III.
Analyses written by REIL members at the request of external organizations
Impact of REC Harmonization on Renewable Investment Decisions

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July 24, 2009
I. INTRODUCTION

State renewable energy portfolio standards (“RPS”) are creatures of state law, created by state legislatures to reflect the policies and priorities of that state. One result of this state-by-state approach is that RPS policies have limited commonality across states. In particular, the most typical differences include: (i) inconsistent definitions of eligible renewable energy resources; (ii) varying definitions of what constitutes a renewable energy credit (“REC”); and (iii) geographic restrictions on the trading of RECs themselves.¹ These differences either unintentionally or explicitly limit the trading of RECs across state boundaries. Often REC trading is further restricted by the requirements of the regional attribute tracking system governing the RECs. This state-based approach to renewable energy development creates a fragmented, local market for RECs and is thought to inhibit investment in renewable energy projects. However, achieving consistency among state RPS policies is not a simple task, as it requires changes to the statutes and regulations of the various states, and modifications to regional attribute tracking systems, or the adoption of a federal RPS.²

Much research and thought has been put into the differences among RPS and REC policies and the impediments to harmonizing such policies across states. The underlying assumption is that harmonization of state RPS policies will attract new investors and increase investment in renewable energy. Theoretically, increased REC liquidity should increase the flow of funds to renewable energy generation due to greater transparency in pricing and the additional cash flow associated with REC sales.

However, it is not clear that the price transparency and REC liquidity brought by RPS harmonization would alone be sufficient to significantly increase renewable energy investment in a particular state beyond existing investment levels. While the ability to freely trade RECs should create a more efficient market, it may be that other factors drive renewable energy investment with RECs playing a smaller role. Alternatively, renewable energy investment in the various states may be already maximized with investors are capitalizing on the current market fragmentation.

As the final deliverable for the Commonwealth of Pennsylvania on behalf of the Connecticut Energy Office, the Massachusetts Energy Office, and the Vermont Energy Office, Baker & McKenzie interviewed individuals with experience in REC markets and renewable energy investment. The purpose of these interviews was to gain understanding as to the extent to which the current fragmentation in the REC market and variations in RPS policies influences renewable energy investment decisions and whether harmonization would change those decisions. This paper discusses the opinions

¹ The differences between state RPS programs are discussed more fully in Enhancing Markets for Renewable Energy and Energy Efficiency Credits: Interim REC Market Status Report attached as Appendix A.
² Further discussion of the options available for harmonizing state RPS policies can be found in Legal Options for the Harmonization of State Renewable Credit Policies attached here as Appendix B.
expressed by these interviewees and draws certain conclusions as a result of such interviews.

II. PROCESS

Baker & McKenzie interviewed individuals with extensive experience as buyers and/or sellers of RECs or as investors in and developers of renewable energy projects across the U.S. These individuals were selected not only for their experience but also for their knowledge about state RPS policies and how these policies impact REC markets and investments in renewable energy.3

Baker & McKenzie conducted an interview with each individual, focusing on the factors critical to their decision to invest in renewable energy projects and what role RECs and state RPS policies played in the decision-making process. The interviews did not focus exclusively on investments that are required by state RPS, in other words utility company investments required to comply with the RPS or renewable projects developed in cooperation with a utility to satisfy such requirements. The interviewees also discussed the implications of a more liquid REC market on energy projects that sell into the “spot market.” In particular, each interviewee was asked the following three questions:

- Do investors look to a state’s RPS and REC policies when determining where to develop (or invest in) renewable energy? Why or why not? What are the most important factors in making those investment decisions?

- Does the lack of REC liquidity across states negatively (or positively) impact investment in renewables? If the impact is negative, what changes would increase investment?

- Other than changing state RPS legislation, are there other options for harmonizing state REC policies or for creating a more fluid REC market?

Throughout each interview, the interviewees raised issues that they felt were important to a discussion of RPS policies and REC liquidity. These thoughts and comments are incorporated into the discussion below.

For purposes of this paper, the comments and opinions of the interviewees have been summarized and combined so that no one comment may be attributed to any one individual. In addition, the conclusions drawn from these interviews are those of the authors and not necessarily the interviewees. While this is by no means a broad survey of the various opinions regarding REC markets, RPS policies, and the intersection with renewable energy development, it is a representative sample that can help inform state policy makers.

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3 For purposes of this report, all interviewees requested to remain anonymous.
III. DISCUSSION

The rationale underlying efforts to harmonize state RPS policies is that consistent treatment of RECs and the ability to easily buy and sell RECs across state lines will increase investment in renewable energy. There are reasons to believe that a national or even regional REC market could drive-up such investment. First, a liquid REC market should appeal to investors attracted by the ability to easily commoditize their investments and capitalize on the REC market. At least one interviewee expressed the view that decreased fragmentation in the REC markets would not necessarily increase mainstream investment in renewables, but would attract a broader range of investors. Entities such as hedge funds and other market intermediaries would be attracted to renewable energy projects that such investors might not have otherwise considered. Marginal projects in particular would benefit from the new financial resources. Currently, financial investors target a limited number of projects in a select few states that have robust renewable energy markets. While RECs provide a mechanism for commoditizing a renewable energy investment, RPS policies severely restrict the liquidity and sale of such RECs. The current limitation on REC sales makes them a less attractive investment vehicle for these types of investors and eliminates a potential source of financing for renewable projects.

Second, a broader, more robust, and liquid REC market should provide greater price stability. Renewable energy projects are capital intensive and developers need a known (or at least predictable) revenue stream to allow them to finance and operate their development. While this difficulty is mitigated under power purchase agreements with utilities seeking to meet RPS requirements, developers of merchant facilities do not have the funding stability of a power purchase agreement and a robust, liquid REC market that allows for price discovery may be more critical for such developers. A stable REC price and broader market should encourage independent development of projects.

However, it is not the presence of a larger pool of investors, price stability, or even the liquidity of RECs in and of themselves that would increase renewable energy investment. Instead, ability of RECs to influence renewable development is linked to their role as a mechanism for financing projects and not just a marker for the transfer of environmental attributes. There are a number of reasons why harmonization may not improve investment in renewable energy, including the impact of liquidity on REC prices, the role of RECs as a marker of regulatory compliance, and the existence of other factors that may be more important to the development of renewable energy. These factors are discussed further below.

Pricing

The impact of harmonization on REC monetary values is a significant factor in whether harmonization will lead to additional renewable energy investment. Both the absolute value of a project’s REC and the value of those RECs to the cost of the project are important.
With respect to the value of RECs, a liquid REC market does not guarantee that REC prices will increase and in fact, the current market restrictions may be inflating REC prices overall or at least within certain submarkets. Because most RPS impose geographic limitations on the local REC market, REC buyers cannot reach outside of those boundaries, limiting the supply of available RECs. Markets with restricted supply typically experience higher prices depending on the local demand. Thus, opening the market may actually depress REC prices overall. If the local REC markets have varying prices, not all markets will benefit from harmonization. A true market, even just regional, will likely drive REC prices toward a mean price. Thus, submarkets with higher REC prices will find their REC price decrease. If RECs help subsidize renewable projects in those submarkets, then development may be negatively impacted.

This price decrease is likely to have the most financial impact on high cost renewables that may be more reliant on the cash generated by REC sales to help offset the cost of producing energy from that resource. RPS set asides for such technologies help address this difficulty for compliance RECs, but do little for any additional merchant development. Lower REC price might make financing harder especially if the resource relies on the sale of RECs as part of its cash flow.

On the other hand, submarkets with REC prices that start out below the mean will benefit by a move to the higher mean price. Further, a regional REC market would allow utilities to buy resource specific RECs from generators that can efficiently produce certain types of renewable energy either due to the ready availability of the resource in a particular geographic area or due to technological advantage. This could drive funding toward renewable development in those areas or toward specific technology. While there would be little or no immediate benefit to the development of all types of renewable in each state, it could lead to more overall renewable energy development in the U.S.

Even if REC prices do increase as the result of RPS harmonization, the increase may not be sufficient to allow RECs to play a substantial role in financing renewable development so as to actually increase such development. While RECs currently provide some level of financial support for certain renewable projects, they likely do not provide enough cash flow alone to be critical to any one project’s success. Other sources of financing such as grants and tax credits are typically as, if not more, important.

Developers must still sell the energy from their projects and unless that energy can be sold at a competitive price, there may be few takers. Of course, the incremental value of the RECs may help finance projects for which tax credits and other financing mechanisms are not sufficient to make the energy price competitive. Certainly, RECs along with tax credits and grants can provide the financing necessary to make renewable energy cost competitive. However, the key issue is whether the relative value of RECs matter to a development and whether a liquid REC market increases the value of RECs sufficiently for them to drive additional investment.

A notable outcome of the interviews was the common opinion that while eliminating REC market fragmentation and the inconsistency among state RPS policies would lead to some increase in renewable energy investment, differing RPS policies and illiquid RECs
are not the primary barrier to increasing investment. Instead, the financial fundamentals of a renewable energy project are more important to investment decisions and RECs do not substantially impact these fundamentals. The individuals interviewed agreed that harmonizing state RPS and REC policies could increase investment in renewable energy generation, although none believed that harmonization alone without broader policy reform would result in a substantial increase in such investment.

