

**Massachusetts
Renewable & Alternative Energy
Portfolio Standards**

**MASSACHUSETTS RPS & APS
ANNUAL COMPLIANCE REPORT
FOR 2011**

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**Department of Energy Resources
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EXECUTIVE SUMMARY

The Massachusetts Renewable and Alternative Energy Portfolio Standards (RPS and APS) are statutory obligations under the Green Communities Act of 2008 (the Act), with minor changes under the Competitively Priced Electricity Act of 2012. The Act requires Massachusetts Retail Electricity Suppliers to obtain from qualified sources certain percentages of the electricity needed to supply their retail customers each year. Sources eligible for RPS Class I are post-1997 renewable plants, for RPS Class II Renewable Energy pre-1998 renewable plants, for RPS Class II Waste Energy pre-1998 Massachusetts waste-to-energy plants, and for APS plants using certain “alternative energy” technologies. These standards commenced in January 2009. RPS Class I succeeded the original RPS, which began in 2003 with an obligation of one percent and increased by a half percent annually until it reached four percent in 2009. Under the Act, the Class I obligation increases by one percent annually and was six percent in 2011. As of 2010, the Class I standard has included a Solar Carve-Out obligation that began at less than one tenth of one percent and rises annually. The Class II obligations do not increase annually, while the APS obligation increases by a half percent annually through 2014 and a quarter percent annually thereafter.

The 37 Retail Electricity Suppliers with RPS and APS obligations in 2011 met their obligations with a mix of (a) Certificates purchased from the owners of qualified Generation Units, (b) surplus Attributes banked from 2009 and 2010, and (c) Alternative Compliance Payments (ACPs) in lieu of Certificates. Each RPS Class I and Class II Renewable Energy Certificate (REC), each Solar Carve-Out Renewable Energy Certificate (SREC), and each Waste Energy Certificate (WEC) represents the RPS Attributes of one megawatt hour (MWh)¹ of electricity generated during the Compliance Year by a Generation Unit qualified for a specific standard. Alternative Energy Certificates (AECs) represent the APS Attributes of the energy from APS qualified facilities during the Compliance Year, as calculated in a manner prescribed in the APS regulations for each specific technology.

The supply of 2011 RPS Class I RECs fell about 9% short of demand. The total retail load obligation in 2011 was 49,386 gigawatt hours (GWh),² of which the 5.8373% RPS Class I obligation (net of the 0.1627% Solar Carve-Out obligation) was 2,883 GWh. This obligation was met by 2,613 GWh of 2011 Class I RECs purchased by the Suppliers and 271 GWh of banked Attributes from 2009 and 2010 surplus RECs, plus 106 GWh of ACPs (costing about \$6.6 million) from fourteen Suppliers that fell short of their obligations. The net result was a 108 GWh surplus of 2011 Class I RECs, virtually all of whose Attributes were eligible to be banked forward by nineteen Suppliers for future compliance.

Note that, in addition to the MA RPS Class I RECs documented in the 2011 Filings, a number of additional RECs were used by several MA Suppliers for meeting “green product” claims, i.e., for providing RECs to customers who voluntarily signed up for 50% or 100% renewable electricity. Also, some RECs were transferred into the NEPOOL GIS Reserve Account for retirement by various entities as “green” or for other purposes. A large quantity of MA RECs that *also* qualified for RPS in other New England states were used for RPS compliance in those states, while some RECs appear not to have been used for RPS at all and might have been left unsold by generators.

RECs from Class I renewable sources in Massachusetts in 2011 grew by 45% from 2010, exceeded on a percentage basis only by increases from previously qualified wind farms in northern Maine and Quebec and a large Rhode Island landfill, and exceeded on an absolute basis only imports from New York wind farms and landfills. Meantime, supplies from biomass plants in Maine continued their long-term decline. Most RPS Class I RECs came from electricity generated by wind turbines (47%), landfill methane fueled

¹ One megawatt hour = one thousand kilowatt hours (or one million watt hours) of electrical energy.

² One gigawatt hour = one thousand megawatt hours (or one million kilowatt hours) of electrical capacity.

power plants (32%), and biomass-fired power plants (15%). The remaining supply came from anaerobic digester plants, hydroelectric plants, and solar photovoltaic (PV) arrays. Geographically, resources in Maine (especially wind farms) supplied 28% of the RECs, while New York resources (landfill methane plants and wind farms) supplied 26%, wind farms in adjacent Canadian provinces 13%, New Hampshire (mostly biomass) 13%, Massachusetts (mostly landfill methane) 11%, and other New England states the balance.

The supply of SRECs to satisfy the RPS Solar Carve-Out (SCO) obligation of 0.1627% in 2011, fell well short of the 80 GWh required. While 25 Suppliers each purchased some of the 27 GWh of SRECs available, all except seven Suppliers met some or all of their SCO obligations with 54 GWh worth of ACPs totaling almost \$24 million. PV development and the resultant supply have continued to accelerate steeply. This is expected to yield a surplus in the near future, which should result in lower SREC prices, activation of the SREC auction mechanism, and a substantial reduction in use of the ACP option for compliance.

The supply of RECs for the RPS Class II Renewable Energy requirement was far short of the demand in 2011. Only 39 pre-1998 plants (hydroelectric, landfill methane, and wind) with a total capacity of nearly 77 MW were qualified for 2011. Consequently, only twelve Suppliers were able to acquire the 236 GWh of available Class II RECs towards meeting the 3.6% obligation totaling 1,643 GWh, while 86% of the obligation was met by ACPs, which totaled about \$36 million.

The supply of WECs for the RPS Class II Waste Energy requirement, on the other hand, exceeded demand. To meet the 3.5% obligation totaling 1,596 GWh, Suppliers obtained 1,568 GWh and used 238 GWh banked from 2010 surplus, while ten Suppliers also used 2 GWh of ACP, costing \$24 thousand. The net result was a surplus of 213 GWh, of which 207 GWh were eligible to bank forward for future compliance.

The supply of 325 GWh of AECs for the Alternative Energy Portfolio Standard (APS), augmented by less than 1 GWh banked from 2009 and 2010 surplus, was significantly short of the need for 912 GWh to meet the 2% obligation. Consequently 594 GWh (65%) of the APS obligation were met by ACPs totaling about \$12.1 million, while a surplus of almost 8 GWh was banked forward by six Suppliers for future compliance. As in 2010, almost all AECs in 2011 came from combined heat and power plants.

In sum, RPS Class I continued its intended role of providing an incentive for the accelerated development of new Renewable Generation Units, while RPS Class II has begun to provide incentives for the continued and improved operation of older renewable and waste energy facilities, and APS provides a significant boost for combined heat and power (CHP) plants (which bring much higher efficiencies to the use of natural gas and renewable fuels). Beginning in 2010, the Solar Carve-Out within RPS Class I supplemented and succeeded the previous stimuli provided by funding from both the Massachusetts Clean Energy Center (MassCEC) and the federal American Reinvestment and Recovery Act (ARRA). Those federal funds have provided significant stimulus since 2009 for CHP and renewable energy resources in Massachusetts, as well as clean energy nationwide.

In other activities, the process of revising the woody biomass eligibility standards within the RPS Class I regulations continued during 2011. That process reached its conclusion on August 17, 2012 with promulgation of the regulations. The new standards were based on forest sustainability and life-cycle CO₂ emissions criteria, and were also informed by extensive stakeholder comments and legislature input.

SECTION ONE

INTRODUCTION TO THE RENEWABLE & ALTERNATIVE ENERGY PORTFOLIO STANDARDS

This section describes the Massachusetts Renewable and Alternative Energy Portfolio Standards (RPS and APS) as structured in 2011 pursuant to the Green Communities Act of 2008.³ The last paragraph briefly summarizes changes that took effect during 2012, after the period of this report.

The original 1997 RPS statute obligated Retail Electricity Suppliers (“Suppliers”), both regulated distribution Utilities and Competitive Suppliers, to obtain for their retail customers a small but growing percentage of electricity (the “Minimum Standard”) from sources that qualified as New Renewable Generation Units, namely generators that began operation after 1997 and used eligible resources and technologies – especially solar, wind, landfill methane, and low-emission/advanced technology biomass. The RPS began with an obligation of one percent in 2003 and increased by a half percent annually through 2009, when it reached four percent and was renamed RPS Class I. Since 2009, RPS Class I has increased by one percent annually. The obligation was six percent in 2011 and will be fifteen percent in 2020.⁴ In addition to RPS Class I, as of 2009 the Suppliers must comply with three new Energy Portfolio Standards mandated by the Green Communities Act, and, as of 2010, with the new Solar Carve-Out within Class I. These Standards are also structured as percentage obligations for Suppliers, but with each Standard having different eligibility criteria and percentage obligations.

In 2009, the changes were implemented in three Regulations, respectively for RPS Class I, RPS Class II, and the Alternative Energy Portfolio Standard.⁵ The new Regulation for RPS Class I continues to limit eligibility to post-1997 Generation Units, but with some grandfathered Vintage Generation Units from RPS still partially qualified and, as of 2010, with a “carve-out” for post-2007 solar photovoltaic projects (the latter detailed below). The list of RPS eligible resources was expanded to include hydroelectricity plants of small size (up to 25 MW) and low environmental impact⁶, as well as geothermal and “marine and hydro-kinetic” facilities. In addition, as of 2009, Behind-the-Meter Units (a.k.a. distributed generation), which formerly had to be located within Massachusetts, could be located anywhere in the ISO New England (ISO-NE) control

³ The RPS provisions of the Electricity Restructuring Act of 1997, later replaced by provisions of the Green Communities Act of 2008 (<http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169>), were incorporated in Massachusetts law in M.G.L., c. 25A, §11F (<http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F>).

⁴ The RPS law and regulations (except for the Solar Carve-out regulations) do not include final limits or ending dates.

⁵ The [Regulations](#) – 225 CMR 14.00 (RPS Class I), 15.00 (Class II), and 16.00 (APS) – became effective on an “emergency” basis on January 1, 2009, and the subsequent, formal rulemaking process concluded with the promulgation of final revised Regulations effective on June 12, 2009. The RPS Class I regulation was subsequently revised to include a Solar Carve-Out standard on an emergency basis in January of 2010, launching a process that culminated in December of 2010. Section One of this report describes RPS Class II and APS in their final, 6/12/09 form and RPS Class I in its 12/10/10 form, incorporating the finalized Solar Carve-Out provisions. Revision of the woody biomass eligibility standards in the Class I Regulation was promulgated in August of 2012, and is only briefly summarized in this report. See this [announcement](#) and this account of the [revision process](#).

⁶ Hydroelectric plants in Class I are limited to post-1997 facilities of no more than 25 MW *or* to incremental output at pre-1998 facilities attributable to added capacity or efficiency improvements amounting to no more than 25 MW. Eligibility for Class II is limited to facilities of no more than 5 MW capacity. In addition, stringent statutory environmental criteria apply to facilities under both Class I and Class II; these are normally met through certification by the [Low Impact Hydropower Institute](#), a non-profit organization located in Portland, ME. See the details for Class I hydropower in 225 CMR 14.05(1)(a)6 and for Class II hydropower in 225 CMR 15.05(1)(a)6. *Note:* under the Competitively Priced Electricity Act of 2012 (<http://www.malegislature.gov/Bills/187/Senate/S02395>), the eligible hydroelectricity capacity limits have been increased, effective as of November 1, 2012, to 30 MW in Class I and 7.5 MW in Class II.

area (the New England grid), but all such generation now must be reported to the NEPOOL GIS⁷ by an independent third party.⁸

Under the new Solar Carve-Out (SCO) Minimum Standard, each Supplier must demonstrate annually that, *within* its Class I percentage obligation, it has obtained a specified, much smaller percentage of its electricity from small, on-site, grid-connected, photovoltaic (PV) systems within Massachusetts that were installed after 2008.⁹ The SCO percentage obligation rises annually through a methodology detailed in the Class I Regulation (225 CMR 14.07(2)). On a dollar per MWh basis, PV is much costlier to install than the other major Class I renewable technologies. That expense is reflected in higher Alternative Compliance Payment (ACP) rates, with the intent of providing sufficient incentive to bring 400 MW of new PV generating capacity on line in Massachusetts.¹⁰ With the SCO obligation of 0.1627% netted out, the remaining 6% Class I obligation for 2011 was 5.8373%, which was met by RECs from non-SCO, Class I qualified generation.

RPS Class II is limited to, and intended to support the continued operation of, two classes of pre-1998 Generation Units. The RPS Class II Renewable Energy Minimum Standard of 3.6% is for Units that meet the same technology, resource, and location criteria as Class I, but with some differences for hydropower (currently limited to 5 MW)¹¹ and biomass (not necessarily “advanced technology”)¹². The RPS Class II Waste Energy Minimum Standard of 3.5% provides incentives for pre-1998 Waste Energy generation, which had been listed as “renewable” but not “eligible” under the original RPS. The Class II eligibility of Waste Energy Generation Units (a.k.a., trash-to-energy plants or municipal solid waste [MSW] plants) is conditioned on recycling and other regulatory criteria that are specific to Massachusetts.

The Alternative Energy Portfolio Standard (APS) is limited to, and intended to support, certain “alternative,” largely non-renewable, technologies and resources whose development the Legislature deemed worthy of incentives modeled on RPS.¹³ Two APS technologies are active to date: Flywheel Storage and Combined Heat and Power (CHP, a.k.a., cogeneration).¹⁴ The Alternative Energy Certificates (AECs) earned by a CHP Unit represent the energy saved (in MWh) by operating the Unit as a CHP Unit as

⁷ See <http://www.nepoolgis.com>, as well as descriptive paragraphs below.

