing in the future if people who bid well and got the REC contracts turn out not to provide as many benefits as expected. It just adds another level of complexity for a small project.

The economic benefits aspect was (and will be) unnecessarily cumbersome.” (Note: This comment was made by a biomass developer.)

Some developers interviewed claim to have far more wind development experience than the two winners and suggested that the winning bidders could possibly have overestimated the benefits of their projects to “game the system.” If true, this would have caused KEMA’s team to overestimate the benefits of both existing and future projects.

#### **CHARACTERIZATION OF THE VERIFIABILITY OF DATA FOR FUTURE SOLICITATIONS**

The next step in the credibility assessment was to develop alternative values and benchmarks, where available, for the four key data indicators. The sources of data used for this section include the data from participating and nonparticipating developers’ interview response data, municipality interview response data, and other secondary sources. The interview responses provided very little additional information, since the objectives of the interviews did not cover economic benefits issues other than a review of NYSERDA’s procurement processes. The secondary review yielded some data on wind technologies, but little comparable data for biofuels or hydro technologies. Table 4.3 provides an assessment of the limited benefits data that we found in secondary sources in comparison with the average values of winning wind power bidders, broken down into the key benefits indicators.



**Table 4.3  
Comparison of Self-Reported Per-MWh Economic Benefits with Other Sources (Awardees only)**

<u>Data Set</u>	<u>RPS Projects (1037 &amp; 1168)</u>	<u>Maple Ridge Case Study</u>	<u>Developer Estimates</u>	<u>Michigan Case Study</u>	<u>Maple Ridge % of RPS</u>	<u>Developer % of RPS</u>	<u>Michigan % of RPS</u>
<b>Short-term Impacts (Total)</b>	\$ <b>8.21</b>	\$ <b>4.24</b>	\$ <b>4.65</b>	\$ <b>8.47</b>	<b>52%</b>	<b>57%</b>	<b>103%</b>
Short-term Jobs	\$ 2.53	\$ 0.81	\$ 1.50	n/a	32%	59%	n/a
Short-term PILOT & Fees	\$ 0.27	\$ -	\$ -	n/a	0%	0%	n/a
Construction (3-year Non-payroll Purchases)	\$ 5.22	\$ 3.05	\$ 3.05	n/a	58%	58%	n/a
Payments to Abutters	\$ 0.18	\$ 0.38	\$ 0.10	n/a	207%	54%	n/a
<b>Long-term Impacts (Total)</b>	\$ <b>17.70</b>	\$ <b>5.95</b>	\$ <b>10.54</b>	\$ <b>17.88</b>	<b>34%</b>	<b>60%</b>	<b>101%</b>
Long-term Jobs	\$ 4.58	\$ 1.02	\$ 2.30	\$ 9.13	22%	50%	199%
PILOT	\$ 5.96	\$ 2.89	\$ 4.24	\$ 6.09	48%	71%	102%
Fuels (Biomass) & Land Lease	\$ 2.70	\$ 2.04	\$ 4.00	\$ 2.66	76%	148%	99%
Other O&M (in addition to fuel, lease, PILOT and long-term labor costs)	\$ 4.45	n/a	n/a	n/a	n/a	n/a	n/a
<b>Total 20-Year Benefits</b>	\$ <b>26.75</b>	\$ <b>10.19</b>	\$ <b>15.19</b>	\$ <b>26.35</b>	<b>38%</b>	<b>57%</b>	<b>99%</b>

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## Secondary Review

The KEMA team performed a general review of relevant secondary research on renewable energy technologies, including energy industry associations and energy advocacy groups. One source underscored the potential value of economic benefits of renewable energy generation projects:

As compared to traditional fossil fuels, renewable energy is a labor-intensive sector that generates a wide variety of high-wage and high-skilled jobs in the areas of research and development; design and manufacturing; construction and installation of power-generating facilities (such as the turbine, solar array, and fuel cell); cultivation and collection of fuel in the case of biomass; and operation and maintenance jobs.<sup>130</sup>

Secondary data on wind power projects are relatively plentiful; however, little recent data or publicly available studies on prospective economic benefits for other technologies could be found.

## Wind Technologies

Nearly 83% percent of NYSERDA's contracted resources through the three recent procurements come from wind technologies—the richest source of secondary data for projecting economic benefits addresses wind technologies. NYSERDA conducted a case study of the Maple Ridge Wind Project to characterize the economic benefits associated with it.<sup>131</sup> The following is a summary of those benefits estimates:

- Total benefits ranging from \$9.71 to \$10.66 per MWh for projects ranging in size from 50MW to 350 MW.
- Short-term impacts related to development, construction, local spending and other impacts of approximately \$4.24 per MWh.
- Long-term impacts related to host payments, property taxes, operations and maintenance of approximately \$5.47/MWh. These long-term impacts break down approximately as follows:
  - Payments in Lieu of Taxes (PILOTs) to municipalities range from \$2.41 to \$3.36 per MWh.
  - Host payments by landowners or property holders are about \$2.04/MWh

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<sup>130</sup> Sam Swanson, Director of the Renewable Energy Technology Analysis Project at the Pace Law School Energy Project, in a letter to Susan Hudson of the Vermont Public Service Board, discussing a survey, prepared for Renewable Energy Vermont, of employment impacts of renewable energy investments, November 17, 2003.

<sup>131</sup> Hale, Kevin of the New York State Energy Research and Development Authority, "Major Impacts of Utility-Scale Wind Projects in New York," December 2005.

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Comparing these values to average values reported under their winning bids from the two later RFPs, the Maple Ridge Case Study appears to be considerably lower (see Table 4.3):

- Short-term benefits averaged \$8.21/MWh, including \$5.22/MWh for construction materials and \$2.53/MWh for short-term (primarily construction) jobs. This appears to be twice as high as the values produced in the Maple Ridge Case Study.
- Long-term benefits averaged \$17.70/MWh. This is nearly triple those estimated for Maple Ridge.
  - PILOTs ranged from \$3.13 to \$17.66 per MWh, with an average of \$5.96.
  - Host payments ranged from \$2.10 to \$3.59 per MWh, with an average of \$2.70.
- Total benefits averaged \$26.75/MWh (versus \$10.19 for Maple Ridge)

It should be noted that the values from the Maple Ridge Case Study report were in 2004 dollars, while the data for winning bidders are in 2006 dollars and would be higher without real price adjustment. Moreover, we should expect some normal fluctuations in market conditions for negotiated values such as PILOTs and host payments. Nevertheless, these figures are somewhat higher than those reported for the Maple Ridge project. It is unclear to what extent these differences reflect changing industry conditions, the excellent location chosen for the Maple Ridge site, or the possibility that we are comparing non-parallel data sets that should not be compared.

In another recent case study, the US Department of Energy's Office of Energy Efficiency and Renewable Energy and the National Renewable Energy Laboratory (NREL) hosts and sponsors the Jobs and Economic Development Impact (JEDI) Model which is particularly designed for modeling economic benefits of wind projects.<sup>132</sup> A recent case study of 1,000 MW of new windpower in Michigan itemized the total impacts (direct plus indirect/induced) on a per MW basis over a 2 to 3 year construction cycle and a 20 year operational time horizon. These values, for comparison, were converted into per-MWh units using a capacity factor of 0.3 and are surprisingly similar to the NYSERDA awardees' averages (see Table 4.3).<sup>133</sup>

- (Short-term) construction-phase expenditures of \$8.47/MWh
- Long-term impacts of \$17.88/MWh, including
  - Property tax revenues as \$6.09/MWh
  - Landowner lease payments of nearly \$2.66/MWh

While these estimated values are remarkably similar, we also note that the difference in the market for land rents, the labor market, and the technical conditions for wind development between New York and

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<sup>132</sup> [http://www.windpoweringamerica.gov/filter\\_detail.asp?itemid=707](http://www.windpoweringamerica.gov/filter_detail.asp?itemid=707), accessed October 14, 2008.

<sup>133</sup> "Economic Benefits, Carbon Dioxide Emissions Reductions, and Water Conservation Benefits from 1,000 MW of New Wind Power in Michigan," Produced for the US Department of Energy by the National Renewable Energy Laboratory, June 2008. DOE/GO-102008-2564.

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Michigan are potentially very significant. The comparison, however, is instructive in that the Michigan Case Study values are not wildly different from the Maple Ridge Case Study to begin with.

### Biofuels

Another 14% of new renewable energy contracted by NYSERDA is derived from three biofuel projects (including a project that was accepted as a maintenance resource). Biofuels also factor prominently in the long-term for prospective economic impacts to New York State because of long-term expectations for growth and the relatively greater labor-intensive nature of supplying fuels and their O&M expenditures. Biofuels can also supply a great deal of economically valuable environmental services that do not neatly fall within the four specified indicators above, including the avoided cost of disposal alternatives and forest treatments.<sup>134</sup> The technology range for biofuel projects spans plants that combust wood chips/pellets and other waste streams. One of the projects is a coal co-firing facility (4% biomass output), while others are 100% biomass. Some are new; others are existing, including one “maintenance resource.” Still others are coal plants converted to burn biomass. The variability in technology, scale and application is reflected in the prospective benefit values, making such comparisons difficult.

### Hydropower

NYSERDA’s three procurements obtained a small percentage (3%) of new renewables from hydropower upgrades. However, the secondary review of public information sources on hydropower technologies yielded little comparative data similarly grounded in the four benefit categories specified above—especially for upgrade-scale projects. Because available secondary resources are scant on the total economic impacts, comparative data cannot be supported in this study.

### **In-Depth Interview Responses With Market Actors**

KEMA recently conducted in-depth interviews with developers (participating and nonparticipating) and municipalities, as well as some follow-up discussions with additional stakeholders.

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<sup>134</sup> Morris, Gregory, Green Power Institute, “The Value of the Benefits of US Biomass Power,” produced for NREL, November 1999. NREL/SR-570-257541.

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### Wind Developers

To the extent that developers could provide additional input into updated values for the economic benefits of wind projects (only), developers offer the following reaction to the values expressed in the Maple Ridge Case Study. These reported data are considerably less (about 60% as high as) than those averages provided for awarded wind projects in Table 4.1:

- The project development cycle is typically longer than two years in New York—possibly even up to six years.
- Current PILOT rates in some regions of the state are approximately \$8,000 to \$9,000 per MW for years 1 to 15 with some decline thereafter.
- An assumption of \$40,000 per year in salary and benefits for O&M employees is low.
- Typically, developers assume 3,000 construction man hours or 1.5 FTE per MW.
- Overall, total benefits are currently closer to \$15 per MWh in the regions of the state where the developers that we interviewed have been active.
  - Short-term impacts related to development, construction, jobs, PILOTs and payments to abutters are approximately \$4.65 per MWh.
  - Long-term impacts related to host payments, property taxes, operations and maintenance are approximately \$10.54 per MWh.

Specific values offered by benefit item are shown in Table 4.3.

### Municipalities

Interviews with municipalities covered topics addressing the economic impacts but not directly the magnitude of those impacts. Some municipalities did in fact offer some limited information on the value of their PILOTS when asked about the increased economic activity resulting from new renewable energy projects in their community:

Local landowners receive about \$9000/unit/year for a 25-year lease, with an extension to 40 years. These agreements do not vary by landowners. Other leases including land for transmission lines.

During construction, of course they've hired a group of local people. Obviously, there're some technical jobs that follow the projects...In the future, they will not provide a lot of jobs: 3-6 full time jobs when complete. There're also payments to the town. They've agreed to have a science center for the local schools; they've made agreements to give annual payments to the local volunteer fire company. Nothing has been done yet, but these are the plans. Also, tourists are driving up to look at the wind projects.

