



**Massachusetts
Renewable & Alternative Energy
Portfolio Standards**

**MASSACHUSETTS RPS & APS
ANNUAL COMPLIANCE REPORT
FOR 2014**

MAY 4, 2016

**Department of Energy Resources
Executive Office of Energy & Environmental Affairs
Commonwealth of Massachusetts**

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EXECUTIVE SUMMARY

The year 2014 was an excellent one for the Massachusetts Renewable and Alternative Energy Portfolio Standards (RPS and APS). Solar and other Class I certificates (SRECs and RECs) sourced from Massachusetts renewable generation rose by more than 41% over 2013, and in-state resources were, for the first time, the largest single source of those certificates. In addition, the total Alternative Compliance Payments (ACPs) for all classes of RPS and APS fell by 12%, a decrease of more than \$4 million, compared to 2013.

RPS is a statutory obligation created by the Electricity Restructuring Act of 1997 and activated by regulation in 2002. The statute was revised by the Green Communities Act of 2008 to add the APS and a second class of RPS, and it was further modified by the Competitively Priced Electricity Act of 2012. The statute 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 the RPS Class I are post-1997 renewable plants; for the RPS Class II Renewable Energy subclass, pre-1998 renewable plants; for the RPS Class II Waste Energy subclass, pre-1998 Massachusetts waste-to-energy plants; and for the APS, plants using certain “alternative energy” technologies. These new standards commenced in January 2009. RPS Class I succeeded the original RPS that began in 2003 with an obligation of one percent and increased by a half percent annually until it reached four percent in 2009. After 2009, the Class I obligation has increased by one percent annually and was nine percent in 2014. Since 2010, the Class I standard has included a Solar Carve-Out obligation for in-state solar photovoltaic generation. The SCO, as well as its 2014 successor Solar Carve-Out II, began at less than a tenth of one percent and rise annually per a formula set in regulation. The Class II Renewable Energy obligation rises annually per a schedule and a formula set in regulation, while the Class II Waste Energy obligation does not increase annually. The APS obligation increases by a schedule set in regulation.

The 56 Retail Electricity Suppliers with RPS and APS obligations in 2014 met their obligations with a mix of (a) 2014 Certificates purchased from the owners of qualified Generation Units, (b) Attributes banked from 2012 and 2013 surplus Certificates, and (c) Alternative Compliance Payments (ACPs) in lieu of Certificates. However, one of the 56, which filed for bankruptcy in 2014, failed to comply by not providing the required ACPs to meet its Certificates shortfall. 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 Generation Attributes of one megawatt hour (MWh)¹ of electricity generated during the Compliance Year by a Generation Unit qualified for the relevant 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 alternative energy technology.

The supply of 2014 RPS Class I RECs exceeded demand by 4%. The total retail load obligation in 2014 was 48,129 gigawatt hours (GWh),² of which the average 8.0081% RPS Class I obligation (9% minus the 0.9481% Solar Carve-Out and the average 0.0437% Solar Carve-Out II obligations within Class I)³ was 3,854 GWh. This obligation was met by 3,980 GWh of 2014 Class I RECs purchased by the Suppliers and 273 GWh of banked Attributes from 2012 and 2013 surplus RECs, plus 6 GWh of ACPs (costing about \$378 thousand) paid by Suppliers that fell short of their REC obligations. The net result was a 404 GWh surplus of 2014 Class I RECs, almost all of whose Attributes were bankable for future compliance.

In addition to the MA RPS Class I RECs documented for compliance in the 2014 Filings, a number of additional RECs were used by several MA Suppliers to meet “green product” claims, i.e., to acquire RECs for 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. Almost 18% of MA RECs (net of SRECs, which are a sub-set of Class I RECs) were used for RPS compliance in other New England states (mostly Connecticut and Rhode Island) where those Certificates *also* qualified; some of those RECs might have been used to meet voluntary green product claims there.

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

² One gigawatt hour (GWh) = one thousand MWh = one million kWh = one billion (US) watt hours of electrical energy.

³ See footnote 55 for an explanation of this year’s use of “average” Minimum Standard obligations for Class I RECs and SRECs.

The supply of RECs, SRECs, and SREC-IIs from Class I renewable sources within Massachusetts in 2014 grew by 327 GWh (41%) from 2013, the highest GWh increase among all locations. Geographically, resources in Massachusetts (mostly solar, wind, and landfills) supplied more than 24% of all RPS Class I RECs settled for compliance. Maine resources (especially wind) supplied 22% of all RPS Class I RECs, while New York (landfills and wind) supplied 19%, adjacent Canadian provinces (wind) 13%, and New Hampshire (mostly wind and biomass) 11%, with the remaining 11% coming from other New England states. Most RPS Class I RECs came from electricity generated by wind turbines (56%), landfill methane-fired plants (18%), solar photovoltaic (PV) arrays (15%), and biomass (8%). The remainder came from a combination of hydroelectric, marine & hydrokinetic, and anaerobic digester gas facilities. Solar PV continued to be the fastest growing type of renewable generation source.

For the RPS Solar Carve-Out (SCO) within Class I, continued growth in PV development yielded another SREC surplus in 2014, which lowered SREC prices, again activated the [Solar Credit Clearinghouse Auction](#) mechanism, and minimized use of the ACP option for compliance. The 606 GWh supply of 2014 SRECs was almost a third more than the 456 GWh required to meet the RPS SCO obligation of 0.9481% in 2014. Of the 606 GWh, 125 GWh were deposited into the Auction, 481 GWh were used for SCO compliance (along with 8 GWh banked from 2013), and 36 GWh of surplus were banked forward. However, some of the obligation was still met with almost 4 GWh worth of ACPs, totaling less than \$554 thousand.

The supply of SREC-IIs for the Solar Carve-Out II in its first year was short of demand. After netting out the retail load obligation under contracts that predated the April 25, 2014, promulgation of the regulatory change, the net retail load obligation was almost 24,966 GWh and the SREC II obligation was about 21 GWh. Of that, almost 16 GWh was met by SREC-IIs, and the shortfall of more than 5 GWh was met by ACPs that totaled just over \$2 million.

The supply of Class II RECs in 2014 for the RPS Class II Renewable Energy obligation of 1.75% was less short of demand in 2014 than in 2013. The obligation totaling 841 GWh was met with 526 GWh of RECs (mostly hydroelectric) and 104 GWh of 2013 banked RECs, from which 42 GWh were banked forward. The resulting shortfall of 268 GWh was met by ACPs that totaled less than \$7.3 million (versus \$10.2 million for 2013).

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 1,682 GWh, Suppliers obtained 1,441 GWh of 2014 WECs and used 252 GWh banked from 2013 surplus, while some Suppliers also used 3 GWh of ACPs, totaling \$32 thousand.

The supply of 831 GWh of AECs for the Alternative Energy Portfolio Standard (APS), plus 7 GWh banked from 2013 surplus, was significantly short of the 1,682 GWh needed to meet the 3.5% obligation. Consequently almost 836 GWh (50%) of the APS obligation were met by ACPs totaling about \$18.1 million, and fewer than 1 GWh of surplus AECs were banked forward. Almost all AECs came from combined heat and power (CHP) plants.

Finally, one Supplier that submitted a Filing failed to meet most of its obligations by not providing Alternative Compliance Payments totaling \$345,979.82 to cover its certificates shortfall. (Details are in Appendix 1.)

In sum, RPS Class I continued its intended role of incentivizing the accelerated development of new Renewable Generation Units, while RPS Class II continued incentivizing ongoing and improved operation of older renewable and waste energy facilities. The APS incentive has increased the financial viability of new and incremental CHP projects, which generate large savings in net, source-fuel consumption when compared with conventional sources of electricity and thermal energy. Finally, the highly successful Solar Carve-Out in RPS Class I ended by overshooting its initial limit of 400 MW of installed PV in Massachusetts, for which regulatory revisions provided a relief mechanism and accommodation within a new overall capacity limit of 1,600 MW that includes the successor Solar Carve-Out II, which was launched in 2014 and is supporting continued strong growth of in-state PV.

In 2014 regulatory activities, DOER completed the Solar Carve-Out II revision within the Class I regulation in a manner that has more nuanced and targeted incentives and attempts to manage the overall growth curve, all intended to achieve the new overall goal of installing 1,600 MW of PV by 2020. DOER also revised the RPS Class II Renewable Energy regulation to more realistically reflect the realities of qualified, pre-1998 installed capacity of renewables and waste energy, and to make Class II environmental standards for woody biomass equivalent to those for Class I. Finally, DOER began preparing for the addition of renewable thermal technologies to APS, as mandated under a 2014 statute.

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 2014 pursuant to the Green Communities Act of 2008 (the “2008 Act”) and the Competitively Priced Electricity Act of 2012 (the “2012 Act”).⁴ The last four paragraphs briefly summarize changes that took effect during and after 2014.

The original 1997 RPS statute obligated Retail Electricity Suppliers (“Suppliers”), both regulated distribution Utilities and licensed 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 renewable resources and technologies – especially solar, wind, landfill methane, and low-emission/advanced technology biomass⁵. 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. Under the 2008 Act, the RPS was renamed RPS Class I and, since 2009, has increased by one percent annually. The obligation was nine percent in 2014, ten percent in 2015, and will be twenty percent in 2025.⁶ In addition to RPS Class I, as of 2009 the Suppliers must comply with three new energy portfolio standards mandated by the 2008 Act, and, as of 2010, with a Solar Carve-Out within Class I⁷. As of 2014, an additional Solar Carve-Out II within Class I went into effect. All of the Minimum Standards are structured as percentage obligations for Suppliers, but with each Minimum Standard having different eligibility criteria and percentage obligations.

In 2009, the changes mandated by the 2008 Act were implemented in three Regulations, respectively for RPS Class I, RPS Class II, and the Alternative Energy Portfolio Standard.⁸ 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 list of RPS eligible resources was expanded to include hydroelectricity plants of small size and low environmental impact⁹, as well as geothermal and “marine and hydro-kinetic” facilities. In addition, as of 2009, Behind-the-Meter distributed generation units, which formerly had to be located

⁴ The RPS provisions of the Electricity Restructuring Act of 1997 (<https://malegislature.gov/Laws/SessionLaws/Acts/1997/Chapter164>), later replaced by provisions of the Green Communities Act of 2008 (<http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169>) and further amended by the Competitively Priced Electricity Act of 2012 (<https://malegislature.gov/Laws/SessionLaws/Acts/2012/Chapter209>), are incorporated into law in M.G.L., c. 25A, §11F (<http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F>). APS provisions are in M.G.L., c. 25A, §11F½ (<https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F1~2>). Additional statutory changes for APS are addressed at the end of this section of the Report.

⁵ In the case of woody biomass, the regulation since 2012 has included detailed fuel sourcing and energy conversion efficiency standards 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 supply. See the [Biomass Sustainability and Carbon Policy Study \(a.k.a. Manomet Study\) webpage](#) and the [RPS Biomass Policy Regulatory Process webpage](#).

⁶ The RPS law and regulations do not include final limits or ending dates except for the Solar Carve-out regulations.

⁷ Each year’s Class I obligation equals the obligation scheduled in regulation, 225 CMR 14.07(1), minus the Solar Carve-Out obligations that are calculated per a method specified in regulation, 225 CMR 14.07(2). See the second paragraph of Section Two for additional detail.

⁸ 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, and was revised again in 2014 to add a follow-up Solar Carve-Out II standard.