⁸ Another substantive change in RPS Class I was the addition of a provision that a qualified plant *not* commit its generation capacity to Control Areas other than ISO-NE, with some exceptions. In addition, non-intermittent generators now must participate in the ISO-NE Forward Capacity Market except to the extent that their capacity is previously committed elsewhere. For details, see 225 CMR 14.05(1)(e). In the case of plants outside of ISO-NE, the import rules now also include a “round-tripping” prohibition, for which see 225 CMR 14.05(5)(d).

⁹ To qualify for the SCO, a PV system also must meet certain limitations on the types and percentages of public funding of the system’s installation costs.

¹⁰ For more detail about the Solar Carve-Out, visit the [RPS/APS homepage](#). Note that a proposed ten-year forward schedule of Solar Carve-Out ACP Rates was issued on August 3, 2011, with the intention of providing more certainty in the marketplace to facilitate financing the development of SCO-qualified PV. A formal [Guideline on the Solar ACP Rate Schedule](#) was issued on December 28, 2011. Both that schedule and a revision in the formula for calculating the SCO annual Minimum Standard are included in an [RPS Class I rulemaking](#) that began on February 27, 2013.

¹¹ See footnote 6 for more details, including an increase of the Class II hydropower capacity limit to 7.5 MW.

¹² On August 23, 2012, DOER [announced suspension](#) of the consideration of Class II applications for Generation Units fueled by woody biomass until the completion of a pending process to revise the biomass eligibility standards in the Class II Regulation. The revision would incorporate into Class II, to the extent appropriate, standards that were recently adopted for Class I.

¹³ The APS statute is at <http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F1~2>.

¹⁴ Other technologies qualified under APS include the displacement of fossil fuels by certain paper-derived fuel cubes, coal gasification with permanent carbon sequestration, and “efficient steam technology”. Stringent carbon dioxide emission reductions and other emission and efficiency criteria apply. However, regulations have not yet been developed for the second and third of the three technologies listed in this footnote.

compared to separately operating an on-site thermal plant while drawing electricity from the grid.¹⁵ The quantity of AECs earned by a flywheel storage Unit is equal to 65% of the electricity discharged by the Unit and represents a value placed upon the Unit's reduction of peak power generation and voltage regulation.

A major but temporary difference between RPS Class I and all of the new standards (RPS Class II and APS) is a transition mechanism mandated by law to mitigate the price impact of the standards for the Competitive Suppliers. Competitive Suppliers, unlike regulated Utilities, are not able to pass the additional compliance costs along to retail customers with whom they were already contracted to deliver electricity at a price that did not include the purchase of the newly-required Class II RECs, WECs, and AECs. A Competitive Supplier, rather than having to comply with RPS Class II or APS for its entire retail load, must meet those standards only for the portion of its load that is served under contracts that were executed or extended on or after January 1, 2009. Accordingly, each Competitive Supplier is required to report in its Filing to DOER the quantity of electricity delivered under pre-2009 contracts (termed Exempt Load) and to subtract that amount from the total load reported for Class I, in order to ascertain the net amount on which to base its RPS Class II and APS obligation. In addition, each Supplier is required to project its Exempt Load for the next five years; these data (for which DOER has promised confidentiality) are reported in the aggregate in Section Seven, Table Eight. This exemption declines rapidly, so that by 2016 all Suppliers will have to comply with RPS Class II and APS for nearly their entire total load obligations.

Retail Electricity Suppliers meet their annual RPS and APS obligations by acquiring a sufficient quantity of MA RPS Class I and Class II qualified Renewable Energy Certificates ("RECs"), Solar Carve-Out Renewable Energy Certificates ("SRECs"), Class II Waste Energy Certificates ("WECs"), and APS qualified Alternative Energy Certificates ("AECs"). These certificates are created and recorded at the NEPOOL Generation Information System ("GIS").¹⁶ The GIS tracks all electricity generated within the ISO New England control area and fed onto the New England grid, as well as electricity exchanged between ISO-NE and adjacent control areas.¹⁷ For each megawatt-hour (MWh) of electricity, whether renewable or not, the GIS creates and deposits one serially-numbered, electronic certificate in the account of the entity that generated or imported the MWh. Any certificate for energy output that qualifies for one or more of the New England states' energy portfolio standards is coded as such.¹⁸ A Supplier with a Massachusetts portfolio standard obligation purchases RECs, SRECs, WECs, and AECs from qualified generators, either directly or via brokers, and they are electronically transferred from the generators' GIS accounts to the Supplier's GIS account. Each GIS certificate qualified for a Massachusetts portfolio standard can be used for compliance with *only* the standard for which it is qualified; thus, for example, a Class I REC can be used only for Class I

¹⁵ For more detail of how an AEC is calculated for CHP Units, see the APS Regulation in 225 CMR 16.05(1)(a)2 and the [APS Guideline for CHP](#).

¹⁶ See www.nepoolgis.com.

¹⁷ The ISO-NE "control area", covering most of New England, is a geographic region in which a common control system is used to maintain scheduled interchange of electrical energy within and without the region. ISO New England Inc. is the independent system operator for the ISO-NE control area, operating the New England electric power grid. It also qualifies as the regional transmission operator (RTO) under the rules of the Federal Energy Regulatory Commission (FERC). See <http://www.iso-ne.com/aboutiso/index.html>.

¹⁸ Each REC is encoded with Attributes that indicate the Generation Unit name, location, and fuel from which the electricity was generated, as well as whether or not the Generation Unit and its RECs are qualified for *each* of the several state RPSs. A Massachusetts qualified REC that is also qualified for RPS in another New England states can be sold, transferred, and used to meet either state's RPS obligation. However, by the end of each GIS Certificate trading year (midnight on June 15 of the year following the Compliance Year), each REC can be located in only one state-specific Supplier sub-account at the NEPOOL GIS; thus, double-counting of RECs is not possible. Each state's RPS statute and regulations define the RPS eligibility of generation a bit differently, and those definitions can be changed over time by each state. Thus, not every certificate that is termed a REC is qualified for MA RPS.

compliance, a Class II WEC only for Class II Waste Energy compliance. However, since SRECs are for a “carve-out” within Class I, they can be used for Class I Renewable Energy compliance, but not vice versa.

The RPS and APS requirements are further detailed in the RPS and APS Regulations and on DOER’s RPS/APS web pages (www.mass.gov/energy/rps), which also explain how facilities become qualified, list the qualified facilities, and explain how Suppliers annually demonstrate their compliance with RPS and APS.

Although unrelated to 2011 RPS or APS compliance, it should be noted that, as of the date of this Report, DOER has begun one formal rulemaking and announced its intention to initiate another.¹⁹ The Class I regulatory revisions would make certain changes in the Solar Carve-Out. The Class II revisions would (a) adopt for woody biomass eligibility those provisions of the recently promulgated Class I standards that are deemed appropriate for Class II, and (b) revise the Class II Renewable Energy Minimum Standard downward to reduce reliance on the ACP compliance mechanism, as examined in a December 31, 2012, DOER report to the Legislature required under the Competitively Priced Electricity Act of 2012.²⁰ Both rulemakings would incorporate statutory increases in the hydropower size limit. Already promulgated on August 17, 2012, but also not pertaining to 2011 compliance, are changes in the RPS Class I eligibility standards for fuel sourcing and energy conversion efficiency for generation units fueled by woody biomass. Those standards are based on forest sustainability and life-cycle carbon dioxide (CO₂) emissions, informed by a DOER-commissioned, 2010 study on the relative environmental impacts of woody biomass as a fuel. The standards were also informed by extensive stakeholder comments and legislature input.²¹ Some discussion of the impact of these changes on the future RPS market is found in Section Seven, below.²²

SECTION TWO

RPS CLASS I COMPLIANCE IN 2011

Summary

The total supply of electricity from 2011 RPS Class I Generation (represented by Class I RECs) fell shorter of demand than in 2010 (9.4% vs. 5.8%). The shortfall in 2010 occurred after three years of surplus (2007-2009), which had followed, in turn, supply shortages in the first four years of RPS (2003-2006). The 2011 RPS Class I obligation for each Supplier was six percent (6%) of its retail load obligation at the NEPOOL GIS, of which 0.1627% was “carved-out” for SRECs from Solar Carve-Out qualified PV projects, leaving a net Class I obligation of 5.8373%. (See Section Three for 2011 Solar Carve-Out compliance.)

The total retail load obligation in 2011 was 49,386,169 MWh, for which the total of all 37 Suppliers’ 5.8373% obligation was 2,882,283 MWh. The Class I REC supply presented for compliance totaled 2,884,425 MWh, which consisted of 2,613,122 RECs from 2011 generation plus 271,303 MWh of Attributes banked from 2009 and 2010 surplus RECs. The small REC surplus was not evenly shared among Suppliers; fourteen of them did not acquire enough RECs and had to meet some of their compliance through 106,203 MWh of Alternative Compliance Payments (ACPs) totaling \$6,598,385.77 at the rate of \$62.13 per MWh.²³ The resulting 2,990,628 MWh total yielded a surplus of 107,805 MWh, of which 107,804 MWh were

¹⁹ See footnotes 10 and 12.

²⁰ DOER’s report to the Legislature: [Evaluation of the Massachusetts RPS Class II Program](#). A link to the Act is in footnote 6.

²¹ See the [Biomass Sustainability and Carbon Policy Study \(a.k.a. Manomet Study\) webpage](#). Information on this rulemaking process, including further actions, is on the [RPS Biomass Policy Regulatory Process webpage](#). Also see footnote 10.

²² DOER’s current rulemaking activities can be accessed via DOER’s RPS/APS homepage, <http://www.mass.gov/energy/rps>.

²³ See 225 CMR 14.08(3) regarding the procedures for ACP and the use of ACP funds. The announcement and calculation of the annual ACP rate can be accessed via the [Compliance Information for Retail Electric Suppliers link](#) on the RPS/APS homepage, <http://www.mass.gov/energy/rps>.

eligible to be banked by nineteen Suppliers for compliance use in 2012 and 2013. Thus, while the shortfall in 2011 supply was met by many Suppliers by drawing down their banked supply, any surplus that was banked forward was much less than had been withdrawn, leaving a smaller cushion of banked supply for use in 2012. Table One displays the 2011 figures, along with those of the previous years, and additional details are in Appendix Two, Table A.

The supply of RECs from Class I Renewable Generation in Massachusetts rose by 44.7%, which is much higher than the annual rates of increase since the first three compliance years.²⁴ 36% of the 2011 increase is attributable to wind, 31% to solar PV (most for the rapidly accelerating Solar Carve-out), and 29% to landfill methane.

Note that all figures regarding the quantities and percentages of Class I RECs from different jurisdictions must be understood in the context of a regional market in which most, but not all, MA Class I RECs can be used for RPS compliance in several New England states. Thus, many more RECs are actually created than are reflected in the 2011 RPS compliance figures. A total of 3,093,455 MA Class I RECs (including SRECs) were created at the NEPOOL GIS. Of those, 2,613,122 RECs were submitted in the Filings for Class I and 26,580 for Solar Carve-Out compliance. 385,536 RECs were settled into Suppliers' GIS subaccounts for the other New England states where they also qualified, presumably to be used for RPS compliance there (mostly in RI, NH, and CT). In addition, 52,492 RECs were settled in MA subaccounts for voluntary "green power product" sales or in the GIS "Reserved Account" for retiring by other entities, and 4,250 other RECs also were transferred to the GIS Reserved Accounts for undetermined purposes. A net balance of 5,255 RECs that were neither settled in Suppliers' state-specific subaccounts nor transferred to Reserve might have remained unsold by the generators.

Compliance Details

DOER received filings from thirty-seven Retail Electricity Suppliers, entities that served retail load in Massachusetts during 2011. These included the four investor-owned, distribution Utility companies that are regulated by the Massachusetts Department of Public Utilities (DPU) and thirty-three Competitive Suppliers that are licensed but not regulated by the DPU.²⁵ In Table Two, three Suppliers that are new to the Massachusetts RPS market are listed in italics, and one other underwent a name change.²⁶

96.3% of the compliance was met by Class I Renewable Generation. 86.9% came from 2011 generation, while 9.4% came from Attributes banked from 2009 and 2010 compliance surplus. 3.7% was met using the Alternative Compliance mechanism – by making ACPs to the Massachusetts Clean Energy Center (MassCEC). 3.7% of the RECs from 2011 generation were qualified to be Attributes banked forward for use towards Class I Compliance in 2012 or 2013, compared to 10% of 2010 RECs.

The detailed compliance figures for all nine of the RPS Compliance Years are in Table One, with more detail for 2011 in Appendix Two, Table A. The changes in manner of compliance during the nine years of the program, 2003-11, are shown in Figure One. The initial shortage of qualified generation and

²⁴ This figure includes the Solar Carve-Out. If the SCO is excluded, then the in-state supply increased by 31.2%, which is still much higher than in most past years.

²⁵ Regulated distribution Utilities provide electricity under "Basic Service" to those customers in their franchise territories that do not purchase electricity from Competitive Suppliers. Competitive Suppliers compete for and supply electricity to retail customers in any or all of the DPU-regulated distribution utility territories.