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The county, town and school district will get \$8.5 million/year for 15 years. At the end of the 15 years, it'll be renegotiated. The PILOT is distributed the same way as tax jurisdiction for a normal year's taxes. This can vary by year.

The town gets \$250,000/year for 20 years. First year is about \$400,000. We're satisfied with the arrangement.

On balance, municipalities report having negotiated fair compensation with developers through the PILOT revenue mechanism, a welcome short-term boom related to construction and other spending activity, and uneven satisfaction with the prospective long-term benefits.

#### Other Stakeholders

KEMA also contacted AWS TrueWind ([www.awstruewind.com](http://www.awstruewind.com), a data resource and project assessment service company) and the Alliance for Clean Energy in New York ([www.aceny.org](http://www.aceny.org), a clean energy advocacy group) to access other potential comparative data sources. Neither organization had such data. One respondent said: "I wish I had that data myself."

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## CONCLUSIONS

This credibility assessment has two functional components: 1) To review and update proposal tracking inputs used in the IMPLAN Economic Benefits Simulation, and 2) To provide some characterization of the level of confidence in the economic benefits indicators as reported by developers of awarded projects. On the first issue, the solicitation review process did reveal some necessary minor corrections and updates. Some developers report confusion with some of the prospective economic benefits data submission requirements, and KEMA's review discovered and corrected reasonable misinterpretations of those requirements, consistent with concerns expressed in the bidders' survey responses. Recommendations for improvement are illustrated in Section 6 below.

The second issue—the degree to which NYSERDA can be confident in the developers' self-reported prospective economic benefits data—is more challenging to address. For hydropower and biofuel technologies, the lack of a broad base of projects and uniformity in application makes benchmarking comparisons difficult. For wind projects, the reported benefits through secondary sources and follow up interviews with various market actors shows that an average of the economic benefits from NYSERDA's awarded projects are reasonably consistent with values provided by other sources.

In conclusion, KEMA's assessment is that the awarded bidders' prospective economic benefits reflect best available information due to variations in project-specific business arrangements, NYSERDA's competitive process, and declared enforcement provisions. For wind projects—the only projects in which the awardees' prospective economic benefits could be benchmarked—a basic and limited comparison shows that the average prospective economic benefit values appear systematically high, but not unreasonably so given the scope of this assessment and the limited points of comparison. We also note that other states maintain a keen interest in delivering economic impacts from such projects, and they demand similar data. While comprehensive benchmarking and verification studies are necessary and could enhance broader cross-sectional research for program use and comparison, at this time, these studies would likely provide less value than persistent evaluation efforts and ongoing communications by program staff with market actors and neighboring states.

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## **POTENTIAL RECOMMENDATIONS**

KEMA's analysis has yielded several considerations for potential changes to the economic benefits section of future procurement efforts. These considerations fall into two categories:

1. Clarifications for the existing RFP structure
2. Possible changes in the RFP

## **CLARIFICATIONS OR REFINEMENTS**

Clarifications include the following:

- Clarify that O&M spending is not a short-term in-state construction benefit.
- Clarify what exactly can be claimed in the short-term for in-state purchases, and offer bidders an opportunity to justify all other non-classifiable in-state purchases in an open-ended question.
- Clarify what exactly can be claimed in the long-term for annual O&M spending in addition to payroll, fuel purchases, PILOT payments and on-going land lease. Offer bidders and opportunity to justify all other non-classifiable O&M spending in an open-ended question.

## **CHANGES**

KEMA's team recommends asking additional questions and requests of bidders about economic development benefits to make reporting more precise, including:

- Specify equipment purchase locations (i.e., in-state vs. out-of-state).
- What percent of the total project budget does your reported "in-state spending" represent?
- What percent of your short-term "in-state spending" will be taxable in NY State?
- Are there aspects of your long-term annual O&M budget besides payroll, fuel purchases, PILOT payments and on-going land lease? If so indicate the additional dollars spent, by basic purchase category.
- What portion of long-term spending on parts for normal part replacement is in-state versus out-of-state?



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**Appendix C**  
**DEVELOPERS INTERVIEW GUIDE (RPS PARTICIPANTS)**

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## Interview Guide

### Developers- Participating

Date/Time:

Interviewers:

Interviewee:

Title:

**Suggested interviewees:** Attempt to contact:

- At least one developer for each technology for each solicitation, e.g., biomass, hydro, and wind.
  
- Target areas
  - a. Applied for Provisional Certification but did not Qualify or elect to bid
  - b. Bid was accepted
  - c. Bid was rejected
  - d. Submitted multiple bid quantities per project
  - e. Participated in more than one solicitation.
  - f. Up to all bidders in 3rd Main Tier solicitation (13 unique contacts for bidders), as well as 3 developers that were qualified to bid but chose not to;
  - g. Up to 10 participants in 2nd solicitation including winning / non-winning bidders, as well as ~2 that qualified to bid but chose not to.
  - h. For the 1<sup>st</sup> solicitation: an out-of-state winning bidder and Maple Ridge since it's the largest wind farm in the northeast.

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#### **INTERVIEW RECRUITMENT SCRIPT**

My company, [Summit Blue Consulting or KEMA,] is conducting an assessment for NYSERDA to assist in the evaluation of New York's RPS program. Our assessment will be part of a report to the Public Service Commission in 2009 that will guide the future direction of New York's RPS program strategies. Your company's experience with the RPS program and in the development of renewable energy will help New York better understand the current needs of project developers and how NYSERDA's programs and New York's policies can foster renewable energy production going forward. We have



signed a confidentiality agreement with NYSERDA. Any input you provide will not be attributed directly to you or your company.

*[If prospective interviewee expresses concern about confidentiality or our purposes, note that they can contact Carole Nemore at NYSERDA (518-862-1090 ext. 3217, or NYSERDA’s attorney, Peter Keane at ext. 3366) to confirm that Summit Blue has been hired to conduct the assessment and has signed a confidentiality agreement.]*

We are seeking to talk to someone familiar with the NYS RPS program and who has a key role in your company’s renewable energy development decision-making in the Northeast. Do you think you or another person at your company would be in the best position to discuss these issues **[Schedule interview or obtain contact information for a more appropriate person at the company.]**

Is there a time that would be convenient for you to talk about these issues in the next week or two? We estimate that the interview will take about [one hour for participating developers, ½ hour for non-participating developers.]

**INTERVIEW INTRODUCTION SCRIPT (once interviewee is on the phone)**

As [we discussed over the phone / I noted in my email] we are conducting an assessment for the NYS Renewable Portfolio Standard program administered by NYSERDA. Thank you for taking the time to speak with me about renewable energy and your experience with project development in NY *[or elsewhere for non-participating developers]*.

This call should take about an hour *[1/2 hour for non-participating developers]*. We have signed a confidentiality agreement with NYSERDA. Any comments you provide will not be attributed directly to you or your company

**I. NYSERDA PROGRAM HISTORY AND COMPANY BACKGROUND [SUMMIT BLUE]**

*[To be completed by interviewer prior to interview to extent possible.]*

- 1. NYSERDA RPS Program History: To be Filled out Prior to Interview

**Roll Up Summary by Solicitation**

Solicitation	# of bids submitted	# of contracts
--------------	---------------------	----------------

		<b>awarded</b>
<b>916</b>		
<b>1037</b>		
<b>1168</b>		

**Project-Level Summary**

<b>Project Name</b>	<b>Solicitations Bid Into</b>	<b>MW (total nameplate capacity)</b>	<b>Technology</b>	<b>% project output sold to NYSERDA</b>	<b># of bid %s submitted per RFP</b>

2. What is your role in the company (title, responsibilities):
  
3. What was your role in the RFP process? (elicit familiarity with the RFP and standard contract)
  
4. In what business areas is your company active (development, brokering RECs, O&M, finance, etc.)?
  
5. What technologies does your company develop and why?
  
6. Could you give me some background on the renewable energy projects your company is currently developing in New York and elsewhere?

<b>Details</b>	<b>NY-RPS Bid Projects</b>	<b>NY Projects (Non-RPS)</b>	<b>Projects in Other States</b>
Technology Types			
Project Names (i.e., used in interconnection queue)			
Location(s) (county/town)			
MW			

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Status as of 6/08			
Expected Completion			

- a. Have there been any unanticipated delays in project development? If so, what has caused these delays (i.e., permitting, local opposition, transmission / interconnection, etc.)?
- b. For any capacity you've built or are building in NY, do you plan to bid that into the next NY RPS solicitation?

**II. PROJECT FINANCE [SUMMIT BLUE]**

- 7. In general, how do you finance your projects (Structures:, leveraged flip with deferred equity, leveraged flip with upfront equity, leveraged lease, PPA pre-payment, all equity, unlevered flip with upfront equity, hedging to manage electricity price risks)?
- 8. Are there any finance partners with which you typically work (e.g., tax equity investors, lenders, power purchasers, REC purchasers, construction contractor, turbine provider, O&M provider, etc)
- 9. Does the RPS funded project (financing package- partners and structure) depart from what is typical for your projects? If so, how?
- 10. Who are the major energy and REC offtakers for your New York projects and to what extent do you have long-term agreements with these entities?
- 11. Are REC revenues essential to your project economics in general, or are your project economics competitive enough with conventional energy sources that REC revenue is becoming less important?

**III. PROGRAM ATTRIBUTION [SUMMIT BLUE]**

12. **[FOR WINNING BIDDERS]** How valuable was the NYSERDA RECs contract helping you finance your project(s)?

**[FOR NON-WINNING BIDDERS]** How valuable are the NYSERDA REC contracts in helping projects get financed?

\_\_\_Critical to project financing

- Of significant value
- Of little or no value
- An obstacle to project finance

13. **[FOR WINNING BIDDERS]** Did the REC contract help you attract other financing? What kind of financing?
14. **[FOR WINNING BIDDERS]** In the absence of the NYSERDA REC contract, would you have developed a project in New York anyway or would you have gone to another state?
15. Did the existence of the NYSERDA RPS *program* change the development plan in other ways (i.e., timing of construction or size of project)?
16. Does the NYSERDA program effect the RE market in NY as a whole, for example by lowering REC prices, making NY more favorable for development relative to other states, or in other ways)?

#### IV. BARRIERS **SUMMIT BLUE**

17. How significant were the following factors as barriers to developing your project [Rank each barrier from 1-5, “1” meaning the barrier was insignificant, “3” meaning the barrier was significant and added time or expense to the development process, and “5” meaning the barrier posed a critical threat to your project’s viability. For anything receiving a 3 or higher, ask for explanation, including how the barrier is affecting REC prices.]

- transmission constraints
- interconnection costs and processes (specify which was focus of respondent feedback)
- cost of doing business in NY
- cost of supplies and raw materials (increased by falling value of U.S\$)
- local opposition (NIMBYism)
- permitting process
- property taxes and/or payments in lieu of taxes
- lack of compatibility of NY with regional REC tracking and trading systems
- availability of parts and supplies (turbines, gearboxes, etc.)
- availability of qualified local workforce to perform O&M
- uncertainty about federal tax incentives
- availability of suitable sites with adequate renewable resources

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\_\_\_ other

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18. What additional assistance could NYSERDA or the State provide to overcome or minimize these barriers?
19. Do these barriers differ from those you have encountered in other states (i.e., less burdensome, same, more burdensome)? How are they different, specifically?
20. Do you have any comments on how these barriers differ across technologies?