Resource Availability

Another factor impacting renewable energy investment, and one raised by all of the interviewees, is the availability of renewable resources. The ready availability of cost-effective renewable resources available within a state or region is critical to the development of renewable resources. Resource availability is unaffected by RPS harmonization. Investors will target states with readily available renewable resources that can cost-effectively produce energy regardless of that state’s REC policies. Although states with limited resources should have higher REC prices, these prices need to be high enough to offset the additional cost associated with the energy source. The geographic limitations contained in many RPS are a direct response by state legislators to the concern that the ability to buy RECs from other states would decrease renewable investment in their states. The interviewees understood the concern for states with limited renewable energy resources or resources that are expensive to develop. However, they felt that most renewable investment is, and will continue to be, directed toward states with readily available renewable resources. States with limited renewable resources are not likely to attract investment beyond the minimum required under their RPS even with a liquid REC market.

Price Caps

A truly liquid REC market will require changes to state RPS beyond just harmonizing the definition of a REC and an eligible renewable energy resources or removing the geographic restrictions. Development of market pricing for RECs is further complicated by the presence of price caps or emergency price relief provisions. Price caps, which exist in many RPS, commonly provide that if the price of RECs exceeds a pre-established amount the utility may pay a fixed dollar amount to the state in lieu of purchasing the required RECs. These price caps are intended to protect local utilities from high REC prices, which would result if insufficient renewable energy sources were developed to meet RPS requirements. However, these relief mechanisms have the unintended consequence of depressing investment in renewable energy resources.

Renewable energy projects, like conventional energy projects, are capital intensive and require a longer-term financial commitment for the purchase of energy and RECs. Buyers have no incentive to hedge against cost increases in RECs by locking into long term contracts because RPS price caps provide a guaranteed maximum price. Further, these price caps set the upper limit on REC prices. Additionally, these price caps negatively impact the development of a secondary REC market in which investors that purchase RECs speculate on rising prices. All of the individuals interviewed mentioned prices caps
as a deterrent to a stable, liquid REC market and stated that the removal of price caps would have a greater impact on investment decisions than increased REC fungibility.

**Regulatory Stability**

One additional factor that could deter renewable investment even in a liquid REC market is the frequency of the modifications to RPS policies and regulations by both state legislators and administrative agencies. Regulatory stability was felt by the interviewees to be a particular deterrent to long-term stable REC markets and thus to investment in renewable resources. As a result of these changes, investors had little confidence that the regulatory scheme underlying their investment will not change in the short-term, making them reluctant to make substantial long-term investments. Even if the current policies are not ideal, it may be better for a state to resist changing them. Further, the current state-based approach for renewable investment was thought to be unsustainable over the long term and modifications inevitable.

**Power Market**

A final factor that may limit renewable energy investment even in a liquid REC market is the role that the current structure of the power market plays in limiting investment in renewable energy. For some of the interviewees, this was the key deterrent to investment and, unless addressed, investment would continue to lag. Issues such as wheeling charges and the short length of power purchase agreements were key concerns. These issues can be addressed without harmonizing state RPS policies and could have a bigger impact in renewable investment.

**FEDERAL RPS**

Ultimately, the underlying difficulty with transforming RECs into a financing tool that helps stimulates renewable development is that RECs have no value outside of their role as a marker of compliance with RPS standards for utilities. RECs are creatures of regulatory compliance and without the RPS compliance requirements, there would be no market for RECs. Thus, a liquid REC market will only drive renewable development to the point at which RPS compliance is achieved.

The adoption of a federal RPS may be the best mechanism for increasing the development of renewable resources. A nationwide renewable portfolio standard sets a floor for renewable development and requires additional renewable energy development to the extent that state-specific RPS have a renewable percentage lower than the federal RPS. However, depending on its structure, a federal RPS may or may not lead to harmonization of the REC markets. A federal RPS may interact with the existing state RPS in several ways including: pre-empting the state program, remaining silent, or recognizing the state RPS. Under the pre-emption approach, since the state RPS would cease to exist a fully harmonized REC market would exist.
To the extent that a federal RPS recognizes the state level RPS programs or permits states to maintain parallel programs, the REC market will remain fragmented at the state level. In fact, a federal RPS may create a more complex two-tiered system with RECs for federal RPS compliance trading on a national market and RECs for state RPS compliance trading only within the parameters defined by that RPS.

Several pieces of legislation have been introduced by Congress over the past several years seeking to create a federal RPS. The American Clean Energy Leadership Act recently approved by the Senate Energy and Natural Resources Committee is an example of the Congressional efforts to move forward a Federal RPS. The House Energy and Commerce Committee has passed its own version of a federal RPS in the American Clean Energy and Security Act.

Regardless of the approach used under a federal RPS, a clear integration or pre-emption of the state RPS will be critical to maintaining the REC market. Additional discussion of the potential structures and the issues associated with a federal RPS are contained in our earlier report Legal Options for the Harmonization of State Renewable Credit Policies attached as Appendix B.

IV. CONCLUSION

The general consensus among the individuals interviewed was that the most gains in renewable development could be made by addressing the issues discussed above and creating some degree of interoperability between state RPS policies; interoperability in which RPS do not work against each other but were not identical.

Further, the harmonization does not need to be nationwide. Instead, the interviewees felt the development of regional renewable energy and REC markets have the greatest potential for increasing renewable energy investment and bringing additional investment. Regional liquidity is most likely to bring economic development and renewable energy development to a region as a whole, and to those states that do not have sufficient renewable resources to develop robust renewable markets of their own.

Liquidity in any market, including the REC market, is valuable, as liquidity should provide greater transparency in pricing and attract additional investment in renewable energy development. However, harmonization of the various state RPS may not have the intended, or hoped for, consequences. As discussed in this report there are a variety of policy, regulatory, and market forces that otherwise hinder the creation of an efficient market for RECs. Further, these forces may not be addressed by creating identical or even compatible RPS policies across states. Harmonization of state RPS would require reconciling inconsistent definitions of eligible renewable energy resources and the varying definitions of what constitutes a REC as well as eliminating geographic restrictions. Thus harmonization may be a difficult goal to achieve, absent federal action, as it requires that all states in a region act in concert. Nonetheless there are steps, other

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4 Such as the Bingaman Amendment to the 2007 Energy Act H.R. 6 (2007).
than attempting to create a liquid REC market, that individual states can take such as addressing price caps, regulatory stability, and the dynamics of the local power market that could be as, or more, critical to advancing renewable energy development within their borders.
APPENDIX A

Enhancing Markets for Renewable Energy and Energy Efficiency
Credits: Interim REC Market Status Report.

Introduction

State created Renewable Portfolio Standards (“RPS”) and the establishment of Renewable Energy Credits (“RECs”) that may be traded in markets as a mechanism to comply with RPS targets has attracted private investment in renewable energy systems and technologies. A similar, but less well established system for Energy Efficiency Credits is beginning to emerge. The degree to which the REC markets (and nascent Energy Efficiency Markets) can catalyze significant additional private investment in renewable energy and energy efficiency technology remains to be seen and will depend largely on whether current barriers to liquidity in the REC markets can be overcome and the degree to which the energy efficiency policies avoid placing similar institutional barriers to market liquidity.

As part of the project proposal “Enhancing Markets for Renewable Energy and Energy Efficiency Credits” (the “Project”) submitted by the Commonwealth of Pennsylvania on behalf of the Connecticut Energy Office, the Massachusetts Energy Office, the Vermont Energy Office, the Alliance to Save Energy and the Renewable Energy and International Law Network, Baker & McKenzie has prepared the following summary report on the status of REC markets and RPS. The Project seeks to analyze market barriers to RECs and Energy Efficiency Credits in Connecticut, Massachusetts, Pennsylvania and Vermont (the “Partner States”) and develop strategies and legal options for overcoming these barriers.

This report is the first in a series of deliverables addressing the status and harmonization of REC markets. It is intended to serve as a concise overview of RPS and REC activities occurring in the four Partner States. As there has been substantial work done in the area of REC markets and RPS programs5, this report does not replicate that work but instead provides a summary of the status of the Partner State programs, identifies barriers that limit the fungibility of RECs and the harmonization of the REC markets across the four Partner States, and serves as a foundation for the next phase of the Project which will focus on potential legal solutions to those barriers.

RPS and REC Markets Overview

As of the end of 2007, 25 states and Washington, D.C. had adopted a mandatory RPS. Four additional states have voluntary renewable energy goals. Generally these programs establish renewable energy purchase obligations for electricity generators, distributors and suppliers within the state. Almost all RPS allow generators, distributors, and suppliers to achieve compliance with their renewable energy obligations through the

5 A resource list including some of the recent papers discussing REC markets and RPS programs is attached to this report.
purchase of RECs. Allowing the use of RECs to achieve compliance with the RPS has resulted in compliance-based REC markets throughout the United States.\(^6\)

Three of the four Partner States – Connecticut, Pennsylvania, and Massachusetts – have mandatory renewable energy programs while Vermont has adopted a voluntary program.\(^7\) Although the specifics differ, the three mandatory programs require covered entities to achieve a specified level of renewable energy within their portfolios by set dates.\(^8\) The percentage of renewable energy required by each state escalates over time.