²⁶ In addition to these 37 companies that served retail load in Massachusetts during 2011, DOER received Filings from two companies that did not serve load in 2011 but are serving load in 2012: Reliant Energy Northeast LLC and Think Energy. Finally, the load obligation of Gulf Electricity, which provides electricity only to Boston's Fenway Park, was transferred within the NEPOOL GIS to TransCanada, and TransCanada included that obligation as part of its own obligation in its Filing for 2011.

Table One
Aggregated Data from the RPS Class I Annual Compliance Filings, 2003-2011 (MWh)²⁷

	2011	2010	2009	2008	2007	2006	2005	2004	2003
CY Retail Sales (= Retail Load Obligation)²⁸	49,386,169	50,026,093	48,301,821	50,321,635	50,978,101	50,143,130	51,558,778	50,063,092	49,834,324
CY aggregated compliance obligation²⁹	2,882,823	2,467,336	1,932,089	1,761,257	1,529,343	1,253,578	1,031,176	750,946	498,343
Total RECs from CY generation	2,613,122	2,323,609	2,129,918	1,896,008	1,599,533	938,772	644,849	444,680	304,112
<i>minus</i> CY total surplus RECs	(107,805)	(241,062)	(387,664)	(216,550)	(87,957)	(9,458)	(739)	(20,297)	(60,837)
Net CY RECs for CY obligation	2,505,317	2,082,547	1,742,254	1,679,458	1,511,576	929,314	644,110	424,383	243,275
<i>plus</i> Banked from pre-CY surpluses³⁰	271,303	380,824	189,835	80,605	6,863	1,661	19,531	61,147	255,069
Total RECs used for CY obligation	2,776,620	2,463,371	1,932,089	1,760,063	1,518,439	930,975	663,641	485,530	498,344
<i>plus</i> Total ACP Credits	106,203	3,965	0	1,208	10,920	322,625	367,858	265,424	181
Total for compliance obligation	2,882,823	2,467,336	1,932,089	1,761,271	1,529,359	1,253,600	1,031,499	750,954	498,525
Surplus Attributes banked forward³¹	107,804	241,061	386,059	210,580	80,743	9,458	739	20,297	61,314
ACP proceeds (rounded)	\$6,598,386	\$241,551	\$0	\$70,765	\$623,750	\$17,786,316	\$19,566,367	\$13,645,448	\$9,056

²⁷ CY is the abbreviation for Compliance Year, coterminous with a calendar year. These are aggregated figures, and compliance is calculated separately for each Supplier, with fractions always rounded upwards. Therefore, the RPS Obligation as calculated on the total “CY Retail Sales” sometimes is less than the “CY Aggregated Compliance Obligation” listed in this table and elsewhere in the report.

²⁸ DOER requires that each supplier use as its “retail electricity sales” the CY’s total of its 90 Day Resettlement figures provided to the Suppliers by the regulated utilities both directly and via DOER. For additional detail, see the *Guideline for Retail Electricity Suppliers on the Determination of Sales to End-use Customers for Calculating the Annual RPS Obligation*, at <http://www.mass.gov/eea/docs/doer/rps-aps/rps-compliance-basis-guideline.pdf>. Also see a discussion of the newly revised methodology in Appendix 1.

²⁹ The RPS Class I Minimum Standard obligation for each of the CYs 2003 through 2010 was, respectively, 1%, 1.5%, 2%, 2.5%, 3%, 3.5%, 4%, 4.9321% (=5% minus the Solar Carve-out Minimum Standard of 0.0679%), and 5.8373% (=6% - 0.1627%). Note that the figures in this row usually are a bit higher than what one would obtain by calculating the total Retail Sales by the Minimum Standard for each year. That is because each Supplier calculates its own obligation, always rounding up to the next whole MWh. The total of all of the individual obligations, of which some are rounded up, is, thereby, higher.

³⁰ RECs for RPS qualified New Renewable Generation from 2002, were “banked” by some Retail Suppliers to use for 2003 compliance under the “Early Compliance” provision of the 2002 regulation in 225 CMR 14.08(2) and 14.09(2). Those Early Compliance RECs “jump-started” the program when the financial incentives of RPS had not yet resulted in a sufficient supply of RECs.

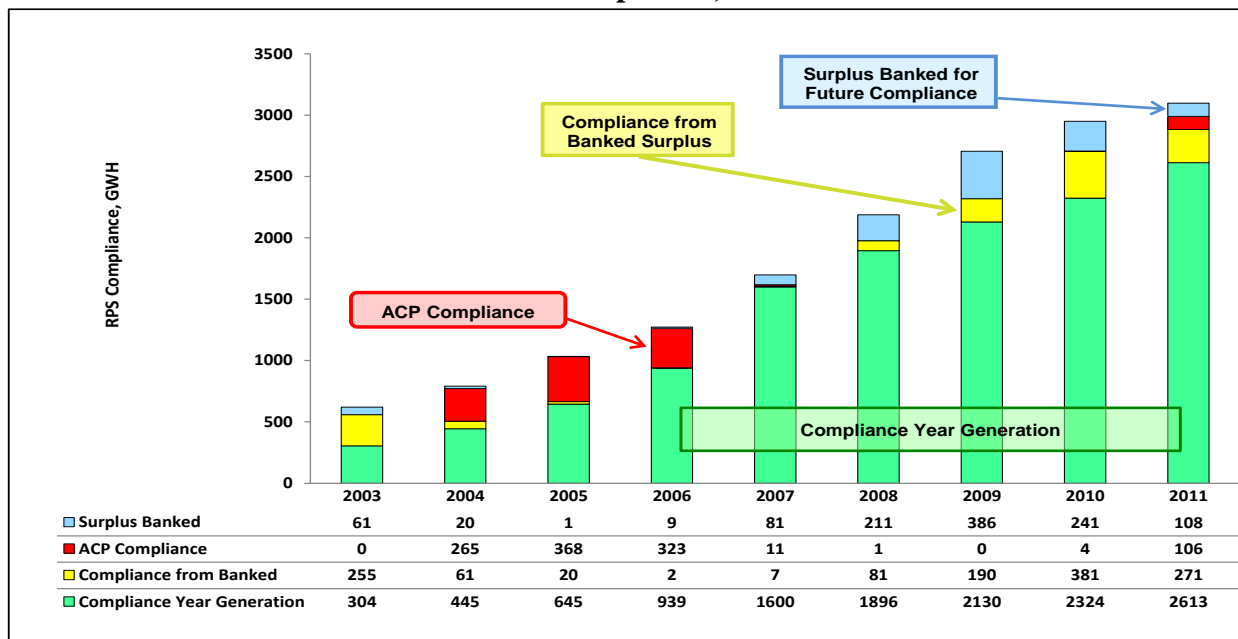
³¹ The large differences in some years between the quantity of surplus RECs and the quantity banked is due to some Suppliers purchasing more RECs than the limit that they are permitted to bank. A Supplier cannot bank a quantity of RECs that is greater than 30% of its total RPS compliance obligation for the year in which those RECs were generated (only 10% for SRECs). Banked RPS Class I RECs can be applied to compliance only with the RPS Class I obligation, not any other portfolio standard class or subclass and not the Solar Carve-Out.

RECs is evident in the high reliance on ACPs during 2004-06. Four years of little or no use of ACPs followed, while 2011 saw a return to modest ACP reliance. The more recent shift notwithstanding, the RPS obligation clearly has demonstrated its success in providing incentives for accelerated development of new Renewable Generation Units since the original RPS regulations were issued in April of 2002.

Table Two
2011 Massachusetts Retail Electricity Suppliers

Distribution Utilities		
Fitchburg Gas & Electric Co. (Unitil)	Massachusetts & Nantucket Electric Companies, d/b/a National Grid	NSTAR Electric Co. Western Massachusetts Electric Co.
Competitive Suppliers		
Cianbro Energy, LLC	Glacial Energy of New England, Inc.	NextEra Energy Services Massachusetts, LLC ³²
Consolidated Edison Solutions, Inc.	Hampshire Council of Governments	Noble Americas Energy Solutions, LLC
Constellation NewEnergy, Inc.	Hannaford Energy, LLC	Open Book Energy, LLC ³³
Devonshire Energy LLC	Harvard Dedicated Energy Limited	Pepco Energy Services, Inc.
Direct Energy Business, LLC	Hess Corporation	Public Power, LLC
Direct Energy Services, LLC	Hudson Energy Services, LLC	REP Energy, LLC
Dominion Retail, Inc.	Integritys Energy Services, Inc.	South Jersey Energy Company.
East Avenue Energy, LLC	Just Energy Massachusetts Corp.	Spark Energy, LP
Easy Energy of Massachusetts, LLC	Liberty Power Holdings LLC	TransCanada Power Marketing Ltd.
First Point Power, LLC	Mint Energy, LLC	WFM Intermediary New England Energy LLC
GDF Suez Energy Resources NA, Inc.	MXenergy Electric, Inc.	Xoom Energy Massachusetts, LLC

Figure One
RPS Class I Compliance, 2003-2011



³² NextEra Energy Services Massachusetts is also known as Gexa Energy, having acquired the latter in 2010.

³³ Open Book Energy, LLC, was identified in the 2010 report as ECM Energy, LLC.

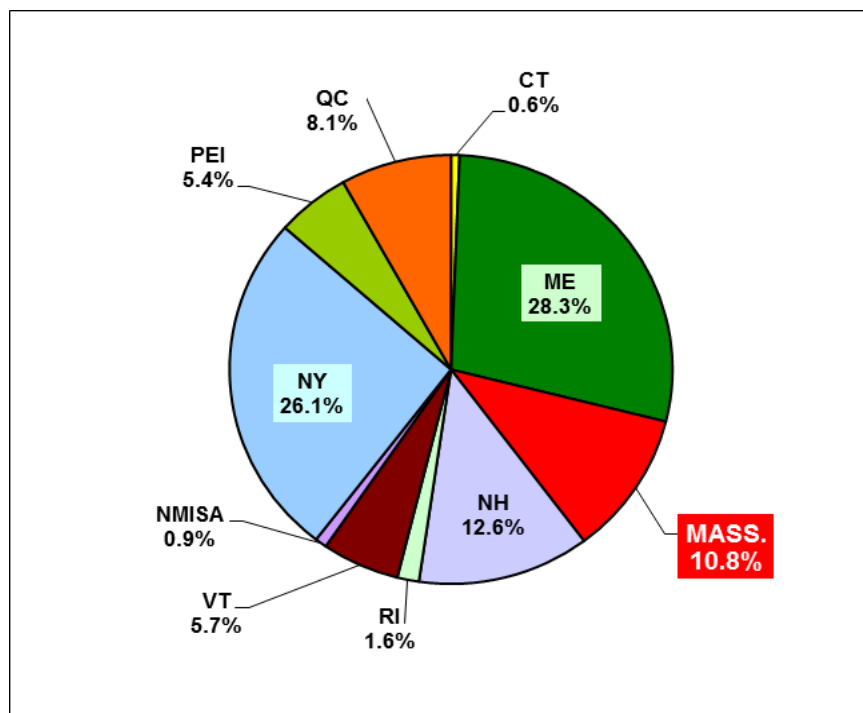
Generation Sources by Location

The percentages of 2011 RECs from the New England states, New York, and adjacent Canadian provinces are illustrated in Figure Two, below. Note that the Northern Maine Independent System Administrator (“NMISA”) is outside the New England grid and connects to ISO-NE via the New Brunswick control area; therefore, the output of NMISA generators must be imported (via Canada) to ISO-NE in order to earn RECs, as with all generation located in electricity control areas outside of and adjacent to ISO-NE. Figure Three illustrates the nine year trend in the location of the REC generation since 2003. Table F in Appendix Three lists the data from which these graphs were generated.

Massachusetts supplied 10.8% of the 2011 RECs presented for MA RPS Class I compliance, up from 8.5% in 2010, with most of the increase attributable to wind, PV, and landfill methane projects. The 44.7% increase of RECs from Massachusetts projects between 2010 and 2011 is the greatest year-to-year increase since the early years of RPS. However, larger shares continued to come from Maine, 28.3% (mostly from wind farms, as biomass output continued declining, as well as from hydro), and from New Hampshire, 12.1% (mostly from biomass, with some from landfill methane), as well as from New York, 26.1% (mostly from landfill methane and wind).