⁹ Hydroelectric plants in Class I initially were 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, while the Class II per-facility capacity limit was 5 MW. However, under the 2012 Act, the eligible hydroelectricity capacity limits were increased, effective as of November 1, 2012, to 30 MW in Class I and 7.5 MW in Class II. In addition, statutory environmental criteria apply to facilities under both Class I and Class II, which normally are met through certification by the non-profit, [Low Impact Hydropower Institute \(LIHI\)](#). 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.

within Massachusetts, could be located anywhere in the ISO New England (“ISO-NE”) control area (the New England grid), but all such generation now must be reported to the NEPOOL Generation Information System (“GIS”)¹⁰ by independent Third Party Meter Readers (a.k.a., “Independent Verifiers”).¹¹

Under the 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, solar photovoltaic (“PV”) systems that are Massachusetts electric grid-connected and were installed after 2008. 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 of energy basis, PV is costlier to install than the other major Class I renewable technologies. That expense is reflected in higher Alternative Compliance Payment (“ACP”) rates (see page 8), with the original intent of providing sufficient incentive to bring 400 MW of new PV generating capacity on line in Massachusetts by 2017.¹² That goal was surpassed in 2013, and, following the promulgation of an emergency regulation in June 2013, a revised, final limit of 653.8 MW was announced in July of 2014; and in 2014, DOER launched the follow-up Solar Carve-Out II (“SCO-II”, a.k.a., SREC II) within Class I.

The new Solar Carve-Out II, meant to continue the Commonwealth’s aggressive rate of PV development, is modeled on the SCO, in that each Supplier must demonstrate annually that, *within* its Class I percentage obligation, it has obtained a specified, smaller percentage of its electricity from small, on-site, SCO II qualified PV systems that are Massachusetts grid-connected and were installed after 2012. However, SCO II has three major differences: (1) the ACP rates are reduced to reflect declining development costs; (2) some types and sizes of projects are provided less incentive than others, reflecting certain public policy priorities; and (3) certain types of large-scale projects are approved under an annual cap within a system of “managed growth” intended to avoid any boom/bust pattern of development.

Approvals of PV systems under the SCO II were originally capped at 946.2 MW of installed capacity, which was designed to meet the Commonwealth’s 1,600 MW goal minus the 653.8 MW already qualified under the original SCO.¹³ However, see the third from last paragraph in this section regarding changes that occurred early in 2016.

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 is for Units that meet the same technology, resource, and location criteria as Class I, but with a lower per-project MW capacity limit for hydropower¹⁴. A revised regulation changed the previously constant Minimum Standard of 3.6% to 1.5% for 2013, 1.75% for 2014, 2.0% for 2015, and it provided a methodology for subsequent annual adjustments. The RPS Class II Waste Energy Minimum Standard of 3.5% provides incentives for pre-1998 Waste Energy generation. The Class II eligibility of Waste Energy Generation Units – a.k.a., trash-to-energy or municipal solid waste plants – is conditioned on recycling and other regulatory criteria 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

¹⁰ See <http://www.nepoolgis.com>, as well as the bottom paragraph on page 7.

¹¹ 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).

¹² For more detail about the Solar Carve-Out, see footnote 53, and visit the [RPS/APS homepage](#).

¹³ For more detail about the Solar Carve-Out II, visit the [RPS/APS homepage](#).

¹⁴ See footnote 9 for more details regarding the Hydroelectric MW limits. See footnote 5 for the Class I woody biomass eligibility standards that were extended to Class II woody biomass in a rulemaking during the first half of 2014.

worthy of incentives modeled on RPS.¹⁵ Two APS technologies are active to date: Flywheel Storage and Combined Heat and Power (“CHP”, a.k.a., cogeneration).¹⁶ The Alternative Energy Certificates (AECs) earned by a CHP Unit represent the energy saved (in MWh) by operating the Unit as a CHP Unit instead of separately operating an on-site thermal plant while drawing electricity from the grid.¹⁷ 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 statutory difference between RPS Class I and the newer standards (RPS Class II and APS) is a transition mechanism to mitigate for the Competitive Suppliers the price impact of adding the newer standards. Competitive Suppliers, unlike regulated Utilities, were unable to pass the additional compliance costs along to retail customers with whom they already had contracted to deliver electricity at prices 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 (“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 obligations. In addition, each Supplier is required to project its Exempt Load for the next five years; these confidential data are reported in the aggregate in Section Eight, Table Nine. This exemption declines rapidly, and DOER projects that no Exempt load will remain for 2017 compliance.

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, recorded, and tracked by the NEPOOL Generation Information System.¹⁸ The GIS tracks all electricity generated within the ISO New England control area and/or fed onto the New England grid, as well as electricity exchanged between ISO-NE and adjacent control areas.¹⁹ 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.²⁰ A Supplier with a Massachusetts portfolio

¹⁵ The APS statute is at <http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F1~2>.

¹⁶ Other technologies qualified under APS include (1) the displacement of fossil fuels by certain paper-derived fuel cubes, (2) coal gasification with permanent carbon sequestration, and (3) “efficient steam technology”. Stringent carbon dioxide emission reductions and other emission and efficiency criteria apply. However, regulations have not yet been developed for the third of the three technologies listed here, and [Chapter 251 of the Acts of 2014](#) both removed the first two and added “renewable thermal” to APS as of 2015, regarding which, see the last paragraph in Sections One and Eight.

¹⁷ For 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](#).

¹⁸ See www.nepoolgis.com.

¹⁹ 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 the region and exchanged with adjacent control areas. ISO New England Inc. is the “independent system operator” (ISO) 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/about>.

²⁰ Each REC is encoded with Attributes that indicate the Generation Unit name, location, and fuel, energy resource or technology, as well as whether or not the Generation Unit and its RECs are qualified for *each* of the several New England state RPSs. A Massachusetts qualified REC that is also qualified for RPS in another New England state can be sold, transferred, and used to meet either state’s RPS or other energy portfolio standard 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, which prevents double-counting of RECs. 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 GIS certificate that is termed a REC is qualified for MA RPS.

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 compliance, a Class II WEC only for Class II Waste Energy compliance. However, since SRECs and SREC IIs are for "carve-outs" within Class I and are encoded at the GIS as types of Class I RECs, they can be used for non-SCO Class I Renewable Energy compliance.

An additional and essential mechanism for RPS and APS compliance, including its flexibility, is the Alternative Compliance Payment ("ACP"). If a Supplier does not acquire sufficient certificates to meet a given Minimum Standard, then it can comply by making a payment to the Massachusetts Clean Energy Center ("MassCEC") in lieu of certificates and at a per-MWh rate specified for each Minimum Standard. This is intended, not as a penalty, but as an alternative that acknowledges that sufficient certificates for a given Minimum Standard may not always be available in the marketplace. The ACP Rate also functions, in effect, as a cap each year on the value of certificates for each Minimum Standard.²¹

Another important mechanism for RPS and APS compliance flexibility is "banking". The RPS or APS Attribute represented by a certificate that is in excess of the quantity that a Supplier needs for compliance with one of the Minimum Standards in a given Compliance Year can be "banked" for use towards that *same* Minimum Standard²² in one of the following two Compliance Years. The total amount that a Supplier can bank is limited to no more than 30% of the amount the Supplier needs for compliance in the Compliance Year in which the surplus generation occurs, but only 10% in the case of the Solar Carve-Outs.²³ (A Compliance Year is the same as a calendar year.)

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 all qualified facilities, explain how Suppliers annually demonstrate their compliance with RPS and APS, and provide links to the statutes and regulations and to any ongoing regulatory processes.

On January 3, 2014, DOER announced a new Class I rulemaking that which was completed on April 25, 2014. This process followed up the 2010 Solar Carve-Out with a new Solar Carve-Out II that was effective for all of 2014. SCO-II was designed to achieve an increase to a combined total of at least 1,600 MW of installed PV in Massachusetts by 2020.

However, on April 8, 2016, DOER filed emergency regulations removing the program cap and allowing all generators larger than 25 kW DC to qualify as long as they can demonstrate that they were interconnected or constructed by no later than January 8, 2017. Additionally, generators equal to or smaller than 25 kW DC may qualify provided they demonstrate that they have been authorized to interconnect by their utility provider prior to the start date of any successor DOER program. While the new program cap is not yet known, DOER will announce a cap immediately after establishment of a new incentive program.

Class II regulatory revisions announced on February 28, 2014, and completed on June 20, 2014, (a) adopted woody biomass eligibility standards that included forest sustainability and greenhouse gas reduction-based provisions earlier promulgated for Class I; (b) revised the Class II Renewable Energy Minimum Standard downward to reduce reliance on the ACP mechanism, as DOER had recommended in its

²¹ See [this webpage](#) for additional details, and see the regulations in 225 CMR 14.07, 15.07, and 16.07

²² For example, banked Attributes from excess Class I and Class II certificates are not interchangeable, nor are Class II RECs and WECs. However, banked Attributes from excess Class I SRECs can be used towards either SCO or Class I compliance.

²³ However, note that surplus Class II WECs from 2014 and 2015 Compliance Years cannot be banked, after which the banking limit for WECs will be 5%, instead of the former 30%, per a 2014 Class II regulatory change in 225 CMR 15.08(2)(b). Also see page 30.

December 31, 2012, report to the Legislature required under the Competitively Priced Electricity Act of 2012²⁴; (c) revised the banking provisions for Waste Energy Certificates²⁵; and (d) incorporated a 2012 statutory increase in the Class II hydropower size limit. All of these changes took effect with the 2013 Compliance Year, except for the November 1, 2012, effective date of the hydropower size limit.

Finally, late in 2014, DOER began to develop changes in the APS regulations to incorporate Renewable Thermal technologies, pursuant to [Chapter 251 of the Acts of 2014](#). These changes would include a suite of heat transfer, combustion, and heat pump technologies by which thermal energy is derived from sunlight, biomass, and thermal gradients in air, ground, and water. Although the 2014 Act mandated these to go into effect on January 1, 2015, complications intrinsic to this mandate have slowed the [Renewable Thermal rulemaking process](#). The required Rulemaking will commence in the Spring of 2016 and, hopefully, be completed by the end of the year.

SECTION TWO

RPS CLASS I COMPLIANCE IN 2014

Summary

DOER received filings from 56 Retail Electricity Suppliers, entities that provided electricity to retail customers (i.e., served retail load) in Massachusetts during 2014; they are listed below in Table One. These included the four investor-owned, distribution Utility companies that are regulated by the Massachusetts Department of Public Utilities (“DPU”) and fifty-two Competitive Suppliers that are licensed by the DPU.²⁶ Ten of the 2014 Suppliers were new to the Massachusetts RPS market, of which two represent the acquisition and renaming of already-active Suppliers, while six Suppliers exited the market during the course of the year. In addition, three Suppliers listed for 2013 served no load in 2014. The net total number of Suppliers at the end of the year was 50, compared to 48 at the end of 2013. The several types of changes during 2014 are indicated in Table One by typeface, bolding, and/or footnotes.²⁷

The total supply of electricity from 2014 RPS Class I Generation (represented by Class I RECs) exceeded demand by 3%. The 2014 RPS Class I obligation for each Supplier was nine percent (9%) of its retail load obligation at the NEPOOL GIS, from which the Solar Carve-Out obligation of 0.9482% and the average Solar Carve-Out II obligation of 0.0438% were subtracted, leaving an average net Class I obligation of 8.0081%²⁸.

Of the total compliance obligation, 99.9 % was met by Class I Renewable Generation. 92.8% came from 2014 generation, while 7.1% came from Attributes banked from 2012 and 2013 RECs that were in excess of those years’ compliance obligations. Only 0.1% was met using the Alternative Compliance Payment (“ACP”) mechanism – by making ACPs to the Massachusetts Clean Energy Center

²⁴ See DOER’s report to the Legislature, *Evaluation of the Massachusetts RPS Class II Program*, which is available [here](#).

