Northeast RPS Compliance Markets:
An Examination of Opportunities to Advance REC Trading

Prepared for Clean Energy States Alliance

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CENTER FOR ENERGY, ECONOMIC & ENVIRONMENTAL POLICY

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PREFACE

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A new financing tool – renewable energy credits (RECs) – has been promoted in recent years as a flexible, market-based mechanism to value and trade the environmental attributes of clean energy production. With the advent of many recently enacted policies establishing mandatory minimums for renewable energy procurement, RECs are intended to facilitate renewable energy development though a tradable commodity that can facilitate the monetization of the bundle of attributes associated with clean power.

To date, RECS are defined by state-based policies commonly known as renewable portfolio standards (RPS). While the proliferation of RPS policies (quickly approaching half of the 50 states) is certainly encouraging and indicative of the widespread appeal of clean energy, the seemingly small differences from state to state are, in practice, limiting one of the great opportunities these policies offer – building true regional markets for clean energy.

The definitions of eligible technologies vary from state to state. The requirements for how the underlying electrical power must be delivered also vary. In some cases, these differences arise from different legislative goals in each state, often reflecting dual ambitions of promoting clean energy and economic development. However, more often, these differences seem to arise from a lack of coordination in how the implementation details for these novel policies are developed.

The result of these differences from one jurisdiction to the next is that the potential to build true regional markets is hampered. In order to understand these details more thoroughly – and explore possible solutions – we commissioned this report.

The Clean Energy States Alliance (CESA) has a significant interest in this area. CESA is a nonprofit association of public clean energy funds in 14 states dedicated to expanding the use of and building markets for clean energy technologies. The New Jersey Board of Public Utilities Office of Clean Energy is an active member of CESA and regularly collaborates with the Center for Energy, Economic and Environmental Policy (CEEEP) at Rutgers University. In many cases, the CESA member funds are actively involved in supporting RPS implementation by developing REC tracking systems, offering creative new financial tools for RECs and exploring the potential of multi-state reciprocity agreements.

In November 2004, CESA hosted a meeting in collaboration with Swiss Re in New York City to discuss how to foster a better functioning market, one that would not be limited unnecessarily by state barriers inherent in RPS laws but that would also advance key state renewable goals. One outcome of that meeting was the formation of a CESA working

group to focus on such regional opportunities in the PJM territory. Following a March 2005 meeting of this working group, we agreed to pursue the fact-collecting research and analysis contained in this report.

To date, there has been no systematic discussion among states about how to overcome barriers to creation of more active regional markets for clean energy. Such a discussion, we believe, could reveal opportunities to refine these first-generation RPS laws so that they can more effectively promote the widespread adoption of clean energy.

The findings in this report highlight several areas where there may be opportunities to seek harmonization between the various RPS policies. Some solutions might be achieved only with new legislative action. But others (eligibility clarification, for example) might be addressed with regulatory approaches. Still others might be achieved with innovative new interstate reciprocity agreements.

Going forward, we envision that any solutions and new strategies will be based on a greater shared understanding between the state funds, regulators, system operators and the private sector about RPS markets and REC trading. A process to work toward this goal would include:

- Educating policy makers about the barriers (in many cases, unintended) of the current RPS policy patchwork
- Pursuing near-term opportunities to resolve conflicts with rulemaking and regulatory actions
- Identifying working models from states with successful programs
- Establishing a consensus to pursue long-term policy opportunities
- Pursuing viable long-term solutions to harmonize regional markets, including legislative changes, interstate agreements and innovative financing structures

We hope that this report will serve to advance the debate in this area.

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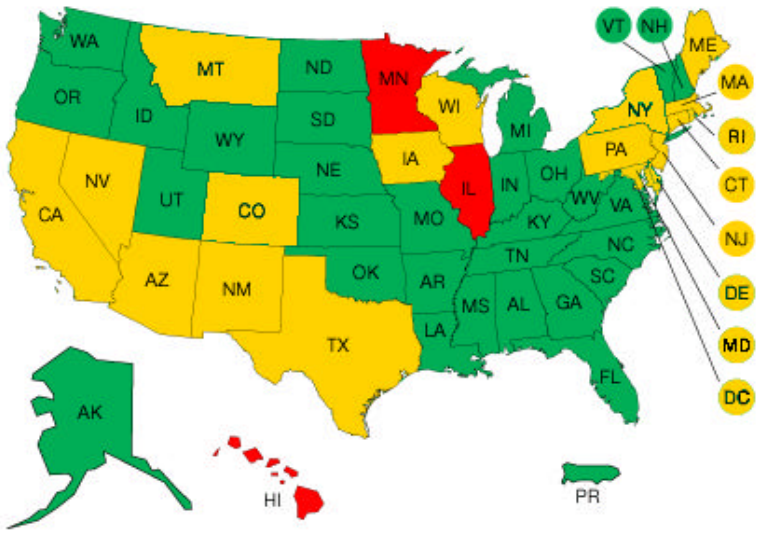
I. INTRODUCTION

Since 1996, states have been promulgating new technology-specific mandates intended to increase the relative proportion of new clean energy generating resources in the electricity portfolio. Commonly, these are referred to as "renewable portfolio standards," or RPS.

Currently, 18 states and the District of Columbia have implemented mandatory RPS policies, and 3 others have legislated voluntary renewable energy goals. In most cases, compliance with the mandates is satisfied through the use of renewable energy credits, or RECs. While the specific eligibility and definitions vary slightly for each state, the REC is generally considered to represent the environmental, social or other non-energy attributes of the clean energy produced. The following map, which illustrates the RPS states, has been updated from the Renewable Energy Policy Project (REPP) website.

REPP Renewable Portfolio Standard (RPS) Map



- States that have an RPS.

- States that have voluntary renewable energy goals or RPS-type legislation without enforcement provisions.

- States that do not have RPS or renewable energy goal policies.

Three states (Hawaii, Illinois, Minnesotta) have voluntary renewable energy goals or RPS-type legislation without enforcement provisions.

Martinot, et al. (2005), describes the impact of state RPS policies in the U.S.A. as follows:

> *According to Petersik (2004), state RPS policies helped motivate demand for 2,335 megawatts of new renewable energy capacity through 2003. The vast majority of this capacity, 2,183 megawatts, was wind power… In fact, of the 4,300 megawatts of wind power installed in the United States from 2001 to 2004, approximately half appeared to have been motivated in part by RPS requirements…*
>
> *Looking to the future, state RPS programs are expected to grow in significance. Assuming full compliance with existing policies (admittedly, an aggressive assumption), an estimated 25,000 megawatts of new renewable energy capacity would be required by 2017 (Wiser et al 2004).*
>
> *While these projected additions are substantial compared to historic rates of growth, the aggregate amount of renewable generation required under these policies by 2017 equates to just 3% of the total 2002 electric sales in the United States, and to 7.2% of 2002 load in those states with RPS requirements.*

Currently, sixteen states and the District of Columbia recognize trading of RECs for RPS compliance. (AZ, CO, CT, DC, DE, ME, MD, MA, MN, MT, PA, NV, NJ, NM, RI, TX, WI). Whereas RECs offer the promise of a flexible, market-based tool for RPS compliance and development of regional clean energy markets, in actual practice, the liquidity of RECs is limited by varying state eligibilities and the specific requirements to transfer RECs from one jurisdiction to another.

As noted by the Clean Energy Group in its background materials on building markets for renewable energy credits,

> *Much of the current discussion of REC activity focuses on voluntary markets – green power markets and tag sales. Twenty or more companies are currently marketing REC products… Many residential customers are the major market drivers currently, primarily for companies that are fulfilling or marketing an environmental commitment.*
>
> *These transactions are almost entirely bilateral agreements at the retail level. However, these activities (with some notable exceptions) rarely have any direct impact on project finance opportunities for new clean energy facilities. That is, most of this activity is confined to a short-term (1-3 year) market and there is little to no long-term market for voluntary RECs…*

Therefore, this paper is an investigation of the factors currently limiting the development of a liquid, regional compliance REC market in the northeastern United States, as this market has the capacity to provide long-term price security to support project financing.

Our investigation has revealed several possible mechanisms for overcoming these barriers. Some solutions are rooted in regulatory changes; other solutions, however, require only the cooperation and coordination of various state agencies, state clean energy funds and independent system operators.

II. OVERVIEW OF THE NORTHEAST

Renewable Portfolio Standards have become the most popular state-level policy to support renewable energy in the United States. Of all of the state-level policies, the RPS is proving to be the most important in stimulating large amounts of renewable energy additions. Massachusetts was one of the first states to enact an RPS, in 1997, but Connecticut has the distinction of having one of the earliest effective dates for any RPS, January 1, 2000.

In the northeastern United States of America, nine states and the District of Columbia currently have RPS policies, and nine of these recognize the trading of RECs as a compliance mechanism. The states are Connecticut, Washington D.C., Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania and Rhode Island. Vermont currently does not have an RPS, but the General Assembly recently passed a bill that directs the Public Service Board to implement an RPS in 2013 if certain conditions are not met, concerning the load growth in the state and the voluntary acquisition by Vermont utilities of renewable energy sufficient to cover the growth in load from the period of 2005 to 2012.

Within the northeast, there are three Independent System Operators (ISOs) that facilitate open access of the electric transmission system, administer a robust energy market, and ensure the reliability of the nation's power grid. The ISOs do not develop or enforce any renewable portfolio standards upon their participants, but ISOs are well suited for tracking the trade of RECs, as they operate regional market settlement systems that perform billing and settlements for their respective wholesale electricity markets and have the capacity to track the deliverability of electricity.

The northern-most ISO is ISO-New England (ISO-NE), which oversees the competitive wholesale electricity market in the regional power grid created by the New England Power Pool (NEPOOL) that now includes more than 350 separate generating plants and more than 8,000 miles of transmission lines. Of the northeastern RPS states, four are served by ISO-NE – Connecticut, Maine, Massachusetts and Rhode Island.

Directly to the west of and adjacent to ISO-NE, is NYISO, which serves all of New York State. New York is among the northeastern RPS states, although it does not recognize REC trading as a compliance vehicle. To the south of NYISO is PJM Interconnection (PJM), which operates the largest competitive wholesale electricity market in the world. PJM coordinates the movement of electricity as far south as North Carolina and as far west as Illinois. This ISO serves four of the northeastern RPS states and Washington D.C., which also has an RPS, – Delaware, Maryland, New Jersey and Pennsylvania.

III. STATE AND ISO PROFILES

In order to best understand the northeastern RPS market, it is important to become familiar with the individual RPS states that comprise the regional market. There is much variability between RPS policies, in terms of their histories and the details of their implementations. As new states develop their RPS statutes and regulations, they study older RPS policies and take lessons from the past.

1. PJM

2004 fuel mix generation data from PJM Interconnection's 2004 State of the Market Report indicates the following:

TABLE 1 – PJM INTERCONNECTION 2004 GENERATION BY FUEL TYPE

FUEL	% of TOTAL	FUEL	% of TOTAL
Coal	52.1%	Nuclear	36.9%
Gas	7%	Oil	1.1%
Hydro	2.3%	Solid Waste	0.6%
		Wind	0.1%

Clearly, the technologies defined as "clean" or "renewable" in the various state RPS policies currently represent a very small percentage of the overall portfolio mix. A key motivation behind most RPS policies is to ensure that these new, emerging technologies are afforded some extra incentive in order to compete with the traditional, incumbent technologies.

a. PJM States

The District of Columbia, Delaware, Maryland, New Jersey, and Pennsylvania constitute the RPS states in PJM. Thus far, three states (MD, NJ, and PA) have elected to use the PJM Generation Attribute Tracking System (GATS) for certificate tracking purposes. GATS became operational very recently in August 2005.

- The District of Columbia passed its RPS legislation in 2005; its portfolio target is 11% renewable resources by 2022, and the first compliance year is 2007. This legislation is independent of the District's electric restructuring act, which was passed in 1999. Regulations have yet to be written, and a tracking system has yet to be selected. Privately owned retail suppliers serving DC are obligated by the RPS. According to the U.S. Energy Information Administration (EIA) the District of Columbia had 231,984 retail customers, including residential, commercial and industrial customers, one investor-owned utility[1] and two energy service providers[2] in 2002.

[1] According to the EIA's online glossary, an Investor-Owned Utility (IOU) is a privately-owned electric utility whose stock is publicly traded. It is rate regulated and authorized to achieve an allowed rate of return.

[2] According to the EIA's online glossary, an Energy Service Provider is an energy entity that provides service to a retail or end-use customer.