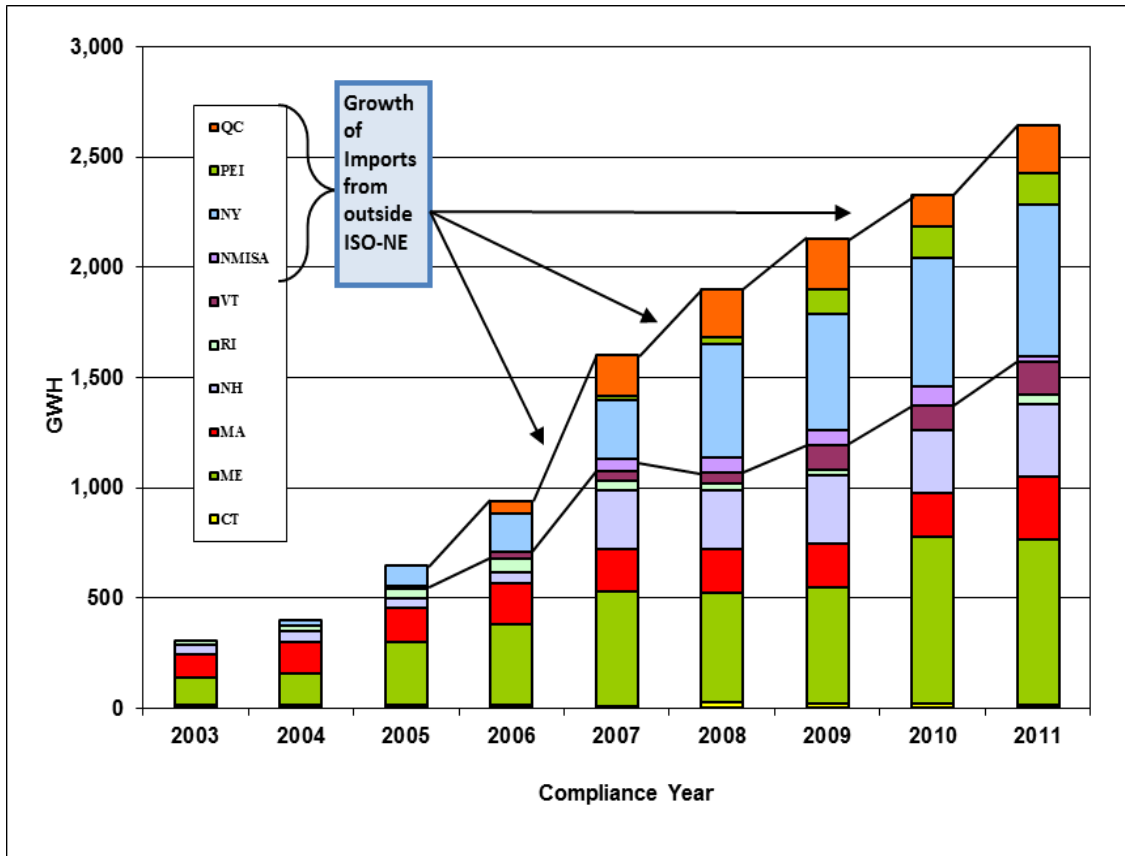
Between 2010 and 2011, the supply of RECs for MA RPS Class I compliance that was sourced from Generation Units inside the ISO-NE control area increased by 15%, while the supply from electricity imported from Units outside of ISO-NE increased by 12%. The ISO-NE share of the total rose slightly, from 59% in 2010 to 60% in 2011, and the imported share fell slightly. The sources of imports changed considerably: imports from wind farms in Quebec rose by 55% from an unexplained low in 2010, those from Prince Edward Island fell by 1%, and those NMISA fell by 75%, while imports from New York wind and landfills rose by 18%. The net result is that New York’s share of total imports rose from 25% to 26%, and Quebec’s rose from 15% to 20%.

Figure Two
2011 RPS Class I Compliance by Generator Location*



* Includes the Solar Carve-Out.

Figure Three
RPS Class I Compliance by Generator Location, 2003-2011*



* Includes the Solar Carve-Out.

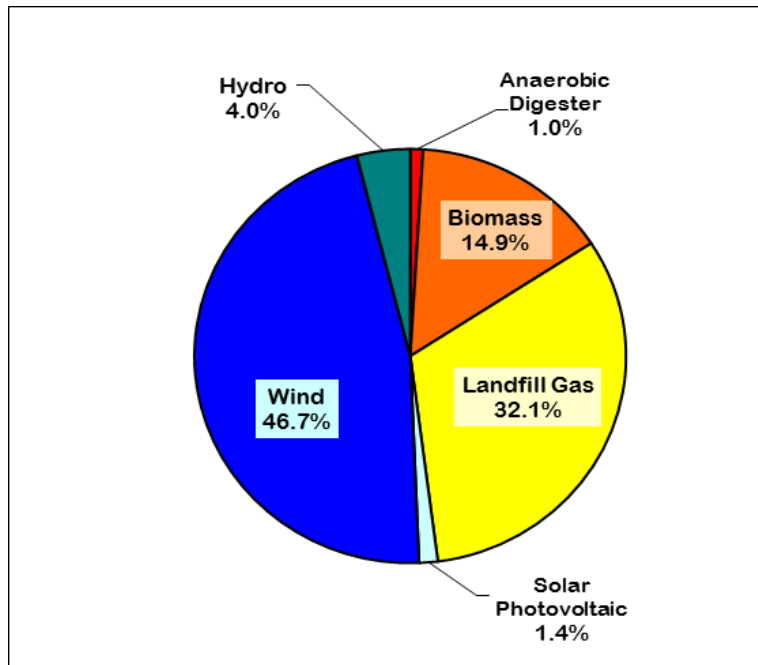
Generation Sources by Type

The percentages of 2011 RECs from the qualified types of renewable resources are illustrated in Figure Four, while Figure Five illustrates the nine year trend of RECs by resource type. Table G in Appendix Three lists the data from which these graphs were generated.

The supply of RECs from biomass declined by 32.8% from 2010 to 2011, continuing a trend that began after 2007. Meantime, the supply of RECs from landfill methane increased by 15.2%, from wind by 37.8%, and from hydro by 30.5%. Most notably, although starting from a much smaller base, solar PV increased by a spectacular 790.5%, almost 8 times the amount in 2010. Although the vast majority of the increase was in the Solar Carve-Out, even the non-SCO PV REC supply rose by 145.3%, almost one and a half times.

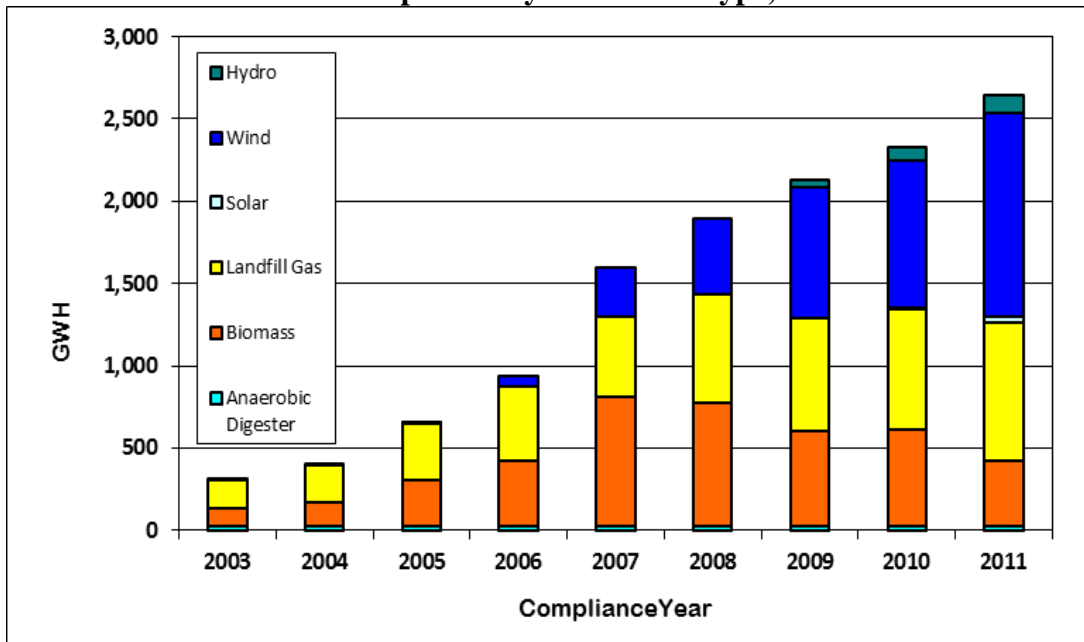
Wind power is the largest and, aside from PV, fastest growing source of RECs for RPS. Most of the wind RECs came from wind farms in Maine and in adjacent control areas: New York, Quebec, and New Brunswick (specifically, from northern Maine [NMISA] and Prince Edward Island). RECs for non-ISO-NE resources are earned only on electricity actually transmitted into ISO-NE. Wind output has been increasing at a higher rate than biomass and landfill methane since 2005, and its share of the growing REC pie has grown from 7% in 2006, to 27% in 2008, 39% in 2010, and 47% in 2011. Given the magnitude of the wind resource – in the mountains, on the New England coast, off the coasts of Massachusetts and other New England states, and in adjacent control areas – DOER expects wind to continue increasing its leading market share in the RPS.

Figure Four
2011 RPS Class I Compliance by Generator Type*



* Includes the Solar Carve-Out.

Figure Five
RPS Class I Compliance by Generator Type, 2003-2011*



* Includes the Solar Carve-Out.

The bulk of landfill methane electricity output is from Massachusetts and New York, but with some from all of the other New England states. Landfill output was the largest source of RECs for several years but increased more slowly than biomass output during 2003-2007 and was overtaken by biomass as the largest source in 2007. Energy from new landfill plants in New York entered the market in 2008 and has continued to rise, while energy from biomass has declined. However, by the time

landfill overtook biomass again in 2009, both had been surpassed by wind. At 32% in 2011, landfill methane remained the second largest REC source after wind.

Almost all the RPS-qualified biomass generation is located in New Hampshire (61%) and Maine (38%).³⁴ Biomass plant output increased substantially from year to year during 2003-2007, overtaking landfill methane in 2007 as the largest single resource type. In 2008, however, while landfill methane generation increased substantially, output from biomass plants declined, and the decline has continued since then. One plant in Maine stopped production at the beginning of 2009, while other Maine plants have had periods of reduced or no operation since 2008. The share of RECs from biomass output fell from 25% of the total in 2010 to 15% in 2011.

Hydroelectricity was added to the qualified mix for RPS Class I in 2009, mostly from post-1998 increases in output at some older plants attributable to capacity and efficiency upgrades. Hydro as a source of RECs has risen very slowly, from only 2% of RECs in 2009 to 4% in 2011. Almost all the RECs were from Vermont (46.6%), Maine (43.5%), and Massachusetts (8.9%).

In 2011 all of the anaerobic digester³⁵ output, which provided only 1% of the 2011 RECs, was from the Deer Island Wastewater Treatment Plant. A not inconsiderable anaerobic digester potential may exist at other wastewater treatment plants and other facilities that generate organic wastes. Late in 2011 the first two RPS-qualified, dairy farm, anaerobic digester plants in Massachusetts began operation. DOER is collaborating with the MassDEP to identify and encourage the expanded production of digester gas – at wastewater treatment plants, food processing and food service facilities, and dairy farms – and its use for electricity generation.

Solar photovoltaic arrays, all of them in Massachusetts, provide a small but very rapidly growing quantity of RECs for RPS. That accelerating growth has been propelled both by focused federal stimulus funding and state financial incentives since the end of 2007, and by the RPS Solar Carve-Out (SCO) launched in January 2010.³⁶ Generation qualified for RPS Class I (but not for the SCO) rose from 2,420 MWh in 2009, to 4,120 in 2010, and to 10,108 in 2011.³⁷ Although the SCO is attracting most of the new development of PV in Massachusetts, growth in the portion of PV that does not qualify for the SCO is also accelerating. Several reasons account for this. Some in-state units have received significant MassCEC or ARRA funding that precludes the additional and much higher financial benefits of SCO qualification, and DOER and the MassCEC are continuing to provide financial and other incentives for PV development. In addition, PV installed outside of Massachusetts cannot qualify for the SCO. All units that do not qualify for the Solar Carve-Out on those grounds can qualify for RPS Class I.

SECTION THREE

RPS SOLAR CARVE-OUT COMPLIANCE IN 2011

The Solar Carve-Out (SCO) commenced in 2010, pursuant to the Green Communities Act of 2008, which provided for a Minimum Standard to be carved out *within* the Class I Minimum Standard for the output of small, on-site, distributed generation located within Massachusetts, with the details to

³⁴ Prior to 2010, Maine had been the leading source of biomass RECs.

³⁵ See footnote 78 regarding the relationship between anaerobic digester gas and biomass in the MA RPS regulations.

³⁶ In addition to RPS, DOER has a suite of programs driving PV development. 1. DOER includes PV as one of the clean energy technologies funded under its [Green Communities Designation and Program](#). 2. DOER partners with the MassCEC, most recently on the [Solarize Massachusetts](#) program. 3. DOER's newest program, the [Sunshot Rooftop Solar Challenge](#) (funded by the US Department of Energy), seeks to streamline permit processes, update planning and zoning codes, improve interconnection standards, and increase access to financing.

³⁷ If the new Solar Carve-Out is included, then PV's 2011 total was 36,688 MWh, a nearly eightfold increase.

be determined by DOER via public rulemaking. Responding to Governor Deval Patrick's commitment in 2007 to achieve 250 MW of total installed PV capacity in Massachusetts by 2017 and consistent with PV's environmental and economic benefits, DOER chose PV for the carve-out provided by the 2008 Act. DOER also set a higher goal of 400 MW, intended to provide a sufficient and long-term market that can better attract solar business development to Massachusetts.