Vermont has established a voluntary renewable portfolio goal under which retail energy suppliers are encouraged to meet the growth in energy demand with renewable energy resources. If the public utility board finds that the programs goals are not achieved by 2012, the voluntary goal converts into a mandatory RPS.

A chart summarizing the key aspects of the Partner States renewable energy programs is attached.

**Key Barriers**

A review of the Partner State’s renewable and alternative energy portfolio requirements and prior research into the RPS programs identify several programmatic and structural barriers to liquid REC markets. In particular:

*Generation Mix and Renewable Attributes:* In each of the four Partner States (that define RECs) a REC is defined to represent a unit of renewable energy. However, a REC can represent both a unit of renewable energy and also the environmental attributes associated with that unit. In practice, the environmental attributes will vary depending on the mix of energy sources replaced by the renewable energy (e.g., a MWh of displaced coal generation has a different environmental attribute than a MWh of displaced hydro generation). As the Partner States sit within different regional energy markets, the generation mix and thus the environmental attributes of the RECs vary to some degree. The PJM generation mix is largely reliant on coal as compared to ISO-NE which relies more heavily on natural gas. The differing generation mixes creates different environmental attributes for RECs on a per MWh basis and thus is a practical limitation on the fungibility of the RECs between PJM and ISO-NE.

\(^6\) While RPS compliance is the underlying driver for the compliance-based REC market, a voluntary REC market also exists. However, unlike the compliance-based market which is driven by the desire to provide renewable energy (along with the various environmental and energy supply benefits derived therefrom), the voluntary REC market is primarily a surrogate for carbon reductions. There have been efforts in Congress to adopt a federal RPS which would impact voluntary as well as compliance-based REC markets. While this issue is beyond the scope of this status report, a discussion on the impacts of a federal RPS on voluntary markets is attached.

\(^7\) The Connecticut and Massachusetts renewable portfolio requirements are referred to as RPS while Pennsylvania uses the term “Alternative Energy Portfolio Standard.”

\(^8\) As shown in the attached table Connecticut’s statute covers electric suppliers and distribution companies, Massachusetts’ RPS applies to retail electricity suppliers selling electricity to end-use customers, Pennsylvania’s AEPS applies to electric distribution companies and electric generation suppliers, and Vermont’s program covers electric suppliers.
**Renewable Energy Resource Definitions:** RECs typically represent a MWh or generation from a renewable energy resource. The definition of what constitutes a renewable energy resource varies among the Partner States, as it does among most states. Two of the Partner States – Connecticut and Pennsylvania – have classes or tiers of renewable energy resources that are eligible under their programs. Massachusetts and Vermont have one class of renewable energy resource. While Connecticut and Pennsylvania’s categories of “first tier” renewables are largely similar to the Massachusetts’ and Vermont’s renewable energy categories, the precise definitions of the categories can vary. More difficult are the “second tier” renewables, which may include energy sources that are not considered renewable in other state programs such as the waste coal included in Pennsylvania’s Tier II category. These varying definitions make translating all RECs from one state to another difficult. Synchronized definitions, limitations on trading only RECs from similarly defined renewable energy resources, or an adjustment factor would be necessary to enable an interstate REC market.

**Geographic Restrictions:** Another key barrier to REC fungibility is the fact that many states place restrictions on the geographic location of the renewable energy generation. Because most states seek to encourage generation of renewable energy within their own borders for a variety of economic and environmental reasons, RPS programs typically place boundaries on the source of the renewable energy and any RECs used for compliance with the RPS. Connecticut, Massachusetts and Pennsylvania are not exceptions to this trend, placing some restrictions on the source of RECs for their programs.

**REC Tracking Systems:** Even if states do not impose geographic restrictions in their RPS programs, the REC attribute tracking systems (NEPOOL-GIS and PJM-GATS in this

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9 For example Pennsylvania defines biomass energy as:

“(i) organic material from a plant that is grown for the purpose of being used to produce electricity or is protected by the Federal Conservation Reserve Program (CRP) and provided further that crop production on CRP lands does not prevent achievement of the water quality protection, soil erosion prevention or wildlife enhancement purposes for which the land was primarily set aside; or

(ii) any solid nonhazardous, cellulosic waste material that is segregated from other waste materials, such as waste pallets, crates, and landscape right-of-way tree trimmings or agricultural sources, including orchard tree crops, vineyards, grain, legumes, sugar and other crop by-products or residues.”

In comparison Massachusetts’s definition is as follows:

“Fuel sources including brush, stumps, lumber ends and trimmings, wood pallets, bark, wood chips, shavings, slash and other clean wood that are not mixed with other solid wastes; agricultural waste, food material and vegetative material as those terms are defined, … by the Department of Environmental Protection at 310 CMR 16.02; energy crops, biogas, organic refuse-derived fuel that is collected and managed separately from municipal solid waste; or neat biodiesel and other neat liquid fuels that are derived from such fuels sources.

10 Connecticut’s RPS statute permits RECs:

1. issued by NEPOOL GIS if the RECs are for:
   a. energy produced by a unit generating Class I or II energy in ISO-NE
   b. energy imported into control area of ISO-NE; and

2. under contract to serve end-use customers in the state on or before October 1, 2006.
case) often have their own rules that may limit the source of the RECs. For example, the REC tracking system itself may limit the locations of generators for which it will issue RECs. The NEPOOL-GIS requires that the energy associated with certificates issued under the NEPOOL-GIS be delivered into ISO-NE and that the energy be generated in a control area adjacent to ISO-NE. Thus even if a state RPS statutorily allows non-state generated RECs to be traded within the state’s REC market and be used for RPS compliance, the attribute tracking system may not permit it.

The above barriers are both legislative and regulatory in nature at the state and regional transmission organization levels. In the next phase, the Project will develop approaches for addressing these barriers specifically looking toward legal options that states may use to address these barriers. These legal options will be accompanied by a briefing paper on the financial community’s perspective on REC market design and the current limits on fungibility.
## REC Market/RPS State Summaries

Prepared by Baker & McKenzie

<table>
<thead>
<tr>
<th>State</th>
<th>Connecticut</th>
<th>Massachusetts</th>
<th>Vermont</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Renewable Requirements</strong></td>
<td>Electric providers must meet requirements according to the following schedule:</td>
<td></td>
<td>Retail electricity providers are encouraged to secure long term contracts for renewable energy to meet the increase in retail electricity sales between 2005 and 2012.</td>
<td>Electricity generators and suppliers must meet the following alternative energy requirements:</td>
</tr>
<tr>
<td></td>
<td>2005: 4.5% (1.5%- Class I, 3%-Class II)</td>
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<td></td>
<td>2007: 1.5% Tier I (including .0013% Solar), 4.2% Tier II</td>
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<td></td>
<td>2006: 5% (2%- Class I, 3%-Class II)</td>
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<td></td>
<td>2008: 1.5% Tier I (including .003% Solar), 4.2% Tier II</td>
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<td></td>
<td>2007: 7.5% (3.5%- Class I, 3%-Class II, 1%- Class III)</td>
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<td></td>
<td>2009: 2% Tier I (including .0063% Solar), 4.2% Tier II</td>
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<td></td>
<td>2008: 10% (5%- Class I, 3%-Class II, 2%- Class III)</td>
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<td></td>
<td>2010: 2.5% Tier I (including .012% Solar), 4.2% Tier II</td>
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<td></td>
<td>2009: 12% (6%- Class I, 3%-Class II, 3%- Class III)</td>
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<td></td>
<td>2011: 3% Tier I (including .0203% Solar), 6.2% Tier II</td>
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<td></td>
<td>2010: 14% (7%- Class I, 3%-Class II, 4%- Class III)</td>
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<td></td>
<td>2012: 3.5% Tier I (including .0325% Solar), 6.2% Tier II</td>
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<td></td>
<td>2011: 15% (8%- Class I, 3%-Class II, 4%- Class III)</td>
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<td></td>
<td>2013: 4% Tier I (including .0510% Solar), 6.2% Tier II</td>
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<td></td>
<td>2012: 16% (9%- Class I, 3%-Class II, 4%- Class III)</td>
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<td></td>
<td>2014: 4.5% Tier I (including .084% Solar), 6.2% Tier II</td>
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<td></td>
<td>2013: 17% (10%- Class I, 3%-Class II, 4%- Class III)</td>
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<td></td>
<td>2015: 5% Tier I (including .144% Solar), 6.2% Tier II</td>
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<td></td>
<td>2014: 18% (11%- Class I, 3%-Class II, 4%- Class III)</td>
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<td></td>
<td>2016: 5.5% Tier I (including .25% Solar), 8.2% Tier II</td>
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<tr>
<td></td>
<td>2015: 19.5% (12.5%- Class I, 3%-Class II)</td>
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<td></td>
<td>2017: 6% Tier I (including .2933% Solar), 8.2% Tier II</td>
</tr>
</tbody>
</table>

To qualify as a new renewable resource, systems must have been installed after December 31, 1997; old systems may qualify under "vintage waiver" provision.