²⁵ See footnote 23 regarding WEC banking.

²⁶ Regulated distribution Utilities provide electricity under “Basic Service” to those customers in their franchise territories that have not chosen to 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. Competitive Suppliers must be licensed by the DPU, per its regulation [220 CMR 11.05](#). For more information and DPU perspective about the “restructured” electricity market in which RPS and APS operate, see [this web page](#).

²⁷ All changes from the 2013 list are indicated by **bold** typeface. Entities that are new in 2014 are also *italicized*, while those that exited during the course of 2014 are in **Arial** font. However, see the footnotes for Constellation Energy Services and Direct Energy Business Marketing.

²⁸ The Solar Carve-Out II average was determined by dividing the aggregated SCO-II obligations (in MWh) by the 2014 Total Retail Load without first subtracting the exempt portion. See footnote 45 for this year’s use of “average” Minimum Standard obligations for Class I RECs and SRECs.

("MassCEC")²⁹. 10.5% of the RECs from 2014 generation were qualified to be Attributes banked forward for use towards Class I compliance in 2015 or 2016 (vs. 8.7% banked forward from 2013).

Table One
2014 Massachusetts Retail Electricity Suppliers³⁰

| 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 | | |
| Abest Power & Gas, LLC | Great Eastern Energy (BBPC, LLC) | Palmco Power MA, LLC |
| Cianbro Energy, LLC | Gulf Oil LP ³¹ | Perigee Energy, LLC |
| Clearview Electric, Inc. | Hampshire Council of Governments | Provider Power MASS, LLC |
| Consolidated Edison Solutions, Inc. | Hannaford Energy, LLC | Public Power, LLC |
| Constellation Energy Power Choice, Inc. | Harvard Dedicated Energy Limited | Reliant Energy Northeast LLC |
| Constellation Energy Services, Inc. ³² | HOP Energy, LLC | REP Energy, LLC |
| Constellation NewEnergy, Inc. | Hudson Energy Services, LLC | South Jersey Energy Company |
| Devonshire Energy LLC | Just Energy Massachusetts Corp. | Spark Energy, LP |
| Direct Energy Business, LLC | Liberty Power Holdings LLC | Starion Energy, Inc. |
| Direct Energy Business Marketing, LLC ³³ | Major Energy Electric Service, LLCs | Sunwave Gas & Power Massachusetts, Inc. |
| Direct Energy Services, LLC | Massachusetts Gas & Electric Co. | Texas Retail Energy, LLC. |
| Dominion Retail, Inc. ³⁴ | Mega Energy Holdings, LLC | Town Square Energy, LLC ³⁵ |
| East Avenue Energy, LLC | Mint Energy, LLC | TransCanada Power Marketing Ltd |
| Energy Plus Holdings, LLC | NextEra Energy Services Massachusetts, LLC ³⁶ | Verde Energy USA Massachusetts, LLC |
| First Point Power, LLC | Noble Americas Energy Solutions, LLC | Viridian |
| GDF Suez Energy Resources NA, Inc. | Oasis Power, LLC | Xoom Energy |
| GDF Suez Retail Energy Solutions LLC, d/b/a Think Energy | OBE Electric, LLC | |
| Glacial Energy of New England, Inc. ³⁷ | Open Book Energy, LLC | |

Although the 2014 REC supply exceeded demand, thirteen Suppliers did not acquire enough RECs and instead used the ACP mechanism. This non-acquisition of sufficient RECs by some Suppliers may be partly due to 35 Suppliers buying and banking surplus *beyond* their 2014 compliance needs, partly due to miscalculations, and partly due to decisions to avoid procuring very small numbers of RECs. Eight Suppliers bought exactly the quantities that they needed for compliance. Surplus RECs banked forward significantly exceeded both the quantity banked from prior years and the 2014 ACP Credits total. In fact, 2014 RPS yielded the highest quantity of RECs banked forward for future compliance in RPS's twelve years.

²⁹ See Section Nine for details about ACP collection and expenditure.

³⁰ See footnote 27 regarding font differences.

³¹ Some of Gulf Oil's retail load (the portion serving Boston's Fenway Park) was transferred in the NEPOOL GIS to TransCanada, which met the RPS and APS compliance obligation for the Fenway Park load as part of its own obligation.

³² Constellation Energy Services, Inc., is the successor to Integrys Energy Services, Inc.

³³ Direct Energy Business Marketing, LLC, is the successor to Hess Corporation and Hess Energy Marketing.

³⁴ Dominion's retail business was transferred to Reliant during the second quarter of 2014, and both entities submitted Filings.

³⁵ Town Square Energy is registered at the NEPOOL GIS as Twin Cities Power, LLC.

³⁶ NextEra Energy Services Massachusetts is also known as Gexa Energy, having acquired the latter in 2010.

³⁷ Glacial Energy submitted its Filing, albeit late, and it demonstrated ownership of a number of GIS Certificates. However, it declined to provide any ACP to cover its Certificates shortfall. Therefore, DOER found Glacial Energy in Non-Compliance. See Appendix One for details.

Table Two displays the compliance figures for the last ten years, 2005 through 2014, while additional details are in Appendix Two, Table A.³⁸

In addition to the record surplus, the most notable facts for 2014 RPS Class I compliance are that the supply of RECs (including SRECs) from Massachusetts generation rose by more than from any other state in the region, almost all from accelerating PV output, and that the ACP total fell by almost \$1.7 million. 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 many MA Class I RECs can be used for RPS compliance in several New England states. Thus, many more RECs are actually created at the NEPOOL GIS than are reflected in the 2014 RPS compliance figures. Almost 5,514,000 MA Class I RECs (including 605,969 SRECs and 15,908 SREC-IIs) were created at the NEPOOL GIS. Of those, 3,979,958 RECs were submitted in the Filings for Class I, 480,753 SRECs for Solar Carve-Out compliance, and 15,663 SREC-IIs for Solar Carve-Out II compliance, together totaling more than 81% of all Class I RECs generated by facilities located in MA, while 124,831 surplus SRECs (2%) were transferred to the Auction Account at the GIS.³⁹ Almost 861,000 MA Class I RECs, nearly 16% of the total supply, were settled into Suppliers' GIS subaccounts for the other New England states (mostly in CT and RI) where they also qualified for RPS, presumably to be used for RPS compliance there. In addition, 31,114 RECs (less than 1%) were identified in voluntary "green power product" sales.⁴⁰ Finally, just over 1,000 RECs were minted but not transferred at the GIS, presumably not sold by the generators.

Compliance Details

The total retail load obligation in 2014 was 48,129,294 MWh (2.3% less than in 2013), for which the total of all 56 Suppliers' average 8.0081% obligation was 3,854,245 MWh. The Class I REC supply totaled 3,979,958 RECs from 2014 generation *plus* 272,660 MWh of Attributes banked from 2012 and 2013 surplus RECs. That yielded a surplus of 404,133 RECs, and a net total of 3,848,485 MWh presented for compliance. Only thirteen Suppliers lacked enough RECs and met some of their compliance through 5,719 MWh of ACPs, totaling \$378,369 at the rate of \$66.16 per MWh.⁴¹ Of the surplus, 403,976 MWh were eligible to be banked by 35 Suppliers for compliance use in 2015 and 2016. An additional 41 MWh of ACP, totaling \$2,712.56, is due from one noncompliant Supplier⁴². Except for latter, the aggregate figures are displayed in Table Two, with more detail in Appendix Two, Table A, and Appendix Three, Tables G, H, and I. Note that the Class I tables in Appendix Three include all 2014 SRECs and SREC-IIs, including those used for Solar Carve-Out compliance, as well as those transferred to the Auction. However, Table Two and Figure One in this subsection do not include the Solar Carve-Outs.

³⁸ Figures for earlier years, beginning with 2003, are found in [earlier Annual Compliance Reports](#).

³⁹ See additional detail in Section 3, Solar Carve-Out Compliance.

⁴⁰ The 31,114 Class I RECs retired as "Voluntary Renewable Energy (VRE) purchases" from the 2014 Filings DOER reported to the Massachusetts Department of Environmental Protection (MassDEP), which, in turn, will retire a calculated number of allowances for a future vintage year in the Regional Greenhouse Gas Initiative (RGGI). The retired allowances represent the Greenhouse Gas emissions avoided by 31,114 MWh of renewable energy. That quantity will reduce the number of allowances that can be sold in the RGGI Auction for that future year, which will, in turn, slightly reduce the regional allowance cap for non-renewable thermal power plants for that year. DOER's regulatory basis for this report is the CO₂ Budget Trading Program Auction Regulation, 225 CMR 13.14. More information about RGGI can be found at <http://www.rggi.org/>. The location and types of generation from which VRE was sourced in 2014 are listed in Table M in Appendix Three.

⁴¹ Regarding the procedures for ACP and the use of ACP funds, see 225 CMR 14.08(3) and Section Nine of this report. 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>.

⁴² See footnote 37 and Appendix One.

Table Two
Aggregated Data from the RPS Class I Annual Compliance Filings, 2005-2014 (MWh)⁴³

| | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 |
|---|-------------------|-------------|--------------|-------------|------------|------------|------------|------------|--------------|--------------|
| CY Retail Sales (= Retail Load Obligation)⁴⁴ | 48,129,294 | 49,252,929 | 48,992,430 | 49,386,169 | 50,026,093 | 48,301,821 | 50,321,635 | 50,978,101 | 50,143,130 | 51,558,778 |
| <i>CY Net Minimum Standard (% obligation)⁴⁵</i> | 8.0081% | 7.714% | 6.837% | 5.8373% | 4.9321% | 4.0% | 3.5% | 3.0% | 2.5% | 2.0% |
| CY aggregated compliance obligation⁴⁶ | 3,854,245 | 3,799,402 | 3,349,611 | 2,882,823 | 2,467,336 | 1,932,089 | 1,761,257 | 1,529,343 | 1,253,578 | 1,031,176 |
| Total RECs from CY generation | 3,979,958 | 4,064,043 | 3,056,894 | 2,613,122 | 2,323,609 | 2,129,918 | 1,896,008 | 1,599,533 | 938,772 | 644,849 |
| <i>minus CY total surplus RECs</i> | (404,133) | (330,272) | (70,022) | (107,805) | (241,062) | (387,664) | (216,550) | (87,957) | (9,458) | (739) |
| Net CY RECs for CY obligation | 3,575,825 | 3,733,771 | 2,986,872 | 2,505,317 | 2,082,547 | 1,742,254 | 1,679,458 | 1,511,576 | 929,314 | 644,110 |
| <i>plus Banked from pre-CY surpluses</i> | 272,660 | 31,102 | 107,351 | 271,303 | 380,824 | 189,835 | 80,605 | 6,863 | 1,661 | 19,531 |
| Total RECs used for CY obligation | 3,848,485 | 3,764,873 | 3,094,223 | 2,776,620 | 2,463,371 | 1,932,089 | 1,760,063 | 1,518,439 | 930,975 | 663,641 |
| <i>plus Total ACP Credits</i> | 5,719 | 31,642 | 255,388 | 106,203 | 3,965 | 0 | 1,208 | 10,920 | 322,625 | 367,858 |
| Total for compliance obligation⁴⁷ | 3,854,204 | 3,796,515 | 3,349,611 | 2,882,823 | 2,467,336 | 1,932,089 | 1,761,271 | 1,529,359 | 1,253,600 | 1,031,499 |
| Surplus Attributes banked forward⁴⁸ | 403,976 | 328,984 | 69,916 | 107,804 | 241,061 | 386,059 | 210,580 | 80,743 | 9,458 | 739 |
| ACP proceeds (rounded) | \$378,369 | \$2,065,273 | \$16,350,132 | \$6,598,386 | \$241,551 | \$0 | \$70,765 | \$623,750 | \$17,786,316 | \$19,566,367 |

⁴³ CY is the abbreviation for Compliance Year, coterminous with a calendar year. These are aggregated figures, with compliance calculated separately for each Supplier, and with fractions always rounded upwards. Therefore, if one calculated the RPS Obligation using the total “CY Retail Sales,” the result usually would be less than the “CY Aggregated Compliance Obligation” listed in this table and elsewhere in the report. This is true for all RPS classes and for APS. See [earlier Annual Compliance Reports](#) for pre-2005 data.