- Delaware's General Assembly passed RPS legislation very recently, in July 2005, separate from the state's Electric Restructuring Act of 1999. The first year of compliance is 2007, and the portfolio target is 10% by 2019. Regulations have yet to be written, and a tracking system has yet to be selected. Privately owned retail suppliers serving the state are obligated by the RPS. The RPS does not apply to retail electricity sales to industrial costumers "with peak demands in excess of 1,500 kilowatts." According to the EIA, Delaware had 392,135 retail customers, including residential, commercial and industrial customers, one investor-owned utility and five energy service providers in 2002.
- Maryland's RPS legislation was passed by the state legislature in 2004, and its portfolio target is 7.5% in 2019. The first year of compliance is 2006. Like the other RPS states in the PJM, Maryland RPS legislation was passed separately from the electric restructuring legislation, which was passed in 1999. Privately owned retail suppliers serving the state are obligated by the RPS. Maryland's RPS does not apply to retail electricity sales to single customers in Maryland in excess of 300 million kWh of industrial process load. According to the EIA, Maryland had 2,217,771 retail customers, including residential, commercial and industrial customers, two investor-owned utilities and seven energy service providers in 2002.
- New Jersey's RPS was initially passed in 1999 as part of the state's electric restructuring legislation, but it was amended in 2004, setting the portfolio target at 6.5% in 2008. The NJ Board of Public Utilities (BPU) is currently considering setting the target at 20% in 2020. The 2004 RPS rules contain a solar electric generation requirement that was not part of the original RPS requirements. Pursuant to this provision, all electricity suppliers must include solar energy in their energy mixes, and solar renewable energy certificates (SRECs) can be used to comply with this regulation. Privately owned retail suppliers serving the state are obligated by the RPS. According to the EIA, New Jersey had 3,704,567 retail customers, including residential, commercial and industrial customers, four investor-owned utilities and twelve energy service providers in 2002.
- Pennsylvania has a portfolio standard, but it is not an RPS. Pennsylvania's Alternative Energy Portfolio Standard (AEPS), which was passed in 2004, includes non-renewable resources that the state's general assembly considers "environmentally beneficial," such as waste coal. However, the resources are distinguished in separate "tiers" that have differing compliance requirements. The state passed its electric restructuring legislation in 1996, long before its RPS bill. The RPS target is 18% in 2019, and privately owned retail suppliers serving the state are obligated by the AEPS. According to the EIA, Pennsylvania had 5,692,097 retail customers, including residential, commercial and industrial customers, ten investor-owned utilities and twenty energy service providers in 2002.

2. NYISO

New York employs its own Environmental Disclosure Program (EDP) as a renewable attribute tracking system. New York, therefore, relies on their EDP to confirm energy attributes and does not accept REC trading as an RPS compliance mechanism. The New

York Public Service Commission (PSC) has data on the mix of energy sources that was used to generate New York's electricity in 2003, available in Table 2, below.

TABLE 2 – NY STATE 2003
GENERATION BY FUEL TYPE

FUEL	% of TOTAL	FUEL	% of TOTAL
Coal	18%	Solid Waste	1%
Gas	22%	Biomass	<1%
Hydro	17%	Solar	<1%
Nuclear	29%	Wind	<1%
Oil	12%		

- New York's RPS is not legislated, but the NY Public Service Commission (PSC) developed the RPS regulations in 2004. New York's RPS target for 2013 is a 24% renewable standard, and the policy-makers hope that the voluntary market will account for the development of an additional 1%. The New York State Energy Research and Development Authority (NYSERDA) is responsible for centrally procuring renewable attributes to meet the RPS. The first compliance year is 2006. The Long Island Power Authority (LIPA) is not subject to the jurisdiction of the PSC and the state RPS, whereas the New York Power Authority (NYPA), which accounts for almost 80% of the existing renewable energy in the state's portfolio, was an active participant in the development of New York's RPS. According to the EIA, New York had 8,228,335 retail customers, including residential, commercial and industrial customers, eight investor-owned utilities and twenty-four energy service providers in 2002.

3. ISO-NE

2004 fuel mix data from ISO New England's 2004 Annual Markets Report indicates the following:

TABLE 3 – ISO-NE 2004
GENERATION BY FUEL TYPE

FUEL	% of TOTAL	FUEL	% of TOTAL
Coal	12%	Nuclear	28%
Coal/Oil	3%	Oil	4%
Gas	30%	Oil/Gas	13%
Hydro	5%	Wood/Refuse	5%

a. ISO-NE States

Connecticut, Maine, Massachusetts, and Rhode Island constitute the RPS states in ISO-NE. All states in the NEPOOL region use the NEPOOL Generation Information System (NEPOOL GIS) for certificate tracking purposes.

- Connecticut's RPS policy was passed in 1998 as part of the state's electric restructuring legislation, and the first compliance year was in 2000. The RPS was amended in 2003, and the percentage target is 10% by 2010. Notably, the statute was amended again in 2005, limiting REC trading to generators in NEPOOL. The Connecticut Clean Energy Fund is supplementing the state's RPS by funding 100 MW of RPS-eligible renewable resources through a program called "Project 100."

Privately owned retail suppliers serving the state are obligated by the RPS. According to the EIA, Connecticut had 1,554,990 retail customers, including residential, commercial and industrial customers, three investor-owned utilities and four energy service providers in 2002

- Maine passed its RPS policy in 1999 as part of its electric restructuring act, and it became effective in the same year. The portfolio requirement is 30%, but the existing supply of renewable and efficient resources (coupled with a less strict definition of eligible resources than used in other states) exceeds the standard so the RPS does nothing to stimulate the development of renewable energy technologies. Northern Maine is not served by ISO-NE; Northern Maine Independent System Administrator (NMISA) administers the region, and for service to customers in Northern Maine, energy used to satisfy the portfolio requirement must be physically delivered into NMISA. Privately owned retail suppliers serving the state are obligated by the RPS. According to the EIA, Maine had 786,290 retail customers, including residential, commercial and industrial customers, two investor-owned utilities and twelve energy service providers in 2002.
- Massachusetts passed its RPS in 1997, as part of its electric restructuring act; the first compliance year was in 2003, and the portfolio target is set at 4% in 2009. Generators must have a commercial operation date after December 31, 1997 (new renewable generation) in order to be eligible for the RPS. 61% of the 2003 RPS obligation was met by 2003 new renewable generation; the Massachusetts Division of Energy Resources (DOER) forecasts shortages in the supply of RECs for the next several years. Privately owned retail suppliers serving the state are obligated by the RPS. According to the EIA, Massachusetts had 2,890,518 retail customers, including residential, commercial and industrial customers, seven investor-owned utilities and eight energy service providers in 2002.
- Rhode Island's RPS policy is the newest of the NEPOOL states. It was passed in 2004, independent of the state's electric restructuring act, which was passed in 1996. The draft regulations were released on August 15, 2005, and the state's ultimate portfolio target is a 16% standard in 2019. Privately owned retail suppliers serving the state are obligated by the RPS. According to the EIA, Rhode Island had 471,549 retail customers, including residential, commercial and industrial customers, two investor-owned utilities and four energy service providers in 2002.

IV. COMPARISON OF NORTHEASTERN RPS STATES

1. Comparison of Policy Objectives

Policy makers cite four broad categories of benefits that may be derived from RPS policies. We have categorized them as economic development, environmental, reliability, and security benefits. The scopes of these benefits vary, as economic development benefits are generally localized, but environmental benefits may be regional or global. Further, it is significant to note that some states list their policy objectives in their RPS statutes, others note them in their RPS regulations, some outline them in reports or on websites, and others do not describe them at all. Therefore, the states attribute different amounts of weight to their RPS policy objectives.

RPS policy goals provide a context for the discussion of developing regional markets for renewable technologies, for ultimately it is up to state policy makers as to whether they will expand their markets or not. In any regional discussion, it will be important to recognize the states' goals in order to find areas of alignment and catalyze a cooperative effort at regional market expansion.

The economic benefits of RPS revolve around the development and maintenance of energy technologies and the local job growth associated with building new renewable generators. These benefits are generally specific to the state and its neighbors; for example, former Governor McGreevey specifically noted that renewable energy sources "offer opportunity for job creation and economic development by attracting these emerging industries to the State of New Jersey" in Executive Order #45, in which he created the Renewable Energy Task Force that examined the existing RPS and recommended changes that were subsequently implemented by the BPU.

Environmental benefits vary, in terms of the scales of their impacts. For example, reducing greenhouse gas (GHG) emissions is a global benefit, but other emissions reductions from fossil fueled power plants only have local and regional benefits. This distinction can be noted in Table A1, below. Public health benefits are typically included under the category of environmental benefits, although they are listed separately by a few of the RPS states for emphasis.

Reliability benefits include improving transmission and distribution performance, as well as easing the strain on the existing energy infrastructure. These benefits include the improved performance of the electric grids that transmit electricity from the generators to the retail customers. Reliance benefits are generally localized; and they are rarely mentioned or listed. Only two of the northeastern RPS states note them in any official capacity.

The security benefits of RPS policies can be described in several different ways. Some states note that the development of renewable energy resources will "decrease our reliance on fuels imported from other regions," as the Massachusetts DOER background document describes; others, like Maryland, recognize the fuel diversity benefits of renewable energy technologies. Delaware's RPS legislation lists "increased protection

against price volatility and supply disruption" as a benefit of promoting renewable resources, which is derived from the benefit of fuel diversity. New York's regulations tie all of these ideas into one objective, "generation diversity for security and independence." Ultimately the security benefits of renewable energy resources are both regional and national.

TABLE A1 – RPS POLICY GOALS BY GEOGRAPHIC IMPACT

	Local / Regional	Global
Economic	• Development of Local Resources • Job Opportunities • Regional REC Trading	• Manufacturing of New Technologies
Environmental	• Air Quality • Water Quality • Public Health	• Greenhouse Gas and Climate Change • Public Health
Reliability	• Transmission and Distribution Performance • Decreased Reliance on Centralized Power Plants	
Security	• Fuel Diversity • Price Volatility Moderated	

Two of the states do not provide their RPS objectives; they are Connecticut and Pennsylvania. Connecticut's RPS legislation was originally part of its electric restructuring act, and while the original act does include findings, these are specific to restructuring, rather than Renewable Portfolio Standards. Notably, the Connecticut Clean Energy Fund (CCEF) clearly lists its goals and objectives in its Strategic Focus report, but the CCEF only supplements the state RPS.

Of the eight states that list their goals, four identify them in their RPS statutes; they are the District of Columbia, Delaware, Maryland, and Rhode Island. These are four of the most recently passed RPS, none of which were passed as part of their states' electric restructuring acts. New York's goals are in its RPS regulations – the state does not have any RPS legislation – and New Jersey's goals can be found in former Governor McGreevey's Executive Order #45. It is notable that New Jersey's RPS regulations only list the environmental benefits of an RPS, whereas Executive Order #45 lists RPS goals in all four categories.

While legislative and executive goals are official and binding, two states list their policy objectives in other documents. Maine's Public Utility Commission (PUC) website has a document titled "Review of Emerging Technologies as Eligible Resources Under State's Portfolio Requirement," dated February 10, 2005. This review notes the RPS policy goals and objectives. As for Massachusetts, the DOER issued an RPS background document previous to two public hearings, scheduled in October 2001, to receive oral and written testimony on the proposed portfolio standard. This background document outlines the state's policy objectives.

Table A2 below indicates the categories of RPS policy goals that are listed by the northeastern states. The columns for Pennsylvania and Connecticut are shaded to indicate that no policy goals are listed. An 'X' indicates which goals are listed by the states.

TABLE A2 – RPS POLICY GOALS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Economic		X	X	X	X		X	X		
Environmental		X	X	X	X	X	X	X		X
Reliability			X				X			
Security		X	X	X	X	X	X	X		X
X – *listed under policy goals*										

Of all the states that have formal RPS goals, New Jersey and Delaware are the only ones that list goals in each of the four categories. Rhode Island and Massachusetts, conversely, only list goals in the two categories with the broadest geographical range of benefits, implying that these states would be most amenable to developing a northeastern region-wide market for renewable energy resources. The full list of state policy goals is listed in Appendix A.

2. Comparison of Fuel Definitions

To most effectively develop regional markets for renewable energy resources, the states would have to agree upon a definition of renewable energy. Currently, definitions vary from state to state; some states list resources that no other states list, and some states list the same resource but qualify it differently. Table B1 shows which renewable resources are included in the northeastern states' RPS policies, but states often define renewable resources differently. For example, two states may list biomass as an RPS-eligible resource but have very different definitions of what resources are included in the biomass category.

TABLE B1 – RENEWABLE RESOURCES INCLUDED IN NORTHEASTERN STATES RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Biomass *(10)*	X	X	X	X	X	X	X	X	X	X
Fuel cells (renewable) *(6)*		X	X		X	X	X			X
Fuel cells (all) *(4)*	X			X				X	X	
Geothermal *(7)*		X	X	X	X		X		X	X
Hydroelectric *(10)*	X	X	X	X	X	X	X	X	X	X
Methane gas *(10)*	X	X	X	X	X	X	X	X	X	X
Ocean *(9)*	X	X	X	X	X	X	X	X		X
Solar *(10)*	X	X	X	X	X	X	X	X	X	X
Wind *(10)*	X	X	X	X	X	X	X	X	X	X
										X – *included*

Clearly, the states are not likely to completely synchronize their RPS fuel definitions due to respective state policy interests, varying renewable resources, and differing political realities, but a basic consensus is highly recommended. If the states could at least agree upon the definitions of those fuels that they all list, a regional market would become much more viable. Those fuels that are specific to certain states, as poultry litter is to Maryland, would still be eligible for specific state RPS policies, but the competition for the more broadly accepted renewable technologies would expand with the breadth of the regional RPS fuel definition.

Some renewable fuel definitions are less murky than others and should be easier to agree upon across the region. For example, wind power should be fairly simple to define, whereas the definition of biomass varies widely from state to state. The broader the fuel definition, the more renewable generators are likely to be RPS-eligible.

a. Wind

Every one of the 10 northeastern states includes wind in their RPS, as illustrated below in Table B2.