Retail electricity providers must utilize new renewable energy sources according to the following schedule:

2003: 1.0%
2004: 1.5%
2005: 2.0%
2006: 2.5%
2007: 3.0%
2008: 3.5%
2009: 4.0%
+1% each year thereafter

If the electricity provider’s do not contract for renewables 1) equal to the growth in Vermont’s electricity usage or 2) greater than 10% of Vermont’s 2005 electricity usage is not renewable then a mandatory RPS becomes effective in 2014.

In addition there is a separate state goal of 1) 20% of statewide electric retail sales from renewables and 2) 25% of all energy consumed in state produced by renewables by 2025 with an emphasis on farms and forests.
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>REC Trading</td>
<td>Obligation can be met through purchase of RECs issued by NEPOOL. Also, an electricity supplier may discharge its RPS obligation by making an alternative compliance payment to the Massachusetts Technology Park Corporation, which administers the state's Renewable Energy Trust.</td>
<td>Obligation can be met through purchase of RECs issued by NEPOOL.</td>
<td>The mandatory RPS obligation can be met through the purchase of RECs.</td>
<td>Alternative Energy Credits (AEC) (defined as tradable instruments) may be used to comply with the AEPS.</td>
</tr>
<tr>
<td>Geographic Restrictions</td>
<td>Electric suppliers and distributors may meet the requirements with: 1) RECs issued by NEPOOL GIS if the RECs are for a) energy produced by a unit generating Class I or II energy in ISO-NE or b) energy imported into control area of ISO-NE; 2) REC’s under contract to serve end-use customers in the state on or before October 1, 2006</td>
<td>For electrical energy transactions not included in the ISO-NE settlement market system but for which the supplier holds GIS Certificates from NEPOOL, the supplier must document the ownership of the GIS Certificates. For electrical energy transactions not included in ISO-NE settlement market system and for which the supplier has not secured GIS certificates, the transaction must be verified by an independent third-party. Off-grid and behind-the-meter generators must be located in Massachusetts.</td>
<td>Electricity generated inside or outside Vermont may be counted toward the goal.</td>
<td>AECs may be certified for the portion of renewable energy consumed or delivered to PA or the control area of the RO that manages part of PA. AECs from outside PA are eligible for compliance purposes only in the parts of PA that are within the same RTO control area as the generator of the alternative energy.</td>
</tr>
<tr>
<td>REC</td>
<td>Any electric supplier that seeks to</td>
<td>No explicit provision regarding</td>
<td>No explicit provision regarding</td>
<td>Owned by alternative energy</td>
</tr>
<tr>
<td>State</td>
<td>Pennsylvania</td>
<td>Vermont</td>
<td>Massachusetts</td>
<td>Connecticut</td>
</tr>
<tr>
<td>--------</td>
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<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Ownership</td>
<td>Participate in RECs</td>
<td>Participate in RECs</td>
<td>Participate in RECs</td>
<td>Participate in RECs</td>
</tr>
<tr>
<td></td>
<td>Other Renewable - 3%</td>
<td>Other Renewable - 3%</td>
<td>Other Renewable - 3%</td>
<td>Other Renewable - 3%</td>
</tr>
<tr>
<td></td>
<td>Combined Source - 4%</td>
<td>Combined Source - 4%</td>
<td>Combined Source - 4%</td>
<td>Combined Source - 4%</td>
</tr>
<tr>
<td></td>
<td>Hydro - 5.5%</td>
<td>Hydro - 5.5%</td>
<td>Hydro - 5.5%</td>
<td>Hydro - 5.5%</td>
</tr>
<tr>
<td></td>
<td>Oil - 24.4%</td>
<td>Oil - 24.4%</td>
<td>Oil - 24.4%</td>
<td>Oil - 24.4%</td>
</tr>
<tr>
<td></td>
<td>Coal - 9.2%</td>
<td>Coal - 9.2%</td>
<td>Coal - 9.2%</td>
<td>Coal - 9.2%</td>
</tr>
<tr>
<td></td>
<td>Nuclear - 14.4%</td>
<td>Nuclear - 14.4%</td>
<td>Nuclear - 14.4%</td>
<td>Nuclear - 14.4%</td>
</tr>
<tr>
<td></td>
<td>Natural Gas - 38.1%</td>
<td>Natural Gas - 38.1%</td>
<td>Natural Gas - 38.1%</td>
<td>Natural Gas - 38.1%</td>
</tr>
</tbody>
</table>

Electricity distribution companies and electricity retailers are responsible for maintaining and selling RECs, with the new RECs covered by the RECs for each state.
<table>
<thead>
<tr>
<th>State</th>
<th>Connecticut</th>
<th>Massachusetts</th>
<th>Vermont</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency</td>
<td>Connecticut Department of Public Utility Control</td>
<td>Massachusetts Division of Energy Resources</td>
<td>Vermont Public Service Board</td>
<td>Pennsylvania Public Utility Commission</td>
</tr>
<tr>
<td></td>
<td>Regs., Conn. State Agencies, § 16-245a-1 et seq.</td>
<td>NEPOOL-GIS Operating Rules</td>
<td>NEPOOL-GIS Operating Rules</td>
<td>GATS Operating Rules</td>
</tr>
</tbody>
</table>

1) the generator has been pre-qualified by one of the PJM states for its RPS program, and 2) the state has approved the creation of certificates.
Additional Background Reading


Appendix B

Legal Options for the Harmonization of State Renewable Credit Policies
Legal Options for the Harmonization of State Renewable Credit Policies

June 16, 2008
V. EXECUTIVE SUMMARY

State renewable energy portfolio standards ("RPS") have a significant impact on the renewable energy credit ("REC") market and the subsequent investment in renewable energy resources. Since RPS are creatures of state law, the RPS have been created to reflect the policies of the various states. This fact has resulted in a fragmented market for RECs.

The fragmentation is largely caused by (i) inconsistent definitions of eligible renewable energy resources; (ii) varying definitions of what constitutes a REC; and (iii) geographic restrictions on the trading of RECs themselves. There are several options for achieving harmonization among the state RPS and increasing REC market liquidity. These options include changes to the statutes and regulations of the various states, modifications to the regional attribute tracking systems, and the adoption of a federal RPS. While no one option provides a complete and simple resolution, this paper explores the benefits and potential negatives of these options.

VI. INTRODUCTION

This paper is the second in a series of deliverables on the harmonization of state-based REC policies for the Commonwealth of Pennsylvania on behalf of the Connecticut Energy Office, the Massachusetts Energy Office, and the Vermont Energy Office (the “Partner States”). RPS programs and RECs are a strong force behind renewable energy development in the U.S. and the Partner States are seeking to advance both their RPS and development of renewable resources.\(^\text{11}\)

The Partner States requested that the Alliance to Save Energy, the Renewable Energy and International Law Network, and Baker & McKenzie analyze market barriers to RECs and energy efficiency credits in the Partner States.

To date there has been much thoughtful work on the differences between the various state RPS programs and how the state program variations present barriers to the fungibility of RECs. This paper builds on that work by analyzing the legal options for harmonizing state RPS as a means to reduce fragmentation in the REC market. Increasing REC fungibility and market liquidity is viewed by many as an important factor in catalyzing greater investment in renewable energy technologies. This paper identifies several options as possible approaches to expanding the REC market,\(^\text{12}\) including: creating identical state RPS programs; harmonizing state RPS programs, including addressing the requirements of the regional attribute tracking systems; creating a weighted REC scheme; and implementing a federal RPS.

\(^{11}\) Ryan Wiser and Galen Barbose, *Renewable Portfolio Standards in the United States: A Status Report with Data Through 2007*, April 2008, Lawrence Berkeley National Laboratory, P. 12. The data do not determine whether the renewable energy was developed because of a state’s RPS and do not take into account that some states allow for out-of-state generation to count toward the RPS.

\(^{12}\) Since the barriers to REC market liquidity are generally consistent across states, we focus our discussion on the Partner States.
VII. The Status of State RPS and REC Markets

Over twenty-five states have a RPS in place with over half of these implemented since 2004. Most existing RPS allow regulated entities to use RECs for compliance purposes. While the general principle of a RPS—to require retail electricity suppliers to obtain a particular level of renewable energy per year—is consistent across the states, the details of the RPS among the states vary greatly. State programs differ in the type of eligible renewable projects, the ability to use RECs outside of the state’s power pool, and even the definition of what qualifies as a REC.

RPS programs in the Partner States are no exception, each taking a different approach. Of the four Partner States, three – Connecticut, Pennsylvania, and Massachusetts – have a mandatory RPS while Vermont has adopted a voluntary program. The details of the three mandatory programs differ but all three require covered entities to include specified, increasing levels of renewable energy within their portfolios by set dates. Vermont established a voluntary renewable portfolio goal which encourages retail energy suppliers to meet the growth in the state’s energy demand using renewable energy resources. If the programs goals are not achieved by 2012, the voluntary goal converts into a mandatory RPS. The details of the Partner States’ RPS are outlined in Appendix A.