⁴⁴ 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 *5/24/12 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>. DOER uses the term “retail load obligation” or just “load obligation” to refer to these figures.

⁴⁵ The RPS Class I Minimum Standard obligation for each of the CYs after 2009 is calculated by subtracting from that CY’s scheduled percentage the Solar Carve-out and (starting with 2014) Solar Carve-out II Minimum Standards. See Sections Three and Four, as well as footnote 55.

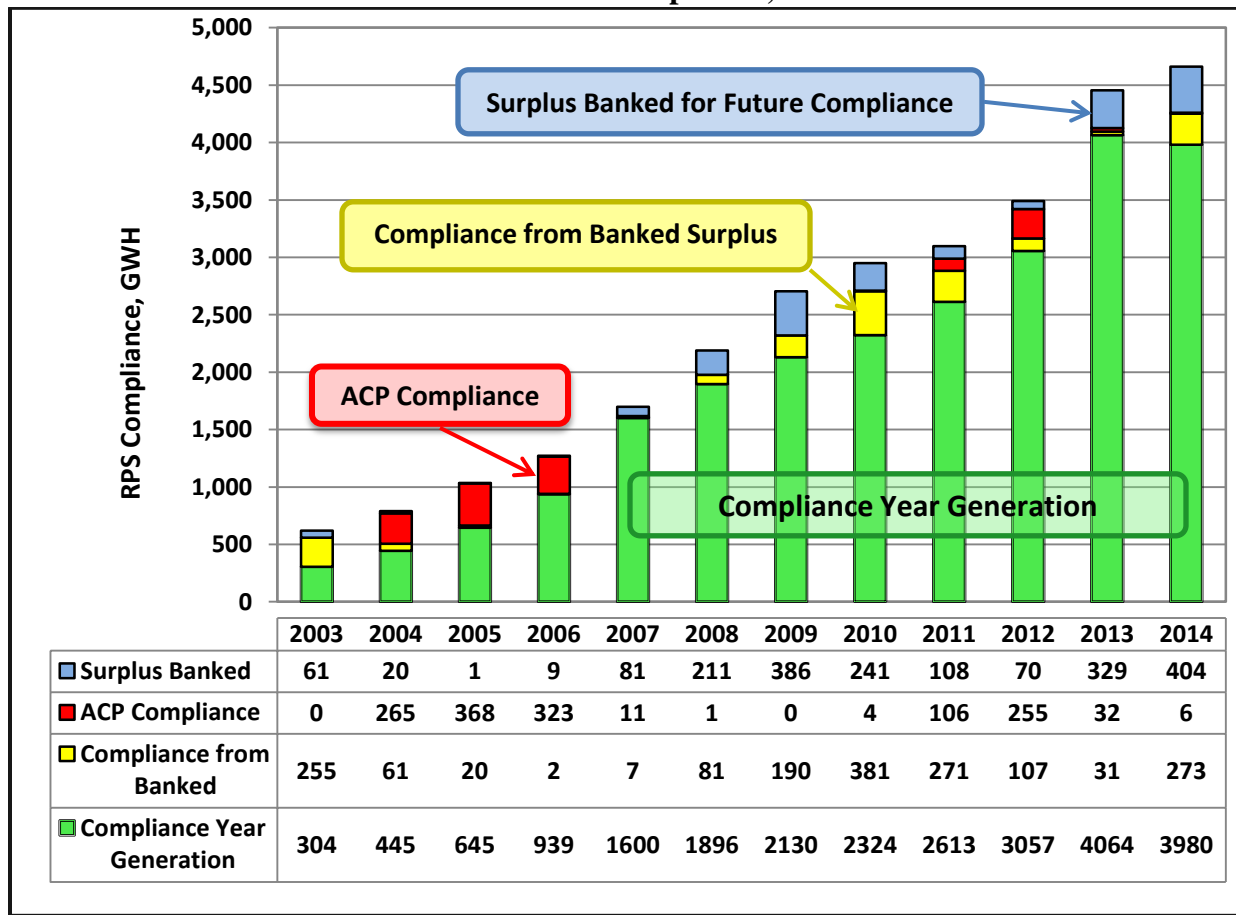
⁴⁶ Note that the figures in this row usually are a bit higher than what one would obtain by multiplying the total Retail Sales by the Minimum Standard for each year, as explained in footnote 43.

⁴⁷ A 41 MWh shortfall in the 2014 total resulted from one noncompliant Supplier’s failure to make its required ACP. See footnote 37 and Appendix One.

⁴⁸ The annually varying differences between the quantity of surplus Attributes (RECs) and the quantity banked are 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 and SREC IIs). 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-Outs. However, since SRECs and SREC IIs are a type of Class I REC, those that are surplus or banked can be used for Class I compliance.

Changes in the manner of compliance during the first twelve years of the program, 2003-14, are shown in Figure One. The initial shortage of qualified generation and REC's was mitigated in 2003 by the use of REC's bought in 2002, the so-called "Early Compliance Year", during which generation became qualified and earned REC's for their output, but when Suppliers did not have to meet compliance obligations. After that jump-start, the initial shortage is evident in the high reliance on ACPs for compliance during 2004-06. Next came three years of REC surpluses, 2007-09, with little or no use of ACPs for compliance. Supply was short in 2010, with Suppliers depending more heavily on the use of previously banked Attributes to help met their compliance obligations, and further shortfalls in 2011 and 2012 required a return to ACP reliance. Since then, surpluses in 2013 and 2014 again have greatly reduced ACP reliance. Thus, the RPS obligation has succeeded in providing incentives for accelerated development of new Renewable Generation Units and the growth of a robust market in REC's in Massachusetts and the region since the original RPS regulations were issued in 2002.

Figure One
RPS Class I Compliance, 2003-2014



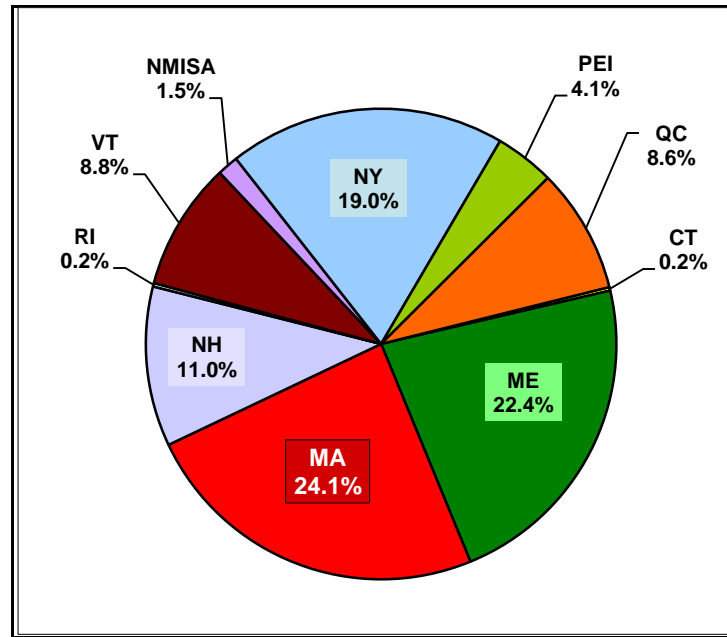
Generation Sources by Location

The percentages of 2014 REC's from the New England states, New York, and adjacent Canadian provinces are illustrated in Figure Two.⁴⁹ Figure Three illustrates the twelve year trend in the location

⁴⁹ Note that the transmission grid in two northern Maine counties is outside the ISO New England control area, is separately managed by the [Northern Maine Independent System Administrator](#) ("NMISA"), and connects to the ISO-NE grid via the Maritime Areas grid, which is managed by the [New Brunswick System Operator](#). Therefore, the output of NMISA-located generators must be imported via Canada to ISO-NE in order to earn REC's, as must generation elsewhere in the Maritimes Area, as well as in the New York and Quebec control areas.

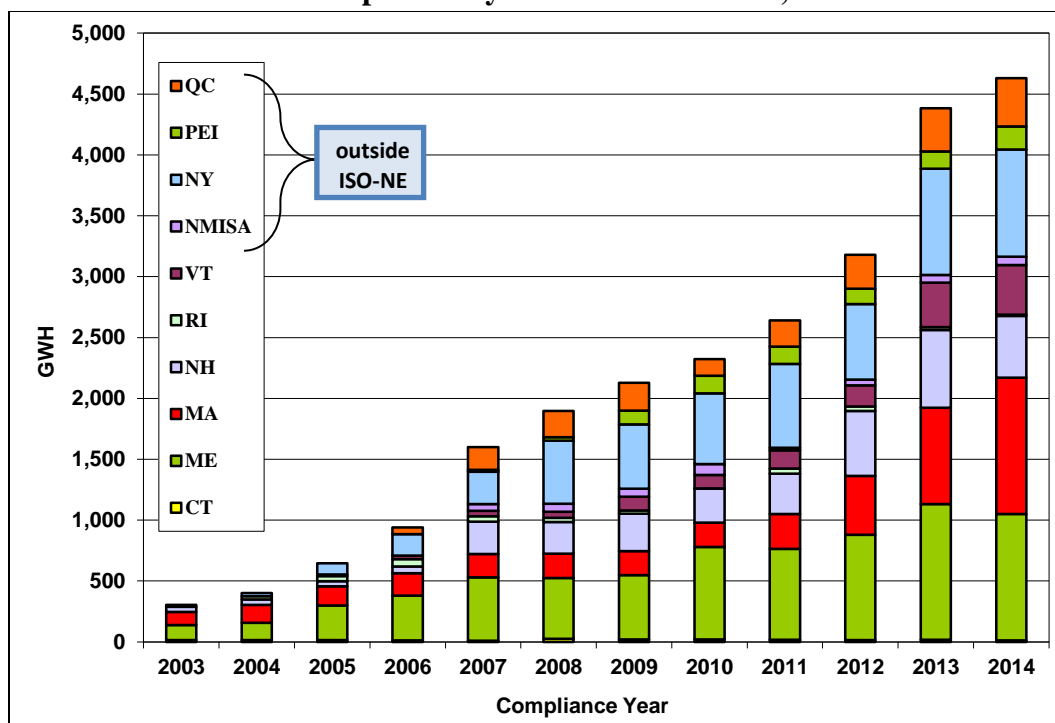
of the REC generation since 2003. Table F in Appendix Three lists the data from which these graphs were generated. *Note that the figures in this subsection and in the referenced tables and graphs include all 2014 SRECs and SREC-IIs, as well as the non-SCO and non-SCO-II Class I RECs.*

Figure Two
2014 RPS Class I Compliance by Generator Location*



* Includes the Solar Carve-Outs, all SRECs & SREC-IIs.

Figure Three
RPS Class I Compliance by Generator Location, 2003-2014*



* Includes the Solar Carve-Outs, all SRECs & SREC-IIs.