TABLE B2 – STATES THAT INCLUDE WIND RESOURCES AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Wind *(10)*	X	X	X	X	X	X	X	X	X	X
										X – specifically noted

The most descriptive language used in a state's RPS policy can be found in New York's RPS regulations, in which wind energy is specifically described as energy produced by

"wind turbines." Of course, "wind turbines" are inherently implied in the concept of wind energy, and the rest of the northeastern states simply list wind as either "wind power," "wind energy," "wind," "the wind," or "electricity derived from wind energy." Clearly, the concept of wind power is universal and simple.

b. Solar

All states in the Northeast include solar power in their RPS. Nevertheless, some states specify that solar energy must come from photovoltaic technologies, and others do not. Some states specifically list solar technologies and photovoltaic technologies as two separate fuel sources. The second row of Table B3 indicates which of the northeastern states specifically list photovoltaic technologies in their RPS. Some form of solar technology is acceptable by all ten policies, as indicated in the first row of Table B3.

TABLE B3 – STATES THAT INCLUDE SOLAR RESOURCES AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Some Solar Listed *(10)*	X	X	X	X	X	X	X	X*	X	X
PV Listed *(4)*						X	X	X	X	
X – specifically noted										
* only photovoltaic technologies listed under solar category										

The State of New York does not accept any solar technologies except for photovoltaics in its RPS, whereas the other nine states either do not specify any particular form of solar technology in their rules or legislations, or else list the acceptable solar technologies.

Maryland's RPS legislation lists "solar" as a "Tier 1 renewable source," and Connecticut's legislation lists "solar power" as a "Class 1 renewable energy source." Neither states' legislation details which solar technologies are acceptable. New Jersey lists photovoltaic technologies separately than solar technologies, but it does not outline which technologies beyond photovoltaics would qualify as solar technologies. The language of Maine's RPS legislation lists "solar arrays and installations" as eligible renewable resources, but this language is not more specific than Maryland's or Connecticut's.

Washington D.C., however, is very specific in its description of eligible solar technologies: "radiant energy, direct, diffuse, or reflected, received from the sun at wavelengths suitable for conversion into thermal, chemical, or electrical energy." Likewise, Massachusetts, which lists "solar photovoltaic" and "solar thermal electric energy" separately, specifies which solar technologies are RPS eligible, but its definition is more restrictive than Washington D.C.'s broader one.

The term "radiation" is in the language of many of the states' RPS policies. "Direct solar radiation" is eligible under Rhode Island's RPS, Delaware accepts "solar technologies that employ solar radiation to produce electricity," and Washington D.C. describes several different forms of "radiant energy" that qualify under its RPS. It seems likely that "radiation" is actually implied with any "solar" technology, and therefore these definitions are not much different than those of Maryland and Connecticut.

c. Methane Gas

As can be seen in Table B4 below, all states allow for some form of methane gas to qualify for their RPS. Maine is the only state that does not use the word "methane," but its legislation specifies "landfill gas," which is essentially methane gas. In fact, landfill gas, often termed "landfill methane gas," is listed in every one of the northeastern states' RPS policies.

Methane is the major component of the natural gas used in many homes for cooking and heating. The same types of anaerobic bacteria that produced natural gas still produce methane today. The bacteria break down or "digest" organic material in the absence of oxygen (anaerobic) and produce "biogas" as a waste product. Anaerobic processes can be managed in a "digester" (an airtight tank) or a covered lagoon (a pond used to store manure) for waste treatment. "Biogas" production is a highly useful benefit of this process, and it consists of methane (50%-80%), carbon dioxide (20%-50%), and trace levels of other gases. The three main feeds for anaerobic digestion are farm animal wastes, municipal wastewater treatment plants, and various food and beverage waste streams.

TABLE B4 – STATES THAT INCLUDE METHANE GAS RESOURCES AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Methane Gas *(10)*	X	X	X	*	X	X	X	X	X	X
Anaerobic Digestion *(7)*		X	X		X	X	X	X	X	
X – specifically noted										
*methane is implied by "landfill gas"										

Anaerobic decomposition (or digestion) is listed as a separate category by Delaware and Massachusetts, three states list it under biomass, and it's noted under the category of methane gas in three other states. Maryland actually lists "anaerobic decomposition" under biomass *and* methane gas, and three of the states don't note it at all. It is also significant that there is some overlap within the states' RPS regulations and statutes between "methane gas," "biomass," and "anaerobic digester gas" resources. For example, Rhode Island lists "landfill methane gas" directly under the category of "biomass," as does Maine, but the other eight states list methane as an entirely separate category of renewable resource.

TABLE B5 – STATES THAT INCLUDE PARTICULAR WASTE SOURCES FOR ANAEROBIC DIGESTION IN THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Animal Waste *(3)*					X			X	X	
Food Waste *(3)*						X	X	X	X	
Landfill Gas *(10)*	X	X	X	X	X	X	X	X	X	X
Sewage or Wastewater *(5)*		X			X		X	X	X	
X – specifically noted										

As noted in Table B5, only New York and Pennsylvania accept gas resources from all four waste categories. New Jersey and Maryland each allow for the anaerobic

decomposition of three of the four categories; New Jersey's statute does not mention animal waste, and Maryland's statute does not list the anaerobic digestion of food waste. Massachusetts' definition of "eligible biomass" includes "food… and vegetative material," which can be used to produce anaerobic digester gas, among other alternatives.

Whereas landfill gas is specified by all of the states, sewage or wastewater is listed in five of the RPS policies, and animal waste and food waste are each only listed by three states.

d. Hydro

Hydroelectric resources are eligible for all of the northeastern states' RPS, as shown in Table B6 below. According to the Rhode Island RPS, a small hydro facility is one "employing one or more hydroelectric turbine generators and with an aggregate capacity not exceeding 30MW."

TABLE B6 – STATES THAT INCLUDE HYDROELECTRIC RESOURCES AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Hydro *(10)*	X	X	X	X	X	X	X	X	X	X
Small Hydro *(6)*	X*		X		X		X	X		X
Low-impact Hydro *(1)*									X	
Large Hydro *(1)*									X	
Unspecified Hydro *(4)*		X		X	X	X				
X – specifically noted										
* 5 MW maximum capacity										

Five of the six states that list small hydro as an eligible renewable resource specify that a small hydro facility should not have an aggregate capacity of more than 30MW. These states are New Jersey, New York, Delaware, Maryland and Rhode Island. Notably, Connecticut has an even lower ceiling of 5MW on eligible small hydro facilities.

On the other hand, Pennsylvania AEPS' fuel category labeled "low-impact hydro" does not have a capacity limit. Rather than ascribing a capacity limit to hydroelectric generators, the legislation requires generators to meet the certification standards established by the 'Low Impact Hydropower Institute (LIHI) and American Rivers, Inc.' According to the LIHI:

> *The Low Impact certification criteria are aimed at ensuring that the certified dam adequately protects or mitigates its impacts in eight key resource areas: river flows, water quality, fish passage and protection, watersheds, threatened and endangered species, cultural resources, and public access and recreation opportunities.*

The LIHI further states that:

> *The "small hydro" standard is based on the capacity of the generator, not on the size or impacts of the dam the generator is located at… That means*

a "small hydro" standard will allow most dams to pass as "green," without bothering to investigate their individual or cumulative impacts on the environment.

Notably, Pennsylvania is also the only northeastern state to explicitly list "large hydro" as an AEPS-eligible resource, although it only qualifies as a Tier II resource. "Large hydro" in Pennsylvania is any hydroelectric generator that does not qualify as "low-impact," including pumped storage.

Of the four states that list hydro resources that are not specifically described as large or small, Maine is the only state to have a nameplate capacity limit for hydroelectric generators. In fact, the 100MW capacity limit in Maine applies to all RPS-eligible resources, not just hydroelectric generators.

Maryland and Washington D.C. list "hydroelectric power other than pump storage generation" as Tier II renewable resources, and the Massachusetts RPS legislation lists "naturally flowing water and hydroelectric," which does not allow for pumped storage hydroelectric generators. Interestingly, the Massachusetts RPS regulations do not list hydro as an RPS-eligible resource, whereas the Massachusetts RPS legislation does.

e. Fuel Cells

All RPS policies in the northeastern states allow entities to meet their compliance obligations by including fuel cell generators in their portfolios, but some states specify that only those fuel cells that produce electricity from renewable resources can qualify for their RPS policies. The remaining states promote fuel cells in their RPS policies as a technology choice, rather than a fuel choice, thereby broadening the incentives for their development. Table B7 lists the northeastern states and indicates which states accept only fuel cells of renewable fuel types and which states accept fuel cells of any fuel source.

Of the states that allow only renewable fuel cells, several have further fuel specifications. For example, the Washington D.C. and Maryland RPS policies dictate that fuel cells must produce electricity from either biomass or methane gas fuels that are described in their respective portfolio policies. Massachusetts allows fuel cells that use "eligible biomass fuel, landfill or anaerobic digester methane gas, hydrogen derived from such fuels or hydrogen derived from the electrical output of a renewable generation unit." On the other hand, Delaware, New Jersey and Rhode Island simply require fuel cells to use any renewable fuels that would be compliant under their respective RPS policies.

TABLE B7 – STATES THAT INCLUDE FUEL CELLS AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Fuel cell (renewable) *(6)*		X	X		X	X	X			X
Fuel cell (any) *(4)*	X			X				X	X	
X – specifically noted										

One item that is of note is the language that specifies acceptable fuel types under some states' RPS policies. While there is no requirement in Maine law for fuel cells to generate

electricity from renewable resources, fuel cells are listed in the Maine legislation under "Renewable Resources." In New Jersey's RPS legislation, fuel cells are listed under "Class I renewable energy," but there is otherwise no indication as to which fuel cells are acceptable. It would be possible to misinterpret the full picture by reviewing only the legislation and assume that RPS-eligible fuel cells in New Jersey could produce electricity from all fuels, as the state's RPS regulations contain the language that restricts RPS-eligible fuel cells to those that produce electricity from renewable resources.

f. Distributed Generation

According to Connecticut's RPS legislation, distributed generation (DG) "means the generation of electricity on the premises of an end user within the transmission and distribution system including, but not limited to, fuel cells, photovoltaic systems or small wind turbines." According to this definition, all of the northeastern states accept some forms of DG, as fuel cells and some form of solar technology are eligible fuel resources for every one of the northeastern RPS policies.

However, it should be noted that Connecticut specifically lists distributed generation under its definition of "Class I renewable energy sources," assuming that it's generated from another eligible renewable resource, and Pennsylvania lists DG as a "Tier II alternative energy source," and then defines it as "small-scale power generation of electricity and useful thermal energy.

More recently, Connecticut has passed a distributed energy requirement that is separate from the existing RPS policy. Under HB 7501, signed into law July 21, 2005, the Connecticut DPUC will establish a program by January 1, 2006 to provide one-time capital subsidies to customers who install customer-side generation and requires electric companies and competitive suppliers to acquire 1% of their supply from DG in 2007, increasing to 4% by 2010.

Additionally, New York's RPS encourages DG in a particularly unique way. Whereas Connecticut and Pennsylvania list DG as an eligible AEPS resource, New York has an entire tier dedicated to "customer-sited" energy, which only includes photovoltaics, fuel cells, and small wind turbines. Essentially, New York's customer-sited tier includes all of the most common DG technologies. (However, early economic impact analyses conducted by NYSERDA suggests that they anticipate significant development of fuel cell technologies in order to satisfy this requirement.)

g. Ocean

Ocean-based technologies are acceptable under all of the northeastern states' RPS policies, except for Pennsylvania, as can be seen in Table B8 below. The four types of ocean energy technologies that might be eligible under the states' RPS are current, tidal, wave, and ocean thermal. Of these, only tidal energy technologies are accepted in each of the nine states that allow for ocean-based resources.

TABLE B8 – STATES THAT INCLUDE OCEAN RESOURCES AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Any form of Ocean *(9)*	X	X	X	X	X	X	X	X		X
Current *(5)*		X	X		X			X		X
Tidal *(9)*	X	X	X	X	X	X	X	X		X
Wave *(8)*	X	X	X		X	X	X	X		X
Thermal *(7)*	X	X	X		X	X		X		X
X – specifically noted										

Ocean thermal energy is listed in seven of the state RPS, but in New York's RPS regulations, the technology description is more complicated than simply "ocean thermal energy" or "thermal differences." The language in New York's regulations reads, "ocean thermal pumped storage hydro powered by tidal," which describes a very specific ocean resource technology, rather than allowing for other forms of ocean thermal energy technologies.

Maine's RPS does not actually list "ocean" as a renewable resource; it only lists "tidal power," which, of all the states with RPS-eligible ocean technologies, is the most restrictive definition. The New Jersey RPS, like the Maine RPS, does not list "ocean" as an RPS-eligible resource, but it allows for "wave or tidal action," which imply ocean-based renewable energy technologies.

Rhode Island's RPS legislation does not specifically mention any of the four ocean-based technologies, as according to the legislative language, any "movement or the latent heat of the ocean" qualify for the RPS. Despite this unique phrasing, it is clear that current, tidal and wave action all fall under the category of "movement," and ocean thermal energy is no different than the "latent heat" of the ocean.

h. Geothermal

Seven of the states reviewed include geothermal fuel resources in their RPS. Table B9, below, indicates that geothermal fuel resources are not eligible under the Connecticut, Massachusetts and New York RPS policies.