While most states use the term RPS in reference to their portfolio standards, Pennsylvania refers to its portfolio standard as an Alternative Energy Portfolio Standard (“AEPS”) and uses the term Alternative Energy Credit (“AEC”) in place of REC. The AEPS seeks to increase the use of alternative forms of energy including renewable resources, reflecting the fact that Pennsylvania’s program includes energy sources that are not renewable.13

States have various economic, environmental, and policy reasons motivating the design of their RPS. For instance, some states may restrict the ability to buy RECs in order to create incentives for the development of local renewable energy sources. Connecticut and Pennsylvania have established preferences for certain types of renewable energy sources by creating different “tiers” of renewable energy resource types and setting targets specific to such tiers. A tiered system functions to encourage higher-cost renewable energy sources that may not otherwise be competitive. A tiered system also allows a state to favor resources that provide particular environmental or economic benefits within its borders. Other states may recognize an energy source as "renewable" that another state views as less environmentally beneficial. For instance, only Pennsylvania recognizes energy generated from waste coal as an eligible alternative energy source. State-specific RPS programs allow each state to customize its RPS to meet its local conditions and politics.

As a result of limited commonality between the states in important program design elements, the REC market is not a cohesive, nationwide market but instead is highly fragmented regional or even state-based market. Even regional markets are restricted due to state RPS and attribute tracking system restrictions. Fragmentation of the REC market inhibits overall investment in renewable energy projects because fragmented markets are less efficient and less liquid and

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13 Since RPS is the more commonly used term, this paper will generally use RPS to refer to programs that set portfolio standards. However, specific references to Pennsylvania’s program will use the terms AEC and AEPS.
therefore have not attracted the capital market investors that require greater liquidity. Fragmentation in the REC market has led to significant price differentials depending on the state, the type of eligible renewable energy sources in a particular state and the level of interstate trading of RECs.\(^{14}\)

One thesis is that harmonizing the REC market, even on a regional basis, would lead to increased interstate fungibility of RECs and greater liquidity, which in turn would lead to greater investment in renewable energy. Renewable energy projects are often capital intensive and the cash flows related to REC sales are an important consideration in investment decisions. Even limited harmonization could lead to greater clarity in the market, which enables enhanced investment decision-making. Harmonizing state programs may, to some degree, mitigate the price volatility by allowing RECs to flow to areas in need of RECs and with limited renewable energy in-state capacity. A uniform price for RECs is thought to create a more predictable investment environment.

We are mindful, however, that there are potential benefits to individual states in maintaining their locally tailored RPS and the associated fragmented market. First harmonization of state RPS programs may be optimal from a market efficiency standpoint but, as discussed later, would require revisions to state statutes or regulations that created the RPS programs. Such revisions may implicate policy decisions underlying the RPS structure as well as disrupt the REC market in the short term as market participants adjust to the changes. In addition, the market fragmentation may provide development opportunities that would not otherwise exist. Certain investors maybe capitalizing on the existing fragmentation, bringing financial resources to renewable energy development that might not otherwise exist. For the purposes of this analysis, we assume that the benefits of a regional REC market outweigh the benefits of the status quo.

**VIII. IMPEDIMENTS TO HARMONIZATION**

The establishment of a more liquid REC market is restricted by the specific provisions of the underlying state regulations and statutes establishing the RPS programs. The state statutes and regulations delineate the REC market by setting forth the definition of renewable energy sources that may be used to create RECs and the geographic restrictions on the trading of RECs. State laws also define what constitutes a REC (e.g., does it include environmental attributes such as avoided emissions). As illustrated below, Connecticut, Massachusetts, Pennsylvania and Vermont have differing approaches to these concepts. Establishing even limited harmonization between the states would require some consistency among the key programmatic elements.

**A. Eligible Renewable Energy Sources**

Establishing a consistent definition of the eligible renewable energy sources among states would enable renewable energy projects across the region to meet that element of each state’s RPS program. Currently, the Partner States’ RPS statutes or regulations outline a positive list of renewable energy sources that are eligible to create RECs. As shown in Appendix A, the Partner

States have some commonality between the eligible categories of renewable resources. All Partner States recognize the following broad renewable energy categories: solar, wind, methane gas, hydroelectric and biomass. Aside from wind, the states further define each broad category. For instance, in the statute establishing Massachusetts’s program, eligible biomass must satisfy the following definition: “low-emission, advanced biomass power conversion technologies, such as gasification using such biomass fuels as wood, agricultural, or food wastes, energy crops, biogas, biodiesel, or organic refuse-derived fuel.”\textsuperscript{15} In comparison, Pennsylvania requires, among other things, that the material used to create biomass energy be “segregated from other waste materials, such as waste pallets, crates and landscape or right-of-way tree trimmings or agricultural sources, including orchard tree crops, vineyards, grain, legumes, sugar and other crop by-products or residues.” Therefore, some biomass projects may qualify under Massachusetts’ program and not under Pennsylvania’s and vice versa.

Aside from further restrictions on the broad renewable energy category, there are other differences between the states’ programs. For instance, Pennsylvania recognizes waste coal energy as an eligible alternative energy source while Vermont, Connecticut and Massachusetts do not. Therefore, coal waste “AECs” cannot be used for compliance purposes in Connecticut or Massachusetts or in Vermont’s voluntary program. The recognition of such “AECs” may also be against state policies that seek to promote renewable energy sources and not simply alternative energy sources. Harmonizing eligible renewable energy resources in the Partner States would ensure states were comfortable in allowing in out-of-state RECs because they would know the projects creating the RECs in the other state were from acceptable sources. For Pennsylvania, this may mean that not all of its Tier II resources would be fungible.

\section*{B. Geographic Restrictions}

A liquid REC market is bolstered by a free flow of RECs across geographic boundaries. Most states with an RPS allow the use of unbundled RECs for compliance purposes. As a result, there is greater flexibility in complying with RPS programs as RECs could theoretically come from across the nation. However, a common feature of RPS programs, including the Partner States, is to restrict the geographic source of RECs,\textsuperscript{16} creating an obvious barrier to REC market liquidity.

The Partner States analyzed in this report do not allow the unrestricted purchase of RECs for RPS compliance. See Appendix A. For instance, Connecticut recognizes RECs from generators within ISO-NE or from energy imported into ISO-NE pursuant to Rule 2.7(c) of the NEPOOL-GIS operating rules as described below. Massachusetts allows for out-of-state RECs so long as the corresponding energy is delivered into ISO-NE.

In addition, the northeast attribute tracking system – the New England Power Pool-Generation Information System (“NEPOOL-GIS”) – has its own operating rules regarding importation of energy, which affect both Massachusetts and Connecticut. NEPOOL-GIS allows only RECs that accompany energy imported into ISO-NE from adjacent states to be eligible to create GIS certificates. The NEPOOL-GIS rules serve to exclude all non-NEPOOL RECs except those from

\textsuperscript{15} M.G.L. 25A Sec. 11F(b)(viii).

\textsuperscript{16} Clean Energy States Alliance, \textit{Northeast RPS Compliance Markets: An Examination of Opportunities to Advance REC Trading}, October 12, 2005 [hereinafter “CESA Report”].
New York, which is adjacent to ISO-NE. Therefore, even if Connecticut and Massachusetts allowed for freely traded RECs, the NEPOOL-GIS rules would impede the flow of non-NEPOOL, non-New York RECs.

In comparison, Pennsylvania does not allow RECs from outside the regional transmission organizations that serve Pennsylvania (i.e., PJM or MISO) even if energy is also imported. The relevant attribute tracking system in Pennsylvania – PJM-Generation Attributes Tracking Systems (“PJM-GATS”) – recognizes out-of-state RECs so long as the RECs have been approved by the receiving state as eligible under the receiving state’s RPS. Therefore, unlike with NEPOOL-GIS, only Pennsylvania’s state requirements and not PJM-GATS function to restrict the use of RECs in Pennsylvania.

Even if all Partner States had the same definition of eligible renewable energy sources, the geographic restrictions would still restrict REC market liquidity. Eliminating the geographic restrictions in the state RPS programs and NEPOOL-GIS would significantly contribute to the harmonization of the REC market in the Partner States.

C. Definition of RECs

The attributes included in a REC are not well-defined or universally agreed-upon. Some believe that a REC includes only a certification that one megawatt-hour of energy has been generated from an eligible renewable energy source. Others maintain that RECs include environmental attributes such as the avoided emissions that result from renewable energy generation as compared to the displaced conventional energy generation.

The difference in the REC definitions is important because it may affect the fungibility of the REC as well as the REC value. In theory, if a compliance REC does not include avoided emissions, the avoided emissions portion could be sold to a third-party. A REC that includes avoided emissions should command a different price than RECs that do not include avoided emissions. If the REC definitions in the Partner States are not consistent, it could result in decreased liquidity in the region’s REC market.