Massachusetts supplied 24.1% of the 2014 RECs presented for MA RPS Class I compliance, up from 18.0% in 2013, with almost all of the increase attributable to PV projects. Although the 41.4% increase of Class I RECs and SRECs from Massachusetts projects between 2013 and 2014 is less than the 63.5% increase between 2012 and 2013, that 41.4% is still among the highest year-to-year increases since the early years of RPS. Moreover, for the first time in the twelve years of RPS, the 2014 percentage of RECs from Massachusetts was higher than those from any other state, edging out the 22.4% from Maine (mostly from wind farms), including NMISA⁵⁰, and 19.0% from New York (from landfill methane and wind).

The overall quantity of Class I RECs rose by 5.6% from 2013 to 2014, with RECs from within the ISO-NE control area rising by 4.7% (66.9% of the total increase) and those imported from the adjacent control areas by 6.6% (33.1% of the total increase). Within ISO-NE, the REC supply from Massachusetts and Vermont rose by 41% and 12% respectively, while the supply from the other four states actually declined. Among imports from outside ISO-NE, increases from Prince Edward Island (33%) and Quebec (12%) were much higher than the increases from New York and NMISA.

Generation Sources by Type

The percentages of 2014 RECs from the qualified types of renewable resources are illustrated in Figure Four, while Figure Five illustrates the twelve year trend of RECs by resource type. Table G in Appendix Three lists the data from which these graphs were generated. *The figures in this subsection and in the referenced tables and graphs include all 2014 SRECs and SREC-IIs, along with the non-SCO and non-SCO-II Class I RECs.*

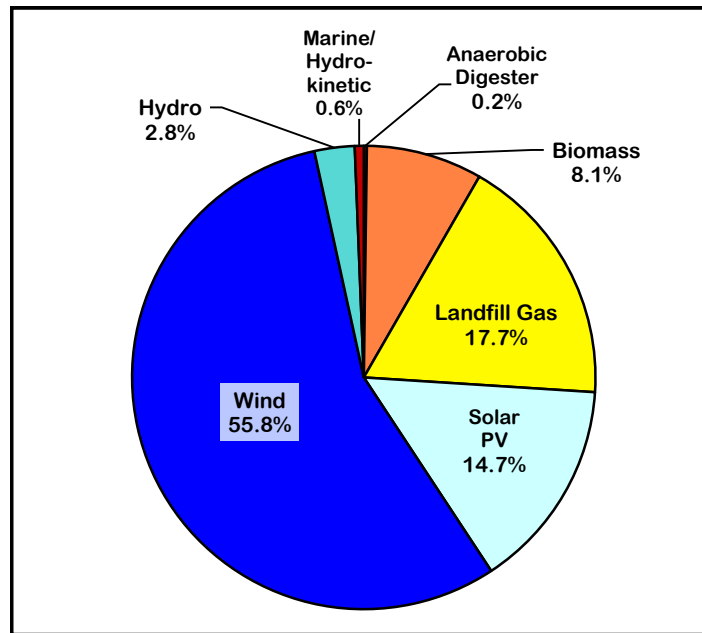
By far the greatest increase in the supply of RECs from 2013 to 2014 was the 111% increase from PV, from 323,164 MWh in 2013 to 681,502 MWh in 2014. Of that total, 605,969 MWh were SRECs, and 15,908 MWh were SREC-IIs, so the 2014 net non-SREC Class I PV RECs totaled 59,625 MWh, compared with the 2013 net PV RECs total of 35,220 MWh. Thus, the *net* non-SREC PV increase in Class I was 69% (see Sections Three and Four for more detail on SRECs and SREC-IIs). Much smaller increases came from hydroelectricity (14%) and other sources, while supply from wind, the largest single source, actually declined by almost 1%, and from landfill methane, the second largest source, declined by 14%.

Wind power continues to be the largest source of RECs for RPS, at 56% of the 2014 supply. 28% of all wind RECs came from wind farms in Maine, 16% from New York, 13% from New Hampshire, and 13% from Quebec. RECs for non-ISO-NE resources are earned only on electricity actually transmitted into ISO-NE. 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 its leading market share in the RPS.

Landfill methane is a distant second to wind as a REC source, at 18% in 2014. Most landfill methane RECs are from New York (55%) and Massachusetts (23%), but with some from all New England states except Rhode Island, whose large output is under in-state contract. The PV share of RECs is expected soon to pass that of landfills, given the much faster growth of PV capacity.

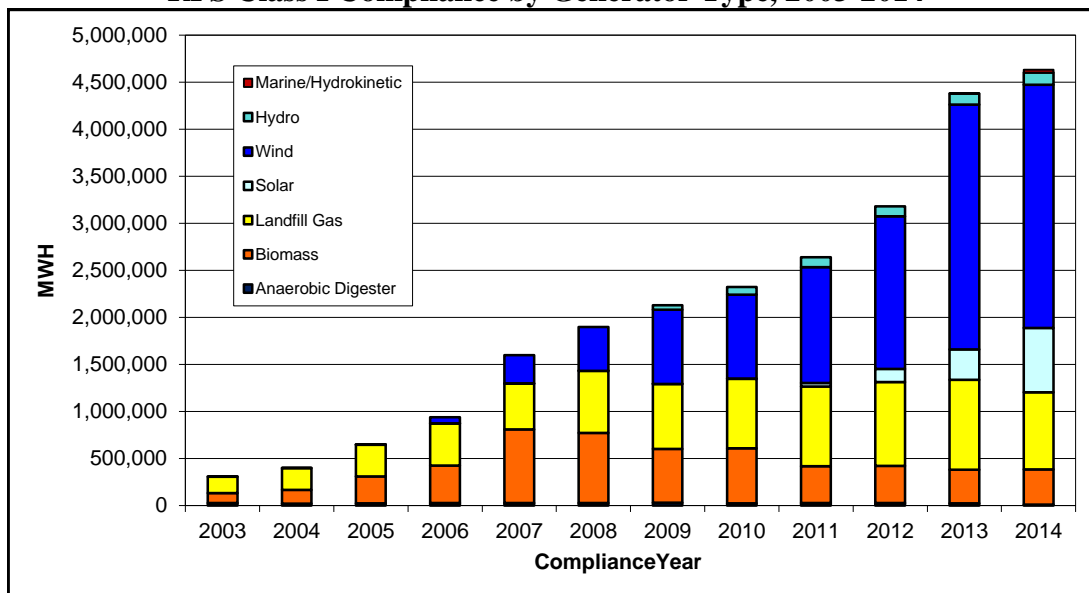
⁵⁰ The Maine total would be 23.9% if it included the NIMSA counties in northern Maine. See footnote 49.

Figure Four
2014 RPS Class I Compliance by Generator Type*



* Includes the Solar Carve-Out, all SRECs

Figure Five
RPS Class I Compliance by Generator Type, 2003-2014*



* Includes the Solar Carve-Out, all SRECs.

Solar photovoltaic arrays provide the most rapidly increasing share of RECs, amounting to 15% of total Class I RECs in 2014. This accelerating growth has been propelled by a number of factors in the last few years, including declining equipment costs, federal and state tax incentives, federal stimulus dollars, state “net metering” policy, and, notably, the RPS Solar Carve-Out (SCO) launched in January 2010 and SCO II launched in April 2014.⁵¹ Solar generation qualified for RPS Class I (but not for the SCO or SCO II) rose from 4,120 MWh in 2010, to 10,108 MWh in 2011, 25,387 MWh in 2012, 35,220

⁵¹ In addition to RPS, MA has a suite of other programs helping to drive PV development. See the [Solar page](#) at DOER’s website.

MWh in 2013, and 59,625 MWh in 2014. Although the SCO and SCO II are attracting a large majority of new PV development, over 125 MW of PV have also qualified outside of the SCO for RPS Class I, of which more than 22 MW are located in Massachusetts and about 103 MW are located in other New England states (84 MW in Vermont alone).

Non-anaerobic digestion-based biomass generation provided 8% of Class I RECs in 2014, almost all from Maine (60.9%) and New Hampshire (38.7%). Most of the qualified biomass plants in Maine have either reduced or ceased production since 2008. The qualification of most or all of the woody biomass plants in Maine and New Hampshire is expected to cease at the close of 2015 if they cannot increase their energy conversion efficiencies to meet the 2012 standards for which they have been heretofore grandfathered.

Hydroelectricity was added to the qualified mix for RPS Class I in 2009, mostly from post-1998 increases in output at some older plants from capacity and efficiency upgrades. Hydroelectricity as a source of RECs has risen very slowly, still amounting to less than 3% in 2014, mostly from Maine and Vermont, although hydroelectricity from Massachusetts has been increasing.

In 2014 almost 60% of the small anaerobic digester⁵² output was from Maine, with smaller amounts from Massachusetts and Vermont dairy farms. Anaerobic digester potential exists at wastewater treatment plants and other facilities that generate organic wastes. DOER is collaborating with the MassDEP to identify and encourage expanded production of digester gas and its use for electricity generation at wastewater treatment plants, food processing and food service facilities, and dairy farms.

Finally, note that the REC supply increased from Marine and Hydrokinetic projects, which had begun only in 2013, including one tidal project on the far north coast of Maine and small turbines within Massachusetts water supply conduits. Both types have potential for future growth.

SECTION THREE

RPS SOLAR CARVE-OUT COMPLIANCE IN 2014

The Solar Carve-Out (SCO) is a sub-set of RPS Class I that commenced in 2010, pursuant to the Green Communities Act of 2008, and was originally intended to provide incentives for 400 MW of PV to be installed within Massachusetts by 2017.⁵³ As a “carve-out”, the SCO Minimum Standard for each year is subtracted from that year’s overall Class I Minimum Standard.

The SCO succeeded beyond expectations in attracting solar business development to Massachusetts. In fact, qualified installations surpassed the regulatory cap of 400 MW in 2013, four years ahead of the date anticipated by DOER. That overshoot resulted from a rapid acceleration of applications in the spring of 2013 as the 400 MW cap approached. In order to avoid penalizing a substantial amount of investment made in good faith, DOER issued an emergency revision of the Class I regulation in June of 2013 to set rules for raising the cap.⁵⁴ Finally, in order to maintain the PV development momentum going forward, DOER launched in January of 2014 and concluded that April a rulemaking for a successor Solar Carve-Out II, described below in Section Four.

⁵² See footnote 111 regarding the relationship between anaerobic digester gas and biomass in the MA RPS regulations.

⁵³ The eligibility requirements for a PV system to qualify include the following: (a) interconnection with the Massachusetts electricity grid, (b) at least a minimal 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 it had received funding by certain other government programs. See DOER’s [Solar Carve-out/SREC-I webpages](#) for additional information on the program.

⁵⁴ The revised cap became 653.8 MW (11,788 projects), of which 647.9 MW (11,786 projects) were installed by the end of 2015. For a detailed list of SCO projects, visit <http://www.mass.gov/eea/docs/doer/rps-aps/solar-carve-out-units.xlsx>.