TABLE B9 – STATES THAT INCLUDE GEOTHERMAL RESOURCES AS PART OF THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Geothermal *(7)*		X	X	X	X		X		X	X
X – specifically noted										

Of the seven states that list geothermal technologies in the RPS, Maryland and Washington D.C. simply list it as "geothermal," with no further description, and Maine lists it as "geothermal installations," while Rhode Island describes it as "the heat of the earth," which are equally broad definitions.

On the other hand, Delaware, New Jersey, and Pennsylvania (all of which are in PJM) have more detailed descriptions of what "geothermal" actually means in the context of their RPS policies:

- **Delaware:** geothermal energy technologies that generate electricity with a steam turbine, driven by hot water or steam extracted from geothermal reservoirs in the earth's crust.
- **New Jersey:** electricity from extracting hot water or steam from geothermal reservoirs in the earth's crust and supplied to steam turbines that drive generators to produce the electricity.
- **Pennsylvania:** electricity produced by extracting hot water or steam from geothermal reserves in the earth's crust and supplied to steam turbines that drive generators to produce electricity.

These three definitions of geothermal technologies are all very similar. Each of the three definitions includes the three primary concepts of "hot water and steam," geothermal reservoirs in the "earth's crust," and "steam turbines" that drive electricity generators. Essentially, the phrasing of the three definitions varies slightly among these PJM states, but the definitions are actually identical in meaning.

i. Biomass

Of all the renewable energy technologies that are incentivized by RPS policies, the most nuanced is the concept of "biomass." The fuel sources that qualify under "biomass" vary from state, and other qualifiers vary as well. For example, some states require that biomass fuels be sustainable, whereas other states do not, and only half of the states specifically require that biomass be separated from other waste.

TABLE B10 – STATE RPS BIOMASS QUALIFIERS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Emissions standards *(2)*	X•									X
Environmental standards *(2)*								X	X	
Nonhazardous *(3)*		X			X				X	
Organic *(4)*		X*			X		X		X	
Separated from other waste *(5)*		X			X	X			X	X
Sustainable *(5)*	X		X		X		X	X		
Waste-to-Energy♣ *(-1)*			O♣							
										X – *specifically noted* O – *not allowed*

* *Includes 'cellulosic'*

♣ *Waste to energy facility or an incinerator*

• *Emissions standards only for facilities that began operation before 07-01-98*

Notably, the Massachusetts and Rhode Island RPS policies share similar language, and include nearly the same biomass resources, just as Maryland and the District of Columbia also share similar language in their RPS statutes. Further, Maine offers almost no

specifications for biomass, and while Connecticut only specifically lists two examples of biomass, it also includes "other biomass that regenerates," which could include many different biomass resources.

The biomass fuel qualifiers are organized in Table B10 above. At first glance, one should note that Delaware is unique in that it is the only state with a negative qualifier that applies to all biomass fuel sources; in its legislation, Delaware specifically forbids waste to energy combustion of biomass fuels, directly within its description of "biomass."

Four states and the District of Columbia specifically require that biomass be segregated from other waste products, and this particular specification is Massachusetts' only biomass qualifier, aside from fuel source specifications. Three states and the District of Columbia specifically mention that biomass must be organic; the District of Columbia actually requires that biomass be cellulosic, but all cellulosic materials are organic because they are carbon-based.

Connecticut's RPS legislation specifically sets limits on Nitrogen Oxides emissions for biomass facilities that began operation before July 01, 1998, but Rhode Island's statute is the only one to list biomass facilities "maintaining compliance with current air permits" under its list of eligible renewable energy resources. Notably, only Pennsylvania and New York impose specific environmental restrictions on biomass fuel sources.

While the qualifiers for biomass definitions vary significantly, the RPS-eligible biomass fuels vary more broadly from state to state. In order to best present the ten extensive definitions of biomass, we have broken biomass into four categories: agricultural resources, noncommercial wood resources, commercial wood resources, and waste resources.

TABLE B11 – STATES THAT INCLUDE AGRICULTURAL BIOMASS RESOURCES IN THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Agricultural by-products* *(6)*		X			X		X*	X*	X	X*
Energy Crops♣ *(5)*						X	X♣	X♣	X	X
Grain *(3)*		X			X				X	
Legumes *(3)*		X			X				X	
Sugar *(3)*		X			X				X	
Tree Crops• *(3)*		X			X				X•	
Vineyard materials *(3)*		X			X				X	
										X – specifically noted

* Includes agricultural waste & residue
§ Includes Bioenergy crops & sustainable yield wood
• Includes orchard tree crops

Table B11, above, indicates which agricultural biomass sources are specifically noted within the RPS policies. Maryland, Pennsylvania, and the District of Columbia are the most specific. No other states list grain, legumes, sugar, tree crops and vineyard materials. However all of these resources could also fall into the more inclusive

categories of "agricultural by-products" and "energy crops." Notably, Delaware, Maine and Connecticut do not specifically list any agricultural resources under biomass.

TABLE B12 – STATES THAT INCLUDE NONCOMMERCIAL WOOD BIOMASS RESOURCES IN THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Aquatic Plants *(1)*							X			
Brush *(4)*		X			X	X				X
Old Growth Timber *(-3)*		O			O		O			
Slash* *(6)*		X			X	X*	X*		X*	X
Tree stumps *(3)*	X					X				X
Wood♣ *(1)*								X♣		
Yard waste• *(3)*		X			X			X•		
X – specifically noted O – not allowed										

* Includes thinning & trimming of trees, possibly from forest floor or landscaping
§ Silvicultural waste wood, otherwise not described
• Included under urban wood and related waste

According to the District of Columbia's RPS statute, slash is defined as "tree tops, branches, bark, or other residue left on the ground after logging or other forestry operations; or tree debris left after a natural catastrophe." Table B12, above, indicates that slash, of all the noncommercial wood resources listed under biomass, is the most commonly listed. It is also interesting to note that Connecticut lists tree stumps in its RPS statute and no other specific forest resources. Maine and Delaware both list no noncommercial resources under their definitions of biomass.

TABLE B13 – STATES THAT INCLUDE COMMERCIAL WOOD BIOMASS RESOURCES IN THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Black Liquor *(-1)*							O			
Lumber ends & trimmings *(2)*						X				X
Mill residue* *(3)*		X			X		X*			
Pulping by-products[Π] *(1)*									X[Π]	
Recycling plant ground wood *(1)*							X			
Wood[∇] *(1)*								X[∇]		
Wood Chips *(2)*						X				X
Wood Shavings♣ *(2)(-1)*					O♣	X				X
Wood Thinning• *(2)*		X•			X•					
X – specifically noted O – not allowed										

* Includes wood shavings and scrap from lumberyard / paper mill
§ Includes sawdust
• Specifically precommercial wood thinning
[Ñ] Wood harvested during commercial harvesting
[Ò] Not listed under biomass, includes wood manufacturing by-products (wood chips, sawdust, etc.)

Commercial wood resources listed under biomass include a lot of detail. For example, Table B13, above, indicates that three states list mill residue, but Maryland's RPS specifically does not allow "sawdust and wood shavings," and New Jersey's regulations list black liquor, "a viscous liquid containing inorganic chemicals and organic material such as lignin and aliphatic acids, which is separated from wood during chemical pulping," as ineligible.

Pennsylvania's AEPS lists "pulping by-products" separately from "biomass," and includes it only as a tier II resource. This category includes "by-products of the pulping process and wood manufacturing process including bark, wood chips, sawdust, and lignin in spent pulping liquors," whereas Maryland and New Jersey each forbid specific mill and lumberyard by-products listed in Pennsylvania's definition. Maine, Connecticut and Delaware do not specifically list any commercial wood biomass resources.

The fourth biomass resource subcategory is that of waste sources, as listed in Table B14 below. Delaware and Maine do not list any of these resources in their biomass categories, and neither does New Jersey. Connecticut lists "land clearing debris," which is the only other biomass fuel specification that it notes besides "tree stumps."

TABLE B14 – STATES THAT INCLUDE WASTE BIOMASS RESOURCES IN THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Crates *(3)*		X			X				X	
Dunnage *(2)*		X			X					
Food Material* *(2)*						X*				X*
Land clearing debris *(1)*	X									
Organic refuse-derived fuels *(1)*						X				
Pallets *(6)*		X			X	X		X	X	X
Urban wood waste *(1)*								X		
X – specifically noted										
* Also includes 'vegetative material'										

None of the waste categories are listed by more than three states, except for waste pallets, which is listed six times. Urban wood waste is only listed by New York, organic refuse-derived fuels are only listed by Massachusetts, and land-clearing debris is only listed by Connecticut.

TABLE B15 – STATES THAT INCLUDE BIOGAS-RELATED BIOMASS RESOURCES IN THEIR RPS

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Anaerobic Digestion *(3)*					X		X	X		
Biogas *(3)*						X		X		X
Landfill gas *(3)*				X				X		
X – specifically noted										

Table B15 notes the states that list anaerobic digestion, biogas and landfill gas as items directly within their "biomass" categories. These have been addressed under the

"Methane Gas" resource category above, as other states do not list these under the biomass resource category.

j. Other Eligible Resources
Some RPS-eligible resources do not fall into any of the above categories:

- Cogeneration facilities qualify as "efficient resources" under Maine's RPS policy if they were constructed prior to January 1, 1997, and meet the following efficiency standard: during the calendar year, the sum of the useful power output and the useful thermal energy output of the facility is no less than 60% of the total energy input to the facility.
- Liquid biofuel is listed as its own category in New York's regulations, but this is closely related to biomass resources.
- Low emissions advanced renewable energy conversion technologies are also listed in Connecticut's RPS.
- Municipal solid waste is listed as tier II in Pennsylvania. It is also listed under "renewable resources" in Maine, but only "in conjunction with recycling."
- Poultry litter is listed as a tier II resource in Maryland's RPS legislation.
- Resource Recovery is listed in New Jersey's RPS policy as a tier II alternative. These are facilities where retail competition is permitted and the Commissioner of the Department of Environmental Protection determines that the facilities meet the highest environmental standards and minimize impacts to the environment and local communities.
- Small power production facilities under the FERC rules qualify under Maine's RPS policy as "renewable resources."
- Waste-to-energy is listed by Connecticut, the District of Columbia, and Maryland. Connecticut refers to this as trash-to-energy, but this is equivalent. New York allows waste-to-energy, but only if it is derived from identified, eligible biomass, which must be source-separated and separately converted to energy; this is termed "refuse-derived fuel."

Pennsylvania's policy, embodied in an 'Alternative Energy Portfolio Standard,' (AEPS) rather than a Renewable Energy Portfolio Standard (RPS), includes several eligible resources that are not eligible under most RPS policies:

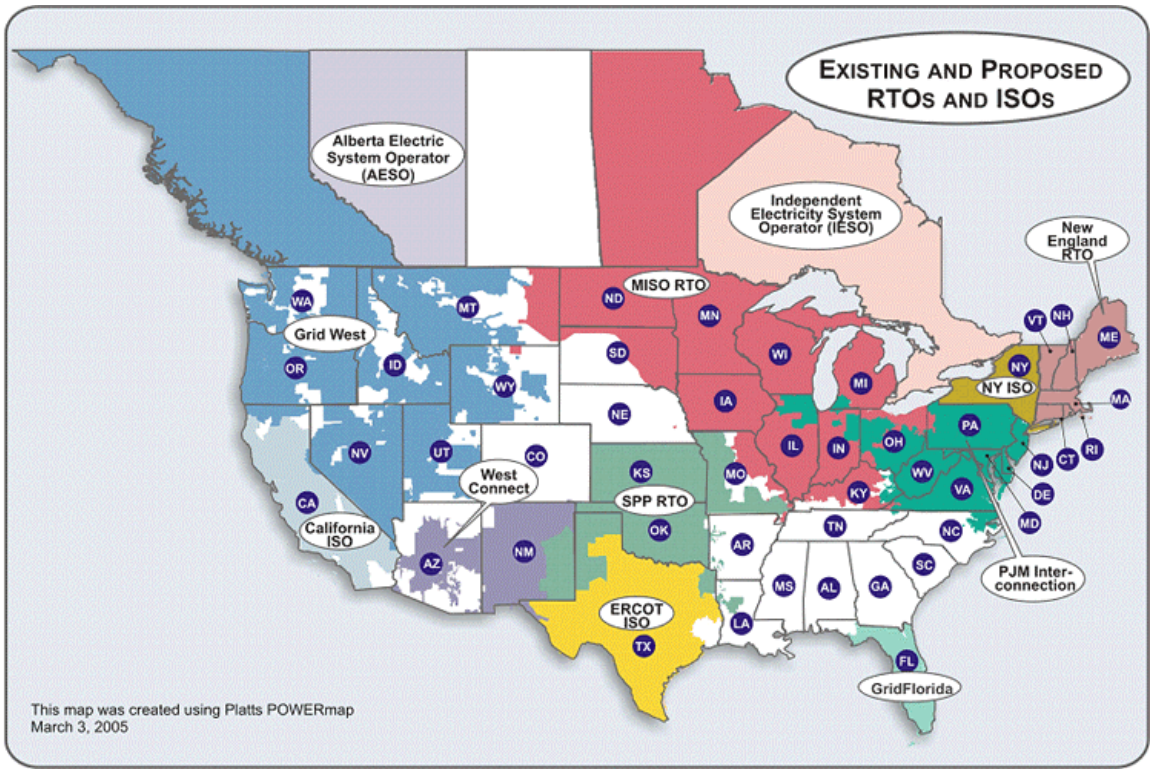
- Coal mine methane gas that is emitted from abandoned or working coal mines.
- Demand-side management qualifies as a tier II resource and consists of the management of customer consumption of electricity or the demand for electricity through the implementation of technologies, strategies, etc.
- Integrated Combined Coal Gasification (ICCG) qualifies as tier II
- Waste coal qualifies as tier II if it was disposed or abandoned prior to July 31, 1982, or disposed thereafter in a permitted coal refuse disposal site.