The eligibility requirements for a PV system to qualify include the following: (a) location within Massachusetts, (b) use of some electricity on-site with the balance of the output connected to the grid, and (c) nameplate, direct current capacity limited to no more than 6 MW on a single parcel of land. In addition, a system is *not* eligible if funded by programs administered by the Massachusetts Renewable Energy Trust or the successor Massachusetts Clean Energy Center (MassCEC) prior to 2010 or if more than 67% of its installed cost was funded by the American Reinvestment and Recovery Act (ARRA).³⁸

The installation cost of PV is considerably higher per MW than the other technologies currently participating in RPS Class I and thus presents greater financial challenges. To meet those challenges, DOER developed and established in regulation an innovative design for the SCO Minimum Standard, a design that annually adjusts the Minimum Standard through a formula that maintains a reasonable balance of supply and demand, with the intent of assuring a robust development curve. DOER first established a high Alternative Compliance Payment (ACP) Rate, starting at \$600 per MWh in 2010, with potential reductions to be determined annually. Next, in an effort to improve the revenue predictability and, thereby, the financeability of new PV project development, on August 3, 2011, DOER issued for public comment a ten-year forward schedule for the ACP Rate. On December 28, 2011, DOER issued the schedule as a formal [Guideline on the Solar ACP Rate Schedule](#) and expects to codify it in the Class I Regulation during a rulemaking underway as of the date of this report.³⁹

Third, DOER sought to establish an SREC price assurance through an innovative auction mechanism, with a fixed price per SREC of \$300, of which \$285 per SREC would be transferred to the SREC seller and \$15 per SREC applied to administrative costs. The auction mechanism provides a "buyer of last resort" for unsold SRECs whenever a surplus of supply over demand develops for a given Compliance Year. Further details of the SCO program design are provided in DOER's [Solar Carve-Out web pages](#).

Finally, unlike all other classes of RPS and APS, the SCO has a sunset provision; that is, additional PV systems will not be qualified for the SCO after 400 MW of qualified generation have been installed.⁴⁰ However, after that threshold has been met, the SCO Minimum Standard will continue for as long as any SCO-qualified system is still within its Auction Opt-In Term, the period of years during which it is entitled to deposit any surplus SRECS into the auction. A particular PV system's Opt-in Term is set when it is first qualified. The Opt-In Term can be raised or lowered each year for subsequently qualified systems by a procedure described in regulation (225 CMR 14.06(e)), beginning at ten years for systems qualified in 2010 and 2011 and possibly declining in years of oversupply of SRECs to no fewer than five years for systems qualified in 2016.

A large SREC supply shortfall in 2010, the SCO's first year, continued into 2011, even while the pace of new development greatly accelerated. The 0.1627% Minimum Standard required 80,370 MWh of SRECs⁴¹; however, the 44.9 MW of installed, SCO-qualified, PV capacity (much of it installed

³⁸ PV systems that do not meet those criteria can still qualify for RPS Class I.

³⁹ See footnote 10.

⁴⁰ Note that DOER has begun discussions about providing RPS incentives for PV after the 400 MW limit has been reached.

⁴¹ The 2011 compliance obligation for the Solar Carve-Out was set at 78,577 MWh by Regulation in 225 CMR 14.07(2)(b), which yielded a Minimum Standard of 0.1627% of the 2009 retail load of 48,301,821 MWh under the procedures in 225

later in the year) yielded only 26,580 MWh of SRECs in 2011.⁴² Those 26,580 MWh met only 33% of the obligation (but better than 2010's 8%), so 67%, of the obligation, 53,803 MWh, was met through ACPs totaling \$23,887,474. Only seven Suppliers managed to satisfy their entire obligations by purchasing SRECs, while the other thirty Suppliers met some or all of their obligations through ACPs. The figures are displayed in Table Three, with more detail in Appendix Two, Table B.

Table Three
Aggregated Data from the Solar Carve-Out (SCO) Compliance Filings, 2010-2011 (MWh)

	2011	2010
CY Retail Sales (=Retail Load Obligation) ⁴³	49,386,169	50,026,093
CY aggregated SCO obligation (0.0679% in 2010, 0.1627% in 2011) ⁴⁴	80,370	33,988
Total SRECs from CY generation	26,580	2,738
<i>minus</i> CY total surplus SRECs	(13)	0
Net CY SRECs for CY obligation	26,567	2,738
<i>plus</i> Banked from pre-CY surpluses	0	0
Total SRECs used for CY obligation	26,567	2,738
<i>plus</i> total ACP Credits	53,803	31,250
Total for compliance obligation	80,370	33,988
Surplus Attributes banked forward	13	0
ACP proceeds (rounded)	\$23,887,474	\$11,682,793

In order to ease the compliance cost for Suppliers with previously contracted retail loads, the Regulation was adjusted during the 2010 rulemaking to provide a two-tiered ACP Rate. For the portion of a Competitive Supplier's retail load served under contracts entered *prior* to the January 1, 2010, start of the SCO obligation (with the cost of the obligation not known at that time and not incorporated into contracted rates), the ACP Rate for SREC shortfall is the same as for Class I, \$62.13 per MWh in 2011. For any shortfall in serving retail loads under contracts *commencing* after 2009, the Rate in 2011 was \$550. Following a methodology provided by DOER for the Annual Compliance Filings, each Supplier was able to calculate its SCO SREC ACP at each of the two rates. Of the total SCO obligation, the shortfall under pre-2010 contracted load was 11,692 MWh, for which the ACP totaled \$726,423.97 at the Class I rate of \$62.13/MWh, and the shortfall under retail load contracted in 2010 or later was 42,111 MWh, for which the ACP totaled \$23,161,050 at the \$550/MWh rate.⁴⁵

After 2011, DOER anticipates that reliance on the ACP mechanism will be greatly reduced by a rapidly growing supply, SREC supply will exceed demand for some period of time, SREC prices will decline, and the auction mechanism will be utilized. (See Section Seven for a more detailed discussion.)

CMR 14.07(2)(a). Since the actual retail load for 2011 turned out to be 49,386,169, the resulting compliance obligation for 2011 was 80,352 MWh. However, due to each supplier rounding up its individual SREC obligation, the aggregated total for compliance was 80,370 MWh.

⁴² However, see Section Seven regarding the accelerating increase in PV development during 2012.

⁴³ This figure is the same as the Class I figure in Table Two.

⁴⁴ See footnote 27 regarding the difference between totaling individual obligations and calculating overall obligation.

⁴⁵ See Table Nine (not in the 2010 report) in Section Seven for a forward projection of the portion of the total retail load under contracts that commenced before 2010.

SECTION FOUR

RPS CLASS II RENEWABLE ENERGY COMPLIANCE IN 2011

RPS Class II was established in the Green Communities Act of 2008 with the purpose of providing incentives for the continued operation of pre-1998 renewable energy plants and Massachusetts waste energy plants. RPS Class II Renewable Energy is generated by the same resources and technologies as Class I, with two exceptions.

- Hydroelectric plants in Class II are limited to 5 MW (vs. 25 MW in Class I). However, the 5 MW limit was increased to 7.5 MW, effective November 1, 2012, per the *Competitively Priced Electricity Act of 2012*.⁴⁶
- Biomass plants in Class II share the Class I “low emissions” criteria but omit the Class I “advanced technology” criteria. However, on August 23, 2012, a moratorium was announced on applications for plants using *woody* biomass. The moratorium will be lifted when DOER has promulgated in regulation new woody biomass eligibility standards that will be modeled, to the extent appropriate, on those recently finalized in Class I.

Because only pre-1998 plants that can qualify for Class II, the Minimum Standard (annual compliance percentage) does not rise over time.⁴⁷ That standard is 3.6% of total retail sales, as represented by retail load obligations; however, DOER has been directed by the Legislature in the 2012 Act to conduct a study and recommend regulatory or statutory changes to alleviate the program’s reliance on the ACP mechanism, which may result in the lowering of the Minimum Standard. That study, [Evaluation of the Massachusetts RPS Class II Program](#), was issued and presented to the Legislature on December 31, 2012. (Note that an additional, separate standard of 3.5% applies to the Waste Energy subclass within RPS Class II, described in Section Five.)

In 2011, the net (non-Exempt) load⁴⁸ for the Class II Renewable Energy obligation was 45,586,503 MWh, and the total of all 37 Suppliers’ 3.6% Class II Renewable Energy obligations was 1,641,134 MWh. The Class II REC supply was very short of the demand. Only five Competitive Suppliers met their full obligations by acquiring Class II RECs and using 63 MWh banked from 2010 surplus (which provided them a net surplus of 1,749 RECs to bank forward). Another seven Suppliers acquired all of the remaining Class II RECs, for a total of 236,472 RPS Class II RECs. Suppliers had a total shortfall of 1,406,356 RECs. The overall total of 236,472 RECs from 2011, plus 63 from 2010 surplus, minus 1,757 surplus (of which 1,749 MWh were able to be banked forward) was 234,778 MWh for 2011 compliance, which amounted to only 14% of the total Class II Renewable Energy obligation. The remaining 1,406,356 MWh (86%) of the obligation was met by the Alternative Compliance mechanism, that is, by making ACPs to the MassCEC at the rate of \$25.50 per MWh, totaling \$35,862,072. These figures are displayed in Table Four, with more detail in Appendix Two, Table C, and in Appendix Three, Tables H and I.

⁴⁶ See footnote 6 regarding the pending increase in the hydropower capacity limits and for a link to the 2012 Act.

⁴⁷ If a pre-1998 Generation Unit increases its annual output by installing additional capacity or improving its efficiency, then that increased output may qualify for RPS Class I under the Incremental Generation provisions in 225 CMR 14.05(2).

⁴⁸ See the discussion of Exempt Load for RPS Class II and APS above, on page 7.

Table Four
Aggregated Data from the RPS Class II Renewable Energy
Compliance Filings, 2009-2011 (MWh)

	2011	2010	2009
CY Retail Sales (=Retail Load obligation)⁴⁹	49,386,169	50,026,093	48,301,821
Exempt Load	3,799,666	8,233,703	31,918,771
Net Load	45,586,504	41,792,390	16,383,050
CY aggregated RPS II RE obligation, at 3.6%⁵⁰	1,641,134	1,504,544	589,801
Total Class II RECs from CY generation	236,472	103,837	35,543
<i>minus</i> CY total surplus Class II RECs	(1,757)	(63)	(653)
Net CY RECs for CY obligation	234,715	103,774	34,890
<i>plus</i> Banked from pre-CY surpluses	63	653	0
Total Class II RECs used for CY obligation	234,778	104,427	34,890
<i>plus</i> total ACP Credits	1,406,356	1,400,117	554,911
Total for compliance obligation	1,641,134	1,504,544	589,801
Surplus Attributes banked forward⁵¹	1,749	63	653
ACP proceeds (rounded)	\$35,862,072	\$35,002,925	\$13,872,775

The above facts indicate a significant shortage of qualified Class II Renewable Energy generation. 2011 began with over 54 MW of qualified capacity at 22 hydropower units and four landfill methane gas units and ended with nearly 77 MW at 32 hydropower plants (53.6 MW), six landfill methane plants (17.3 MW), and one wind farm (6 MW). So far in 2012, 17 hydropower plants have become qualified, with a capacity totaling more than 44 MW. In 2011, 93% of the Class II RECs came from hydropower generation, 7% from landfill methane electricity generation. DOER has 20.4 MW of capacity in the application pipeline at this time and may qualify still more units for 2012. However, with insufficient qualifying generators and a declining exempt load, DOER expects another substantial shortfall for 2012. The magnitude of the shortfall is currently under review and is expected to be addressed in a formal rulemaking process to revise the RPS Class II regulations.

SECTION FIVE

RPS CLASS II WASTE ENERGY COMPLIANCE IN 2011

RPS Class II Waste Energy is a separate sub-class within RPS Class II. This means that each Supplier must comply separately with both the Renewable Energy subclass and the Waste Energy subclass. Qualification is limited to plants that meet the Massachusetts Department of Environmental Protection regulations for such facilities.⁵² The MassDEP regulations, in addition to provisions for municipal solid waste handling, emissions, etc., provide for enhanced sorting and recycling and for the

⁴⁹ This figure is the same as the Class I figure in Table Two.

⁵⁰ See footnote 27 regarding the difference between totaling individual obligations and calculating an overall obligation.

⁵¹ Any surplus RPS Class II Attributes (measured as quantities of qualified surplus RECs) beyond the 30% banking limit can be applied to compliance only with the RPS Class II Renewable Energy obligation, not any other portfolio standard. See footnote 31 regarding the 30% limit.

⁵² The MassDEP regulations are in 310 CMR 7.08(2) and 310 CMR 19.000.

owner of each plant to remit to the MassDEP 50% of the proceeds from selling its RPS Class II WECs. The MassDEP uses those funds to help finance municipal recycling programs.

In 2011, the net load for the Class II Waste Energy obligation was 45,586,504 MWh, and the total of the 37 Suppliers' Class II Waste Energy obligations of 3.5% was 1,595,546 MWh. To comply with that obligation, the Suppliers acquired 1,568,127 WECs, which, combined with the use of 237,620 Attributes banked from 2010 surplus WECs, yielded a surplus of 212,565 WECs, of which 207,041 were eligible to bank towards Class II Waste Energy compliance over the next two Compliance Years. The surplus notwithstanding, seven small Suppliers acquired no WECs, and three others failed to purchase enough WECs. Those ten Suppliers met their total shortfall of 2,364 WECs by making ACPs to the MassCEC at the ACP rate of \$10.20 per MWh, for total payments of \$24,113. These figures are displayed in Table Five, with more detail in Appendix Two, Table D.