In recognition of this issue, some states have explicitly stated that RECs used for compliance with the RPS must include the environmental attributes like avoided emissions.\(^{17}\) Connecticut requires that any electric supplier that seeks to demonstrate RPS compliance by participating in the renewable energy trading program must have exclusive ownership of all renewable energy and environmental attributes that are associated with its renewable energy sources. In other words, a utility submitting RECs for compliance in Connecticut cannot separately sell the avoided emissions from the same megawatt hour to another party. Massachusetts’ definition of “Generation Attribute” is less clear and does not explicitly reference environmental attributes or

avoided emissions. Pennsylvania’s current AEC definition is silent with respect to environmental attributes and states only that the AEC “shall equal one megawatt hour of electricity from an alternative energy source.” In a proposed rulemaking dated July 25, 2006, Pennsylvania takes a different approach and allows parties to contract to include or exclude environmental attributes in the AECs. If this rulemaking becomes final, an entity in Pennsylvania could sell the environmental attributes separately to a third-party because environmental attributes need not be included in the AEC used for compliance purposes.

The fact that the Partner States do not have consistent REC definitions may impede market liquidity because a Pennsylvania AEC may or may not have the environmental attributes necessary for RPS compliance in Connecticut and potentially required in Massachusetts. Entities and investors would need to differentiate between RECs with or without environmental attributes, which may impact underlying eligibility and pricing for RECs among the Partner States.

IX. MECHANICS OF HARMONIZATION

Harmonizing the Partner States’ RPS and increasing REC fungibility at the state level will likely require (i) changes in the definitions of renewable resource, (ii) changes to the definition of the REC itself; (iii) changes to the geographic restrictions contained in the state RPS programs; and (iv) changes to the attribute tracking rules. These changes will either be administrative or legislative in nature or potentially both. The various state RPS schemes are all authorized by state statute; however, the degree to which the state legislature has defined the RPS versus leaving the specific programmatic requirements up to the rulemaking process of the administrative agency in charge of implementing the RPS varies from state to state.

States which have included most of their RPS provisions in their statutes will have to amend those statutes through their legislative processes, requiring consideration and approval by the state legislature. In states where regulations determine the RPS requirements, the responsible agency will have to amend their regulations through their rulemaking process. In some cases, the states have adopted regulations to further define the statutory requirements and a change in the statute will need to be followed by regulatory changes. Each of the Partner States is discussed briefly below:

Connecticut’s RPS is defined by legislation adopted by the Connecticut General Assembly. The RPS statute defines the classes of renewables that may be used for RPS compliance, sets the compliance percentages, and provides for geographic restrictions on the source of RECs used to comply with the RPS. The Connecticut Department of Public Utility Control has adopted regulations which provide additional detail regarding reporting requirements, operating rules,

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18 The NEPOOL-GIS rules, which are relevant in Massachusetts and Connecticut, do not require avoided emissions to be included with the REC and thus do not provide further clarification for the REC definition in Massachusetts.
19 73 P.S. § 1648.2.
20 Pennsylvania Bulletin, Vol. 36, No. 41, October 14, 2006, p. 6299. This rulemaking has not yet been finalized.
modifications and alternative payments under the RPS.\textsuperscript{22} Any change to definitions, geographic restrictions or other key elements of Connecticut’s RPS will require legislative changes made by the Connecticut General Assembly and corresponding changes to the Department of Public Utility Control’s regulations.

Massachusetts’ RPS is primarily a creation of state regulation and not state statute. The General Law of Massachusetts directs the Division of Energy Resources to establish an RPS that meets certain basic requirements.\textsuperscript{23} The Division of Energy Resources has adopted regulations that define the requirements of the state RPS.\textsuperscript{24} As a consequence, Massachusetts may amend its RPS through the rulemaking process. The statute does define the list of eligible renewable resources but further allows the Division of Energy Resources to amend the list by adding technologies with the exception of coal, oil, natural gas\textsuperscript{25}, and nuclear power. To the extent that harmonization requires removing resources from the Massachusetts renewable definition or adding waste coal, legislative change will be necessary.

Pennsylvania’s AEPS is largely detailed by legislation.\textsuperscript{26} Not only does the statutory language set the portfolio standards, but it also defines the alternative energy sources allowed for compliance and the program’s geographic restrictions. The Pennsylvania Public Utility Commission has proposed regulations that further define the State’s AEPS. Because the AEPS is governed by statute, the Pennsylvania General Assembly will be required to vote on any amendments to the AEPS. Therefore, any attempts at full or partial harmonization will require legislative changes.

Vermont’s statute provides the structure of a mandatory RPS, leaving much of the detail to the rulemaking process of the Vermont Public Service Board.\textsuperscript{27} Since the RPS will not become effective until and unless the state electricity providers fail to meet the voluntary standard, Vermont has not adopted RPS regulations. Any attempts to harmonize the key elements of the RPS of the Partner States will not likely require legislative action in Vermont. In addition, when and if Vermont adopts mandatory RPS regulations, it will be able to draft it regulations so as to accommodate any harmonization efforts.

\section*{X. OPTIONS TO OVERCOME BARRIERS AND INCREASE MARKET LIQUIDITY}

Despite the current fragmented nature of REC markets, there are several ways to overcome barriers and increase market liquidity and REC fungibility throughout the Partner States. Options range from entirely revamping state RPS statutes and regulations to create identical (or nearly identical) programs to implementing a federal RPS. Each option would require different levels of engagement by the state and would have varying levels of harmonization and impact on regional market liquidity.

\textsuperscript{22} Regulations of Connecticut State Agencies, § 16-245a-1 et seq.
\textsuperscript{23} M.G.L. c. 25a, § 11F.
\textsuperscript{24} 225 CMR 14.00.
\textsuperscript{25} The statute includes an exception for use in fuel cells. M.G.L. c. 25a, § 11F(b).
\textsuperscript{26} 73 P.S. § 1648.1 et seq.
A. Adopt Identical Programs Across Partner States

One option for creating a more liquid regional REC market is to adopt identical programs in the Partner States. If the Partner States adopted identical programs, there would be certainty regarding the type of renewable resource creating the RECs. This may result in greater acceptance of RECs from anywhere within the region because the energy sources of each REC will be recognized in each state’s RPS.28

This option may be most preferable from a market liquidity standpoint, but there are several significant obstacles. First, there is no universally preferable RPS design as each state has elements that may be important to it but not acceptable to others. Thus, there may be significant opposition to sweeping changes to the state’s RPS program to the extent it implicates policy decisions underlying the design of the initial RPS program.

Even assuming political exigencies are surmountable, there would need to be significant cooperation and coordination among the Partner States to craft consistent law. As described in Section V above, creating identical programs would require legislative change in multiple states, and ensuring that individual legislative processes result in compatibility with the other states’ programs would be challenging. Even in the states that could change significant elements of the RPS program by regulation, aspects of the program could be significantly altered in the rulemaking process. Due to the difficulty in passing compatible legislation in the states at issue, the likelihood of implementing identical RPS programs in all Partner States is low and would be a time-consuming undertaking.29

B. Harmonize Treatment of a Common Set of Renewables

While identical programs among the Partner States may result in the greatest level of liquidity, the Partner States’ RPS schemes need not be identical to improve market liquidity and REC fungibility. Market liquidity could be enhanced by altering the following key aspects of a state’s RPS: the definition of eligible renewable resource, the REC definition, and geographic restrictions on RECs. Harmonization of these key aspects would allow for RECs generated from a common set of renewable energy resources to be more freely traded among the Partner States.

The harmonization of a portion of a state’s RPS program allows states to maintain much of their existing RPS program, which lessens the need for potentially sweeping regulatory or legislative changes. Each state also would be able to include or exclude resources that are critical to that state (e.g., waste coal, ocean thermal energy). While the harmonization of several types of

28 However, as discussed in more detail below, attribute tracking system rules in NEPOOL-GIS may also function to restrict movement of RECs even if the Partner States have identical RPS programs.
29 For example, the Regional Greenhouse Gas Initiative ("RGGI") is an effort to establish a regional carbon cap-and-trade program for electricity generators in the Northeast. It took over three years from the initiation of the effort to reach agreement on a Model Rule. After the Model Rule was determined, each participating state had to implement the Model Rule (or significant design elements from it) by legislative or regulatory means. Now, two years after the Model Rule was decided upon, some states are still implementing the necessary framework for RGGI. The cap-and-trade program is expected to commence January 1, 2009.
renewable energy sources does not achieve complete market liquidity, it would create a set of fully fungible RECs between the Partner States and result in greater liquidity in the RECs which are recognized in more than one state.

1. **Eligible Renewable Energy Sources**

One key aspect that would need to be harmonized among the Partner States is the definition of eligible renewable energy types. As previously stated, the Partner States recognize different renewable energy sources as eligible under their RPS programs. While identical renewable energy types across the Partner States would most improve market liquidity the choice of eligible renewable energy sources is informed by local conditions and preferences. Therefore, agreeing upon all eligible renewable energy sources among the Partner States may be difficult.