Table Three
Aggregated Data from the Solar Carve-Out (SCO) Compliance Filings, 2010-2014 (MWh)

| | 2014 | 2013 | 2012 | 2011 | 2010 |
|--|-------------------|------------------|------------------|---------------------|---------------------|
| CY Retail Sales (=Retail Load Obligation) | 48,129,294 | 49,252,929 | 48,992,430 | 49,386,169 | 50,026,093 |
| Minimum Standard⁵⁵ | 0.9481% | 0.2860% | 0.1630% | 0.1627% | 0.0679% |
| CY aggregated SCO obligation⁵⁶ | 456,347 | 140,855 | 79,882 | 80,370 | 33,988 |
| Total SRECs from CY generation⁵⁷ | 480,744 | 143,589 | 77,491 | 26,580 | 2,738 |
| minus CY total surplus SRECs | (36,222) | (8,334) | (963) | (13) | 0 |
| Net CY SRECs for CY obligation | 444,522 | 135,255 | 76,259 | 26,567 | 2,738 |
| plus Reminted Auction SRECs | 9 | 0 | 0 | 0 | 0 |
| plus Banked from pre-CY surpluses | 8,159 | 1,294 | 13 | 0 | 0 |
| Total SRECs used for CY obligation | 452,690 | 136,549 | 76,272 | 26,567 | 2,738 |
| plus total ACP Credits | 3,657 | 4,206 | 3,787 | 53,803 | 31,250 |
| Total for compliance obligation | 456,347 | 140,755 | 80,059 | 80,370 | 33,988 |
| Surplus Attributes banked forward | 36,222 | 8,066 | 961 | 13 | 0 |
| ACP proceeds (rounded) | \$553,512 | \$306,518 | \$245,360 | \$23,887,474 | \$11,682,793 |

The large SREC supply shortfalls of 2010 and 2011 have been replaced by surpluses since then, due to the rapidly accelerating pace of new development. During 2014, the installed capacity of SCO-qualified PV increased from 408.7 MW to 619.4 MW. The SCO Minimum Standard for 2014 required 456,347 MWh of SRECs⁵⁸, while the SCO-qualified PV systems yielded 605,969 MWh of SRECs in 2014. Of that total, 480,744 MWh were reported for SCO compliance, and 124,831 were deposited into DOER's Solar Credit Clearinghouse Auction account at the NEPOOL GIS. The remainder was left unsettled at the GIS and was not reported in the Filings. Another 8,159 MWh banked from 2012 and 2013 surplus SRECs, and 9 Reminted Auction SRECs from 2013 were also used for 2014 compliance. The surplus notwithstanding, eleven Suppliers depended on ACPs to meet some or all of their SCO obligations. 36,222 MWh of SCO Attributes were banked forward by 31 Suppliers, but depositing SRECs into the Auction seemed to be the preferred option for Suppliers with surplus SRECs. The Filing figures are displayed in Table Three, with more detail in Appendix Two, Table B. Changes in the manner of compliance during the first five years of the program are shown in Figure Six.

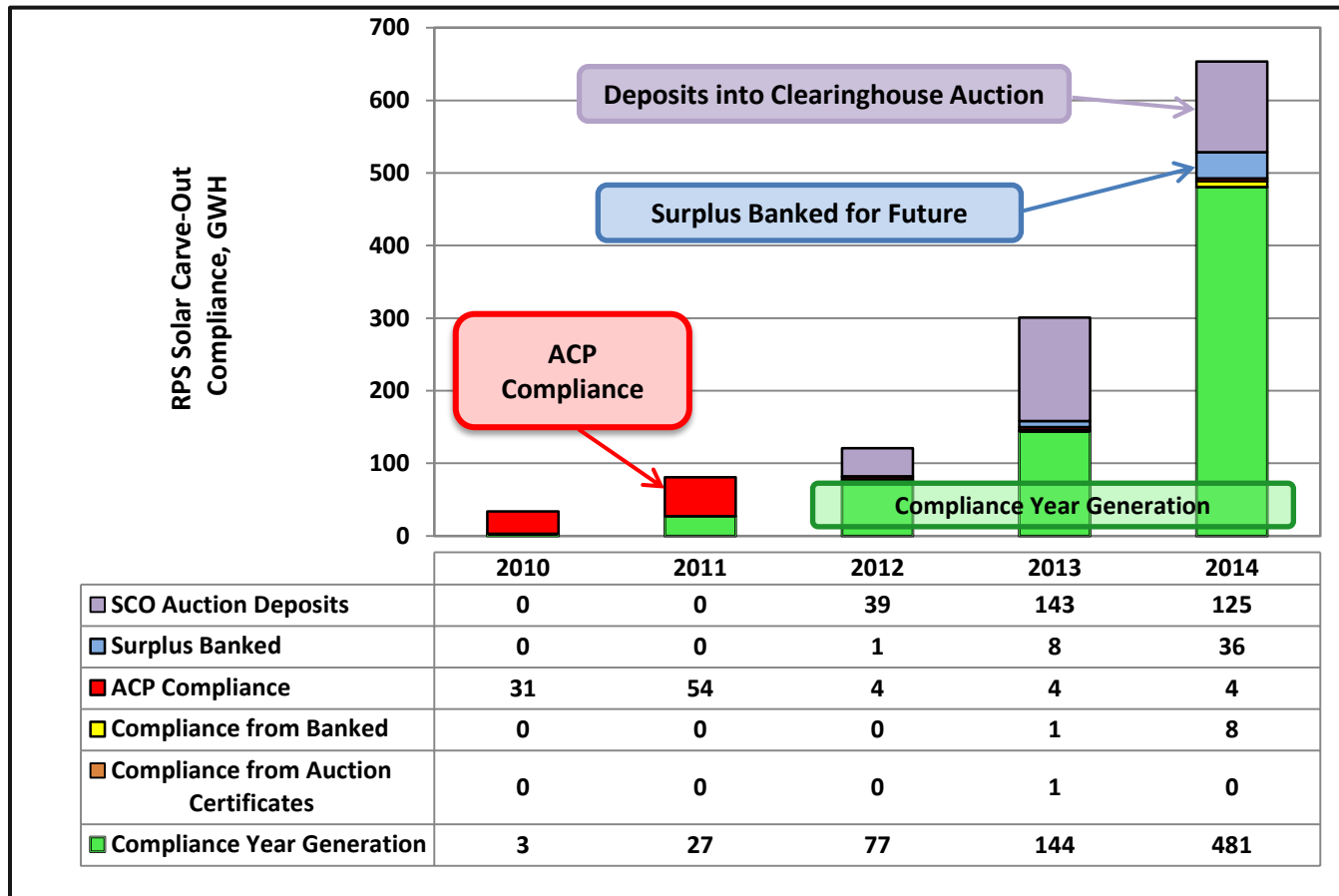
⁵⁵ While the Minimum Standards for 2010 through 2012 applied to all CY Retail Sales, the subsequent Standards represent the average resulting from the application of exemptions for certain load served under contracts entered into prior to specific dates. In 2013, all load served under contracts entered into prior to June 7, 2013, was subject to a Minimum Standard of 0.2744%. All load served under contracts entered into on or after June 7, 2013, was subject to a Minimum Standard of 0.3833%. Since such sales vary from Supplier to Supplier, DOER presents here for 2013 the average percentage: aggregated SCO obligation of all Suppliers divided by total Retail Sales. This exemption did not apply in 2014, but a new exemption for electricity supplied under contracts signed prior to June 28, 2013, will apply in 2015.

⁵⁶ Also, see footnote 43 regarding the difference between totaling individual obligations and calculating overall obligation.

⁵⁷ This figure includes only SRECs that were reported in the Filings, not those that were deposited into the SREC Auction Account at the NEPOOL GIS before the end of the 2014, quarter 4 trading period or others that were not reported.

⁵⁸ The 2014 compliance obligation of 464,520 MWh, when divided by the 2012 Retail Load Obligation was 0.9481%, was set by the methodology outlined at <http://www.mass.gov/eea/docs/doer/rps/ma-rps-solar-carve-out-determination-of-cy2014-min-std-doer-080113.pdf>, per 225 CMR 14.07(2)(a). However, due to a lower total Retail Load Obligation in 2014 than in 2012 and each Supplier rounding up any fractional MWh of its individual SREC obligation, the aggregated total needed for compliance was ultimately 456,347 MWh.

Figure Six
RPS Class I Solar Carve-Out Compliance, 2010-2014



Of the total SCO obligation, the shortfall under pre-2010 contracted load in 2014 was 2,975 MWh, for which the ACP totaled \$196,826 at the Class I rate of \$66.16/MWh, and the shortfall under retail load contracted in 2010 or later was 682 MWh, for which the ACP totaled \$356,686 at the \$523/MWh rate.⁵⁹ The overall total for SCO ACPs was \$553,512 for 3,657 MWh of shortfall.

DOER administered its third Solar Carve-Out Clearinghouse Auction, for SRECs minted in 2014. The Auction required only one round, held on July 28, 2015, in which a total bid volume of 1,113,789 was received from 55 individual bidders, and all 124,831 deposited SRECs were sold to the bidders. All SRECs were sold to bidders at the \$300/MWh auction price, and depositors were paid \$285/MWh for each SREC deposited. The 2014 Reminted Auction SRECs can be used for SCO compliance through CY 2016.

Two related developments occurred in the SCO program during 2014 and 2015. First, following the 2013 announcement of a new goal of installing 1,600 MW of PV in-state by 2020, DOER immediately commenced development of a successor compliance standard termed the RPS Solar Carve-Out II (SCO II, a.k.a. SREC-II). This was established through a rulemaking that began on January 3, 2014, concluded on April 25, 2014, and was immediately effective for the entire year of 2014. For more, see Section Four, below.

⁵⁹ See Table Nine in Section Seven for a forward projection of the portion of the total retail load under pre-2010 contracts. Note that the one non-compliant Supplier fully complied with its SCO obligation and does not owe any ACP for the SCO.

Meantime, the total installed capacity cap under the original Solar Carve-out was set when the SCO II regulation went into effect on April 25, 2014. All qualified projects over 100 kW were required to make a demonstration that they were mechanically complete by no later than June 30, 2014, in order to remain qualified. The SCO capacity cap is now set at 653.8 MW, based on the number of qualified MW. As of the date of this report, all generators have received their authorizations to interconnect.

SECTION FOUR

RPS SOLAR CARVE-OUT II COMPLIANCE IN 2014

2014 was the first year for compliance under the Solar Carve-Out II Minimum Standard established by revised regulations for RPS Class I promulgated on April 25, 2014, following more than a year of both internal and contracted analysis, stakeholder discussions, and a formal rulemaking. The Solar Carve-Out II Minimum Standard within RPS Class I set a capacity cap for total, qualified, solar carve-out installation at 1,600 MW in the state, inclusive of the prior Solar Carve-Out capacity (now 653.8 MW), with a goal of reaching that overall cap by 2020. The Solar Carve-Out II differs from the Solar Carve-Out in the creation of “Market Sectors” and “SREC Factors” for qualifying projects. Under the Solar-Carve-Out II, the highest incentive, namely a full SREC Factor of one SREC-II per MWh of output, is given to small (25 kW or less) projects, solar canopies, community shared solar, projects providing 100% of their power to low income housing, and emergency power sites. The Solar Carve-Out II gives slightly lower SREC Factors to larger building-mounted projects, those that mostly serve an on-site load, and those built on eligible landfills and qualified “brownfields”. “Greenfield” projects that are over 650 kW and export the majority of their power to the grid receive the lowest incentive (0.7 SREC per MWh of output) and must be assigned capacity space in the “annual capacity blocks” in the Managed Growth sector.⁶⁰ For additional details, see the [Solar Carve-Out II web pages](#) especially the [About the Solar Carve-Out II Program](#) page⁶¹.

In order not to penalize Suppliers having retail contracts that were not priced to consider this new Minimum Standard, it applies only to retail load served under contracts after its April 25, 2014, date of promulgation, exempting load served under prior contracts. This is consistent with the Exempt Load provision in effect for RPS Class II and APS and is reflected in Table Eleven (in Section Eight).