3. Comparison of Treatment of Out-of-State Generators

A key factor in developing regional markets for clean energy and RPS compliance is allowing RECs to move freely across state boundaries. Currently, however, many of the states place limitations on which out-of-state generators can qualify to trade RECs on their markets. State REC-trading policies are further complicated by the restrictions of the regional attribute tracking systems.

a. Electricity Wholesale Markets

As previously discussed, the northeast contains three major electricity wholesale markets, each of which is operated by an independent system operator (ISO). They are ISO-NE (New England), NYISO (New York), and PJM (PA-NJ-MD-DE-and now other states). The map below, available on the Federal Energy Regulatory Commission (FERC) website, shows the existing ISOs in the United States and Canada.



The three ISOs have very similar markets. The primary product that is sold is electric energy. Electricity, at the wholesale level, is measured in megawatt-hours (MWh). These markets establish the price of energy, which changes hourly, and varies with the location at which the energy is produced by generation units and consumed by load. Generation units submit energy bids to the ISOs, which select the least expensive combination of generation units that satisfy demand for electricity. The ISOs also make sure that all reliability requirements, transmission limitations, and other operational constraints are also satisfied.

Load serving entities (LSEs) purchase electricity from the wholesale market and resell it to retail consumers (residential, commercial, and industrial customers). LSEs can buy

their electricity directly from the ISOs' administered markets or from generation owners, marketers, or brokers. When transactions between sellers and buyers occur within an ISO, these transactions are purely financial. In other words, the electricity does not literally flow from Generator A to LSE B. Instead, the ISO ensures that the physical flow of electrons satisfies all reliability and operational requirements.

When energy flows from one ISO to another, then the contracting parties must schedule that transaction with each of the ISOs, and any intervening ISOs. Unlike intra-ISO transactions, inter-ISO ones do affect the flow of electrons. The parties must also purchase transmission from the point of generation to the point of delivery, including and transmission that crosses other ISOs' boundaries. Parties determine the availability, type, and cost of transmission through the use of the Open Access Same Time Information Service (OASIS). Thus, inter-ISO transactions have an additional transmission charge that intra-ISO transactions do not. Once the necessary transmission service has been procured, the transaction is scheduled on a daily basis by the parties with the affected ISOs. The ISOs implement this schedule subject to reliability and operational limitations.

The other major product that is sold is capacity. Its units are $/MW. Capacity is a reliability product that makes sure each LSE has sufficient available capacity, including a reserve margin, above that LSE's peak load to avoid rolling blackouts. Capacity, like energy, can be sold within or across ISOs.

b. Tracking Systems

PJM Generation Attribute Tracking System (GATS), which became operational in August 2005, will create certificates for any generator that delivers into PJM. However, GATS does not necessarily require deliverability of electricity into PJM in order to create certificates. External generators that are not scheduled and delivered into PJM must qualify for one of the RPS policies within the PJM region and be located in states "adjacent to PJM geographical boundaries."

GATS also has a protocol for certificate imports from a compatible tracking system. Therefore, while NEPOOL is not adjacent to PJM, the GATS rules would allow RECs to be transferred from NEPOOL, as long as they were retired from the NEPOOL GIS, per an agreement between the two systems' administrators. Until GIS is officially declared a "compatible tracking system," renewable generators in New England must deliver their energy into PJM Interconnection in order to receive certificates from PJM GATS.

NEPOOL Generation Information System (GIS) requires that the energy associated with any renewable attributes produced outside of NEPOOL be delivered into ISO-NE, and it further mandates that no GIS certificates will be produced for generators in control areas that are not directly adjacent to ISO-NE.

Therefore, even if a NEPOOL state's RPS policy allows a generator in PJM to qualify for its RPS, the GIS policy would prevent the generator from trading on the state's REC market because the PJM control area is not adjacent to ISO-NE.

New York's Environmental Disclosure Program (EDP) is used to track the energy associated with the attributes that NYSERDA contracts for. The EDP, created in 2002, is operated by the New York Public Service Commission (PSC) and was amended in April 2005 to ensure the allocation and disclosure of renewable power related to the RPS program consumer surcharge. The EDP's new functions, beyond providing information to consumers about the types of fuel and related air emissions that are used to generate their electricity, are:

1. Authorizing the Administrator to allocate, for environmental disclosure purposes, RPS Program-eligible energy and associated emissions characteristics to each load serving entity, based on its proportion of commodity sales to customers for whom RPS Program charges are collected;
2. Directing that load serving entities accurately disclose to their retail customers the fuel type and emissions characteristics of those customers' share of RPS Program-related energy based on their proportion of commodity sales to customers from whom RPS Program charges are collected;
3. Requiring that RPS Program related energy is disclosed to customers on a statewide basis as a percentage of total state energy requirements;
4. Providing a tracking and accounting mechanism for purposes of determining the effectiveness of the RPS Program in meeting the renewable resource goal and for transactions of renewable energy across neighboring regions; and
5. Providing for the collection of information regarding each load serving entity's customers' respective contribution to the RPS Program charge.

c. PJM States

Delaware

Delaware allows generators within PJM to trade RECs freely. Generators outside of PJM must import their electricity into PJM in order to qualify for REC trading.

According to the RPS statute:

> *"Eligible Energy Resources" include… energy sources located within or imported into the PJM region.*

Delaware passed its RPS legislation recently in July 2005; regulations have not yet been written, and Delaware has not officially selected an attribute tracking system, although it's very likely that the Delaware Public Service Commission will elect to use PJM GATS.

The Commission will be opening their docket on this matter in early September to start the development of the Regulation for the RPS.

The District of Columbia

The District of Columbia allows generators within PJM and generators within states that are adjacent to PJM to trade RECs freely. Generators in adjacent control areas, such as

NYISO and MISO, can also participate in the RPS program, as long as the energy that corresponds to the renewable energy attributes is imported into PJM.

The DC RPS statute reads:

> *"Renewable energy credit" or "credit" means a credit representing one megawatt-hour of electricity consumed within the PJM Interconnection region that is derived from a tier one renewable source or a tier two renewable sources that is located:*
>
> 1. *In the PJM Interconnection region or in a state that is adjacent to the PJM Interconnection region; or*
> 2. *Outside the area described in subparagraph (1) of this paragraph but in a control area that is adjacent to the PJM Interconnection region, if the electricity is delivered into the PJM Interconnection region.*

DC passed its RPS legislation recently in April 2005; regulations have not yet been written, and DC has not officially selected an attribute tracking system, although it's very likely that the DC Public Service Commission will elect to use PJM GATS.

Maryland

Maryland allows generators within PJM and generators within states that are adjacent to PJM to trade RECs freely. Generators in adjacent control areas, such as NYISO and MISO, can also participate in the RPS program, as long as the energy that corresponds to the renewable energy attributes is imported into PJM.

The MD RPS statute reads:

> *"Renewable energy credit" or "credit" means a credit equal to the generation attributes of 1 megawatt-hour of electricity that is derived from a Tier 1 renewable source or a Tier 2 renewable sources that is located:*
>
> 1. *In the PJM region or in a state that is adjacent to the PJM region; or*
> 2. *Outside the area described in item (1) of this subsection but in a control area that is adjacent to the PJM region, if the electricity is delivered into the PJM region.*

However, the RPS regulations seem to allow for RECs from generators that do not deliver their energy into PJM. The MD RPS regulations read:

> *A supplier may request recognition of a REC associated with a Tier 1 or Tier 2 renewable source not delivered into the PJM region under the following conditions:*
>
> 1. *The electricity is generated at a facility that has been certified by the Commission…*

2. *Certification by the operator of the control area in which the facility is located of the total number of MWhs generated at the facility by month and calendar year; and*
3. *Certification by the authorized representative of the facility that the RECs associated with the electricity have not expired, been retired, been transferred, or been redeemed.*

Maryland will use PJM GATS.

New Jersey

New Jersey allows generators within PJM to participate in the NJ RPS freely. Generators outside of PJM must import their electricity into PJM in order to qualify for REC trading and must have begun their operations after January 1, 2003.

The NJ RPS regulations text reads as follows:

- *To qualify as class I or class II renewable energy for the purposes of this subchapter, energy shall be generated within or delivered into the PJM region… Energy shall be considered delivered into the PJM region if it complies with the energy deliverability rules established by PJM Interconnection.*
- *If class I or class II renewable energy is generated outside of the PJM region, but was delivered into the PJM region, the energy may be used to meet the requirements of this subchapter only if the energy was generated at a facility that commenced construction on or after January 1, 2003.*

New Jersey will use PJM GATS and currently contracts with Clean Power Markets, Inc. to track their solar RECs (SRECs).

Pennsylvania

Pennsylvania allows generators within PJM and generators within ISOs that operate within Pennsylvania (like MISO) to trade RECs freely. No other generators qualify, and physical deliverability does not matter.

The PA AEPS statute reads as follows:

> *Energy derived only from alternative energy sources inside the geographical boundaries of this Commonwealth or within the service territory of any regional transmission organization that manages the transmission system in any part of this Commonwealth shall be eligible to meet the compliance requirements under this act.*

According to Eric Thumma of the PA Department of Environmental Protection (DEP),

> *RECs from NY would not be eligible under the act by the DEP's reading and the Pennsylvania Public Utilities Commission (PUC) staff is in agreement with this*

perspective. It is possible that credits from MISO could qualify so long as the electricity is actually scheduled into PJM, but the precise details on those requirements are still being worked out between PUC and DEP staff.

RPS regulations have not been written yet, but Pennsylvania will use PJM GATS.

d. NYISO

New York

New York requires that energy generated outside of New York State be delivered into NYISO in order to be eligible under the New York RPS program, but generators need not be in adjacent control areas. New York allows for "monthly matching" deliverability. New York's RPS is unique in the discussion of REC trading and renewable energy markets in the northeast because New York's RPS does not recognize RECs at all. New York uses the NY EDP to track renewable attributes.

e. ISO-NE States

Connecticut

Connecticut allows generators within ISO-NE to trade RECs freely.

According to the CT RPS statute, generators in Delaware, Maryland, New Jersey, New York and Pennsylvania will also be allowed to participate in the CT RPS freely in 2010; deliverability into ISO-NE will not matter.

The text of the recently amended (2005) CT RPS legislation is as follows:

An electric supplier or electric distribution company may satisfy the requirements of this subsection by

1. *Purchasing Class I or Class II renewable energy sources within the jurisdiction of the regional independent system operator, or, on and after January 1, 2010, within the jurisdiction of New York, Pennsylvania, New Jersey, Maryland, and Delaware, provided the department determines such states have a renewable portfolio standard that is comparable to this section; or*
2. *By participating in a renewable energy trading program within said jurisdictions as approved by the Department of Public Utility Control.*

It should be noted that previous to the recent amendment, the RPS legislation allowed generators in Delaware, Maryland, New Jersey, New York and Pennsylvania to participate in the CT RPS freely, with no deliverability requirements, effective immediately.

RPS regulations have not been written yet so the legislative language has yet to be interpreted; item 2 in the above statute may allow policy makers some flexibility.

Connecticut uses NEPOOL GIS.

Therefore, while the Connecticut RPS legislation would allow generators in certain PJM states to trade RECs freely in 2010, the GIS rules make this impossible because PJM is not adjacent to NEPOOL.

Maine

Maine allows generators within ISO-NE and the Northern Maine Independent System Administrator (NMISA) to trade RECs freely.

The Maine RPS regulations require that generation units located outside of the ISO-NE and NMISA Control Areas deliver their energy into ISO-NE and NMISA, but need not be in adjacent control areas:

> *For service to customers in the ISO-NE control area, the source of GIS certificates used to satisfy the portfolio requirement must be energy that is physically delivered to the ISO-NE control area… For service… in the Maritimes control area, energy… must be… delivered to the Maritimes control area.*

Maine uses NEPOOL GIS.

Therefore, while the Maine RPS regulations would allow generators in PJM to trade RECs in Maine, assuming that they physically deliver their electricity into ISO-NE, the GIS rules make this impossible because PJM is not adjacent to NEPOOL.

Massachusetts

Massachusetts allows generators within ISO-NE to trade RECs freely.