## V. NYSERDA RPS PROGRAM COMPONENTS **[KEMA]**

### **Economic Development Benefits**

21. Bidders were required to report the project's expected economic development benefits. Did this requirement affect bid price or bid quantity? If so, how?
22. Were any of these economic benefits categories difficult to estimate? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]
  - a. Short-term jobs?
  - b. Long-term jobs?
  - c. Payments to localities/state?
  - d. Access to resources?
  - e. In-state purchase of goods/services?
23. **[Winning bidders only]** Do you think the Post-award Economic Benefits Documentation and the deadlines were reasonable?
  - a. Specifically, do you anticipate any difficulty demonstrating that you have delivered 85% of the Expected Total Dollar Benefit?
24. Do you believe there were any additional economic development benefits that should have been used as selection criteria but were not?

### **Contract Duration**

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25. What was the impact of the NYSERDA contract term on your bid price [Minimum 3 years, maximum 10 years]?

26. What would be your optimal contract term and why?

### **Bid Quantities and Partial Bidding**

**[Min of 30% and Max 95% of REC output can be sold to NYSERDA]**

27. The program requires facilities to set aside at least 5% for voluntary markets outside the RPS program, with a minimum bid of 30% of a facility's output. Would you have bid 100% if you were allowed to do so?

28. **[If only submit one bid quantity and percentage]** What was the rationale for the quantity of supply you chose to bid? And how did it affect your bid price?

29. **[If submitted multiple bid quantities / percentages for the same project]** What was your rationale for submitting multiple bid quantities and percentages for the same project, and did why the REC prices you bid varied by Bid quantity / percentage?

30. How did your REC pricing bid in NY compare with the REC prices you've secured in:

- a. Other states with RPS policies.
- b. The voluntary REC market?

### **Out of State Facilities' Hourly Matching Requirement**

31. Did any of NYSERDA's requirements for out-of-state facilities delivering energy to the NY control area affect your bid? If so, how? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]

- a. Hourly matching requirement
- b. Event of default if Seller of intermittent facility attribute fails to meet delivery requirements during 90% of hours in a Contract Year
- c. Verification requirements for attributes.

- d. Seller must be the financially responsible party to the delivery point (New York border)

**RPS Attributes [For participants in any of the 3 rounds]**

- 32. Did the definition of “RPS Attributes” (RECs) and the requirements for certification, verification and conveyance to NYSERDA cause any concerns when you submitted your bid proposal? *[Interviewer will be familiar with RFP provisions and will provide brief description to interviewee if necessary.]*
- 33. How will the RGGI market affect your projects going forward, and the likelihood that you would bid into future NYSERDA RPS solicitations?

**Energy Sales - Bilateral and Spot Market**

- 34. In the first round of the Main Tier solicitation, NYSERDA required winning bidders to sell the energy into the NY-ISO spot market, while the second and third solicitations allowed bidders to also enter into bilateral energy contracts. What impact, if any, did this change have on your bid price and interest in participating in the RPS?

**Interconnection**

- 35. Did the cost and process of interconnecting to the grid affect any of the following?
  - a. Your REC / bid price?
  - b. Your siting location (i.e., are there significant differences in interconnection costs across the different NY-ISO zones? different states?)
  - c. Your on-line date?
  - d. Were there problems or delays that could be avoided?
  - e. Was the electric utility helpful or difficult to work with?
- 36. Is there any other RPS program component that affected either your bid price or your interest in participating in the RPS program that we haven't discussed yet?

**VI. PROGRAM PROCESS AND STRUCTURE / TARGETS [KEMA]**

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## Project Selection Process

37. To date, the program has supported large-scale wind, biomass, landfill gas, and repowered hydropower projects.
- a. How do you think the solicitation process has affected the selected generation mix?
  - b. What, if anything, should the program change to encourage more renewable resource diversity?
38. The project selection process scores projects based on price and economic development benefits to the state, with price weighted at 70% and economic development weighted at 30%. Do you believe this is an appropriate scoring approach?
39. Besides bid price and economic development benefits, should NYSERDA consider any other criteria when selecting winning projects, such as “proximity to load,” “capacity factor,” or anything else that you can think of? Please explain.
40. Do you think the use of a bid ceiling price skews REC prices or prevents viable projects from receiving REC awards?
41. 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 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?
42. When you compare your experience in New York to that in other states, are there particular benefits or problems with New York’s approach to meeting its RPS requirements, or with the NYSERDA solicitation process?
43. **[FOR WINNING BIDDERS]** Have there been any major contracting issues that could have been handled better? If so please explain.
44. **[FOR LOSING BIDDERS]:**

- a. Have you received any feedback as to why your project was not selected in the solicitation?
- b. Are you planning to bid these or other projects in response to future NY RPS solicitations?

**NYS Program Goals and RPS Targets**

45. The RPS program goal is for 25% of the State’s electric load to be supplied with renewables by 2013, with intermediate targets for each year. [The PSC has set annual targets for NYSERDA of 3,549,026 MWh in 2008 and 4,767,994 MWh in 2009.]

- a. Do you think the goals are achievable given the market, the overall economy and the resources available in New York?
- b. What are the biggest challenges the program faces in meeting its annual RPS procurement targets going forward?

46. To date, NYSERDA has not attained its annual target for any given year. Do you have any ideas about why that might be? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]

- a. The available program funding?
- b. The central procurement approach (as distinct from having utilities involved)?
- c. The bid ceiling price?
- d. The RFP process that NYSERDA employs?
- e. Other

47. If there were three (3) things you could change about the NYSERDA RPS program what would they be?

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

**VII. GENERAL MARKET CONDITIONS [SUMMIT BLUE]**

- 
48. In general, which market factors have the greatest effect on REC prices (i.e., wholesale price of electricity, prices being offered by other REC suppliers, equipment pricing and availability, project financing structure, etc.)?
49. Describe how market conditions have changed since NY first introduced its RPS (2004), particularly in the areas of project finance strategies, the types of market players who are most active, and equipment pricing and procurement strategies.
50. How have these changes affected project development in New York?
51. What future changes in market conditions do you anticipate, and how should NYSERDA adapt its program planning, if at all, to accommodate these changes?

### **VIII. STEPS TO A SUSTAINABLE MARKET [SUMMIT BLUE]**

52. What policies and market design features are necessary to develop a sustainable renewable energy market in NY? By sustainable, I mean a market that will sustain at least 25% RE supply in NY without state incentives. Indicate high, medium, low importance:
- a. RPS design, presence
  - b. Regional attribute tracking system,
  - c. Other financing methods, such as feed-in tariffs
  - d. PPA requirements for utilities / Load-Serving Entities
  - e. Other
53. **[ASK ONLY IF SUFFICIENT TIME REMAINING]** What characteristics would indicate that the New York wholesale renewable market has become self-sustaining (i.e., active REC tracking and trading system, enough demand from voluntary market to eliminate the need for NYSERDA central procurement of RECs, etc.)?
54. For your technology, where does the NY market stand on the path toward achieving a self-sustaining renewable energy market, and what are the remaining challenges NY must overcome in order to achieve a sustainable market?
- a. What must happen in the marketplace in order to overcome those challenges?

- 
- b. What, if anything, is needed from NYSERDA to facilitate those market changes?
  - c. Are conditions significantly different for other technologies?



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**Appendix D**  
**DEVELOPERS INTERVIEW GUIDE (NON-PARTICIPANTS)**

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## Interview Guide

### Developers: Non-Participating

Date/Time:

Interviewers:

Interviewee:

Title:

Company:

**Suggested interviewees:** Attempt to contact:

- At least one developer for each technology for each solicitation, e.g., biomass, hydro, and wind.
- Target areas
  - i. Applied for Provisional Certification but did not Qualify or elect to bid
  - j. Bid was accepted
  - k. Bid was rejected
  - l. Submitted multiple bid quantities per project
  - m. Participated in more than one solicitation.
  - n. Up to all bidders in 3rd Main Tier solicitation (13 unique contacts for bidders), as well as 3 developers that were qualified to bid but chose not to;
  - o. Up to 10 participants in 2nd solicitation including winning / non-winning bidders, as well as ~2 that qualified to bid but chose not to.
  - p. For the 1<sup>st</sup> solicitation: an out-of-state winning bidder and Maple Ridge since it's the largest wind farm in the northeast.

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### INTERVIEW RECRUITMENT SCRIPT

My company, [Summit Blue Consulting or KEMA,] is conducting an assessment for NYSERDA to assist in the evaluation of New York's RPS program. Our assessment will be part of a report to the Public Service Commission in 2009 that will guide the future direction of New York's RPS program strategies. Your company's experience with the development of renewable energy will help New York better understand the current



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needs of project developers and how NYSERDA's programs and New York's policies can foster renewable energy production going forward. We have signed a confidentiality agreement with NYSERDA. Any input you provide will not be attributed directly to you or your company.

*[If prospective interviewee expresses concern about confidentiality or our purposes, note that they can contact Carole Nemore at NYSERDA (518-862-1090 ext. 3217, or NYSERDA's attorney, Peter Keane at ext. 3366) to confirm that Summit Blue has been hired to conduct the assessment and has signed a confidentiality agreement.]*

We are seeking to talk to someone familiar with the NYS RPS program and who has a key role in your company's renewable energy development decision-making in the Northeast. Do you think you or another person at your company would be in the best position to discuss these issues **[Schedule interview or obtain contact information for a more appropriate person at the company.]**

Is there a time that would be convenient for you to talk about these issues in the next week or two? We estimate that the interview will take about [one hour for participating developers, ½ hour for non-participating developers.]

### **INTERVIEW INTRODUCTION SCRIPT (once interviewee is on the phone)**

As [we discussed over the phone / I noted in my email] we are conducting an assessment for the NYS Renewable Portfolio Standard program administered by NYSERDA. Thank you for taking the time to speak with me about renewable energy and your experience with project development in NY [*or elsewhere for non-participating developers*].

This call should take about an hour [*1/2 hour for non-participating developers*]. We have signed a confidentiality agreement with NYSERDA. Any comments you provide will not be attributed directly to you or your company

### **J. COMPANY BACKGROUND [SUMMIT BLUE]**

*[To be completed by interviewer prior to interview to extent possible.]*

1. Interviewee's role in the company: \_\_\_\_\_

2. Business areas in which the company is active (development, brokering RECs, O&M, finance, etc.).
  
3. What technologies does your company develop and why?
  
4. Could you give me some background on the renewable energy projects your company is currently developing in New York and elsewhere?

Details	NY Projects (Non-RPS)	Projects in Other States
Technology Types		
Project Names (i.e., used in interconnection queue)		
Location(s) (county/town)		
MW		
Status as of 6/08		
Expected Completion		

- c. Have there been any unanticipated delays in project development? If so, what has caused these delays (i.e., permitting, local opposition, transmission / interconnection, etc.)?

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## II. PROJECT FINANCE [SUMMIT BLUE]

5. In general, how do you finance your projects (Structures:, leveraged flip with deferred equity, leveraged flip with upfront equity, leveraged lease, PPA pre-payment, all equity, unlevered flip with upfront equity, hedging to manage electricity price risks)?
6. Are there any finance partners with which you typically work (e.g., tax equity investors, lenders, power purchasers, REC purchasers, construction contractor, turbine provider, O&M provider, etc)
7. Who are the major energy and REC offtakers for your New York projects and to what extent do you have long-term agreements with these entities?
8. Are REC revenues essential to your project economics in general, or are your project economics competitive enough with conventional energy sources that REC revenue is becoming less important?