For 2014, the Minimum Standard was calculated per regulatory methodology⁶² to be 0.0843% of each Supplier’s non-exempt Retail Load Obligation. As shown in Table Four, the net load for SCO-II compliance in 2014 was 24,965,886, so 21,076 SREC-IIs were required for compliance. However, with the SCO II in its start-up year, the newly-qualified PV systems yielded only 15,908 MWh of SREC-IIs, of which 15,633 were presented in the Filings⁶³. Nineteen Suppliers met their full obligations by acquiring sufficient SREC-IIs, with six of them banking forward a combined surplus of 21 SREC-IIs. Another ten suppliers acquired the remaining SREC-IIs. With 187 surplus SREC-IIs banked forward, the net total of 15,446 amounted to 73.3% of the total SCO II Renewable Energy obligation. The remaining 5,476 MWh (26%) of the obligation was met by the Alternative Compliance mechanism, that is, by making ACPs to the MassCEC at the rate of \$375 per MWh, totaling \$2,115,001. However, the one noncompliant Supplier owes \$57,750.00 for its 154 MWh obligation (see footnote 37). Except for the latter, these figures are displayed in Table Four; more detail is in Appendix Two, Table C.

⁶⁰ See [Minimum Standard Adjustments, SREC Factors, and ACP Rates](#), as well as [Current Status of the Solar Carve-Out II Program](#) for more details.

⁶¹ More information on the SCO II stakeholder and rulemaking process is at the linked [Historical Development of the Solar Carve-Out II webpage](#). The regulatory provisions specific to the SREC-II are mostly in 225 CMR 14.05(9) and 14.05(7)(3), here.

⁶² See 225 CMR 14.07(3), especially (3)(a) and (3)(c).

⁶³ One Supplier acquired the remaining 275 SREC-IIs, but they were in excess of its SCO-II obligation and its banking limit and instead were used for non-SCO Class I compliance.

Table Four
Aggregated Data from the Solar Carve-Out II (SCO II) Compliance Filings, 2014 (MWh)

| | 2014 |
|---|-------------|
| CY Retail Sales (=Retail Load Obligation) | 48,129,294 |
| Exempt Load ⁶⁴ | 23,163,408 |
| Net Load | 24,965,886 |
| Minimum Standard | 0.0843% |
| CY aggregated SCO II obligation ⁶⁵ | 21,076 |
| Total SREC-IIs from CY generation ⁶⁶ | 15,633 |
| minus CY total surplus SREC-IIs | (187) |
| Net CY SREC-IIs for CY obligation | 15,446 |
| [plus Banked from pre-CY surpluses] | 0 |
| Total SREC-IIs used for CY obligation | 15,446 |
| plus total ACP Credits | 5,476 |
| Total for compliance obligation ⁶⁷ | 20,922 |
| Surplus Attributes banked forward | 21 |
| ACP proceeds (rounded) | \$2,115,001 |

On April 8, 2016, DOER filed [emergency regulations](#) to extend the Solar Carve-Out II Program, after receiving enough application to reach the 1,600 MW program capacity cap in February 2016. The rulemaking for these regulations is expected to conclude later this summer. A revised capacity cap will be determined and announced following the implementation of a successor solar incentive program.

SECTION FIVE

RPS CLASS II RENEWABLE ENERGY COMPLIANCE IN 2014

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 one exception: hydroelectric plants in Class II are limited to 7.5 MW (vs. 30 MW in Class I), pursuant to the *Competitively Priced Electricity Act of 2012*⁶⁸.

Because only pre-1998 plants that can qualify for Class II, and the quantity of pre-1998 renewable energy generation that DOER originally had projected to qualify did not materialize during the early years of the program, Class II Renewable Energy experienced very high REC shortfalls and costly reliance on the ACP mechanism. DOER reacted with a Class II regulatory revision that reduced the original 3.6% Minimum Standard to 1.5% for 2013, 1.75% for 2014 and 2.0% for 2015, following

⁶⁴ The SCO-II Minimum Standard does not apply to load served under contracts entered or extended on before April 25, 2014, per 225 CMR 14.07(3)(b). See Table Eleven in Section 8 for the projected amount of SCO-II Exempt Load aggregated from the 2014 Filings.

⁶⁵ Also, see footnote 43 regarding the difference between totaling individual obligations and calculating overall obligation.

⁶⁶ This figure includes only SREC-IIs that were reported in the Filings, not those that were deposited into the SREC-II Auction Account at the NEPOOL GIS before the end of the Quarter 4 trading period (none in 2014) or others that were not reported.

⁶⁷ A 154 MWh shortfall in the 2014 total resulted from one noncompliant Supplier's failure to make its required ACP. See footnote 37 and Appendix One.

⁶⁸ See footnote 9 for more information about hydroelectric eligibility and for a link to the 2012 Act.

which the Standard is set annually by a formula that responds to changing market conditions⁶⁹. The expected results of these changes have materialized: a very much reduced dependence on the ACP mechanism for 2013 and 2014, and increased banking.⁷⁰

The data for 2014 indicate that, while a large shortage of qualified Class II Renewable Energy generation continued, it declined substantially in 2013 and declined a bit more in 2014. Consequently, dependence on the ACP mechanism, with its attendant expense, has been much reduced. At the same time, the continuing shortfall provides sufficient support for at least some additional pre-1998 plants to qualify for Class II benefits, especially older hydropower plants achieving certification by the [Low Impact Hydropower Institute](#). Another factor in the continuing shortfall is the settlement of 19% of all available MA Class II RECs in other New England states, about two-thirds of those in Connecticut⁷¹ and about one-third in New Hampshire, which reduced the quantity available for MA RPS Class II.

Table Five
Aggregated Data from the RPS Class II Renewable Energy
Compliance Filings, 2009-2014 (MWh)

| | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|--|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| CY Retail Sales (=Retail Load obligation) | 48,129,294 | 49,252,929 | 48,992,430 | 49,386,169 | 50,026,093 | 48,301,821 |
| Exempt Load⁷² | 79,801 | 973,011 | 1,584,015 | 3,799,666 | 8,233,703 | 31,918,771 |
| Net Load | 48,049,493 | 48,279,918 | 47,408,415 | 45,586,504 | 41,792,390 | 16,383,050 |
| <i>Minimum Standard</i> | <i>1.75%</i> | <i>1.5%</i> | <i>3.6%</i> | <i>3.6%</i> | <i>3.6%</i> | <i>3.6%</i> |
| CY aggregated obligation⁷³ | 840,893 | 724,222 | 1,706,727 | 1,641,134 | 1,504,544 | 589,801 |
| Total Class II RECs from CY generation | 526,415 | 509,609 | 246,665 | 236,472 | 103,837 | 35,543 |
| <i>minus</i> CY total surplus Class II RECs | (62,401) | (167,874) | (874) | (1,757) | (63) | (653) |
| Net CY RECs for CY obligation | 464,014 | 351,735 | 245,791 | 234,715 | 103,774 | 34,890 |
| <i>plus</i> Banked from pre-CY surpluses | 104,498 | 919 | 1,739 | 63 | 653 | 0 |
| Total Class II RECs used for CY obligation | 568,512 | 342,654 | 247,530 | 234,778 | 104,427 | 34,890 |
| <i>plus</i> total ACP Credits | 268,337 | 381,007 | 1,459,197 | 1,406,356 | 1,400,117 | 554,911 |
| Total for compliance obligation | 836,849 | 723,661 | 1,706,727 | 1,641,134 | 1,504,544 | 589,801 |
| Surplus Attributes banked forward^{74,75} | 42,035 | 167,874 | 874 | 1,749 | 63 | 653 |
| ACP proceeds (rounded) | \$7,288,033 | \$10,207,169 | \$38,347,723 | \$35,862,072 | \$35,002,925 | \$13,872,775 |

In 2014, the net (non-Exempt) load⁷⁶ for the Class II Renewable Energy obligation was 48,049,493 MWh, and the total of all 56 Suppliers' 1.75% Class II Renewable Energy obligations was 840,893 MWh. Class II RECs available for Class II compliance, almost all from New England hydroelectric plants, were short of the demand, but much less so than in prior years. 24 Suppliers met

⁶⁹ The Minimum Standard of [2.5319% for 2016](#) was announced by DOER on September 8, 2014, of [2.5909% for 2017](#) on August 28, 2015.

⁷⁰ See Section Four of the [RPS & APS 2013 Annual Compliance Report](#) for additional details on the regulatory change process.

⁷¹ Qualification for Connecticut RPS Class I does not include a vintage cut-off date. Therefore, many pre-1998 vintage plants that qualify for MA RPS Class II also qualify for CT RPS Class I, whose \$55 ACP rate for Class I is much higher than the ACP rate for MA Class II.

⁷² The Exempt and Net Load figures pertain to the compliance obligation calculations only of unregulated Competitive Suppliers.

⁷³ See footnote 43 regarding the difference between totaling individual obligations and calculating an overall obligation.

⁷⁴ Any surplus RPS Class II Attributes (MWh 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 48 regarding the 30% limit.

⁷⁵ A 4,044 MWh shortfall in the 2014 total resulted from one noncompliant Supplier's failure to make its required ACP. See footnote 37 and Appendix One.

⁷⁶ See the discussion of Exempt Load for RPS Class II and APS above, on page 7.

their full obligations by acquiring RECs, with eighteen of them having a combined surplus of 62,401 (of which only 42,035 could be banked forward). Another six acquired the remaining RECs, for an overall total of 526,415 RECs. That total, plus 104,498 RECs banked from 2013 banked surplus, minus the 62,401 surplus RECs, yielded 568,512 RECs for 2014 compliance. That net total amounted to 68% of the total Class II Renewable Energy obligation. Of the remaining obligation, 268,337 MWh (32%) was met by the Alternative Compliance mechanism, that is, by making ACPs to the MassCEC at the rate of \$27.16 per MWh, totaling \$7,288,033. An additional 4,044 MWh of ACP, totaling \$109,835, is due from the one noncompliant Supplier (see footnote 37). Except for the unpaid ACP, the aggregate figures are displayed in Table Five, with more detail in Appendix Two, Table D, and in Appendix Three, Tables J and K.

SECTION SIX

RPS CLASS II WASTE ENERGY COMPLIANCE IN 2014

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 (“MassDEP”) regulations for such facilities.⁷⁷ The MassDEP regulations, in addition to provisions for municipal solid waste handling, emissions, etc., provide for enhanced sorting and recycling and for the 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.

Table Six
Aggregated Data from the RPS Class II Waste Energy
Compliance Filings, 2009-2014 (MWh)

| | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|---|-------------------|------------------|------------------|-----------------|-----------------|----------------|
| CY Retail Sales (=Retail Load obligation) | 48,129,294 | 49,252,929 | 48,992,430 | 49,386,169 | 50,026,093 | 48,301,820 |
| Exempt Load⁷⁸ | 79,801 | 973,011 | 1,584,015 | 3,799,666 | 8,233,703 | 31,891,115 |
| Net Load | 48,049,493 | 48,279,918 | 47,408,415 | 45,586,504 | 41,792,390 | 16,410,706 |
| CY aggregated WEC obligation, at 3.5%⁷⁹ | 1,681,759 | 1,689,821 | 1,659,318 | 1,595,546 | 1,462,750 | 574,384 |
| Total WECs from CY generation | 1,440,670 | 1,703,780 | 1,710,117 | 1,568,127 | 1,378,219 | 1,046,833 |
| <i>minus</i> CY total surplus WECs | (13,873) | (307,868) | (282,023) | (212,565) | (251,554) | (473,177) |
| Net CY WECs for CY obligation | 1,426,797 | 1,395,912 | 1,428,094 | 1,355,562 | 1,126,665 | 573,656 |
| <i>plus</i> Banked from pre-CY surpluses | 251,993 | 278,771 | 207,057 | 237,620 | 330,288 | 0 |
| Total WECs used for CY obligation | 1,678,790 | 1,674,682 | 1,635,151 | 1,593,182 | 1,456,953 | 573,656 |
| <i>plus</i> total ACP Credits⁸⁰ | 2,968 | 13,828 | 24,167 | 2,364 | 5,797 | 728 |
| Total for compliance obligation | 1,681,758 | 1,688,511 | 1,659,318 | 1,595,546 | 1,462,750 | 574,384 |
| Surplus WE Attributes banked forward⁸¹ | 0 | 305,433 | 278,990 | 207,041 | 237,667 | 330,288 |
| ACP proceeds (rounded) | \$32,232 | \$148,236 | \$253,993 | \$24,113 | \$57,970 | \$7,280 |

⁷⁷ The MassDEP regulations are in 310 CMR 7.08(2) and 310 CMR 19.000.