The Massachusetts RPS regulations require that generation units located outside of the ISO-NE Control Area deliver their energy into ISO-NE, but need not be in adjacent control areas:

> *A generation unit located outside of the ISO-NE Control Area may qualify as a New Renewable Generation Unit provided the generation unit meets the eligibility requirements… The portion of the total electrical energy output that qualifies as New Renewable Generation in a given time period shall meet the requirements that include, but are not limited to the following:*
>
> 1. *An external unit Contract…*
> 2. *Documentation:*
>   a. *The electrical energy delivered pursuant to the External Unit Contract* ***was settled in the ISO-NE MSS****;*
>   b. *The generation unit produced… the amount of MWh claimed…*
>   c. *The electrical energy… received a NAERC tag confirming transmission…*
>   d. *The… attributes have not otherwise been… used to satisfy obligations in jurisdictions other than Massachusetts.*

Massachusetts uses NEPOOL GIS.

Therefore, while the Massachusetts RPS regulations would allow generators in PJM to trade RECs in Massachusetts, assuming that they physically deliver their electricity into ISO-NE, the GIS rules make this impossible because PJM is not adjacent to NEPOOL.

It should also be note that the MA RPS statute defines location restrictions for off-grid generation and behind the meter (BTM) generation as follows:

> *The generation unit location is subject to the limitations set forth herein.*
>
> 1. *Off-grid generation. If the generation unit produces off-grid generation, such unit must be located in Massachusetts.*
> 2. *Behind the Meter Generation. If the generation unit is wired to the electrical system on the end-use customer's side of a retail electric meter, it must be located in Massachusetts.*

Rhode Island

Rhode Island allows generators within ISO-NE to participate in the RI RPS freely.

The Rhode Island RPS statute requires that generation units located outside of the NEPOOL Control Area must be in adjacent control areas and must deliver their energy into ISO-NE:

> *A generation unit located in an adjacent control area outside of NEPOOL may qualify as an eligible renewable resource, but the associated generation attributes shall be applied to the renewable energy standard only to the extent that the energy produced by the generation unit is actually delivered into NEPOOL for consumption by New England customers.*

Rhode Island uses NEPOOL GIS.

4. Comparison of RPS Policy Design Elements

Another way in which RPS policies differ is in their design; in fact, the ISOs that run the GIS and GATS tracking systems also differ in their design, and these differences may affect which renewable resource market a generator chooses to sell its RECs into.

a. Tracking Systems

One difference between NEPOOL GIS and PJM GATS is the interval at which new renewable certificates are produced by the corresponding tracking system. GIS produces certificates quarterly, on the 15th day of the calendar quarter that is the 2nd calendar quarter following the calendar quarter in which the energy associated with a certificate was generated. GATS, on the other hand, produces certificates monthly, on the last business day of the following month. Therefore, for example, a generator in New York might elect to register with GATS, rather than GIS, to reduce the administrative complexity and have a more immediate stream of RECs available.

Another difference is that GIS uses hourly deliverability data from the NEPOOL market settlement system (MSET) to produce certificates, and GATS relies on monthly data from the PJM market settlement system (MSS).

b. States

There are several policy design tools that state policy makers have used to shape their RPS policies. These include set-asides and credit multipliers for particular renewable resources (intended to promote some technologies beyond others), REC banking and extended REC lifetimes (intended to increase market flexibility), as well as compliance fees, early compliance alternatives, true-up and cure periods, and retroactive issuance of RECs. It is notable that New York's central procurement RPS model does not include any of the design mechanisms that affect REC trading.

Alternative Compliance Fees

Of all of these mechanisms, one of the most critical is the alternative compliance payment (ACP). This is one of the most direct mechanisms to ensure that an RPS is met. In most cases, these payments are considered a recoverable cost, meaning that these payments are ultimately passed along to the ratepayer.

As such, it is interesting to note that many states refer to these payments as "alternative compliance," which suggests that the payment is a compliance alternative to the retail supplier, rather than a penalty. In most cases, these compliance alternatives have been put in place in order to avoid undue costs from achieving the RPS goals that might result from a lack of available resources or undue influence of market power. Also of note, some state compliance fees are calculated by kilowatt-hour, and others are calculated by megawatt-hour (MWh). For the purposes of this paper, all fees have been converted into dollars per MWh.

Table C1 (below) indicates the differences in language between state policies, but it is significant to recall that if an "alternative compliance" is set too high, it becomes a "compliance penalty" with a different name.

TABLE C1 – COMPLIANCE POLICIES BY STATE

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Alternative Compliance *(5)*			X			X	X		X	X
Compliance Penalty *(4)*	X	X		X	X					
X – *specifically noted*										
**fee, sanctions, and/or penalty*										

TABLE C2 – COMPLIANCE FEES CHARGED BY STATES

State	Cost
CT	$55 per MWh
DC	$25 per MWh for tier 1 $10 per MWh for tier 2 $300 per MWh for solar
DE	$25 per MWh, up to $50 per MWh*
ME	Not defined
MD	$20 per MWh for tier 1 $15 per MWh for tier 2
MA	$50 per MWh (in adjusted 2003 $)
NJ	$50 per MWh $300 per MWh for solar
NY	
PA	$45 per MWh 200% of market price for solar
RI	$50 per MWh (in adjusted 2003 $)
* in subsequent years	

The level at which an ACP is set affects the renewable resource market by creating a price ceiling for RECs – since retail suppliers will not pay renewable generators more for RECs than the alternative compliance. Therefore, the cost differences between states are noted in Table C2, to the right. Maryland and DC have significantly lower fees than the other states. Delaware has a fee of $25 in the first year of noncompliance, but this is increased to $35 dollars in the subsequent year of noncompliance, then to $45 in the 2nd year, and finally $50 for all future subsequent years of noncompliance.

Maine does not specify that a compliance fee will necessarily be levied; instead it mandates that compliance sanctions will be enforced by the Public Utilities Commission, which can include license revocation, a payment into the renewable resource research and development fund, penalties, other sanctions, or a waiver.

It is also interesting that almost all of the states with compliance fees designate funds for the compliance fees to be deposited into. The only exceptions are Maine, which does not designate a specific fee, and New Jersey, which allows the Board of Public Utilities (BPU) to apply the ACP payments as it determines appropriate. The BPU has expressed intent to support the development of renewable energy. Every other state has a fund that supports the development of renewable energy resources, or in Pennsylvania's case, sustainable energy resources. The District of Columbia actual specifies that monies from its Renewable Energy Development Fund are meant to support the creation of new solar resources in DC.

Set-Asides and Multipliers

Unlike the compliance fee, which is essentially an enforcement mechanism, some policy design tools can be used to encourage the development of specific renewable technologies. Among these design elements are set-asides (usually for solar energy) and credit multipliers that reward certain resources with more RECs per MWh than other resources.

Three states have multipliers, as can be seen in Table C3 below, and three states have set-asides for solar resources. The District of Columbia, Delaware, and Maryland offer multipliers for solar, wind and methane technologies, with certain differences. DC offers 120% credit until (and including) December 31, 2006 for solar and wind technologies, and 110% credit after December 31, 2006 for the same. Further, Methane resources receive 110% credit until December 31, 2009 in DC REC market.

In Delaware, renewable technologies must be installed before specified dates in order to qualify for the credit multipliers. Solar technologies and renewable fuel cells receive 300% credit if they are installed before December 31, 2014, and wind resources receive 150% credit if they are installed before December 31, 2012 and located in Delaware.

Maryland offers a 200% credit multiplier for solar resources with no restrictions, as well as multipliers for wind and methane resources within certain time periods. The state offers 120% credit until (and including) December 31, 2005 for wind technologies, and 110% credit after December 31, 2005 for the same. Methane resources receive 110% credit until December 31, 2008.

TABLE C3 – SET-ASIDES AND MULTIPLIERS BY STATE

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Multiplier *(3)*		X	X		X					
Set-Aside *(3)*		X*					X*	X	X*	
										X – *specifically noted*
**solar*										

DC's RPS policy includes both multipliers and a solar set-aside, and New Jersey and Pennsylvania also use the solar set-aside as a policy instrument to promote the development of solar technologies. Pennsylvania's solar set-aside is part of its tier 1 requirement, whereas New Jersey and DC's solar set-asides supplement the requirements for other renewable resources. New Jersey's set-aside is unique in that only solar generators within NJ are eligible for the set-aside, and New York's set-aside is unique in that its entire customer sited tier of renewable resources, which includes fuel cells, PV and small wind systems, is part of the set-aside, essentially creating a set-aside for distributed generation.

TABLE C4 – SET-ASIDES SET BY STATES

State	Target
DC	.386% solar in 2022
NJ	.16% solar in 2009
NY	2% of RPS is customer sited
PA	.5% solar in 2019

Early Compliance and Retroactive RECs

Two states allow for early compliance in their RPS legislations. Massachusetts, which began its program with a 1% portfolio standard in 2003 allowed retail suppliers to accrue RECs during calendar year 2002 for 2003 compliance. Due to a lack of sufficient renewable resources, early compliance certificates were used for 2003 compliance. Likewise, Rhode Island's RPS program will commence with a 7% standard in 2007, but the legislation allows suppliers to purchase RECs from renewable energy generated during 2006, thereby softening the impact of the new RPS upon the suppliers.

TABLE C5 – EARLY COMPLIANCE AND RETROACTIVE RECs BY STATE

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Early Compliance *(2)*						X				X
Retroactive RECs *(1)*					X					
X – *specifically noted*										

Maryland offers electric retail suppliers the option of receiving "retroactive RECs," which in spirit are similar to early compliance. The Maryland Public Service Commission (PSC) must authorize the credit for retroactive RECs, and the application for retroactive RECs had to be filed within six months of the RPS regulations' adoption.

Cure Period and True-up Period

Maine's RPS offers retail suppliers a unique compliance alternative, not matched by any other state, called the "cure period," which allows retail suppliers to fall 10 percentage points short of their 30% RPS requirement in any given year, as long as they "cure the deficiency over the next compliance period, so that over the two compliance periods the 30% portfolio requirement" is satisfied. The PUC may also extend the cure period, under certain circumstances.

TABLE C6 – CURE PERIOD AND TRUE-UP PERIOD BY STATE

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
Cure Period *(1)*				X						
True-up Period *(3)*	X						X		X	
X – *specifically noted*										

A true-up period is rather different than a cure period, but it is similar in that it allows retail electric suppliers some additional time to show RPS compliance. Three states (CT, NJ, PA) offer suppliers an additional three months after the end of every compliance year to file for RPS compliance. This simply extends the deadline by three months, rather than allowing suppliers to fall significantly short of their compliance goals, but it is an additional leniency that some states allow.

REC Banking and Extended REC lifetimes

Three states (MA, PA, RI) allow suppliers to bank their RECs for up to two years after the year of their generation, but Massachusetts and Rhode Island limit the amount of RECs that can be banked for future compliance. In these two New England states, suppliers can only bank up to 30% of their compliance total, and only if the banked RECs were in excess of compliance in the year of generation. Pennsylvania requires that a supplier be AEPS-compliant in order to bank excess RECs but does not place a limit on how many certificates can be banked for future compliance.

Interestingly, the Pennsylvania banking mechanism is not much different in practice than a policy design element that is offered by three of the states in PJM (DC, DE, MD), which essentially is an extended REC lifetime of three years, rather than the standard one-year lifetime. While RECs expire in most states after a single year, RECs in DC, Delaware and Maryland expire after three years, as if the suppliers banked their RECs for RPS compliance in subsequent years.

TABLE C7 – REC BANKING AND EXTENDED LIFETIMES BY STATE

	CT	DC	DE	ME	MD	MA	NJ	NY	PA	RI
REC Banking *(3)*						X*			X	X*
Extended Lifetimes *(3)*		X	X		X					
										X – *specifically noted*
* banking allowed up to 30% of compliance total										

V. CERTIFICATION PROCESSES FOR RPS QUALIFICATION

1. PJM States

- The Delaware PSC will adopt rules and regulations on or before July 31, 2006, to implement Delaware's RPS. No certification process has been formalized yet.
- The District of Columbia's PSC has yet to adopt rules and regulations and yet to develop a certification system. No certification process has been formalized.
- The Maryland RPS regulations were adopted by July 1, 2005. Generators must be certified once by the PSC, and within 30 days of a change in the information contained in their applications, the facilities shall file a copy of the updated or supplemental information.
- The most recent New Jersey regulations became effective on March 7, 2005. Renewable generation facility operators must file annual affidavits with the BPU certifying that their facilities continue to operate in conformity with the RPS policy.
    - Biomass facilities must meet NJDEP requirements for state of the art (SOTA) air pollution control. Resource Recovery facilities are subject to NJDEP environmental compliance standards.
- Pennsylvania's PUC will be releasing a draft guidance document in the next couple of weeks to a month or so that will outline the certification process in draft form. They will then be holding a public comment period on the proposed process before going to final guidance.

2. New York

- New York has yet to develop a certification process for RPS-eligible renewable generators, but the guidebook for biomass will be available for comment in the near future.

3. NEPOOL States

- Connecticut's RPS regulations were finalized in October 2004. The Connecticut DPUC has an online registration process for renewable generators. If any application information changes, the DPUC shall be notified within 10 days.
    - Certain biomass facilities are subject to particular nitrogen oxide (NOX) rate restrictions that are contained within the definitions of Class I and Class II renewable energy sources. These facilities must submit quarterly affidavits attesting to the units' average NOX emission rate for that quarter.
- The Maine PUC adopted RPS rules in September 1999. Maine has no certification process for RPS-eligible renewable generators in Maine. Essentially, generators self-certify in the first instance. The Maine Commission, upon complaint or on its own initiative, can investigate whether any particular generator is actually eligible under Maine's RPS and can take corrective action if necessary.