## III. PROGRAM ATTRIBUTION [SUMMIT BLUE]

9. Did the existence of the NYSERDA REC contract program change the development plan in other ways (i.e., timing of construction or size of project)?
10. Does the NYSERDA program effect the RE market in NY as a whole, for example by lowering REC prices, making NY more favorable for development relative to other states, or in other ways)?

## IV. BARRIERS SUMMIT BLUE

11. How significant were the following factors as barriers to developing your project [Rank each barrier from 1-5, "1" meaning the barrier was insignificant, "3" meaning the barrier was significant and added time or expense to the development process, and "5" meaning the barrier posed a critical threat to your project's viability. For anything receiving a 3 or higher, ask for explanation, including how the barrier is affecting REC prices.]

\_\_\_ transmission constraints

- 
- interconnection costs and processes (specify which was focus of respondent feedback)
  - cost of doing business in NY
  - cost of supplies and raw materials (increased by falling value of U.S\$)
  - local opposition (NIMBYism)
  - permitting process
  - property taxes and/or payments in lieu of taxes
  - lack of compatibility of NY with regional REC tracking and trading systems
  - availability of parts and supplies (turbines, gearboxes, etc.)
  - availability of qualified local workforce to perform O&M
  - uncertainty about federal tax incentives
  - availability of suitable sites with adequate renewable resources
  - other
- 

12. What additional assistance could NYSERDA or the State provide to overcome or minimize these barriers?

13. Do these barriers differ from those you have encountered in other states (i.e., less burdensome, same, more burdensome)? How are they different, specifically?

14. Do you have any comments on how these barriers differ across technologies?

## V. NYSERDA RPS PROGRAM COMPONENTS [KEMA]

15. Why did you choose not to participate in the NYSERDA RPS program?

- a. Were there any program details that caused particular concern for you (i.e. requirement to report economic development benefits, out-of state facility hourly matching requirements, requirements for certification and delivery of RPS attributes, etc.)?

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## Economic Development Benefits

16. Were any of the economic benefits categories NYSERDA required bidder to estimate in their bid proposals difficult to estimate? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]

- f. Short-term jobs?
- g. Long-term jobs?
- h. Payments to localities/state?
- i. Access to resources?
- j. In-state purchase of goods/services?

17. Do you believe the Post-award Economic Benefits Documentation and the deadlines for the documentation to be reasonable?

18. Do you believe that there were economic development benefits that should have been included in the selection criteria but were not?

## Contract Duration

19. What would be your optimal contract term and why?

## Bid Quantities and Partial Bidding

**[Min of 30% and Max 95% of REC output can be sold to NYSERDA]**

20. The program requires bidders to set aside at least 5%, and allows up to 70% set aside, for sales to other markets.

- a. Did you consider the requirement to set aside 5% to be a hindrance, and do you think NYSERDA should allow bidders to bid 100%?

21. The average REC prices NYSERDA contracted for under the RPS program were \$22.90/MWh in the first solicitation (2005) and \$15/MWh in the second solicitation (2006). How does this REC pricing compare with the REC prices you're able to secure in other states with RPS policies, and with the voluntary REC market?

---

### **Out of State Facilities' Hourly Matching Requirement**

22. Did any of NYSERDA's requirements regarding delivery of energy to the NY control area from out of state facilities affect your interest in bidding? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]
- e. Hourly matching requirement
  - f. Event of default if Seller of intermittent facility attribute fails to meet delivery requirements during 90% of hours in a Contract Year
  - g. Verification requirements for attributes.
  - h. Seller must be the financially responsible party to the delivery point (New York border)

### **RPS Attributes**

23. Did the definition of "RPS Attributes" (RECs) and the requirements for certification, verification and conveyance to NYSERDA affect your bid proposal cause any concerns for you or affect your decision to bid? [Interviewer will be familiar with RFP provisions and will provide brief description to interviewee if necessary.]
24. How will the RGGI market affect RE projects in the Northeast going forward, and will it affect the likelihood that you would bid into future NYSERDA RPS solicitations?

### **Energy Sales - Bilateral and Spot Market**

25. In the first round of the Main Tier solicitation, NYSERDA required winning bidders to sell the energy into the NY-ISO spot market, while the second and third solicitations allowed bidders to also enter into bilateral contracts for energy.

What impact did the ability to enter into bilateral electricity sales contracts (in addition to selling into the NY-ISO spot market only) have on your interest in participating in the RPS?

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## VI. PROGRAM PROCESS AND STRUCTURE / TARGETS [KEMA]

### Project Selection Process

26. Renewable Resource Diversity: The program to date has supported large-scale wind, biomass and landfill gas, and repowered hydropower projects.
- c. How do you think the solicitation process affected the selected generation mix?
  - d. What should the program change to encourage more renewable resource diversity?
27. The project selection process scores projects based on the lowest price (70% weight in scoring) and highest economic development benefits in New York (30% weight in scoring). Do you believe this is an appropriate scoring approach?
28. In addition to bid price and economic development benefits to NY, are there other project characteristics that should be considered in order to select the best projects, such as “capacity factor” or “proximity to load,” or other benefits? Please explain.
29. Do you think the use of a bid ceiling price skews the market prices as bid and results in eliminating viable projects from REC awards?
30. The Public Service Commission implementation plan established three solicitation approaches: declining clock auction (DCA), sealed-bid RFPs, and standard financial offer. 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?
31. Do you plan to participate in future rounds of the NYSERDA RPS solicitation?

### NYS Program Goals and RPS Targets

32. NYSERDA RPS Program Goal for 2013 is for 25% of the State’s electric load to be supplied with renewable sources, Do you think the goals are achievable given the economy and natural resources in New York?

---

33. To date, NYSERDA has not attained any annual target in any given year. Why do you think this is the case? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]

- f. The available program funding?
- g. The central procurement approach (as distinct from having utilities involved?)
- h. The bid ceiling price?
- i. The RFP process that NYSERDA employs?
- j. Other

34. If there were three (3) things you could change about the NYSERDA RPS program what would they be?

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

**VII. GENERAL MARKET CONDITIONS [SUMMIT BLUE]**

35. In general, which market factors have the greatest effect on REC prices (i.e., wholesale price of electricity, prices being offered by other REC suppliers, equipment pricing and availability, project financing structure, etc.)?

36. Describe how market conditions have changed since NY first introduced its RPS (2004), particularly in the areas of project finance strategies, the types of market players who are most active, and equipment pricing and procurement strategies.

37. How have these changes affected project development in New York?

38. What future changes in market conditions do you anticipate, and how should NYSERDA adapt its program planning, if at all, to accommodate these changes?

**VIII. STEPS TO A SUSTAINABLE MARKET [SUMMIT BLUE]**

- 
39. What policies and market design features are necessary to develop a sustainable renewable energy market in NY? By sustainable, I mean a market that will sustain at least 25% RE supply in NY without state incentives. Indicate high, medium, low importance:
- f. RPS design, presence
  - g. Regional attribute tracking system,
  - h. Other financing methods, such as feed-in tariffs
  - i. PPA requirements for utilities / Load-Serving Entities
  - j. Other
40. [ASK ONLY IF SUFFICIENT TIME REMAINING] What characteristics would indicate that the New York wholesale renewable market has become self-sustaining (i.e., active REC tracking and trading system, enough demand from voluntary market to eliminate the need for NYSERDA central procurement of RECs, etc.)?
41. For your technology, where does the NY market stand on the path toward achieving a self-sustaining renewable energy market, and what are the remaining challenges NY must overcome in order to achieve a sustainable market?
- a. What must happen in the marketplace in order to overcome those challenges?
  - b. What, if anything, is needed from NYSERDA to facilitate those market changes?
  - c. Are conditions significantly different for other technologies?



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**Appendix E**  
**TRADE ASSOCIATION REPRESENTATIVES INTERVIEW GUIDE (NON-PARTICIPANTS)**

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## Interview Guide

Date/Time:

Interviewee:

Title:

Company:

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**Interviewees:**

### **INTERVIEW RECRUITMENT SCRIPT**

My company is conducting an assessment for NYSERDA to assist in the evaluation of New York's RPS program. Our assessment will be part of a report to the New York Public Service Commission in 2009 that will guide the future direction of New York's RPS program strategies. As part of the assignment we're interviewing a range of stakeholders in the energy marketplace in New York. Your company's experience with the New York renewable energy markets is of great importance to this effort.

*[If prospective interviewee expresses concern about confidentiality or our purposes, note that they can contact Carole Nemore at NYSERDA (518-862-1090 ext. 3217, or NYSERDA's attorney, Peter Keane at ext. 3366) to confirm that Summit Blue has been hired to conduct the assessment and has signed a confidentiality agreement.]*

We'd like to talk to someone familiar with the NYS RPS program. Do you think you or another person at your company would be in the best position to discuss these issues?

**[Schedule interview or obtain contact information for a more appropriate person at the company.]**

---

Is there a time that would be convenient for you to talk about these issues in the next week or two? The call should take about a half hour.

### **Background on Organization**

**[Research prior to interview. Only ask questions as needed to confirm research.]**

1. What is your organization's role in the NY renewable energy market?
2. What types of companies make up your membership?

### **NYS RPS Program's Role in the Market**

3. Do you think the NYS RPS program is the key reason why renewable energy capacity is being built in the State or do you think it would be happening anyway?
4. In the absence of the RPS program, what % of the current large-scale renewable energy development activity would still be taking place in NY?
5. Please explain the available financing (aside from the RPS) that is available, and if the RPS incentives influence the availability of project financing.
6. What are your views on NYSERDA's role as the central buyer of RECs under long-term (10 year) contracts?
  - a. What are the strengths and weaknesses of the RPS centralized program in terms of fostering the development of a sustainable renewable energy market in NY?
  - b. How do you think the market would have responded if NY had structured its RPS the way most other northeastern states by requiring utilities to secure a set % of RE resources
7. Do you think the RE development occurring in NY is suppressing wholesale electricity prices? Why or why not?

### **RPS Program Process and Targets**

8. The project selection process scores projects based on the lowest price (70% weight in scoring) and highest economic development benefits in New York (30% weight in scoring). Do you believe this is an appropriate scoring approach? Do you think other factors should be weighed in the selection process For example:

- 
- a. More Diversity of Technology
  - b. Location factors such as near load pockets or avoidance of T &D congestion
9. The Public Service Commission implementation plan established three solicitation approaches: declining clock auction (DCA), sealed-bid RFPs, and standard financial offer. 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?
10. When you compare your New York's RPS program to that in other states, are there particular benefits or problems with New York's approach to meeting its RPS requirements, or with the NYSERDA solicitation process or approach?
11. For distributed generation that has received RPS support, e.g., PV, small wind, fuel cell and ADG technologies, NYSERDA currently owns their RECs for 3 years. Is this duration reasonable? If not, how long should NYSERDA own RECs generated by RPS-supported DG?
12. NYSERDA RPS Program Goal for 2013 is for 25% of the State's electric load to be supplied with renewable sources, and the PSC has set annual targets for NYSERDA to get to that goal (NYSERDA's target for 2008 is 3,549,026 MWh and for 2009 it is 4,767,994 MWh).
- a. Do you think the goals are achievable given the economy and natural resources in New York?
  - b. What are some of the major challenges the program faces in meeting its annual RPS procurement targets going forward?
13. To date, NYSERDA has not attained any annual target in any given year. Why do you think this is the case? [DO NOT READ BELOW UNLESS THEY REQUEST EXAMPLES.]
- k. The available program funding?
  - l. The central procurement approach (as distinct from having utilities involved)?
  - m. The bid ceiling price?
  - n. The RFP process that NYSERDA employs?
  - o. Other

## **Barriers to Renewable Energy Development**

14. What are the greatest barriers to utility-scale RE development in NY in general and in your service territory specifically. [Rank each barrier from 1-5, “1” meaning the barrier is insignificant, “3” meaning the barrier is a significant nuisance and added time or expense to the development process, and “5” meaning the barrier poses a critical threat to your project’s viability. For anything receiving a 3 or higher, ask for explanation, **including how the barrier is affecting prices.**]

- \_\_\_ lack of availability of long-term REC or energy contracts
- \_\_\_ transmission constraints
- \_\_\_ interconnection costs and processes
- \_\_\_ cost of doing business in NY
- \_\_\_ cost of supplies and raw materials (increased by falling value of U.S\$)
- \_\_\_ local opposition (NIMBYism)
- \_\_\_ permitting process
- \_\_\_ property taxes and/or payments in lieu of taxes
- \_\_\_ lack of compatibility of NY with regional REC tracking and trading systems
- \_\_\_ availability of parts and supplies (turbines, gearboxes, etc.)
- \_\_\_ availability of qualified local workforce to perform O&M
- \_\_\_ federal incentives uncertainty
- \_\_\_ availability of suitable sites with adequate renewable resources
- \_\_\_ other \_\_\_\_\_

15. How do these barriers differ by technology?

16. How do barriers present in New York differ from those in other states?

17. What additional steps should NYSERDA or the State take to minimize these barriers?

a. How significant are local siting issues and should the State be taking a more active role to mitigate hurdles? How important is enactment of an Article X Siting Law?

b. Local governments are impeded from purchasing RE due to laws which require municipalities to purchase the lowest priced commodity. What should be done about this?