However, there are five types of renewable energy sources that are common to the Partner States’ RPS programs: solar, wind, methane gas, hydroelectric and biomass. Within these broad categories, there may be a greater likelihood of finding common ground between the Partner States and creating a set of consistent renewable energy types.\(^\text{30}\)

After the Partner States have agreed upon a set of eligible renewable energy sources that are acceptable to each state, RECs generated from such sources should be equivalent (e.g., hydro RECs from Pennsylvania should be based on the same criteria and thus equally as acceptable as hydro RECs from Connecticut). Agreeing upon a set of consistent renewable energy sources (in conjunction with eliminating other impediments discussed below) would improve liquidity of the market with respect to the common renewable energy sources. This option would also allow the states to continue to recognize for in-state RPS compliance those renewable or alternative energy sources that may be specific to the particular state.

2. **REC Definition**

Along with consistent eligible renewable energy sources, the definition of the REC itself must also be compatible between the states. Connecticut’s REC definition is the most stringent because it requires that a REC include all environmental attributes. Massachusetts may require a REC to include environmental attributes; however, the regulations are ambiguous. Pennsylvania’s current AEC definition is silent with respect to environmental attributes but it is considering proposed regulations that would allow parties to transfer or sell environmental

\(^\text{30}\) The Partner States include further restrictions relating to solar, methane gas, hydroelectric and biomass renewable energy sources. The CESA Report provides an in-depth review of the details of each state’s eligible renewable energy source definitions and the differences between some of the common renewable energy sources. CESA Report, pp. 18-29. The different restrictions on eligible types of biomass projects are especially variable among the Partner States and the nuances likely reflect the particular state’s preference for or local availability of feedstock material. The Partner States would need to agree to harmonize the additional restrictions in order to create a common set of eligible renewable energy sources.
attributes separately from the underlying AEC. Consistent REC definitions across the four states would promote the greatest fungibility between RECs from the Partner States. However, if Pennsylvania or Massachusetts allowed RECs to exclude some environmental attributes, Pennsylvania and Massachusetts RECs could still be used in Connecticut but the buyers would need to ensure that the particular RECs being bought included all environmental attributes.  

3. Geographic Restrictions

After agreeing upon compatible renewable energy and REC definitions, the Partner States would need to revise any restrictions relating to recognizing out-of-state RECs. As described in Section IV.C, these restrictions are either state-specific restrictions or related to the attribute tracking systems. Options to alter restrictions related to the attribute tracking systems are described in the following section. Removing both types of restrictions would improve the liquidity of RECs in the Partner States.

As described in Section IV.B above and outlined in Appendix A, all of the Partner States restrict the eligibility of out-of-state RECs. These restrictions may be directives in regulation or statute or indirect restrictions by virtue of references to attribute tracking systems. Some restrictions on out-of-state RECs may relate to an underlying policy concern about what type of renewable energy source creating the REC in the first place. If a set of eligible renewable categories were harmonized as described above, this concern may be mitigated because all Partner States would have agreed on the common eligible renewable energy sources.

Pennsylvania directly restricts RECs by recognizing some out-of-state RECs but only if the associated energy was generated within MISO or PJM. This restriction prohibits all RECs from the Partner States. In order to allow for trading of the common set of RECs between the Partner States, Pennsylvania would need to amend its restrictions that function to prohibit the recognition of RECs from NEPOOL.

Connecticut and Massachusetts and NEPOOL-GIS restrict non-NEPOOL RECs. As stated, the NEPOOL-GIS rules allow imported RECs only from adjacent states. Thus, the NEPOOL-GIS rules function to restrict the flow of RECs into NEPOOL except those from New York. Even if Connecticut and Massachusetts changed their laws to freely recognize non-NEPOOL RECs but still relied on GIS certificates, NEPOOL-GIS rules would prohibit RECs from Pennsylvania (and from other non-adjacent states). Therefore, any efforts to remove geographic restrictions on RECs in Connecticut and Massachusetts must also include revisions to NEPOOL-GIS rules as described below.

4. Attribute Tracking Systems

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31 We note that these differences required the drafters of the model ABA/ACORE/EMA REC Master Agreement for the trading of RECs to include a complicated schedule with multiple attribute scenarios from which to choose.
Lastly, along with revising state geographic restrictions on RECs, the geographic restrictions in the attribute tracking systems must also be amended. Ideally, such harmonization would occur in tandem with efforts to revise the state-based geographic restrictions. Harmonizing the attribute tracking systems and state RPS programs to remove geographic restrictions would improve market liquidity between the Partner States.

a. NEPOOL-GIS

As stated, the rules require that the energy associated with RECs issued under the NEPOOL-GIS be delivered into ISO-NE and the energy must be generated in a control area adjacent to ISO-NE.32 Essentially, these requirements result in recognizing only non-NEPOOL RECs from New York. Therefore, even if Connecticut and Massachusetts remove any out-of-state restrictions in their RPS programs, the operating rules of the NEPOOL-GIS attribute tracking system remain a barrier.

Altering the operating rules of NEPOOL-GIS would require amending the existing NEPOOL-GIS rules. The NEPOOL-GIS operates according to the GIS Operating Rules, which may be amended according to the Restated NEPOOL Agreement. Rule 1.3 of GIS Operating Rules states that an amendment of the GIS rules must be in accordance with Sections 6, 7 and 10 of the Restated NEPOOL Agreement. Under these sections of the Restated NEPOOL Agreement, the NEPOOL Participants Committee or its delegatee may in its discretion adopt new GIS Operating Rules or amend existing GIS Operating Rules after such amendments or new GIS Operating Rules have been reviewed by the Markets Committee.

b. PJM-GATS

In comparison to NEPOOL-GIS, PJM-GATS is more flexible and will issue certificates for generating units located outside of PJM whether or not the energy is delivered into PJM. However, if the energy was not delivered into PJM, certificates will only be recognized if (i) the generator has been pre-qualified by one of the PJM states for its RPS programs; and (ii) the state has approved the creation of certificates.33 As a result, Pennsylvania’s limitations on RECs are more stringent than its attribute tracking system, and any changes to PJM-GATS would not alter Pennsylvania’s state restrictions.

PJM-GATS operates according to the GATS Operating Rules. Changes to the PJM-GATS Operating Rules are typically made in coordination between state regulators and the PJM-Environmental Information Services (“PJM-EIS”). There is no formal decision-making process, and the system was designed to be flexible to accommodate multiple state policies. With respect to geographic restrictions on RECs, it does not appear that any changes to the GATS Operating Rules would be necessary.

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32 New England Power Pool Generation Information System Operating Rules, § 2.7(c)(w).
The harmonization of NEPOOL-GIS to recognize non-NEPOOL RECs would allow Massachusetts and Connecticut to recognize RECs beyond those generated in New York. PJM-GATS already recognizes RECs from other states so long as they are approved by the non-PJM state. Therefore, any changes to PJM-GATS would not affect Pennsylvania’s geographic restrictions on RECs. As a result, amending NEPOOL-GIS to recognize non-adjacent RECs would improve market liquidity but would need to occur in coordination with changes in Pennsylvania’s state restrictions in order to achieve the greatest level of REC fungibility between the Partner States.

C. Create a Weighted REC Scheme

A third approach to improving the liquidity of the REC markets is to provide for a common REC exchange platform (REC-EX) by which states could freely transfer RECs among each other. Under this idea, state RPS regulators would agree to recognize other state’s RECs for RPS compliance but could discount the incoming RECs at a rate determined by the state. Adjustments would also be made based on the generator’s ability to deliver electricity into the relevant control area as well as the state’s preference regarding particular eligible renewable energy sources. The creation of a weighted REC scheme would require either regulatory or legislative changes to the Partner State’s RPS programs.

Similar to the options described above, the definition of a REC and restrictions on out-of-state RECs would need to be modified. Unlike both options described above, in the weighted REC scheme option, consistent eligible renewable energy project definitions among the Partner States would not be necessary. Under a weighted REC scheme, a state could assert its preference for different renewable energy sources vis-à-vis a discount rate, which would be applied to out-of-state RECs. For instance, if Massachusetts does not perceive Pennsylvania waste coal AECs to be consistent with Massachusetts’ RPS, it could value the waste coal AEC at a percentage of its value in the Pennsylvania AEP system.

Under a weighted REC scheme, market liquidity could theoretically be improved if states were relatively conservative in the level of discounting of out-of-state RECs. If states liberalism asserted the discount, a weighted REC scheme could effectively become the same as restricting out-of-state RECs.

D. Federal RPS

The adoption of a federal RPS would have the effect of harmonizing REC markets and increasing the fungibility of RECs across the U.S. despite the RPS requirements of the states. A federal RPS with a common set of definitions for renewable energy resources and no geographic restrictions could eliminate the fragmentation in the current REC market, created by the varied requirements of the state RPS programs. Entities required to comply with the federal RPS could

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meet the renewable energy requirement through the purchase of RECs. However, since the federal RPS would establish a nationwide standard, the RECs could be purchased from anywhere within the United States.