Table Five
Aggregated Data from the RPS Class II Waste Energy
Compliance Filings, 2009-2011 (MWh)

	2011	2010	2009
CY Retail Sales (=Retail Load obligation)⁵³	49,386,169	50,026,093	48,301,820
Exempt Load	3,799,666	8,233,703	31,891,115
Net Load	45,586,504	41,792,390	16,410,706
CY aggregated RPS II WE obligation, at 3.5%⁵⁴	1,595,546	1,462,750	574,384
Total WECs from CY generation	1,568,127	1,378,219	1,046,833
<i>minus</i> CY total surplus WECs	(212,565)	(251,554)	(473,177)
Net CY WECs for CY obligation	1,355,562	1,126,665	573,656
<i>plus</i> Banked from pre-CY surpluses	237,620	330,288	0
Total WECs used for CY obligation	1,593,182	1,456,953	573,656
<i>plus</i> total ACP Credits	2,364	5,797	728
Total for compliance obligation	1,595,546	1,462,750	574,384
Surplus WE Attributes banked forward⁵⁵	207,041	237,667	330,288
ACP proceeds (rounded)	\$24,113	\$57,970	\$7,280

The continued surplus in 2011 was due to the large, albeit declining, Exempt Load mandated in the Green Communities Act and discussed above in the second paragraph of Section Four. In fact, about 190 GWh of WECs went unsold to Suppliers for that reason. As the Exempt Load continues its sharp decline to nearly zero over the next five years, the net load and, thereby, the demand for WECs will rise.

⁵³ This figure is the same as the Class I figure in Table Two.

⁵⁴ See footnote 27 regarding the difference between totaling individual obligations and calculating an overall obligation.

⁵⁵ Any surplus RPS Class II Waste Energy Attributes (measured as quantities of qualified surplus WECs) can be applied to compliance only with the RPS Class II Waste Energy obligation, not any other portfolio standard.

SECTION SIX

APS ALTERNATIVE ENERGY COMPLIANCE IN 2011⁵⁶

The Alternative Energy Portfolio Standard (APS) is an obligation mandated under the Green Communities Act of 2008. The APS is designed to support certain “alternative” electric power system technologies that largely do not utilize renewable energy resources and that the legislators deemed worthy of support. That support takes the form of financial incentives provided by an energy portfolio standard on the model of RPS. Each Supplier must comply separately with both APS and RPS.

In 2011, the net (non-Exempt) load for the APS obligation was 45,586,504 MWh, for which the 37 Suppliers’ 2% APS obligations totaled 911,748 MWh. To comply with that obligation, the 37 Suppliers purchased 324,922 AECs and used 515 AECs banked from 2010 surplus, from which seven Suppliers put aside 7,636 surplus AECs, for a net total of 317,801 AECs. A net shortfall of 593,947 AECs was met by making ACPs to the MassCEC at the rate of \$20.40 per MWh. The payments totaled \$12,116,514. While the total supply of AECs was short, seven Suppliers banked a total surplus of 7,636 AECs towards APS compliance over the next two Compliance Years. Of the total AECs, 99.9% came from CHP plants, while only 0.1% came from flywheel storage units. These figures are displayed in Table Six; more detail is in Appendix Two, Table E, and in Appendix Three, Table J.

Table Six
Aggregated Data from the APS Compliance Filings, 2009-2011 (MWh)

	2011	2010	2009
CY Retail Sales (=Retail Load Obligation) ⁵⁷	49,386,169	50,026,093	48,301,821
Exempt Load ⁵⁸	3,799,666	8,233,703	31,918,771
Net Load	45,586,504	41,792,390	16,383,050
Aggregated APS Obligation (1.0% in 2009, 1.5% 2010, 2% 2011) ⁵⁹	911,748	626,902	163,844
Total AECs from CY Generation	324,922	227,134	129,925
<i>minus</i> CY total surplus AECs	(7,636)	(520)	(10,600)
Net CY AECs for CY Obligation	317,286	226,614	119,325
<i>plus</i> banked from pre-CY surpluses	515	8,818	0
Total AECs used for CY Obligation	317,801	235,432	119,325
<i>plus</i> total ACP credits	593,947	391,470	44,519
Total for Compliance Obligation	911,748	626,902	163,844
Surplus APS Attributes banked forward	7,636	515	8,838
ACP proceeds (rounded)	\$12,116,514	\$7,829,400	\$890,380

⁵⁶ See the bottom of page 6 in Section One and footnote 15 for a description of the APS and an explanation of how AECs are determined for CHP plants.

⁵⁷ This figure is the same as the Class I figure in Table Two.

⁵⁸ See Section Three for an explanation of Exempt and Net Load.

⁵⁹ See footnote 27 regarding the difference between totaling individual obligations and calculating an overall obligation.

SECTION SEVEN

PROJECTION OF FUTURE RPS AND APS COMPLIANCE OBLIGATIONS AND SUPPLY

DOER provides here one possible scenario for the future RPS and APS compliance obligations through 2017. This scenario is based on the ISO-NE “reference case” for load growth in the *2012 CELT Report*,⁶⁰ following the approach of the 2009 and 2010 RPS Annual Compliance Reports. However, the *2012 CELT Report* differs from previous ones by its inclusion of ISO-NE’s forecast of incremental energy efficiency beyond the Forward Capacity Market beginning in 2015-2016.⁶¹ As a result, electricity consumption now is projected to be flat to declining over the next ten years. Regarding the ISO-NE forecast specifically for 2012, it should be noted that the forecast assumed normal weather and economic drivers; the actual electricity consumption for 2012 may differ to the extent that the weather and the economy deviated from those assumed norms.

In general, any scenario is determined by one’s choice of assumptions, which can be subject to substantial uncertainty. Important variables affecting electricity consumption include (a) weather (especially temperature), (b) national and regional economic conditions, (c) the degree of success in implementing energy efficiency programs, (d) the growth of behind-the-meter generation, and, sometime in the future, (e) the degree of electric vehicle penetration into the market. Presenting a single scenario offers simplicity but misrepresents the degree of uncertainty in these variables. Rather than developing multiple load scenarios, which is outside the scope of this report, DOER chose to base its RPS reference case on the ISO-NE 2012 CELT Forecast. Other analysts can easily replace the CELT Forecast with other ISO-NE scenarios or with non-ISO alternative scenarios to see the effect of various assumptions on the RPS and APS obligations.

Table Seven lists both the actual (2003-2011) and projected (2012-2017) total retail sales – as “retail load obligation”⁶² – and the resulting actual and projected RPS Class I obligations. The RPS Class I percentage obligations (the Minimum Standard) increase as specified in the statute and regulations. This table provides figures only through 2017, although the annual RPS Class I obligation continues increasing indefinitely.

Figure Six shows DOER’s projection for the growth in demand for RECs by the “premium” RPS mandates of the five New England states that have similar, albeit not identical, mandates for new renewable energy generation. Those mandates consist of the CT RPS Class I, the ME RPS, the NH RPS Classes I and II, and the mandate for new facilities in the RI Renewable Energy Standard.⁶³ The projections for all of the states are based on ISO-NE load growth projections cited above.⁶⁴

⁶⁰The ISO-NE figures are from tab 2, column R in the *2012 CELT Report* at http://iso-ne.com/trans/celt/fsct_detail/2012/isone_fcst_data_2012.xls.

⁶¹ This ISO forecast is the culmination of efforts by the ISO to develop a “discreet Energy-Efficiency Forecast” that recognizes increasing investment in energy efficiency through state-sponsored demand-side management.

⁶² See explanation and reference in footnote 28 regarding the use of “retail load obligation” for “retail sales.”

⁶³ The other programs are summarized at <http://www.dsireusa.org/incentives/index.cfm?SearchType=RPS&&EE=0&RE=1>.

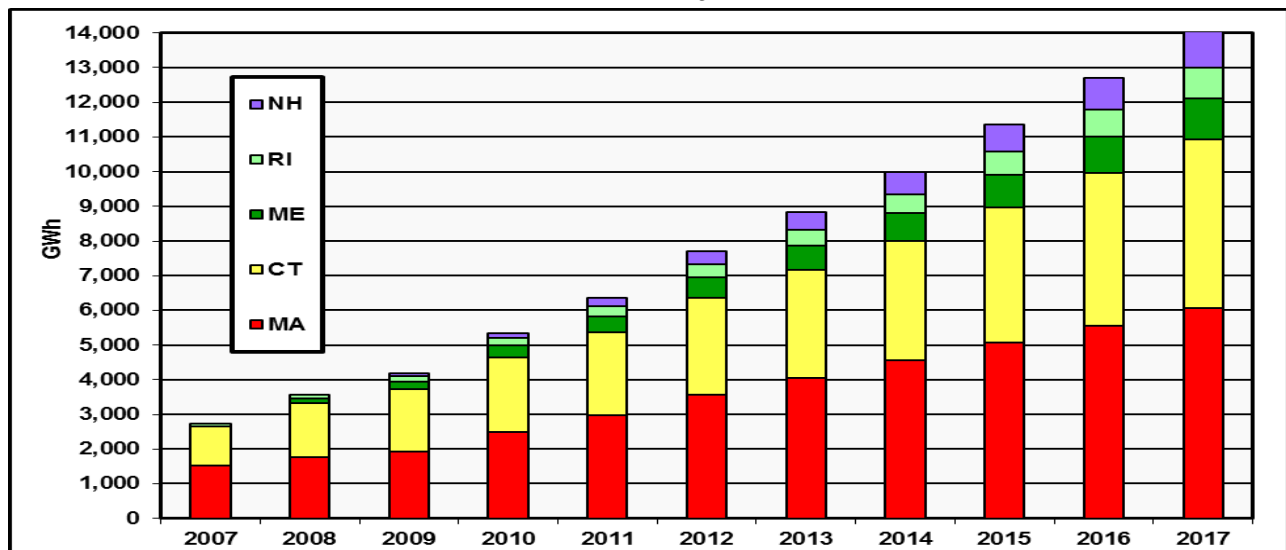
⁶⁴ See footnote 60 for the source of ISO-NE figures.

Table Seven
MA RPS Class I Annual Load & Compliance Obligations,
Actual (2003-2011) & Projected (2012-2017)⁶⁵

Year	Actual/Projected Load Obligation, MWh ⁶⁶	RPS Class I % Obligation	Total RPS Class I REC Obligation ⁶⁷	Solar Carve-Out % Obligation	Solar Carve-Out SREC Obligation
2003	49,834,324	1.0%	498,343		
2004	50,063,092	1.5%	750,954		
2005	51,558,778	2.0%	1,031,176		
2006	50,143,130	2.5%	1,253,578		
2007	50,978,101	3.0%	1,529,343		
2008	50,321,635	3.5%	1,761,257		
2009	48,301,821	4.0%	1,932,089		
2010	50,026,093	5.0%	2,501,305	0.0679%	33,988
2011	49,386,169	6.0%	3,007,569	0.1627%	80,370
2012	52,910,640	7.0%	3,703,745	0.1630%	86,245
2013	52,776,480	8.0%	4,222,118	0.2744% *	135,495 *
2014	52,837,540	9.0%	4,755,379	<i>tbd</i>	<i>tbd</i>
2015	52,740,360	10.0%	5,274,036	<i>tbd</i>	<i>tbd</i>
2016	52,672,420	11.0%	5,793,966	<i>tbd</i>	<i>tbd</i>
2017	52,605,340	12.0%	6,312,641	<i>tbd</i>	<i>tbd</i>

* Note that DOER has proposed via rulemaking a [change in the methodology for determining the annual Minimum Standard](#) for the Solar Carve-Out, a change that would result in the following figures for 2013: 0.3833% and 189,297 MWh.

Figure Six
New England Premium RPS Compliance Obligations by State,
Actual (2007-2011) & Projected (2012-2017)



⁶⁵ The actual figures for 2003 through 2011 are from RPS annual compliance filings. The projections starting in 2012 are from the ISO-NE load growth projections in its 2011 CELT Report (see footnote 60), with 14% of the total Massachusetts load attributable to the municipally owned companies netted out. In this table, the Solar Carve-Out annual obligation is not deducted from the Class I obligation, although it is deducted for compliance purposes.

⁶⁶ See explanation and reference in footnote 28 regarding the use of “load obligation” for “retail sales.”

⁶⁷ Actual total obligation is the sum of individual obligations, which may be larger than the calculation of an overall RPS obligation. Note that the Solar Carve-Out obligations are *not* deducted from the Total Class I obligations in this column.

Table Eight lists the 2009-2011 actual load obligations for RPS Class II and APS, and load obligations projected for 2012 through 2017 (although, like Class I, the standards continue beyond that date). The total load obligation for each year is listed first and is identical to the figures in Table Seven. However, since, as explained in Section Three, electricity sold under pre-2009 contracts is exempt from the Class II and APS standards, the projected Exempt Loads provided by Suppliers are then deducted to yield net load obligations. Then the net load for each year is multiplied by the mandated percentage standards. That standard does not rise for Class II, since that is for qualified pre-1998 plants, but it does rise for APS.