### Market Conditions

18. Who are the major energy and REC offtakers for large scale RE projects in New York and to what extent are long-term contracts taking place?

- 
19. How essential are REC revenues to RE project economics at this point?
  20. How does RE projects' REC pricing bid to NYSERDA compare with the REC prices you're able to secure in other states with RPS policies, and with the voluntary NY REC market?
  21. Which market factors have the greatest influence on REC prices (i.e., wholesale price of electricity, prices being offered by other REC suppliers, equipment pricing and availability, project financing structure, etc.)?
  22. Describe how market conditions have changed since NY first introduced its RPS (2004), (i.e., project finance strategies, types of market players who are most active, equipment pricing and procurement strategies) and what future changes you anticipate in the marketplace.

### **Steps to a Sustainable Market**

23. How would you define a "sustainable RE market" in NY, and how close is New York to achieving those conditions?
24. Of all the different policy and market design options available to policy-makers to lay the groundwork for developing a sustainable renewable energy market in New York, which are most essential? By sustainable, I mean a market that will sustain at least 25% RE supply in NY without state incentives.

[Do Not Read, offer as suggestions only]

- k. RPS
  - l. Regional attribute tracking system,
  - m. Other financing methods, such as feed-in tariffs
  - n. PPA requirements for utilities / Load-Serving Entities
  - o. Other
25. Can the voluntary market grow to the scale necessary to support 25+% renewables supply in the state going forward?

### **Interconnection and Impacts on the Grid**

26. Has the RPS affected New York's energy system reliability in any way, or do you anticipate any reliability problems as a result of renewable added to the grid through the RPS program?

- 
27. What would incentivize new renewable energy generation to locate closer to load centers or pockets? Is this important to do?
  28. Are all the issues that may arise with intermittent renewable capacity being addressed adequately?

### **Voluntary REC Market**

29. How do you think the NY RPS program affects the supply and price of RECs that are available to participants in the voluntary REC market in NY?
30. What are the greatest strengths and weaknesses of the current Environmental Disclosure Program administered by the Department of Public Service?
  - b. Are you concerned about the possibility of double-counting RECs under the existing program?
31. On a scale of 1-5 with 1 being “unimportant” and 5 being “critical to the future success of the voluntary market in NY”, how important is it for NY to adopt an attribute tracking and trading system such as those in place in PJM and NEPOOL?

### **VIII. WRAP UP**

32. If there were three (3) things you could change about the NYSERDA RPS program or New York’s renewable energy policies what would they be?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



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**Appendix F**  
**GREEN POWER MARKETERS INTERVIEW GUIDE (NON-PARTICIPANTS)**

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## Interview Guide Green Marketers

Date/Time:

Interviewer:

Interviewee:

Title:

Company:

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**Interviewer:**

**Suggested interviewees:**

### **Recruitment Script**

Hi my name is \_\_\_ and I am calling from KEMA/Nexus Market Research to ask you some questions about the voluntary green power market in New York, and New York's RPS program. The New York State Energy Research and Development Authority (NYSERDA) is the administrator of the RPS program, and has hired my company to evaluate the program and to assess renewable energy market conditions in the state. Any input you provide will not be attributed directly to you or your company.

*[If prospective interviewee expresses concern about confidentiality or our purposes, note that they can contact Carole Nemore at NYSEDA (518-862-1090 ext. 3217, or NYSEDA's attorney, Peter Keane at ext. 3366) to confirm that Summit Blue/KEMA have been hired to conduct the assessment and has signed a confidentiality agreement.]*

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## Introduction

Thank you for taking the time to talk with me about the voluntary green power market in New York, and New York's RPS program. Our call should take about half an hour.

## Company Background (All Companies)

1. What is your company's role(s) as it relates to the renewable energy industry in New York?
2. In addition to supplying green power / RECs, does your company also **develop** renewable energy generation projects? If so, which technologies? [CIRCLE APPROPRIATE RESPONSES]
  - a. None
  - b. Biogas
  - c. Wind
  - d. Solar PV
  - e. Fuel Cells
  - f. Other [SPECIFY] \_\_\_\_\_
3. Into what markets do you sell RECs from these projects?
  - a. NY RPS market
  - b. NY voluntary market
  - c. Other states' RPS markets
  - d. Other compliance markets outside of NY? Which ones?
  - e. Other voluntary markets outside of NY? Which ones?
4. What other energy business areas does your company engage in?

## Questions for ESCOs (Retail Suppliers ONLY):

5. We're aware of the following green product offerings which your company makes available to customers in New York (briefly summarize and ask them to clarify as needed):

**[Complete table prior to interview, and fill in any blanks through discussion with interviewee]**

<b>Product</b>	<b>Structure (block v. %)</b>	<b>Where sold in NY (utility territory / statewide)</b>	<b>Prices (\$/kWh)</b>	<b>Resource Mix (% wind, solar, biomass, hydro)</b>

6. Are your commodity offers targeted to residential or nonresidential customers or both?

b. Same question for your green offers

7. Do you offer green products in every service territory where you offer commodity service?

If no, how did you determine where you wanted to offer green products?

8. Can you estimate how many NY customers you have overall and by different utility service territories or rank your firm in terms of number of customers enrolled if you are participating in Retail Access?

9. In which sectors do you have the most NY customers? Rank by your market size:

- Residential
- Commercial – small
- Commercial – large
- Municipal/Schools
- Institutional
- Industrial

10. Have sales of green products increased or decreased since 2006 when NYSERDA's RPS program went into effect (i.e. RPS surcharge began being collected and Main Tier program started entering into REC contracts)?

11. Do you have long standing relationships with specific renewable generators?

- a. Are purchase arrangements for RECs long term or short term?

**Questions for Green Brokers ONLY:**

12. We're aware of the following green product offerings which your company makes available to customers in New York (briefly summarize and ask them to clarify as needed):

**[Complete table prior to interview and fill in any blanks through discussion w/ interviewee]**

Product	Structure (block v. %)	Where sold in NY (utility territory / statewide)	Prices (\$/kWh)	Resource Mix (% wind, solar, biomass, hydro)

13. What proportion of your sales of RECs are:
- (a) Sales to distribution utilities or LIPA (in which the utility or LIPA actually takes title to RECs / attributes),
  - (b) Sales to ESCOs (competitive electricity suppliers), i.e. Constellation, ConEd Solutions
  - (c) Sales to end use residential and/or nonresidential customers (either directly to customer, or in which your company is able to market RECs for sale to customers via a utility program- i.e. NGRID's GreenUp program)
14. Are your direct green offers primarily targeted to residential or nonresidential customers or both?
15. Do the characteristics of your current offers differ from the green products offered to end use customers in 2006 or 2007?

If yes, why did the offers change?

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If yes, how have the offers changed?

16. Have you had long standing relationships with specific renewable generators or does the source of your REC's vary from quarter to quarter?
  - a. Are your REC purchase arrangements with generators or their agent's long term or short term in nature?

**New York's RPS-related Polices and Program Processes (All Companies)**

17. New York aims to meet 1% of the state's electric load with new renewable energy supported by the voluntary market by 2013 (about 1.8 million MWh total by 2013). Does this 2013 goal seem realistic to you? [NOTE HOW MUCH VOLUNTARY MARKET SUPPLIES TODAY.]
  - a. Do you know if any of your REC suppliers also participate in NYSERDA's main-tier program?
18. Do you think the RPS main-tier program's REC purchases affect the voluntary green power market in general and your company specifically? For example;
  - a. Does the RPS program affect the price or availability of voluntarily purchased RECs?
  - b. Does the RPS program affect how contracts are structured with either renewable generators and/or REC suppliers? *[For example, NYSERDA's program provides for 10 year contracts, credit requirements, and has a provision which allows RPS-funded projects to sell up to 70% of their Capacity to the voluntary market].*
19. In your opinion is the central procurement model for RPS (NYSERDA is the central administrator) the preferable approach or are there alternative approaches that could be more effective?
20. Do you believe that there is an adequate supply of RECs available to the voluntary market at this time? If no, what quantity of RECs needs to be made available to meet the current demand?

How could policies be modified to ensure that the supply is adequate in the future?

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[If they have no suggestions, may want to provide possible examples such as:

- a. NYSERDA establish a lower cap on percentage of a project's output that NYSERDA can procure through main-tier (i.e., lower than 95%)
  - b. NYSERDA buys more than RPS targets require and resells excess to the green power market
  - c. NYSERDA requires upfront production sold to the voluntary market;
  - d. NYSERDA underpins green market through risk insurance]
21. For distributed generation that has received RPS support, e.g., PV, small wind, fuel cell and ADG technologies, NYSERDA currently owns their RECs for 3 years. Is this duration reasonable? If not, how long should NYSERDA own RECs generated by RPS-supported DG?

#### **Attribute Tracking System Questions (All Companies)**

22. What are the greatest strengths and weaknesses of the current Environmental Disclosure Program administered by the Department of Public Service?
- a. Are you concerned about the possibility of double-counting RECs under the existing program?
23. How does NY's lack of regionally compatible tracking and trading system affect your business?
- a. Do you take additional steps, beyond participating in NY's Environmental Disclosure Program (conversion transaction process), to verify RECs sold in your NY products?
  - b. Is it necessary to take these additional steps in order to get certified by Green-e or ERT?
24. Please describe any key differences between NY's conversion transaction system and the NE-GIS and PJM-GATS tracking and trading system in terms of ensuring integrity in the voluntary and compliance REC markets in NY.

- 
25. On a scale of 1-5 with 1 being “unimportant” and 5 being “critical to the future success of the voluntary market in NY”, how important is it for NY to adopt an attribute tracking and trading system such as those in place in PJM and NEPOOL?