- In April 2002, the Massachusetts Division of Energy Resources (DOER) released its final regulations for the RPS. In order to be certified for the Massachusetts RPS, the owner or operator of such a unit submits a Statement of Qualification (SQ) application to DOER. A list of approved units is available online at http://www.mass.gov/doer/rps/approved.htm.
    - If the plant uses biomass for fuel, then the MA Department of Environmental Protection assists in the review, with particular attention to the air emissions.
- The Rhode Island PUC has yet to adopt RPS regulations, but the RI Renewable Energy Standard (RI RES) Negotiated Rulemaking Group submitted regulatory recommendations in August 2005. The RI RES will be discussing their report with the PUC on August 31, 2005. A certification process has not yet been formalized.

VI. NORTHEASTERN RPS STATE ANALYSIS

1. Fuel Analysis

A common definition of renewable resources would allow the northeastern RPS states to integrate their markets and increase the liquidity of RECs across the region. Two issues are particularly significant in determining the plausibility of developing a common, regional definition.

1. The first consideration should be the current state of eligible fuel resources. If a particular renewable resource is eligible for all of the states' renewable portfolios then it should be a simple matter to include that resource in a regional definition. If a particular resource is eligible for nine out of the states' renewable portfolios then perhaps the tenth state might consider adding that resource eligible to its renewable portfolio.
2. The second consideration should be the breadth of the states' definitions for the renewable resources. The broader the definitions for particular RPS-eligible fuels, the more renewable generators will qualify under those state definitions.

Below are listed the eligible renewable fuels that are listed in all or some of the northeastern RPS policies. Each resource is analyzed according to the two criteria mentioned above.

a. Wind Power

- 10 of the northeastern RPS-states list wind power as an RPS-eligible resource.
- The states' definitions of wind power do not include any qualifiers.

b. Solar Power

- 10 of the northeastern RPS-states list solar power as an RPS-eligible resource.
    - 4 of the states also specifically list photovoltaic technologies, either under the category of solar power, or separately.
- Definitions range from very general: *"solar power"* to very specific: *"solar thermal electric."*
    - All forms of solar energy are renewable, regardless of the technology. Therefore, should all of the states adopt a broad, universal definition for solar energy, such as *"solar power,"* the northeastern regional REC market would become more liquid.

c. Methane Gas

- 9 of the northeastern RPS-states list methane gas as an RPS-eligible resource. The state of Maine lists landfill gas as an RPS-eligible resource; landfill gas is a form of methane gas.
- The definitions of methane gas vary somewhat, and this particular resource's definition is made more complicated by its overlap with "anaerobic digestion," which is listed separately by many states. However, all states accept landfill gas as a renewable resource.

- If landfill gas were to be its own regionally accepted category of renewable resource, or alternatively, if the states opted to include "anaerobic digester gas," instead of methane gas or landfill gas, the northeastern regional REC market would become more liquid because this broad definition is inclusive of all four waste categories that can be used to produce methane gas.

d. Hydroelectric Power

- 10 of the northeastern RPS-states list hydroelectric power as an RPS-eligible resource.
- 6 states list 'small hydro' as an RPS-eligible resource, under the category of hydroelectric power. 5 of these six states define 'small hydro' as not having an aggregate capacity of more than 30MW. Connecticut defines 'small hydro' as not having an aggregate capacity of more than 5MW.
  - If the states were to adopt 'small hydro' as an RPS-eligible resource, including generators not having an aggregate capacity of more than 30MW, the northeastern regional REC market would become more liquid.
  - Pennsylvania's 'low-impact hydro' may be more environmentally beneficial, but it is easier to determine a generators aggregate capacity than to certify it as 'low-impact hydro.'

e. Fuel Cells

- 10 of the northeastern RPS-states list fuel cells as an RPS-eligible resource.
  - 6 of the states only allow fuel cells that use renewable fuels.
  - 4 of the states allow all fuel cells.
- Some states list the eligible fuel cell resources, and other states simply allow all renewable fuel cells that utilize RPS-eligible resources, or all non-renewable fuel cells.
  - All states already accept some renewable fuel cells; should the states all broaden their definitions of renewable fuel cells to include all RPS-eligible fuel resources, rather than limit their renewable portfolios, the liquidity of RECs produced by fuel cell generators would increase throughout the Northeast.

f. Ocean Power

- 9 of the northeastern RPS-states list some form of ocean power as an RPS-eligible resource.
  - If Pennsylvania were to include ocean power in its alternative energy portfolio then ocean power would be RPS-eligible throughout the Northeast.
- Within the category of ocean power, there are 4 subcategories. Every state that allows for ocean power in its renewable portfolio allows the subcategory of tidal power. Further, 8 of the nine states allow wave power.
  - If the RPS states were to broaden their RPS definitions of ocean power to include all four subcategories (current, tidal, wave and thermal), the

liquidity of RECs produced by ocean power generators would increase throughout the Northeast.

g. Geothermal Power

- 7 of the northeastern RPS-states list geothermal power as an RPS-eligible resources.
    - If Connecticut, Massachusetts and New York were to include geothermal power as an RPS-eligible resource, the liquidity of RECs produced by geothermal electricity generators would increase throughout the Northeast.
- Some states do not describe geothermal power. Several states use particular phrases in reference to geothermal power, such as "steam turbine," "hot water or steam," and "earth's crust." While some RPS-states define geothermal energy, the definitions are fairly broad, and none of the definitions are mutually exclusive.
    - The definition of geothermal power varies among the states, but the differing definitions are not exclusive of one another.

h. Biomass Resources

- 10 of the northeastern RPS-states list biomass as an RPS-eligible resource.
- The definitions of biomass vary widely from state to state. Qualifiers differ, and eligible biomass resources differ.
    - Should the RPS states adopt broad language similar to Connecticut's legislative language, which includes, *"other biomass that regenerates,"* a common, regional RPS definition of biomass could be established. Otherwise it seems as if a common definition of biomass may be implausible. For the purposes of a regional RPS market, biomass resources may have to be excluded because of the fuel's inherent complexities.

2. Out-of-State Generators Analysis

The state RPS policies and tracking system rules are consolidated in Table D1. This table indicates which generators can trade their renewable attributes freely in the northeastern RPS states, which generators cannot trade in certain states, and which generators can trade their attributes if they also deliver their energy into particular states' ISOs.

TABLE D1
Treatment of Out-of-State Generators
Including Northeastern State RPS requirements
And Northeastern Tracking System requirements

			To									
			PJM					NYISO	ISO-NE			
			DC	DE	MD	NJ	PA	NY	CT	ME	MA	RI
From	PJM	DC	v	v	v	v	v	D				
		DE	v	v	v	v	v	D				
		MD	v	v	v	v	v	D				
		NJ	v	v	v	v	v	D				
		PA	v	v	v	v	v	D				
	NYISO	NY	v	D	v	D		v		D	D	D
	ISO-NE	CT		D		D		D	v	v	v	v
		ME		D		D		D	v	v	v	v
		MA		D		D		D	v	v	v	v
		RI		D		D		D	v	v	v	v
	MISO	Any	D	D	D	D	D	D				
		Adjacent to PJM	v	D	v	D	v	D				
	CAN	NB		D		D		D		D	D	D
		QB		D		D		D		D	D	D
			v - *RECs are tradable* D- *RECs are tradable if energy is delivered into the ISO*									

In Table D1 there is a category of states that are "adjacent to PJM." These states are not only in adjacent ISOs; they are geographically adjacent to PJM itself. The District of Columbia and the state of Maryland treat generators in these adjacent states differently than other generators that may be in the same ISO. For example, North Dakota and Wisconsin are both in MISO, but Wisconsin is adjacent to PJM and North Dakota is not.

It is very significant to note that the NEPOOL GIS rules limit which generators can trade in the NEPOOL region, regardless of the state RPS policies in the NEPOOL region. Essentially, the GIS rules only allow generators in control areas that are directly adjacent to NEPOOL to trade RECs in NEPOOL states. Therefore, a generator in NYISO can trade its RECs in Massachusetts, but a generator in PJM cannot.

The Massachusetts and Maine RPS policies require that generators outside of NEPOOL that wish to trade their RECs on their state markets deliver the corresponding energy into ISO-NE. However, Massachusetts and Maine do not require that generators outside of

NEPOOL be in control areas that are directly adjacent to NEPOOL. For example, according to the Massachusetts and Maine RPS policies, generators in PJM are allowed to trade RECs in Massachusetts and Maine, as long as they deliver the corresponding energy into ISO-NE. However, the NEPOOL GIS rules make this impossible.

TABLE D2
Treatment of Out-of-State Generators
The Bases for Energy Deliverability Requirements

			To									
			PJM					NYISO	ISO-NE			
			DC	DE	MD	NJ	PA	NY	CT	ME	MA	RI
From	PJM	DC	v	v	v	v	v	D2b				
		DE	v	v	v	v	v	D2b				
		MD	v	v	v	v	v	D2b				
		NJ	v	v	v	v	v	D2b				
		PA	v	v	v	v	v	D2b				
	NYISO	NY	v	D2a	v	D2b		v		D1, D2b	D1, D2b	D1, D2a
	ISO-NE	CT		D1, D2a		D1, D2b		D2b	v	v	v	v
		ME		D1, D2a		D1, D2b		D2b	v	v	v	v
		MA		D1, D2a		D1, D2b		D2b	v	v	v	v
		RI		D1, D2a		D1, D2b		D2b	v	v	v	v
	MISO	Any	D1, D2a	D1, D2a	D1, D2a	D1, D2b	D1	D2b				
		Adjacent to PJM	v	D2a	v	D2b	v	D2b				
	CAN	NB		D1, D2a		D1, D2b		D2b		D1, D2b	D1, D2b	D1, D2a
		QB		D1, D2a		D1, D2b		D2b		D1, D2b	D1, D2b	D1, D2a

D1 – *Deliverability into ISO required by tracking system rules*
D2a – *Deliverability into ISO required by State Law*
D2b – *Deliverability into ISO required by State Regulations*

Table D2, above, highlights and identifies those state-to-state trades, which require the deliverability of energy into the corresponding ISO. Sometimes the deliverability requirements are codified in state law, sometimes in state regulations, and sometimes in the rules of the tracking system. Connecticut and Pennsylvania do not have state-level deliverability requirements.

RPS deliverability requirements for the more recent RPS policies are codified in state statutes, whereas the deliverability requirements for older RPS policies are codified in state regulations. Rhode Island, the District of Columbia, Delaware and Maryland, all of which passed their RPS legislations in 2004 or later, all have their deliverability requirements codified in their RPS legislation, whereas New Jersey, Maine, and

Massachusetts, whose RPS statutes are older, have their deliverability requirements codified in their regulations. New York's RPS is an exception to this trend because it only exists in PSC regulations, although the regulations were written in 2004.

TABLE D3
Treatment of Out-of-State Generators
The Bases for Geographic Trading Restrictions

			To									
			PJM					NYISO	ISO-NE			
			DC	DE	MD	NJ	PA	NY	CT	ME	MA	RI
From	PJM	DC	v	v	v	v	v	D	N1, N2a	N1	N1	N1, N2a
		DE	v	v	v	v	v	D	N1, N2a	N1	N1	N1, N2a
		MD	v	v	v	v	v	D	N1, N2a	N1	N1	N1, N2a
		NJ	v	v	v	v	v	D	N1, N2a	N1	N1	N1, N2a
		PA	v	v	v	v	v	D	N1, N2a	N1	N1	N1, N2a
	NYISO	NY	v	D	v	D	N2a	v	N1, N2a	D	D	D
	ISO-NE	CT	N2a	D	N2a	D	N2a	D	v	v	v	v
		ME	N2a	D	N2a	D	N2a	D	v	v	v	v
		MA	N2a	D	N2a	D	N2a	D	v	v	v	v
		RI	N2a	D	N2a	D	N2a	D	v	v	v	v
	MISO	Any	D	D	D	D	D	D	N1, N2a	N1	N1	N1, N2a
		Adjacent to PJM	v	D	v	D	v	D	N1, N2a	N1	N1	N1, N2a
	CAN	NB	N2a	D	N2a	D	N2a	D	N1, N2a	D	D	D
		QB	N2a	D	N2a	D	N2a	D	N1, N2a	D	D	D

N1 – *REC trading not allowed due to geographic restrictions in tracking system rules*
N2a – *REC trading not allowed due to geographic restrictions in state law*
N2b – *REC trading not allowed due to geographic restrictions in state regulations*

Also of interest are the bases for geographic trading restrictions, which are highlighted and identified in Table D3, above.

Several issues are particularly notable in Table D3. First, Delaware, New Jersey and New York do not place geographic restrictions on renewable generators to trade their attributes in their respective RPS markets, although it should be noted that only solar generators within New Jersey qualify to produce SRECs. Second, Connecticut is the most restrictive state in terms of geographic requirements for RPS eligibility. According to Connecticut's statute, only generators in NEPOOL can trade RECs in Connecticut until 2010.

Third, Massachusetts and Maine do not place geographic restrictions on renewable generators that want to trade renewable attributes in their respective RPS markets, but NEPOOL GIS only allows renewable generators from adjacent control areas to trade renewable attributes within NEPOOL.