Table Eight
MA RPS Class II & APS Annual Load & Compliance Obligations, Net of Exempt Load,
Actual (2009-2011) & Projected (2012-2017), in MWh⁶⁸

Year	Actual/ Projected Load Obligation ⁶⁹	Actual/ Projected Exempt Load Obligation ⁷⁰	Actual/ Projected Net Load Obligation	RPS Class II RECs at 3.6% of Net Load Obligation	RPS Class II WECs at 3.5% of Net Load Obligation	APS Minimum Standard	APS AECs Obligation
2009	48,301,821	31,918,771	16,383,050	589,801	574,368	1.0%	163,844
2010	50,026,093	8,233,703	41,792,391	1,504,526	1,462,734	1.50%	626,886
2011	49,386,169	3,799,666	45,586,504	1,641,114	1,595,528	2.0%	911,730
2012	52,910,640	1,682,771	51,227,869	1,844,203	1,792,975	2.5%	1,280,697
2013	52,776,480	1,099,723	51,676,757	1,860,363	1,808,686	3.0%	1,550,303
2014	52,837,540	145,912	52,691,628	1,896,899	1,844,207	3.5%	1,844,207
2015	52,740,360	93,320	52,647,040	1,895,293	1,842,646	3.75%	1,974,264
2016	52,672,420	61,995	52,610,425	1,893,975	1,841,365	4.0%	2,104,417
2017	52,605,340		52,605,340	1,893,792	1,841,187	4.25%	2,235,727

Projection of future RPS Class I REC supply is particularly difficult for various reasons. Much of the uncertainty derives from forces external to the program itself, especially from changing prospects for renewable energy and climate policies at the federal level, including the uncertain future of the federal Production Tax Credit and other federal stimulus funding, and continued, looming uncertainties in the national and global economies. DOER does expect growth in Massachusetts and elsewhere from onshore and offshore wind farm development, as well as from hydropower, solar, and anaerobic digester gas projects. The effect of the pending Cape Wind project on the supply over the next several years will depend on the actual timetable of construction. The potential for new or incremental hydroelectric projects that meet the small nameplate capacity and environmental standards of the program is difficult to predict. Solar PV projects have received strong state and federal financial incentives since 2009; accelerated PV development began to show up in the RPS market in 2010 and increased considerably during 2011 and 2012; and DOER expects further strong growth in the years ahead. Finally, DOER

⁶⁸ Each of the REC, WEC, and AEC obligations for each year is the total of all the individual obligations in that year and, due to consistent upward rounding, is greater than the result of multiplying the total load obligation by the Minimum Standard.

⁶⁹ The Load Obligation projections here are the same those for RPS Class I in Table Seven. See explanation and reference in footnote 28 regarding the use of “load obligation” for “retail sales.”

⁷⁰ DOER did not request 2017 exempt load obligation figures from the Filers but assumes that the figure will be at or approaching zero by then, as pre-2009 contracts continue to expire. However, note that, although DOER expressed the same expectation for 2016 in the report for 2010, the actual figure for 2016 did *not*, in fact, reach zero.

thinks there is an untapped potential for anaerobic digester gas projects at agricultural, food processing, food service, and wastewater treatment facilities.⁷¹

Although the regulatory changes in the RPS Class I eligibility of woody biomass fueled plants promulgated on August 17, 2012, has ended the moratorium on biomass project qualifications, those changes add overall efficiency requirements on the development of new biomass projects and should focus development activities on such technologies as CHP. Meanwhile, although the new standards will not apply to already qualified plants until 2016 (except for the requirement and documentation of sustainable fuel sourcing, which is effective on January 1, 2013), several of the qualified “merchant” plants in northern New England already had ceased operation or reduced output. However, those moves resulted, not from anticipation of the regulatory revisions, but rather from the decline in electricity prices due to lower natural gas prices and reduced electricity demand during the economic recession, as well as higher feedstock supply costs derived from higher costs for diesel fuel to harvest and transport that supply.

The Solar Carve-out began in 2010 and, like the original RPS in its early years, exhibited a shortage of generation as project development ramped up. However, the development curve has moved sharply upward since 2010. While only 2,358 SRECs were generated in 2010, over 26,598 were generated in 2011, more than a ten-fold increase in generation from one year to the next. Through the first three quarters of 2012, 91,684 SRECs have been generated, with more than 23,000 additional SRECs expected to be generated by the end of the year according to production data reported to MassCEC’s Production Tracking System (PTS) through the end of December 2012. This dramatic increase in generation corresponds with a rapid increase in installed capacity. While only 12 MW of new solar capacity were installed in 2010, 39 MW was installed in 2011, and more than 110 MW were installed in 2012, which is far greater than the total cumulative capacity installed in all prior years. This dramatic increase in installed capacity has led to what will very likely be a significant market oversupply in 2012, meaning that DOER’s Solar Credit Clearinghouse Auction is likely to be utilized for the first time in July of 2013.

The price of SRECs and the cost of the Solar Carve-Out are affected by the relative amounts of the retail load that are under pre-2010 contracts and contracts entered or revised on or after January 1, 2010 (see Table Nine). As explained in Section Three, any shortfall in a competitive Supplier’s (but not a regulated utility’s) SRECs for meeting the earlier contracts can be met by ACPs at the default Class I (\$62.13 per MWh for 2011), while any shortfall under 2010 and later contracts can be met by ACPs under a much higher SCO rate (\$550 for 2011-2013, declining thereafter per a published schedule).

⁷¹ In fact, DOER has been partnering with the MassDEP and MassCEC to identify, evaluate, and promote these opportunities.

Table Nine
MA Solar Carve-Out Loads Served under Pre-2010 & More Recent Retail Contracts,
Actual (2010-2011) & Projected (2012-2017), in MWh

Year	Actual/ Projected Total Load Obligation	Load Served under pre-2010 Retail Contracts, Actual/Projected⁷²	Load Served under 2010 or later Retail Contracts, Actual/Projected
2010	50,026,093	19,323,329	30,702,764
2011	49,386,169	19,286,547	30,099,623
<i>2012</i>	<i>52,910,640</i>	<i>7,542,369</i>	<i>45,368,271</i>
<i>2013</i>	<i>52,776,480</i>	<i>3,931,877</i>	<i>48,844,603</i>
<i>2014</i>	<i>52,837,540</i>	<i>2,049,922</i>	<i>50,787,618</i>
<i>2015</i>	<i>52,740,360</i>	<i>518,482</i>	<i>52,221,878</i>
<i>2016</i>	<i>52,672,420</i>	<i>99,465</i>	<i>52,572,955</i>
<i>2017</i>	<i>52,605,340</i>		<i>52,605,340</i>

With regard to Class II RECs, the pre-1998 installed capacity cannot rise, so the unknown factors are how much of that capacity potentially can meet the environmental criteria to qualify for Class II, along with the likelihood that many potentially MA Class II RECs will be used for compliance with RPS in other New England states. In recognition of the expense to ratepayers and Suppliers of the unacceptably large shortage of Class II RECs to meet the Minimum Standard, DOER has evaluated and recommended program changes to the Legislature and anticipates a rulemaking in 2013 that will lower and improve the Minimum Standard to reduce reliance on the ACP mechanism, as requested by the Legislature in 2012.⁷³

Class II WECs are likely to remain in surplus for several more years, while the net load obligation rises toward rough parity with the annual supply. However, the desired approach to parity may be undermined by the effects of considerable banking forward of WECs prior to expiration of the Exempt Load. DOER is currently reviewing in this situation.

APS is experiencing a growing rate of applications for CHP Units, but DOER is not prepared to provide a projection at this time. The growing supply will have to chase a growing net load obligation, as the Exempt Load declines sharply during the next several years, along with a rising Minimum Standard.

SECTION EIGHT

USES OF THE ALTERNATIVE COMPLIANCE PAYMENT FUNDS

The Alternative Compliance mechanism for meeting RPS and APS obligations in CY 2011 resulted in total ACP proceeds of almost \$78.5 million, as detailed in Table Ten. This substantial increase continued the upward trend that began in 2009. The large ACP increases since 2009 are attributable to the following:

- For RPS Class II Renewable Generation, a significant reduction in the quantity of Exempt Load⁷⁴ as such contracts expired, as well as a continued substantial shortage in Class II-qualified

⁷² DOER did not request 2017 figures from the Filers but assumes that the figure will be approaching zero by then, as pre-2010 contracts continue to expire.

⁷³ See footnote 20 regarding the report to the Legislature.

⁷⁴ See the first paragraph on page 7 regarding the Exempt Load.

generation. The Class II shortage is due to technical and financial issues for biomass-fired and hydropower plants that continued in 2012, including a preference for participation in the RPS programs of certain other New England states on the part of some Units that potentially qualify for MA RPS Class II; that preference is due to differences between the programs with regard to eligibility standards and REC prices.⁷⁵

- For the RPS Class I Solar-Carve Out obligation, the commencement of this obligation in 2010 and the concomitant delay of supply emerging from the project development pipeline. However, rapidly accelerating development is expected to result in an SREC surplus and a near elimination of ACP usage for 2012.
- For APS, an increased non-exempt retail load subject to the obligation (noted above for Class II), annual increases in the obligation, and a delay in supply emerging from the project development pipeline of this relatively new program.

The proceeds from Alternative Compliance Payments are held and spent in accordance with the RPS and APS statutes and regulations, as follows. The funds are held in an account at the Massachusetts Clean Energy Center (MassCEC) that is separate from other funds of the MassCEC. Expenditure of the ACP funds by the MassCEC is overseen by DOER by means of agreements between the two entities. Expenditure of ACP funds from RPS Class I and the Solar Carve-Out must “further the commercial development of RPS Class I Renewable Generation Units and Solar Carve-Out Renewable Generation Units,” while expenditure of ACP funds from APS must “further the commercial development of Alternative Generation.” Although the statute and regulations for RPS Class II do not place any restrictions, DOER uses Class II ACP funds to support or promote the development of renewable and other clean energy, including local and state-level clean energy projects and activities of DOER’s Green Communities Division.

Table Ten
ACP Proceeds per Portfolio Standard, 2010-2011
(rounded to the nearest dollar)

Program/Class	2011	2010
RPS Class I	\$ 6,598,386	\$ 241,551
RPS Class I Solar Carve-Out	\$ 23,887,474	\$ 11,682,793
RPS Class II Renewable Energy	\$ 35,862,072	\$ 35,002,925
RPS Class II Waste Energy	\$ 24,113	\$ 57,970
APS (Alternative Energy)	\$ 12,116,514	\$ 7,829,400
Total⁷⁶	\$ 78,488,558	\$ 54,814,638

DOER issued on November 15, 2012, its *2011 ACP Spending Plan* for the substantial funds paid by Suppliers as Alternative Compliance with their 2011 RPS and APS compliance obligations. The Plan is at the [Annual Compliance Reports page](#) linked to DOER’s RPS & APS homepage.

⁷⁵ For more extensive discussion, see DOER’s 12/31/12 report to the Legislature: [Evaluation of the Massachusetts RPS Class II Program](#).

⁷⁶ The totals, as rounded, are correct. Each appears to be one dollar short because some of the other figures are rounded.

APPENDIX ONE

RPS and APS 2011 Compliance Filings, Review, and Verification

All Suppliers that sold retail electricity to end-use customers in the territories of the four Massachusetts regulated utilities during 2011 were required to submit their Annual Compliance Filings for 2011 by Monday, July 2, 2012. DOER issued forms and instructions for the Filings on June 1st, sixteen days before the end of the NEPOOL GIS trading period for the fourth quarter of 2011. By July 2nd DOER had received Filings from all four regulated utilities and from 28 of the 33 Competitive Suppliers, with two more arriving on July 3rd. The remaining three were received by the end of the week, July 5th.

The review encompassed both printed and electronic copies of Filers' compliance summary tables and GIS spreadsheet reports. The electronic files enabled DOER to aggregate, analyze, and summarize the information in the Filings, while the printed versions of GIS reports were used to verify the electronic versions of those reports. DOER contacted about half of the Suppliers for correction of mathematical errors and for additional information, documentation, explanations, and clarifications.

DOER implemented one significant change in the methodology for annual compliance, effective with the 2011 Filings. On May 24, 2012, DOER issued a [*Guideline for Retail Electricity Suppliers on the Determination of Sales to End-Use Customers for Calculating Their Annual RPS & APS Obligations*](#). Under the new *Guideline*, DOER requires that each Supplier base its calculation of Generation Certificate obligations under the RPS and APS Minimum Standards each year on Load Obligation data provided to Suppliers by the regulated Utilities both via the ISO New England and via DOER, as adjusted by the Supplier for any documented, inter-LSE transfers of Load Obligation Certificates at the NEPOOL GIS and, in the case of RPS Class II and APS obligations, for Exempt Loads. Specifically, the Load Obligation for each Supplier is the total for the year of the Data Reconciliation Process (a.k.a. 90 Day Resettlement) figures that the Utilities provide monthly to the ISO and that each Supplier also receives on a regular basis. DOER obtained that monthly data for all Suppliers on a confidential basis from the four Utilities and, in turn, provided to each Supplier a spreadsheet tabulating the monthly, per-utility data for that Supplier. Each Supplier was instructed, per the *Guideline*, to use its twelve-month total of that data as the basis for calculating its obligations of RECs, SRECs, WECs, and AECs. *For 2011 compliance only*, DOER also required documentation and adjustment from any Supplier that had used a different method for the 2010 Compliance Filings (or that needed to make certain other technical adjustments).

Most of the Filing errors that required follow-up were related to incorrect or undocumented adjustments. In general, the revised method has simplified the task of Suppliers in calculating their obligations. Since the primary adjustment was needed only for the 2011 transition to the revised method and will not be used in the future, errors related to that adjustment should never recur.

Benefiting from internal improvements over the years, most of the 2011 Filings – with exceptions noted above – were submitted, reviewed, supplemented, corrected, clarified, and accepted smoothly. DOER found that the new *Guideline* worked well, and, with the transition year completed, expects even more efficient processing in the future.