**Green Power Demand (All Companies)**

26. Approximately how many MWhs of energy and/or associated REC attributes are you currently selling to NY customers, (or as of 2007)?
27. Have sales of green products increased or decreased since 2006 when NYSERDA RPS program got underway (i.e. when surcharge began and Main Tier REC contracts first signed- though note most projects not actually supplying RECs yet at that point)?
28. In your experience, what price premium are customers willing to pay in terms of \$/kWh and/or % over retail electric prices?
29. What annual growth rate do you expect during the next few years?
30. What annual growth rates have you experienced since 2004?
- a. Is your growth or decline attributable to the New York RPS? Explain.
31. What are the main drivers behind your customers’ purchases of green power?
- a. \_\_\_\_\_ public relations benefits / image
  - b. \_\_\_\_\_ environmental commitment e.g. Climate change?
  - c. \_\_\_\_\_ state mandate (Executive Order 111)
  - d. \_\_\_\_\_ corporate environmental policy requires green power purchases
  - e. \_\_\_\_\_ to obtain LEED certification
  - f. \_\_\_\_\_ Other (specify)
32. Which resource types (wind, biomass, hydro, etc.) are New York voluntary market customers most interested in, and which resources are they opposed to?
33. Is energy generated by “local” renewable resources important to your New York customers?

- 
- a. If yes, how is “local” defined: in-state, northeast, within utility service territory?
- b. How much of your products’ REC supply comes from local sources (%)?
34. Is a certification such as “Green-e” or “ERT” important to your customers?
- a. [IF YES] Is such a certification easy or difficult to obtain for selling into the NY market?
35. The average bid price of attributes NYSERDA contracted to purchase during the second RPS Main Tier solicitation was \$15/MWh. How does this compare to the REC prices generators charge to voluntary market participants like your company? Please specify how prices compare to the price paid by NYSERDA in 2007, by technology:
- a. \_\_\_\_\_% [higher/lower] for the voluntary market for **solar** RECS
  - b. \_\_\_\_\_% [higher/lower] for the voluntary market for **wind** RECS
  - c. \_\_\_\_\_% [higher/lower] for the voluntary market for **biomass** RECS
  - d. \_\_\_\_\_% [higher/lower] for the voluntary market for hydro RECS

**Barriers (All Companies)**

36. What are the biggest barriers facing the voluntary REC market?
- [Rank each barrier from 1-5, “1” meaning the barrier was insignificant, “3” meaning the barrier was a significant nuisance and added time or expense to the development process, and “5” meaning the barrier posed a critical threat to your project’s viability.]
- a. \_\_\_\_\_ REC prices are too high
  - b. \_\_\_\_\_ Green power marketers / suppliers are unable to negotiate low enough long-term REC prices (i.e., due to the low volume they are able to commit to purchase from RE generators)
  - c. \_\_\_\_\_ Green power marketers / suppliers are unable to get access to enough RECs (i.e., because such a large volume is being sold to NYSERDA through the Main Tier RPS program)

- d. \_\_\_\_\_ Customers unwilling to pay any premium for electricity given rising electricity costs
- e. \_\_\_\_\_ Lack of customer awareness
- f. \_\_\_\_\_ Lack of customer interest
- g. \_\_\_\_\_ The logistics of purchasing RECs/green power products are too cumbersome (i.e. it's not part of the standard electric billing system and/or switching suppliers is too cumbersome)
- h. \_\_\_\_\_ Lack of trust for green power suppliers (i.e. doing business with new companies)
- i. \_\_\_\_\_ Lack of trust / credibility for the concept of RECs and buying "green power"
- j. \_\_\_\_\_ Insufficient marketing/sales efforts by green power marketers
- k. \_\_\_\_\_ Insufficient policies to support the market
- l. \_\_\_\_\_ Other (please specify)

37. What should be done to reduce these barriers?

- a. \_\_\_\_\_ Education/awareness campaigns
- b. \_\_\_\_\_ Business support for green power suppliers and marketers
- c. \_\_\_\_\_ Other (please specify \_\_\_\_\_)
- d. \_\_\_\_\_ Other (please specify \_\_\_\_\_)
- e. \_\_\_\_\_ Other (please specify \_\_\_\_\_)

**Market Conditions (All Companies)**

38. How would you describe the market conditions for green power purchasing in New York?

- a. [IF NOT ANSWERED ABOVE] Relative to other states?
- b. [IF NOT ANSWERED ABOVE] How would you characterize the activity level with respect to the market's potential?
- c. [IF NOT ANSWERED ABOVE] What about the number of active firms?

39. How have voluntary green power market conditions changed in New York in the past 4 years?

40. How do you anticipate the market will change going forward?

- 
- a. What, if any, will be the effect of the Regional Green House Gas Initiative on the voluntary REC market?
41. How would you characterize the potential for future growth of the voluntary green power market in New York relative to other states? [READ DESCRIPTIONS ALOUD; DO NOT READ SCALE]
- 5 Much better than average
  - 4 Better than average
  - 3 About the same
  - 2 Worse than average
  - 1 Much worse than average
  - 0 No Opinion/ refused
42. How important a role do REC aggregators play in the New York voluntary green power market today versus in other markets, and how do you see this changing in the future?
43. Does the voluntary green power market in NY skew towards a particular resource or resources? If yes, why?

#### **Steps to a Sustainable Market (All Companies)**

44. What can NYSERDA do to ensure a vibrant Voluntary Market? [DON'T READ: e.g. marketer incentives; publicly funded public education/marketing campaign]
45. Of all the different policy and market design options available to policy-makers to lay the groundwork for developing a sustainable renewable energy market in New York, which are most essential? By sustainable, I mean a market that will sustain at least 25% RE supply in NY without state incentives.

[Do Not Read, offer as suggestions only]

- p. RPS
- q. Regional attribute tracking system,
- r. Other financing methods, such as feed-in tariffs
- s. PPA requirements for utilities / Load-Serving Entities
- t. Other

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46. In your opinion, how likely is it that New York state will ultimately be able to sustain its 25% renewable energy supply in the state relying solely on voluntary market activity?

u. How long do you think this would take?



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**Appendix G**  
**MUNICIPALITIES WITH RENEWABLE ENERGY PROJECTS INTERVIEW GUIDE (NON-**  
**PARTIPANTS)**

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## Interview Guide Municipalities

Date/Time:

Interviewer:

Interviewee:

Title:

Agency:

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**Interviewer: KEMA Inc.**

**Suggested interviewees:** Municipalities where NYSERDA projects are located

### 2. Recruitment Script

Hi my name is \_\_\_ and I am calling from KEMA to ask you some questions about New York's program to support renewable energy development in the state, the Renewable Portfolio Standard (RPS) program. The New York State Energy Research and Development Authority (NYSERDA) administers this program, and has hired my company to evaluate the program's impact. I'm interested in talking with you about how renewable energy project development (wind, biomass, hydro, solar) affects your community, and about any needs or concerns your community might have with regard to renewable energy development.

We'd like to speak with a city / town official who is familiar with past and potential future renewable energy project development in the community. Are you an appropriate person to talk to about these issues? [*Obtain contact info for alternative interviewee if*

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necessary.] Could we schedule a time in the next couple of weeks to talk for about a half an hour?

### **3. Introduction**

Thank you for taking the time to talk with me about your community's experience with renewable energy development. Our conversation should take about a half an hour.

### **4. Background & Program Awareness:**

1. Are you aware of the New York State RPS program and its goals?

*[If no, explain that the program has a goal of achieving 25% renewable energy penetration for New York by 2013. The program encourages project development at two levels, Main Tier (large projects, through long-term REC contracts) and Customer Tier (small projects, through direct financial incentives) and focuses on technologies such as Wind, Biomass, Solar, Hydro, and Landfill Gas.]*

2. Does your community support the goals of the program?
  - a. Can you characterize the public groups that oppose or support renewable energy projects in your community? Does this vary by technology, e.g., wind, biomass, hydro?
  - b. Can you characterize the local government position on renewable energy and how that may differ from the residents?
3. Can you describe the renewable energy project development (large and small) that has occurred or is planned in your community?
4. If renewable energy projects have been developed in your area, what role did you play in the project approval/development process for your area (i.e., permit review, representing public opinion in communications with developer, etc.)?
5. In general, do the public officials in your community view renewable project as favorable or unfavorable to your area –?

### **5. Impact to the Community (Economic Development)**

- 
6. Does your community offer tax breaks or incentives to developers of renewable projects outside of staxes breaks or incentives offered by the State or federal government?.
  7. The New York RPS program evaluates proposed project based on their expected Economic Development benefits, taking into account: long-term and short-term jobs, payments to landowners for access to resources, local taxes and/or host community payments, and the purchase of goods and services to construct and operate the project.,

Do you think those categories accurately reflect the increased economic activity resulting from new renewable energy projects in your community?

8. How are Host Community agreements or PILOT agreements negotiated? Are they fair?
9. How are landowners agreements negotiated? Are they fair?
10. Which types of renewable energy technologies are most acceptable to the community?
11. Which type of renewable energy projects such as wind, solar, and biomass do you believe will bring the greatest economic development benefits to your community?
12. Did your community visit or contact other communities to learn about the impact of existing renewable energy projects ?
13. If projects have already been built in your community, is there evidence that any economic development benefits have occurred?
14. Have there been any “promises” made by the developer to the community that have been broken or compromised? Please explain.
15. Does your community have any greenhouse gas emission reduction goals, or do you encourage projects that can help reduce emissions in your area?

## **6. Siting of Projects**

16. Can you explain the permitting process renewable energy projects must go through in your community?

- 
- a. Is this process significantly more / less rigorous than in other communities in your area?
  17. Do you support the adoption of a more streamlined “one stop shopping” permitting process for power plant development in New York
  18. Are there any zoning ordinances (e.g., . height restrictions) that pose a particular barrier to certain types of renewable energy projects in your community?
  19. Has your community taken any steps to support renewable energy project development through zoning or other measures? If so, what?
  20. Are you aware of any actions in your area to try to keep renewable projects out or create barriers to their development?
    - a. If so, who are the main objectors to the projects and why do they oppose development of renewable projects?
    - b. How successful were those objectors in their efforts to stop project development?
  21. Is / was there a group of individuals or businesses in the community who spoke out in favor of the project?
    - a. If so, who are the main supporters of the projects and why do they support development of renewable projects?
    - b. How successful were those supporters in their efforts to bring about project development?
  22. Did either support or opposition groups seek the help or support of other communities and if so, how did that transpire?
  23. Do you see any major barriers to renewable projects being installed in your area?
    - a. If so please list some barriers
  24. Do you feel the RPS program has made inroads in removing those barriers and assisted in getting more renewable energy projects constructed? In New York? In other states?

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25. Has your community considered the fact that added transmission capacity may be needed to take advantage of more renewable energy development in the future, and do you think there would be viable locations/routes for adding transmission capacity in your community?

**7. General Topic Areas:**

26. Do you believe the New York RPS program provides enough assistance to communities that are looking to evaluate the benefits of renewable energy or to get questions answered regarding projects?

a. If not, what additional steps should be taken by the state to assist communities?

27. Do you believe there are any gaps in New York's portfolio of renewable energy programs or policies?

28. Are you familiar with other RPS activities in other states?

a. If so how do you feel New York compares?

29. Do you have any recommendations for the next RPS solicitation, or any other recommendations about how to make the program more fair, flexible, transparent or efficient?



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**Appendix H**  
**DISTRIBUTION COMPANIES INTERVIEW GUIDE (INCLUDING LIPA AND NYPA)**

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## Interview Guide Distribution Utilities

Date/Time:

Interviewee:

Title:

Company:

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### **Suggested interviewees:**

#### **INTERVIEW RECRUITMENT SCRIPT**

My company is conducting an assessment for NYSERDA to assist in the evaluation of New York's RPS program. Our assessment will be part of a report to the New York Public Service Commission in 2009 that will guide the future direction of New York's RPS program strategies. As part of the assignment we're interviewing a range of stakeholders in the energy marketplace in New York. Given that your company is a key stakeholder in the New York energy market your input is of great importance to this effort.