In addition to fully fungible RECs, there are several other advantages to a federal RPS. To the extent that state-specific RPS programs have a renewable percentage lower than the federal RPS, a nationwide standard sets a floor thereby increasing the available renewable energy resources.\textsuperscript{35} There is also a potential for lower cost renewable resources, and by extension REC prices, as renewable development presumably will occur where it is most cost effective. In states where generators, suppliers, and distributors recover the costs associated with the RPS from consumers, the federal RPS could translate into lower costs for consumers than a state-specific program.

A federal RPS has several drawbacks, particularly from a state policy perspective:

- A federal RPS is not tailored to the particular resources of each state. Under a state RPS scheme, the state may favor resources that are readily available within that state. For example, the federal definition of biomass may not include the emissions limits established under Connecticut law. The federal RPS limits the ability of state-based special interests from including provisions that do not advance the growth of renewable resources; although federal legislation will suffer from its own special interest problems.

- The nationwide fungibility of RECs may drive renewable development to certain states or regions which have greater renewable resources. Those states in which renewable development is difficult may experience less growth in their local renewable resources than they would under a state-specific RPS even if the availability of renewables increases on a national level.

A federal RPS may interact with the existing state RPS in several ways including: pre-empting the state program, remaining silent, or recognizing the state RPS. Under the pre-emption approach, the state RPS would cease to exist and the renewable energy definitions, REC definitions, renewable percentages, and all other aspects of the RPS would be determined by federal statute. In many ways, this is the simplest approach, as the requirements are known and consistent across all states and for all entities that must comply. A federal RPS could also opt to remain silent on the status of state RPS. This is least preferable approach as it makes the status of the state RPS uncertain and thus is likely to create greater market confusion.

Finally, the federal RPS could recognize the state level RPS programs, integrating them into the federal RPS or permitting the state RPS to continue as parallel programs. Integrating state RPS could occur in a variety of ways including allowing compliance with state level RPS to qualify for all or a portion of the federal RPS. This would allow states to favor renewable resources that are readily available within its boundaries or that guarantee the most local economic development. The Federal RPS might also grant credits to electricity providers required to

\textsuperscript{35} According to the Union of Concerned Scientists, a federal RPS with a 20% standard would lead to a six-fold increase in renewable energy generation in the U.S.
http://www.ucsusa.org/clean_energy/clean_energy_policies/res_campaign.html
comply with state RPS. Senate Amendment 1538 to the 2007 Energy Act took such an approach.36

Alternatively, the federal RPS could recognize the state RPS and allow states to maintain their RPS programs. The Bingaman Amendment to the 2007 Energy Act took this approach in proposing a federal RPS.37 The Bingaman Amendment specifically stated that the federal RPS did not diminish the authority of the states to impose RPS of their own.38 This approach has the benefit of allowing states to favor local renewable resources in their state RPS.

However, states would need to address several issues. First, states would need to address the issue of double counting of RECs, determining whether the state will allow compliance with the federal RPS to count toward state level compliance; doing so might decrease the investment in state specific renewable energy resources that are not eligible for the federal RPS. Second, if states do not allow double counting, depending on the level of compliance required at the federal level, states might have to reduce their portfolio standards to assure that the covered entities in their states can comply with both the federal and state RPS.

Regardless of the approach used under a federal RPS, a clear integration or pre-emption of the state RPS will be critical to maintaining the REC market.

XI. CONCLUSION

The fragmentation in the REC market created by the varying state RPS requirements can be addressed by a combination of changes to Partner State laws and the operating rules of NEPOOL-GIS. At a minimum, the definitions of renewable energy resources, the geographic restrictions and the definition of a REC must be addressed as discussed above. Alternatively, a federal RPS could provide consistency across the states, which would improve REC fungibility and market liquidity.

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37 S. Amendment 1573, amending H.R. 6 (2007)
38 Section (h)(1) of S. Amendment 1573, amending H.R. 6 (2007)
Impact of REC Harmonization on Renewable Investment Decisions

July 24, 2009
<table>
<thead>
<tr>
<th>State</th>
<th>Connecticut</th>
<th>Massachusetts</th>
<th>Vermont</th>
<th>Pennsylvania</th>
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</thead>
<tbody>
<tr>
<td>2017:</td>
<td>22.5% (15.5%-Class I, 3%-Class II, 4%-Class III)</td>
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<td></td>
<td>(including .39% Solar), 8.2% Tier II</td>
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<td>2018:</td>
<td>24% (17%-Class I, 3%-Class II, 4%-Class III)</td>
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<td>(including .4433% Solar), 8.2% Tier II</td>
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<td>2019:</td>
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<td>8% Tier II</td>
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<td>2020:</td>
<td>27% (20%-Class I, 3%-Class II, 4%-Class III)</td>
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<td>10% Tier II</td>
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<tr>
<td>Definition of renewable energy</td>
<td>Class I: solar, wind, new sustainable biomass, landfill gas, fuel cells, ocean thermal power, wave or tidal power and some hydropower and biomass.</td>
<td>Solar photovoltaic, solar thermal, wind, ocean thermal, wave or tidal, fuel cell, landfill gas, biomass</td>
<td>Energy produced using technology that relies on a resource that is being consumed at a harvest rate at or below its natural regeneration rate.</td>
<td>Suppliers that do not meet targets are assessed a penalty of $45 per MWh for Tier I or II, or 200% of average REC price for solar PV.</td>
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<td>REC Trading</td>
<td>Obligation can be met through purchase of RECs issued by</td>
<td>Obligation can be met through purchase of RECs</td>
<td>The mandatory RPS obligation can be met through the</td>
<td>Tier I: solar photovoltaic and solar thermal, wind, low-impact hydropower, geothermal, biomass, biogas, fuel cell, coal mine methane. Tier II: waste coal, demand side (energy efficient technology, load management, industrial byproduct use), distributed generation, some hydropower, municipal solid waste, generation from wood processing byproducts, and integrated combined coal gasification technology. Includes new and existing sources.</td>
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<td></td>
<td>NEPOOL.</td>
<td>issued by NEPOOL. Also, an electricity supplier may discharge its RPS obligation by making an alternative compliance payment to the Massachusetts Technology Park Corporation, which administers the state's Renewable Energy Trust.</td>
<td>purchase of RECs.</td>
<td>instruments) may be used to comply with the AEPS.</td>
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<td>Geographic Restrictions</td>
<td>Electric suppliers and distributors may meet the requirements with: 1) REC's issued by NEPOOL GIS if the REC's are for a) energy produced by a unit generating Class I or II energy in ISO-NE or b) energy imported into control area of ISO-NE pursuant to NEPOOL-GIS Rule 2.7(c); 2) REC's under contract to serve end-use customers in the state on or before October 1, 2006</td>
<td>For electrical energy transactions not included in the ISO-NE settlement market system but for which the supplier holds GIS Certificates from NEPOOL, the supplier must document the ownership of the GIS Certificates. For electrical energy transactions not included in ISO-NE settlement market system and for which the supplier has not secured GIS certificates, the transaction must be verified by an independent third-party. Off-grid and behind-the-meter generators must be located in Massachusetts.</td>
<td>Electricity generated inside or outside Vermont may be counted toward the goal.</td>
<td>AECs may be certified for the portion of renewable energy consumed or delivered to PA or the control area of the RTO that manages part of PA. AECs from outside PA are eligible for compliance purposes only in the parts of PA that are within the same RTO control area as the generator of the alternative energy.</td>
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<tr>
<td>REC Ownership</td>
<td>Any electric supplier that seeks to demonstrate RPS compliance by participating in the</td>
<td>No explicit provision regarding ownership of RECs.</td>
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<td>Owned by alternative energy generator (or customer generator) and may sell or transfer.</td>
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<td>renewable energy trading program shall have exclusive ownership of all renewable energy and environmental attributes from such trading programs that are associated with its renewable energy sources.</td>
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<tr>
<td>Generation Mix</td>
<td>2006 ISO-NE Data Natural Gas – 38.1% Nuclear – 14.4% Coal – 9.2% Oil – 24.4% Hydro – 5.5% Pumped Storage – 5.4% Other Renewables – 3%</td>
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<td>2007 PJM Data Coal – 55.3% Nuclear – 33.9% Natural Gas – 7.7% Oil – 5% Hydro – 1.7% Solid waste – .7% Wind – .2%</td>
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<td>Covered Entities</td>
<td>Electricity suppliers and electricity distribution companies</td>
<td>Retail electricity suppliers selling electricity to end-use customers</td>
<td>Retail suppliers</td>
<td>Electricity distribution companies and electricity generation suppliers with respect to energy sold to retail electric customers</td>
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<td>Attribute Tracking System</td>
<td>NEPOOL GIS</td>
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<td>PJM GATS</td>
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<td>Attribute Tracking System Trading Restrictions</td>
<td>NEPOOL-GIS requires that the energy associated with certificates issued under the NEPOOL-GIS be delivered into ISO-NE and that the energy be generated in a control area adjacent to ISO-NE.</td>
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<td>Agency</td>
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<td>73 Penn. Stat. §§ 1648.1 et seq.</td>
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of the PJM states for its RPS program, and 2) the state has approved the creation of certificates.