Also, none of the states' geographic RPS restrictions are codified in state regulations; they can all be found in the state RPS statutes, which further complicates any efforts to align state RPS programs, as legislative changes will likely be more difficult to achieve than regulatory changes

3. Estimated Price Ceilings per Megawatt-hour

Table D4 combines state RPS-compliance fee data from Table C2 with state RPS fuel multiplier data to show the highest prices that renewable generators can receive for their renewable energy attributes per megawatt-hour in each of the northeastern RPS states. The dollar values are given in 2005 dollars, but only the states of Massachusetts and Rhode Island specify that their RPS alternative compliance payments (ACP) must be adjusted annually by the consumer price index (CPI).

TABLE D4 – ESTIMATED RENEWABLE ATTRIBUTE PRICE CEILINGS PER MEGAWATT-HOUR IN 2005

	CT	DC	DE	ME	MD	MA*	NJ	NY	PA	RI*
Biomass	$55	$25	$25	N/A	$20	$53.1	$50		$45	$53.1
Fuel cells (renewable)	$55	$25	$75	N/A	$20	$53.1	$50		$45	$53.1
Fuel cells (all)	$55			N/A					$45	
Geothermal		$25	$25	N/A	$20		$50		$45	$53.1
Hydro (tier 1)	$55	$25	$25	N/A	$20	$53.1			$45	$53.1
Hydro (tier 2)	$55	$10			$15		$50		$45	
Methane gas	$55	$27.5	$25	N/A	$22	$53.1	$50		$45	$53.1
MSW	$55	$10		N/A	$15		$50		$45	
Ocean	$55	$25	$25	N/A	$20	$53.1	$50			$53.1
Solar	$55	$30	$75	N/A	$40	$53.1	$50		$45	$53.1
Solar (set-aside)		$300					$300		***	
Wind	$55	$30	$37.5	N/A	$24	$53.1	$50		$45	$53.1
All prices are per megawatt-hour										

* Adjusted from 2003 dollars
*** 200% of market price

4. RPS Policy Obstacles to Liquidity

In terms of increasing the liquidity of the existing northeastern REC market, the primary obstacles are the trading limitations created by the state RPS policies and the rules of the regional tracking systems. These limitations include policies toward out-of-state renewable generators, incompatible RPS-eligible fuel definitions, RPS program design elements.

One policy obstacle to interstate REC trading is the state and tracking system treatment of out-of-state generators. For example, Pennsylvania's RPS only accepts RECs from renewable generators in the Midwest ISO (MISO) and PJM. The GIS rules, another major trading obstacle, only allow REC trading from adjacent control areas, ruling out any trading from generators in PJM.

Another REC trading barrier is the variability of RPS-eligible fuel definitions. According to table B1, five fuels are listed as RPS-eligible under every renewable portfolio standard in the northeast: biomass, hydroelectric, methane gas, solar and wind, but the RPS-eligible definitions for biomass, hydroelectric and methane gas vary a great deal among the states. Therefore, a particular biomass generator may be eligible to trade its renewable attributes in some RPS states, but not in others, due to differences in fuel definitions.

RPS program design elements, such as REC banking, solar set-asides and alternative compliance payments (ACP) do not act as obstacles to trade, but rather act as traffic indicators. For example, renewable generators will be less likely to trade their RECs in states with low ACPs because their profit per megawatt-hour cannot exceed the ACP cost.

Of the ten RPS policies in the Northeast, three are particularly new and do not require compliance until 2007. These are the policies of the District of Columbia, Delaware and Rhode Island. Of the remaining states, several RPS policies create particular regional market barriers. For example, renewable generators that enter into long term REC contracts with NYSERDA cannot trade those RECs in other states until their NYSERDA contracts expire, and Maine's RPS is not high enough to create a REC market for out-of-state renewable generators.

a. New York

New York's RPS is operated by the New York State Energy Research and Development Authority (NYSERDA), which centrally procures renewable attributes. This mechanism is unique in the Northeast, as every other RPS state allows REC trading as an RPS compliance mechanism. Essentially, NYSERDA enters into long-term contracts for renewable attributes with generators and the New York Environmental Disclosure Program (EDP) is used to confirm that the renewable energy associated with those attributes is delivered into New York State.

New York's RPS program has one structural challenge in that its long-term contracts for renewable attributes cannot effectively predict the price fluctuations of renewable energy. Those projects receiving contracts from NYSERDA are also required to deliver their

power to the New York ISO spot market. Community Energy, Inc., for example, has a contract with NYSERDA for RECs produced from the Atlantic City Wind Project, and while electricity is not delivered directly from the site to New York, Community Energy, Inc. must complete monthly conversion transactions for equivalent amounts of power to be delivered into the NY ISO market.

It is significant to the entire northeastern region that renewable generators that contract their attributes and energy to New York are ineligible to trade renewable energy certificates (RECs) until their contracts with New York expire.

In designing its RPS, the New York Public Service Commission (PSC) recorded the RPS policy design discussion and parties' exceptions in Case 03-E-0188, including the discussion pertaining to credit trading. The PSC's goal, as stated in its order regarding the retail renewable portfolio standard, is "that the mechanism used to track the success of the RPS program should be designed in such a way that it can co-exist with and eventually be replaced by a more market-based approach."

During the NY RPS Design Workshop in Albany, NY on June 9, 2005 Robert Grace gave a presentation on RPS design options to support New York's voluntary market for new renewable energy. Essentially, directing New York's RPS policy to support the growth of the voluntary renewable energy market opens the door for REC trading. One policy alternative presented by Mr. Grace was the possibility of setting a percentage cap on the amount of RECs procured by NYSERDA, thereby allowing the voluntary green market to cover the remaining RPS requirement. This percentage cap could be lowered annually, in order to promote REC trading as an RPS compliance mechanism.

It is significant to note that New York State's RPS is not legislated, in that a regulatory RPS is easier to modify than an RPS statute. However, the absence of RPS legislation also leaves the policy more vulnerable to potential legislative intervention, which may cause renewable generators to doubt the security of long term REC contracts with NYSERDA.

b. Maine

While the state of Maine allows REC trading for RPS compliance, its RPS policy is by far the most lenient of any in the Northeast. For the purposes of Maine's RPS eligible generation facilities must either be renewable resources or efficient resources, which include certain cogeneration facilities. In fact, due to the leniencies of Maine's RPS policy, the state's 30% standard is essentially ineffective, as RPS-eligible generation accounts for approximately 70% of Maine's retail sales.

Due to these circumstances, Maine is not much of a player in the regional RPS market, as the state's RPS does not create enough demand to encourage the development of cheaper, more efficient renewable energy technologies. Should Maine choose to play a greater role in the northeastern REC market, the state must increase its portfolio requirement and either narrow its definition of RPS-eligible fuel sources or create a tiered system with a standard for renewable resources, separate from its standard for efficient technologies.

5. Non-Regulatory Methods to Increase Liquidity

While the REC market is tightly bound by the regulations that create it, there are a couple of instances in which the regulatory and legislative language may allow for actions or interpretations that will increase the liquidity of the northeastern REC market.

a. Connecticut

The state of Connecticut was unique in that its RPS language allowed renewable generators in certain PJM states to sell their RECs on Connecticut's compliance market without requiring deliverability. However, the legislative amendment that was passed in 2005 limited REC trading to only the NEPOOL control area until 2010.

However, according to the RPS statute, an electric supplier or electric distribution company may satisfy the requirements of the Connecticut RPS by "participating in a renewable energy trading program within [NEPOOL] as approved by the Department of Public Utility Control (DPUC)." This language has yet to be interpreted by the DPUC staff, and it may be interpreted to allow the trading of renewable attributes from states outside of NEPOOL.

b. PJM GATS

The rules for the PJM GATS tracking system allow for the possibility of certificate trading with compatible tracking systems, whereas the NEPOOL GIS rules do not. According to GATS Administrator Ken Schuyler, GIS is compatible with GATS, which in turn means that pending the GATS administrator communicating with the GIS administrator, a protocol could be developed by which NEPOOL GIS retires RECs from its system and GATS in turn creates RECs in PJM that indicate their original creation data.

What this would be mean is that NEPOOL generators would be able to trade their RECs on the PJM states' REC markets without delivering their energy into PJM. Currently, this is not possible, as GATS requires deliverability from generators that are in states not adjacent to the PJM control area.

6. Predicting the REC Market

Table D4 indicates the maximum price per megawatt-hour that renewable generators will receive on each of the northeastern RPS markets, depending upon the renewable resources that they employ. Table D1 indicates which generators are allowed to trade on each of the northeastern RPS markets, based upon their geographic locations. It also shows the cases in which the electricity associated with generators' renewable attributes must be delivered into a particular ISO in order to allow for REC trading.

These tables are not predictive, but they provide an indication of the direction in which RECs are likely to be traded across the Northeast, based upon which generators are eligible to trade in each of the markets, and what potential profit generators might make on each of the markets. Of course, there are countless cases of potential REC trades, but it is particularly interesting to consider the flow of RECs that are generated by wind

facilities because they generate electricity at relatively low cost and because several states specifically encourage the development of wind resources with multipliers that credit wind facilities with more RECs than other renewable facilities.

As mentioned at the beginning of this paper, according to Petersik (2004), state RPS policies helped motivate demand for 2,335 megawatts of new renewable energy capacity through 2003, and the vast majority of this capacity, 2,183 megawatts or 94%, was wind power. Clearly, wind technologies play a pivotal role in the scene of renewable resource development.

Judging by Table D4, the highest price per megawatt-hour that a renewable generator might receive for its wind attributes is $55 in Connecticut. Massachusetts and Rhode Island have price ceilings of $53.10 in 2005, which will increase annually with inflation. Further, it is known that the retail electricity distributors in Massachusetts will continue to have difficulty in meeting their portfolio standards because of the limited supply of eligible renewable generation.

According to Table D1, it is apparent that generators in PJM cannot trade their RECs in any of the NEPOOL states because of the NEPOOL GIS rule limitations. Further, Connecticut's legislation does not allow for REC trading from even New York State, which is adjacent to ISO-NE. The Connecticut Clean Energy Fund is also relevant to the development of renewable energy facilities, as it will be subsidizing 100MW of new renewable generation in Connecticut through Project 100.

Due to these circumstances, new wind generators are more likely to be built in New England and New York than in PJM; the highest ceiling price per megawatt-hour for wind resources in PJM is $50 in New Jersey. Of course, the new renewable generation in Connecticut may actually decrease REC prices by increasing the supply of renewable energy, which would change the renewable market landscape.

It should also be noted that wind generators may opt to enter into long term contracts with NYSERDA, but the political precariousness of the NYPSC regulations is likely to deter new generation from being built to satisfy New York's RPS, as there is no assurance that New York State politicians will be supportive of the PSC's RPS initiative.

APPENDIX A – STATE POLICY OBJECTIVES

- Washington DC (statute)
  - Establish a market for electricity from these resources in DC
  - Lower cost to consumers of electricity produced from these sources
  - Economic benefits
  - Environmental benefits
  - Fuel diversity benefits
  - Security benefits
  - Long-term decreased emissions benefits
  - Long-term decreased reliance on and vulnerability from imported energy sources
  - Increased energy security benefits
  - Economic development benefits
  - Healthier environment benefits
- Delaware (statute)
  - Establish a market for electricity from these resources in DE
  - Lower cost to consumers of electricity from these resources
  - Improved regional and local air quality benefits
  - Improved public health benefits
  - Increased electric supply diversity benefits
  - Increased protection against price volatility and supply disruption benefits
  - Improved transmission and distribution performance
  - New economic opportunities
- Maine (PUC website)
  - Environmental benefits (particularly with respect to air emissions)
  - Resource diversity (regional)
  - Reduce reliance on dominant fuel sources
  - Stabilize electricity prices
  - Resource Security (reduce reliance on foreign sources of fuel)
  - Economic development (communities)
- Maryland (statute)
  - Establish a market from these resources in MD
  - Lower cost to consumers of electricity produced from these resources
  - Economic benefits
  - Environmental benefits
  - Fuel diversity benefits
  - Security benefits
  - Long-term decreased emissions
  - Healthier environment
  - Increased energy security
  - Decreased reliance on and vulnerability from imported energy sources
- Massachusetts (DOER background document)
  - Decrease pollution from existing power plants
  - Diversify the fuels used to generate power in or near our region
  - Decrease our reliance on fuels imported from other regions

    - Moderate price volatility caused by reliance on imported fuels (MA)
- New Jersey (Executive Order 45)
    - Improved air and water environmental quality
    - Decrease our dependence on foreign energy sources and susceptibility to potentially volatile traditional energy markets
    - Decrease our reliance on centralized power plants
    - Ease the strain on our energy infrastructure
    - Offer opportunity for job creation and economic development by attracting these emerging industries to the State of New Jersey
- New York (regulations)
    - Generation diversity for security and independence (in New York)
    - Develop renewable resources and advance renewable resource technologies in, and attract renewable resources generators… to New York State
    - Improve New York's environment by reducing air emissions, including GHG emissions, and other adverse environmental impacts on New York
- Rhode Island (statute)
    - Diversity of energy sources including renewable resources
    - Lower and stabilize future energy costs
    - Reduce air pollutants, including CO2 emissions that adversely affect public health and contribute to global warming
    - Protect public health and the environment

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