*[If prospective interviewee expresses concern about confidentiality or our purposes, note that they can contact Carole Nemore at NYSERDA (518-862-1090 ext. 3217, or NYSERDA's attorney, Peter Keane at ext. 3366) to confirm that Summit Blue has been hired to conduct the assessment and has signed a confidentiality agreement.]*

We are seeking to talk to someone familiar with the NYS RPS program and who plays a key role in energy procurement or business planning for your company. Do you think you or another person at your company would be in the best position to discuss these issues?

**[Schedule interview or obtain contact information for a more appropriate person at the company.]**

Is there a time that would be convenient for you to talk about these issues in the next week or two? The call should take about a half hour.

**INTERVIEW INTRODUCTION SCRIPT (once interviewee is on the phone)**

My company is conducting an assessment for NYSERDA to assist in the evaluation of New York’s RPS program. Our assessment will be part of a report to the New York Public Service Commission in 2009 that will guide the future direction of New York’s RPS program strategies. As part of the assignment we’re interviewing a range of stakeholders in the energy marketplace in New York. Given that your company is a key stakeholder in the New York energy market your input is of great importance to this effort.

**ALL INTERVIEWEES**

1. What is your title and what are your primary responsibilities?

**Voluntary Green Power Programs / Market**

**GREEN POWER PROGRAM STAFF ONLY**

**[Summit Blue]**

2. I see from your website that your company offers **XYZ** green power program (briefly summarize our understanding of the program (fill in table below prior to interview) / no green power program. [Ask interviewee to clarify program details as needed (i.e. whether the utility takes title to attributes or not, whether they have an exclusive deal with any REC suppliers, etc.).

[Complete prior to interview to extent possible)

[Green Power Product / Program Name]	Details
(A) Utility takes title to RE attributes (either bundled with energy or not) and resells to customers OR (B) utility grants	

REC suppliers marketing access to their customers	
Targeted to which customer classes (res, commercial, other)?	
(A) Sold as % of load OR (B) in blocks OR (C) other format	
Resource mix (i.e., % wind, hydro, biomass, etc.)	
Price premium	
(A) Utility has exclusive relationship with one REC supplier OR (B) Utility allows multiple REC suppliers to participate in program (ask interviewee to explain how REC suppliers are selected for program)	

3. Is or was your company required to offer green energy, or do you provide it voluntarily?
4. For how many years have your offered this product / program? (we can ask how many years)
5. What is the customer participation rate for your green power program?
  - a. Did the participation rate change after the RPS surcharge went into effect in 2005?
  - b. Are there other factors that may have affected the participation rate in the last few years?
6. Why do you think customers are willing to pay a price premium?
  - a. Has this willingness to pay a premium changed since the RPS went into effect?

### Attribute Tracking System

7. What are the greatest strengths and weaknesses of the current Environmental Disclosure Label Program, and conversion transaction processes administered by the Department of Public Service?

- 
- a. Are you concerned about the possibility of double-counting attributes under the existing system?
  - b. Does the system limit the type of market transactions that can take place in any way (i.e., bilateral contracts with out of state generators, etc.)?
8. Please describe any key differences between NY's conversion transaction system and the attribute tracking systems used in New England and PJM (NE-Generation Information System and PJM-Generation Attribute Tracking System) ***in terms of ensuring integrity in the voluntary and compliance REC markets in NY.***
  9. Would you prefer to use an electronic attribute tracking system (similar to those used in New England or PJM) instead of the Environmental Disclosure Label Program / Conversion Transaction Approach?
  10. If NY were to implement a system similar to the systems in place in New England and PJM, are there any things you would like to see done differently in NY?

**ONLY For utilities taking title to RE (direct purchase of RE; not just allowing GP provider to sell RECs/Attributes to utilities customers)**

11. How does the price premium you pay for wholesale RE compare to the attribute/REC prices being paid by NYSERDA in the RPS program (For comparison, the average weighted price the RPS paid in 2007 was \$15/MWh).
  - a. Can you say what prices you are paying for the renewable attributes?
12. How do you think the NY RPS program affects the supply and price of RE that your company can purchase for its customers?
13. From what resource types are you purchasing energy? For each type, can you describe:
  - a. Where are these facilities located?
  - b. What is the contract length?

- 
- c. What mechanisms (contractual provisions or other) are you using to manage risk with regard to these contracts?
14. Do you think the RE development occurring in NY is suppressing wholesale electricity prices? Why or why not? (*Good question, some estimates had prices declining 15%*)

## **NYS RPS Program and Renewable Generation Capacity**

### **ALL INTERVIEWEES**

#### **[Summit Blue]**

15. Do you think the NYS RPS program is helping to get renewable energy capacity built in the State, or do you think it would be happening anyway?
- a. In the absence of the RPS program, what % of the current large-scale renewable energy development activity would still be taking place?
16. What are your views on the approach used by the NYS RPS program, which centralizes the purchase of attributes for the RPS program under long-term contracts issued by NYSERDA?
- a. What are the strengths and weaknesses of the RPS centralized program in terms of fostering the development of a sustainable renewable energy market in NY?
  - b. Has your company's position on this issue changed since the RPS initially went into effect? [*Or alternatively, do you think the utilities would be more interested today in playing a role in administering the RPS than they were in 2004?*]
  - c. NYSERDA has not procured enough attributes to meet its annual targets. In other states, LSE's pay an "Alternative Compliance Payment" if they fail to meet annual RPS targets. What steps do you think NY could take to ensure that the state meets its annual RPS targets?
    - i. [*Ask as follow up probe only if doesn't come out in response to main question*] Do you think it would be practical for the state to move to a system of "hard targets" with some sort of penalty for non-compliance, and if so, what type of enforcement approach would be appropriate?

- 
17. How do you think utility companies can better coordinate with NYSERDA on achieving the RPS goals?
  18. What is your company's experience with collecting the RPS surcharge?
    - a. Do you think it should continue to be collected jointly with the Systems Benefits Charge (SBC) or separated?
  19. Do you have any recommendations for how the state should integrate the Energy Efficiency Portfolio Standard program with the RPS program and surcharge?
  20. Does the RPS surcharge affect energy sales or the public image of the utilities in any way?
    - a. Do you think the RPS surcharge is equitably distributed among ratepayer classes? (Currently large manufacturers do not pay the RPS/SBC surcharge. Do you think this is justified?)
    - b. For a typical residential customer, what is the typical annual RPS surcharge?
  21. Have any of the following RPS-related factors had a positive or negative impact on reliability or costs?
    - a. Integration of distributed generation into the grid
    - b. Integration of intermittent generation resources into the grid
    - c. Interconnection of renewables
    - d. Net metering
    - e. Other
  22. Does your company have or are you forming proposals for ratemaking changes to better account for the value and quality of renewable energy, taking into consideration such factors as:
    - a. contributions to peak load
    - b. intermittency
    - c. reliability of supply forecasting
    - d. capacity factor
  23. [ONLY IF COMPANY DOES NOT CURRENTLY OFFER A VOLUNTARY GREEN POWER PROGRAM] Do you plan to offer a green power program for your customers in the future?

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## Impact on the Grid

### UTILITY INTERCONNECTION / TECHNICAL CONTACT ONLY

[KEMA]

24. Are you seeing any impacts that RE projects are having on the grid in New York or in your service territory specifically?
- How do these impacts differ between projects over 1 MW and under 1 MW? (1 MW is the threshold used in the RPS to define Main Tier projects vs. DG or “Customer-sited” projects.)
25. How is your company handling these impacts? Does your company need new equipment or operational systems to accommodate the growth of: [read list, then ask about each individually]
- Renewable generation
  - Distributed generation
  - Intermittent resources
26. From a T&D planning perspective, is there a threshold you use to differentiate between large-scale vs. small-scale projects? [If necessary, interviewer should clarify: “For example, one utility that we spoke with has one department that handles interconnection of facilities of 20 MW or greater and another department for smaller facilities, reflecting the NY ISO definition of large and small-scale facilities. Does your company make a similar distinction?”]
27. How do you think interconnection and related grid improvement costs should be shared among ratepayers, utilities and RE project developers:
- For Main Tier resources (including those located far from existing infrastructure)?
  - For RPS Distributed Generation/Customer-Sited Tier resources?
28. We’ve heard from some developers that different utilities require developers to bear different portions of interconnection costs and that the lack of standardization across utilities is a development barrier.
- How does your company determine how much cost should be borne by the developer?
  - Do you know of any “gray areas” in the interconnection tariff that have led to ongoing disputes between utilities and

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developers about who has to bear specific interconnection costs?

- c. What kind of standardization across utility territories would be feasible or appropriate?
29. How important is it to encourage RE generation to locate near load centers or pockets and how would you recommend incentivizing this?
30. Are the ISO and the State adequately addressing intermittency issues associated with wind and solar generation on the NY power grid?
31. Do you think that NYSERDA and/or the utilities should fund research and deployment of technologies that help integrate large renewable energy projects into the grid, such as advanced energy storage systems and improved wind forecasting systems?
32. Advocates of particular renewable energy technologies have claimed transmission-related benefits that are specific to their technologies. What effects do you think the following technologies will have on the grid??
- a. PV and offshore wind, which tend to generate the most power during periods of peak demand, but are also intermittent.
  - b. Pumped hydro, which can be used for energy storage.
  - c. Any other renewable technologies that you can think of.

**CON ED ONLY**

The City of NY has issued an RFP for 2 MW of PV to be installed in the City.

- 33. How are or would your company accommodate such a requirement of additional supply?
- 34. What are the advantages or problems with an RFP approach to new generation in your service territory?
- 35. Can you explain why your “network” grid poses more interconnection/disconnection difficulties than other service territories? (Do not like this question at all, straying from an RPS Evaluation purpose)
  - a. How should the RPS accommodate these constraints?

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LIPA ONLY

*Background:*

- *Solar Pioneers Program: 5- to 20- year REC, energy and capacity contracts for PV projects >100 kW*
- *50 MW PV RFP: issued April 2008. Bundled PPA contracts (energy and attributes) for projects minimum of 100 kW (non-res) in size (open to variety of possible contract structures).*
- *General RE RFP: issued November, 2007. The RFP requests 150 GWh beginning July 1, 2008 and another 150 GWh beginning July 1, 2009 for a term of 10 years.*
- *Their website refers to some land-based wind projects, but no program details and last project was done in 2005 (100 kW). Also, they did an offshore wind RFP last year but found it to be too expensive a resource. However, cost assumptions were MUCH higher than bids that have come in in other places like NJ.*

37. We recognize that LIPA is not required to meet any specific RPS targets presented in the 2004 PSC Order that established the RPS, but that LIPA has voluntarily established a goal of 24% RE by 2013. This is 1% lower than the statewide RPS, but represents an 8-10% incremental increase, which is higher than the 6% statewide. We're aware of your Solar Pioneers program, as well as your 50 MW Solar RFP and your RFP for 10 year contracts renewable energy contracts.
- a. Do you offer any additional renewable energy programs that we haven't noted here?
  - b. Could you describe your progress to date toward achieving LIPA's RE target, and the kind of response you've received to your RE programs so far?
  - c. We've seen reference to a \$355 million Clean Energy Initiative. Does this budget include all renewable energy efforts you have underway? If so, what portion of the budget is allocated to renewable energy efforts?
38. Whereas NYSERDA only purchases unbundled attributes, LIPA's December 2007 RFP solicited bundled renewable energy contracts. What do you see as the advantages and disadvantages of making a bundled purchase, as opposed to just buying attributes only?
39. It's our understanding that the NYSERDA and LIPA rebates for PV are similar in amount (NYSERDA offers a \$3-\$5/Watt rebate and that LIPA offers \$3.50/Watt for private projects and up to \$4.50/W for public projects). Are there any key

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differences between the two programs that we should be aware of (i.e. budget-how many systems does LIPA think it can support with its budget)? (This is a customer-sited tier comparison.)