APPENDIX TWO

2011 RPS and APS Compliance Summaries⁷⁷

Table A: RPS Class I Compliance Summary, 2011 (MWh)

RETAIL ELECTRICITY SUPPLIERS	RETAIL SALES	CLASS I RENEWABLE GENERATION ATTRIBUTES					CY 2011 5.8373% RPS CLASS I OBLIGATION	BANKING FOR FUTURE COMPLIANCE		
	Load Obligation from Filing	2011 MA Class I RECs	2009 Banked Attributes	2010 Banked Attributes	Alternative Compliance Credits	Total RPS Class I Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES										
Fitchburg Gas & Elec.	257,126	15,000	0	13	0	15,013	15,009	4	4,503	4
National Grid	12,243,337	612,484	0	29,834	72,363	714,681	714,681	0	214,405	0
NSTAR	9,307,571	406,901	0	139,320	0	546,221	543,310	2,911	162,993	2,911
W Mass Electric (NU)	1,967,840	111,821	0	0	3,048	114,869	114,869	0	34,461	0
SUBTOTALS	23,775,874	1,146,206		169,167	75,411	1,390,784	1,387,869	2,915	416,362	2,915
COMPETITIVE SUPPLIERS										
Cianbro Energy										
Consolid. Edison Solutions										
Constellation NewEnergy										
Devonshire Energy										
Direct Energy Business										
Direct Energy Services										
Dominion Retail										
East Avenue Energy										
Easy Energy of Mass.										
GDF Suez Energy Resources										
Glacial Energy of NE										
Hampshire Council of Gov'ts										
Hannaford Energy										
Harvard Dedicated Energy										
Hess Corporation										
Horizon Power & Light										
Hudson Energy Services										
Integrus Energy Services										
Just Energy Mass.										
Liberty Power Holdings										
MXenergy Electric										
NextEra Energy										
Noble Americas En. Sols.										
Pepco Energy Services										
Public Power										
REP Energy										
Sempra Energy Solutions										
South Jersey Energy										
Spark Energy										
TransCanada Power Mktg										
WFM Intermediary NE										
SUBTOTALS	25,610,294	1,466,916	30,946	71,190	30,792	1,599,844	1,494,954	104,890	448,500	104,889
TOTALS	49,386,169	2,613,122	30,946	240,357	106,203	2,990,628	2,882,823	107,805	864,862	107,804

⁷⁷ All data for the Competitive Suppliers is aggregated in these four tables in accordance with the provision for confidentiality of product-specific data in the RPS Class I Regulation, 225 CMR 14.09(2)(b). Data for the regulated distribution utility companies are made public in filings at the MA Department of Public Utilities. All five tables have the same Competitive Suppliers, but they are listed only in the first table. See Table One for the complete names of the Suppliers.

Table B
RPS Solar Carve-Out Renewable Energy Compliance Summary, 2011 (MWh)

RETAIL ELECTRICITY SUPPLIERS	RETAIL SALES	SOLAR CARVE-OUT RENEWABLE GENERATION ATTRIBUTES					CY 2011 0.1627% RPS SCO Obligation	BANKING FOR FUTURE COMPLIANCE		
	Load Obligation from Filing	2011 MA SRECs	2009 Banked Attributes	2010 Banked Attributes	Alternative Compliance Credits	Total RPS SCO Attributes		Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
Fitchburg Gas & Electric (Unitil)	257,126	345	0	0	74	419	419	0	42	0
National Grid	12,243,337	5,897	0	0	14,023	19,920	19,920	0	1,992	0
NSTAR	9,307,571	8,798	0	0	6,347	15,145	15,145	0	1,515	0
W Mass Electric	1,967,840	1,185	0	0	2,017	3,202	3,202	0	321	0
SUBTOTALS	23,775,874	16,225	0	0	22,461	38,686	38,686	0	3,870	0
COMPETITIVE SUPPLIERS										
SUBTOTALS	25,610,294	10,353	0	0	31,342	41,697	41,684	13	4,187	13
TOTALS	49,386,169	26,578	0	0	53,803	80,383	80,370	13	8,057	13

Table C
RPS Class II Renewable Energy Compliance Summary, 2011 (MWh)

RETAIL ELECTRICITY SUPPLIERS	RETAIL SALES			CLASS II RENEWABLE ENERGY ATTRIBUTES					3.6% RPS Class II RE Obligation	BANKING FOR FUTURE COMPLIANCE		
	Load Obligation from Filing	Exempt Retail Load	Net Retail Load	2011 MA Class II RECs	2009 Banked Attributes	2010 Banked Attributes	Alternative Compliance Credits	Total RPS Class II RE Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES												
Fitchburg Gas & Electric	257,126	0	257,126	2,631	0	0	6,626	9,257	9,257	0	2,778	0
National Grid	12,243,337	0	12,243,337	118,463	0	0	322,298	440,761	440,761	0	132,229	0
NSTAR	9,307,571	0	9,307,571	78,193	0	0	256,880	335,073	335,073	0	100,522	0
W. Mass Electric	1,967,840	0	1,967,840	10,000	0	0	60,843	70,843	70,843	0	21,253	0
SUB-TOTALS	23,775,874	0	23,775,874	209,287	0	0	646,647	855,934	855,934	0	256,782	0
COMPETITIVE SUPPLIERS												
SUB-TOTALS	25,610,294	3,799,666	21,810,629	27,185	0	63	759,709	786,957	785,200	1,757	235,575	1,749
TOTALS	49,386,169	3,799,666	45,586,503	236,472	0	63	1,406,356	1,642,891	1,641,134	1,757	492,357	1,749

Table D
RPS Class II Waste Energy Compliance Summary, 2011 (MWh)

RETAIL ELECTRICITY SUPPLIERS	RETAIL SALES			CLASS II WASTE ENERGY ATTRIBUTES					3.5% RPS Class II WE Obligation	BANKING FOR FUTURE COMPLIANCE		
	Load Obligation from Filing	Exempt Retail Load	Net Retail Load	2011 MA Class II WECs	2009 Banked Attributes	2010 Banked Attributes	Alternative Compliance Credits	Total RPS Class II WE Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES												
Fitchburg Gas & Electric	257,126	0	257,126	9,000	0	14	0	9,014	9,000	14	2,700	14
National Grid	12,243,337	0	12,243,337	402,621	0	45,136	0	447,757	428,517	19,240	128,556	19,240
NSTAR	9,307,571	0	9,307,571	324,628	0	98,867	0	423,495	325,765	97,730	97,730	97,730
W. Mass Electric	1,967,840	0	1,967,840	68,878	0	0	0	68,878	68,875	3	20,663	3
SUB-TOTALS	23,775,874	0	23,775,874	805,127	0	144,017	0	949,144	832,157	116,987	249,649	116,987
COMPETITIVE SUPPLIERS												
SUB-TOTALS	25,610,294	3,799,666	21,810,629	762,879	0	93,603	2,364	858,938	763,389	95,578	229,032	90,054
TOTALS	49,386,169	3,799,666	45,586,503	1,568,006	0	237,620	2,364	1,808,082	1,595,546	212,565	478,681	207,041

Table E
APS Alternative Energy Compliance Summary, 2011 (MWh)

RETAIL ELECTRICITY SUPPLIERS	RETAIL SALES			APS ALTERNATIVE ENERGY ATTRIBUTES					2% APS Obligation	BANKING FOR FUTURE COMPLIANCE		
	Load Obligation from Filing	Exempt Retail Load	Net Retail Load	2011 APS AECs	2009 Banked Attributes	2010 Banked Attributes	Alternative Compliance Credits	Total APS Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES												
Fitchburg Gas & Electric	257,126	0	257,126	5,200	0	0	0	5,200	5,143	57	1,543	57
National Grid	12,243,337	0	12,243,337	122,203	0	0	122,664	244,867	244,867	0	73,461	0
NSTAR	9,307,571	0	9,307,571	55,671	0	0	130,339	186,152	186,152	0	55,846	0
W. Mass Electric	1,967,840	0	1,967,840	22,128	0	0	17,229	39,357	39,357	0	11,808	0
SUB-TOTALS	23,775,874	0	23,775,874	205,202	0	0	270,232	475,576	475,519	57	142,658	57
COMPETITIVE SUPPLIERS												
SUB-TOTALS	25,610,294	3,799,666	21,810,629	118,578	0	515	323,715	443,808	436,229	7,579	130,883	7,579
TOTALS	49,386,169	3,799,666	45,586,503	323,780	0	515	593,947	919,384	911,748	7,636	273,541	7,636

APPENDIX THREE

Data Tables for RPS and APS Compliance by Generation Location and Type

The first two tables below provide the data from which the graphs in Figures Two through Five were generated. The data in these tables include the Solar Carve-Out within Class I (only PV, only Massachusetts).

Table F
RPS Class I Compliance by Generation Location, 2003-2011

Year Location	2003	2004	2005	2006	2007	2008	2009	2010	2011	
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	%
Massachusetts	108,106	146,228	157,022	184,777	192,200	197,949	197,530	197,748	286,115	10.8
Connecticut	15,209	13,810	14,353	13,204	10,180	25,333	21,371	20,146	16,414	0.6
Maine	122,958	142,715	285,289	367,298	520,821	500,479	526,906	760,476	746,648	28.3
New Hampshire	42,845	45,800	40,677	53,556	265,062	261,468	307,909	282,308	331,996	12.6
Rhode Island	15,117	26,521	42,659	62,230	42,562	34,848	26,061	1,182	41,952	1.6
Vermont	0	0	14,476	26,595	46,915	49,207	112,670	108,849	149,505	5.7
No. Maine ISA (NMISA)	0	0	0	455	54,079	66,418	66,071	89,405	22,742	0.9
New York	0	26,369	90,373	175,961	265,299	517,427	527,751	580,683	688,039	26.1
Prince Edward Island	0	0	0	0	16,922	28,111	113,282	144,549	142,688	5.4
Quebec	0	0	0	54,696	85,493	215,835	230,367	138,263	213,713	8.1
Totals	304,235	401,443	644,849	938,772	1,599,533	1,896,811	2,129,918	2,323,609	2,639,812	100

Table G
RPS Class I Compliance by Generation Type, 2003-2011

Year Type ⁷⁸	2003	2004	2005	2006	2007	2008	2009	2010	2011	
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	%
Anaerobic Digester Gas	24,571	20,662	23,710	27,115	27,511	26,328	28,204	24,292	25,115	1.0
Other Biomass	108,106	146,228	285,289	395,856	782,315	743,882	571,757	584,505	392,629	14.9
Hydroelectricity	0	0	0	0	0	0	47,490	80,823	105,484	4.0
Landfill Gas	171,025	230,553	335,151	449,633	486,558	660,937	690,851	736,298	848,229	32.1
Solar PV	0	0	6	216	803	1,799	2,420	4,116	36,688	1.4
Wind	533	4,000	693	65,952	302,346	463,865	789,196	893,575	1,231,667	46.7
Totals	304,235	401,443	644,849	938,772	1,599,533	1,896,811	2,129,918	2,323,609	2,639,812	100

⁷⁸ Note that the Massachusetts RPS statute and regulations include “biogas”, which includes anaerobic digestion gas, within the list of Eligible Biomass Fuels. However, DOER has been tracking anaerobic digester generation separately since the beginning of the program. Landfill gas, which is included within “biomass” in some state RPS programs, is listed separately from biomass in the Massachusetts RPS statute and regulations.

No separate tables are provided for the RPS Solar Carve-Out, which are all PV and all located in Massachusetts. Instead, the data are included in the Class I tables above.

Table H
RPS Class II Renewable Energy Compliance by Generation Location, 2009-2011

Location	Year	2009	2010	2011	
		MWh	MWh	MWh	%
Massachusetts		483	14,711	21,200	9.0
Connecticut		805	2,378	11,178	4.7
Maine		0	18,605	42,540	18.0
New Hampshire		33,514	29,369	69,674	29.5
Rhode Island		741	3,040	3,524	1.5
Vermont		0	28,837	30,610	12.9
New York		0	6,897	57,856	24.5
Totals		35,543	103,837	236,582	100%

Table I
RPS Class II Renewable Energy Compliance by Generation Type, 2009-2011

Type	Year	2009	2010	2011	
		MWh	MWh	MWh	%
Hydropower		35,543	96,552	172,051	72.7
Landfill Methane		0	7,285	64,531	27.3
Totals		35,543	103,837	236,582	100%

No table is provided for RPS Class II Waste Energy because all of the qualified units are of the same type, and all are located in Massachusetts.

Table J
APS Compliance by Generation Type, 2009-2011
(all located in Massachusetts in 2011)

Type	Year	2009	2010	2011	
		MWh	MWh	MWh	%
Combined Heat & Power		128,922	225,104	324,619	99.9
Flywheel Storage		1,003	2,030	303	0.1
Totals		129,925	227,134	324,922	100%

APPENDIX FOUR

MA RPS and APS Qualified Generation Units

The Generation Unit data that was presented in the last Appendix of each of the reports for 2003 through 2007 have been omitted from subsequent reports, including this one. Beginning in the summer of 2010, these data have been presented at DOER's RPS and APS web pages in downloadable spreadsheets with additional useful information, including RPS and APS qualification dates, effective dates, commercial start dates, and GIS identification. The spreadsheets are updated at regular intervals to include new and updated RPS Class I, Solar Carve-Out, and Class II Generation Units, as well as APS Alternative Energy Units, as they become qualified, begin operation, and sometimes are renamed or increase in capacity. The data are more timely, and they can be filtered and sorted, which makes them more readily accessible and more useful. Since 2010, these spreadsheets have replaced the former HTML-formatted tables at DOER's RPS and APS web pages.