40. Does LIPA own the attributes associated with PV projects installed through the Solar Pioneers Program or for the small wind projects that have been installed in LIPA territory?
41. How important is it for LIPA and its customers to have a regionally compatible tracking and trading system for Renewable Energy Credits?
42. What are the strengths and weaknesses of the RPS central procurement approach being implemented for the rest of New York in terms of fostering the development of a sustainable renewable energy market in NY?
  - a. How do you think the market would have responded if NY had structured its RPS the way most other northeastern states by requiring utilities to secure a set % of RE resources?
43. Do you think LIPA's RE program could be better coordinated with NYSERDA's and take advantage of synergies?
  - a. What about collaboration on offshore wind projects or other mutually beneficial projects that could serve the downstate region, including both NYC and Long Island?
44. Is New York adequately addressing intermittent resource issues (i.e., the capacity value of PV to contribute supply at peak times) and the need for added transmission capacity?
  - a. Is LIPA taking any specific steps to address these issues?

**NYPA ONLY (Public Authority Serves State and Local Government Customers)**

45. We recognize that NYPA is not subject to the Public Service Commission's regulatory purview, and therefore is not required to meet any specific RPS targets presented in the 2004 PSC Order (see pg 11 of Order), though they are strongly encouraged to implement comparable programs to increase renewable energy supply.
  - a. Is NYPA working to achieve the specific RE supply target by 2013, as encouraged by the 2004 PSC Order?
  - b. We recognize that hydro comprises a significant percentage of NYPA's supply portfolio. Does NYPA purchase generation from any other renewables for the purpose of increasing its RE supply, or do you plan to do so in the future?

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- c. We're aware of NYPA's success installing over 600 kW of PV, and a number of fuel cells (4 operational and 6 others in pipeline). What additional efforts are underway?
46. What type of incentive or finance structure do you use for PV, anaerobic digesters and fuel cell projects? How much of the installation is paid for by the host site? [Note: website explains they finance construction of their projects through bond sales to private investors, repaying bondholders with proceeds from our operations.]
47. Is NYPA's RE program sufficiently coordinated with NYSERDA's RPS program?
- a. By technology? (customer-sited technologies) such as: at ADG installations at municipal wastewater treatment plants?
48. Do you see a role for NYSERDA or NYPA in promoting advanced technologies, such as storage, to help with integration of large renewable projects into the grid?
49. Which RE technologies are the most promising as investments for your government customers to save on energy costs?
50. Do you see a future role for aggregators of municipally owned attributes?
51. How important is it for New York to have a REC tracking system that is compatible with neighboring regions?
52. Is New York adequately addressing intermittent resource issues (i.e., the capacity value of PV to contribute supply at peak times) and the need for added transmission capacity?

**All Interviewees**  
**BOTH GREEN POWER AND GRID/INTERCONNECTION CONTACTS**  
 [Summit Blue]

**Barriers to Renewable Energy Development -**

53. What are the greatest barriers to utility-scale RE development in NY in general and in your service territory specifically? [Rank each barrier from 1-5, “1” meaning the barrier is insignificant, “3” meaning the barrier is a significant nuisance and added time or expense to the development process, and “5” meaning the barrier poses a critical threat to your project’s viability. For anything receiving a 3 or higher, ask for explanation, **including how the barrier is affecting prices.**]

<u>NYS</u>	<u>Service Territory or ISO ZONE</u>	
—	—	lack of availability of long-term REC or energy contracts
—	—	transmission constraints
—	—	interconnection costs and processes
—	—	cost of doing business in NY
—	—	cost of supplies and raw materials (increased by falling value of U.S.\$)
—	—	local opposition (NIMBYism)
—	—	permitting process
—	—	property taxes and/or payments in lieu of taxes
—	—	NY’s lack of compatibility with regional REC tracking & trading systems
—	—	availability of parts and supplies (turbines, gearboxes, etc.)
—	—	availability of qualified local workforce to perform O&M
—	—	federal incentives uncertainty
—	—	availability of suitable sites with adequate renewable resources
—	—	other

54. How do these barriers differ by technology?

55. What additional steps could or should the utility companies take to minimize these barriers?

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56. What additional steps should NY State take to minimize these barriers?

### **Market Conditions**

57. Which market factors have the greatest influence on energy and REC prices (i.e., wholesale price of electricity, prices being offered by other REC suppliers, equipment pricing and availability, project financing structure, etc.)?

58. Describe how RE market conditions have changed since NY first introduced its RPS (2004), (i.e., project finance strategies, types of market players who are most active, equipment pricing and procurement strategies) and what future changes you anticipate in the marketplace.

### **Steps to a Sustainable Market**

59. How would you define a “sustainable RE market” in NY, and how close is New York to achieving those conditions?

60. Of all the different policy and market design options available to policy-makers to lay the groundwork for developing a sustainable renewable energy market in New York, which are most essential? By sustainable, I mean a market that will sustain at least 25% RE supply in NY without state incentives.

a. Specifically, what is your opinion on using Feed-In Tariffs to incentive RE, instead of the RPS?

61. How do you think a carbon cap and trade market will affect the RE market and the RPS in New York? Please comment both on the RGGI market as well as a possible future national market.

62. Can the voluntary market grow to the scale necessary to support 25+% renewables supply in the state going forward?



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**Appendix I**  
**NYISO INTERVIEW GUIDE**

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## Interview Guide NYISO

Date/Time:

Interviewer:

Interviewee:

Title:

Company:

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**Interviewer: Summit Blue**

**Suggested interviewees:** NY-ISO representative who has worked on issues of wind integration.

### **INTERVIEW RECRUITMENT SCRIPT**

My company, [Summit Blue Consulting or KEMA,] is conducting an assessment for NYSERDA to assist in the evaluation of New York's RPS program. Our assessment will be part of a report to the Public Service Commission in 2009 that will guide the future direction of New York's RPS program strategies. NY-ISO's experience with issues related to increased renewable energy production in New York are important to our assessment.

We are seeking to talk to someone familiar with the NYS RPS program and who has a key role in NY-ISO's efforts to integrate intermittent renewable energy resources into the NY electric grid. Do you think you or another person at your company would be in the best position to discuss these issues **[Schedule interview or obtain contact information for a more appropriate person at the company.]**

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Is there a time that would be convenient for you to talk about these issues in the next week or two? We estimate that the interview will take about [one hour for participating developers, ½ hour for non-participating developers.]

**Interviewer: KEMA Inc.**

### **INTERVIEW INTRODUCTION SCRIPT (once interviewee is on the phone)**

As [we discussed over the phone / I noted in my email] we are conducting an assessment for the NYS Renewable Portfolio Standard program administered by NYSERDA. Thank you for taking the time to speak with me about renewable energy and your experience with project development in NY [*or elsewhere for non-participating developers*].

This call should take about an hour [*1/2 hour for non-participating developers*]. We have signed a confidentiality agreement with NYSERDA. Any comments you provide will not be attributed directly to you or your company

### **I. Background, Voluntary Market and Views on NY RPS**

6. Could you briefly describe your role with ISO and any experience you have dealing with issues of integrating intermittent renewables into the NY-ISO grid?
7. What are your views on the need for a REC tracking and trading system in NY?
8. What are your views on the NY RPS and NYSERDA's role as the central buyer of RECs under long-term contracts?
9. In the absence of the NY RPS program, what % of the current large-scale renewable energy development activity would still be taking place in the state?
10. Do you think the RE development occurring in NY is suppressing wholesale electricity prices? Why or why not?

### **II. Program Awareness:**

- 
11. Are you aware of the renewable energy targets for the NYSERDA RPS Program for 2013 [If not, summarize for them] and do you believe that the targets are attainable?
  12. The NYSERDA RPS program requires that generators located outside NY schedule and transmit electricity (MWh) into the NY-ISO grid for every hour that the participating generator is producing power (Note: can be from anywhere in the control area for intermittent resources, but must be from the injection point for non-intermittent resources). How much extra cost/burden does this place on out of state generators compared to in-state generators?
  13. How do you see the generation mix required to meet targets changing over time?
  14. What are some of the major challenges the program faces in meeting its RPS procurement targets going forward? Examples:
    - a. Does NY have enough renewable resources?
    - b. Does NY have the potential to meet targets

## **VI. Impact on the Grid**

15. What impact do you think renewable energy project development will have on the Grid in New York, both in terms of what has been developed to date, and in terms of what will be needed to meet the 25% target by 2013?
16. How are these potential impacts being planned for or handled by your organization?
17. How much intermittent resources do you believe can be added to the grid without creating integration problems for the system? Answer in percent or MW
  - a. Recent studies have shown that NY can handle about 3,300 MW of wind, do you believe this to be correct?
18. Do you believe enough is being done to account for issues that may arise when renewable supply nears 25% of the total system mix?
19. Do you see a role for NYSERDA in promoting advanced technologies, such as storage, to help with integration of large renewable projects to the grid?

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20. Do you see a role for NYSERDA in funding improved wind forecasting, to reduce uncertainties associated with wind energy?

21. Do you see any benefits to the grid or to wholesale electricity costs from adding more renewables to the supply mix?

c. If so please list

## VII. General Topic Areas:

22. In the NY-ISO's recent 2008 Power Trends report there is discussion of the importance of NY passing a streamlined "one-stop" permitting process for new power generators, and the fact that passage of such a bill has been difficult. Can you explain the main opposition to a streamlined permitting process, as well as the main counter-arguments?

23. Have there been any major contracting and program compliance issues that you are aware of ? If so please tell me about them

24. Are you aware of interaction between the New York RPS and other states' renewables programs if any?

25. Do you believe there are any gaps in New York's portfolio of renewable energy programs or policies?

26. In general, how would you rate New York's RPS relative to other states' RPS activities?

5 : Much better than average

4 : Better than average

3 : About the same

2 : Worse than average

1 : Much worse than average

0 : No Opinion/ refused

## II. Barriers

27. In your opinion, what are the greatest barriers to utility-scale RE development in NY [Rank each barrier from 1-5, "1" meaning the barrier is insignificant, "3" meaning the barrier is a significant nuisance and added time or expense to the

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development process, and “5” meaning the barrier poses a critical threat to your project’s viability. For anything receiving a 3 or higher, ask for explanation.]

- availability of long-term REC or energy contracts
  - transmission constraints
  - interconnection costs and processes (specify which was focus of respondent feedback)
  - cost of doing business in NY
  - cost of supplies and raw materials (increased by falling value of U.S\$)
  - local opposition (NIMBYism)
  - permitting process
  - property taxes and/or payments in lieu of taxes
  - compatibility of NY with regional REC tracking and trading systems
  - availability of parts and supplies (turbines, gearboxes, etc.)
  - availability of qualified local workforce to perform O&M
  - federal incentives uncertainty
  - availability of suitable sites with adequate renewable resources
  - other
- 

28. What additional steps should NY take to minimize these barriers?