⁷⁸ The Exempt and Net Load figures pertain to the compliance obligation calculations only of Competitive Suppliers.

⁷⁹ See footnote 43 regarding the difference between totaling individual obligations and calculating an overall obligation.

⁸⁰ A 1 MWh shortfall in the 2014 total resulted from one Supplier’s failure to make its required ACP. See footnote 37 and Appendix One.

⁸¹ 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. Per the 2014 Class II rulemaking, no WECs can be banked from 2014 or 2015 surplus. When banking resumes with 2015 surplus, the limit will be 5% of each Supplier’s total WE obligation for the year of the surplus.

In 2014, the net (non-Exempt) load for the Class II Waste Energy obligation was 48,049,493 MWh, and the total of the 56 Suppliers' 3.5% Class II Waste Energy obligations was 1,681,759 MWh. The Suppliers acquired 1,440,670 WECs, which, combined with the use of 251,993 Attributes banked from 2013 surplus WECs, yielded a surplus of 13,873 WECs. Due to a temporary moratorium on WEC banking for 2014 and 2015, none of the surplus could be banked towards future Class II Waste Energy compliance.⁸² The surplus notwithstanding, twelve Suppliers acquired no WECs, and five others failed to purchase enough WECs. All except one of those seventeen Suppliers met their total shortfall of 2,968 WECs by making ACPs to the MassCEC at the ACP rate of \$10.86 per MWh, for total payments of \$32,232.48. An additional \$10.86 for one MWh of ACP is due from the one noncompliant Supplier (see footnote 37). Except for the latter, these figures are displayed in Table Six, with more detail in Appendix Two, Table E.

While the declining Exempt Load now should result in a decline in surplus WECs each year, the much lower surplus in 2014 also resulted from the temporary banking moratorium.⁸³ In order to eliminate what DOER had concluded to be a permanent and inherently large WEC surplus that Suppliers, on average, were carrying forward from year to year, DOER enacted through its 2014 RPS Class II rulemaking a banking moratorium for Compliance Years 2014 and 2015, and lowered the subsequent banking limit from 30% to 5%.

SECTION SEVEN

APS ALTERNATIVE ENERGY COMPLIANCE IN 2014⁸⁴

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 2014, the net (non-Exempt) load for the APS obligation was 48,049,493 MWh, for which the 56 Suppliers' 3.5% APS obligations totaled 1,681,759 MWh. To comply with that obligation, the Suppliers purchased 831,080 AECs and used 7,347 AECs banked from 2013 surplus, for a net total of 838,166 AECs, from which four Suppliers banked all 261 of their surplus AECs. A net shortfall of 835,505 AECs was met by 43 of the Suppliers by making ACPs to the MassCEC at the rate of \$21.72 per MWh. The payments totaled \$18,147,169. An additional 8,088 MWh of ACP, totaling \$175,671.36, is due from the one noncompliant Supplier⁸⁵. Except for the latter, these figures are displayed in Table Seven; more detail is in Appendix Two, Table F, and in Appendix Three, Table L.

⁸² Note that, in addition to the 13,873 excess WECs reported in the Filings, about 343,000 WECs were not sold to Retail Suppliers by the generation owners. This is the difference between the total WECs minted (in a public report at the NEPOOL GIS) and the WECs reported in the Filings.

⁸³ See the discussion of Exempt Load for RPS Class II and APS above, on page 7.

⁸⁴ See the top of page 7 in Section One and footnote 17 for a description of the APS, an explanation of how AECs are determined for CHP plants, and a reference for further details.

⁸⁵ See footnote 37.

Table Seven
Aggregated Data from the APS Compliance Filings, 2009-2014 (MWh)

| | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|---|--------------|--------------|--------------|--------------|-------------|------------|
| CY Retail Sales (=Retail Load Obligation) | 48,129,294 | 49,252,929 | 48,992,430 | 49,386,169 | 50,026,093 | 48,301,821 |
| Exempt Load ⁸⁶ | 79,801 | 973,011 | 1,584,015 | 3,799,666 | 8,233,703 | 31,918,771 |
| Net Load | 48,049,493 | 48,279,918 | 47,408,416 | 45,586,504 | 41,792,390 | 16,383,050 |
| Minimum Standard ⁸⁷ | 3.5% | 3.0% | 2.5% | 2.0% | 1.5% | 1.0% |
| Aggregated APS obligation | 1,681,759 | 1,448,421 | 1,185,236 | 911,748 | 626,902 | 163,844 |
| Total AECs from CY Generation | 831,080 | 531,781 | 351,179 | 324,922 | 227,134 | 129,925 |
| minus CY total surplus AECs | (261) | (7,347) | (1,239) | (7,636) | (520) | (10,600) |
| Net CY AECs for CY obligation | 830,819 | 524,434 | 349,940 | 317,286 | 226,614 | 119,325 |
| plus banked from pre-CY surpluses | 7,347 | 1,239 | 7,635 | 515 | 8,818 | 0 |
| Total AECs used for CY obligation | 838,166 | 525,673 | 357,575 | 317,801 | 235,432 | 119,325 |
| plus total ACP credits | 835,505 | 921,626 | 827,661 | 593,947 | 391,470 | 44,519 |
| Total for compliance obligation ⁸⁸ | 1,673,671 | 1,447,299 | 1,185,236 | 911,748 | 626,902 | 163,844 |
| Surplus APS Attributes banked forward | 261 | 7,347 | 1,239 | 7,636 | 515 | 8,838 |
| ACP proceeds (rounded) | \$18,147,169 | \$19,750,452 | \$17,397,429 | \$12,116,514 | \$7,829,400 | \$890,380 |

SECTION EIGHT

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 2020. This scenario is based on the ISO-NE “reference case” for load growth in the *2015 CELT Report*,⁸⁹ following the approach of the RPS/APS Annual Compliance Reports for 2009 through 2013. However, the *2015 CELT Report* differs from the *2014 CELT Report* by its inclusion of ISO-NE’s forecast of PV generation in the wholesale market and that which is imbedded behind the meter. PV is now included, along with Energy Efficiency, in the forecast beyond the Forward Capacity Market of 2019-20.⁹⁰ The ISO-NE expects electricity demand over the 2015-24 period to grow only 0.6% annually, while consumption is expected to remain flat or decline. Regarding the ISO-NE forecast specifically for 2015, it should be noted that the forecast assumed normal weather and economic drivers; the actual electricity consumption for 2015 may differ to the extent that the weather and the economy deviate 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) regional and national economic conditions, (c) the degree of success in implementing energy efficiency programs, (d) the growth of behind-the-meter generation, and,

⁸⁶ See page 6 in Section Three for an explanation of Exempt and Net Load, which pertain to the compliance obligation calculations only of Competitive Suppliers..

⁸⁷ See footnote 43 regarding the difference between totaling individual obligations and calculating an overall obligation.

⁸⁸ An 8,088 MWh shortfall in the 2014 total resulted from one noncompliant Supplier’s failure to make its required ACP. See footnote 37 and Appendix One.

⁸⁹ The ISO-NE figures are from Tab 2, column X in the *2015 CELT Report* document titled “Forecast Data 2015”, dated 5/14/2015 and listed at <http://www.iso-ne.com/system-planning/system-plans-studies/celt>.

⁹⁰ This ISO forecast is the culmination of efforts by the ISO and stakeholders to develop an “Energy-Efficiency and PV Forecast” that recognizes increasing investment and penetration of these resources.

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 2015 *CELT Report* 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 Eight lists both the actual (2010-2014) and projected (2015-2020) total retail sales, as “retail load obligations”⁹¹, 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 2020, although the annual RPS Class I obligation continues increasing indefinitely. Note that the 2014 projected load obligation in the previous report was 172,529 GWh higher than the 2014 actual, which lowers all of the post-2014 projections. This should serve as a reminder that the projections can have a fairly wide range of reliability.

Table Eight
MA RPS Class I Annual Retail Load & Compliance Obligations (% & MWh),
Actual (2003-2014) & Projected (2015-2020)⁹²

| Year | Actual/ Projected Retail Load Obligation | RPS Class I (including Solar Carve-Outs) | | Solar Carve-Out and Solar Carve-Out II | | | RPS Class I – <u>net of the SCO & SCO-II</u> | |
|------|---|---|-------------------|---|-----------------------|----------------------|--|-------------------------|
| | | Minimum Standard | REC Obligation | SREC Obligation | SREC-II Obligation | Total Obligations | Net REC Obligation | Net Minimum Standard |
| 2010 | 50,026,093 | 5.0% | 2,501,305 | 33,988 | N/A | 33,988 | 2,467,317 | 4.9321% |
| 2011 | 49,386,169 | 6.0% | 3,007,569 | 80,370 | N/A | 80,370 | 2,927,199 | 5.8373% |
| 2012 | 48,992,430 | 7.0% | 3,429,493 | 79,882 | N/A | 79,882 | 3,349,611 | 6.8370% |
| 2013 | 49,252,929 | 8.0% | 3,940,234 | 140,801 | N/A | 140,801 | 3,799,434 | 7.7141% |
| 2014 | 48,129,294 | 9.0% | 4,331,636 | 456,347 | 21,039 | 477,353 | 3,854,245 | 8.0081% |
| 2015 | 48,847,296 | 10.0% | 4,884,730 | 1,021,718 | 121,596 | 1,143,314 | 3,741,415 | 7.6594% |
| 2016 | 48,952,229 | 11.0% | 5,384,745 | 848,031 | 333,058 | 1,181,088 | 4,203,657 | 8.5873% |
| 2017 | 48,815,899 | 12.0% | 5,857,908 | TBD | TBD | TBD | TBD | TBD |
| 2018 | 48,562,244 | 13.0% | 6,313,092 | TBD | TBD | TBD | TBD | TBD |
| 2019 | 48,366,425 | 14.0% | 6,771,299 | TBD | TBD | TBD | TBD | TBD |
| 2020 | 48,204,482 | 15.0% | 7,230,672 | TBD | TBD | TBD | TBD | TBD |

Figure Seven 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, ME RPS, NH RPS Classes I and II, VT Renewable Energy Standard Tier II (beginning in 2017), and the mandate for new facilities in the RI Renewable Energy Standard.⁹³ The projections for all of the states are based on ISO-NE load growth projections cited above.⁹⁴ It should be noted that all of these standards are subject to

⁹¹ See explanation and reference in footnote 44 regarding the use of “retail load obligation” for “retail sales.”

⁹² The actual figures through 2014 are from RPS annual compliance filings. The retail load obligation projections starting in 2015 are based on the ISO-NE load growth projections in its *CELT Report* (see footnotes 89 and 90), with 14% of the total Massachusetts load attributable to the RPS/APS-exempt municipally owned companies netted out. In this table, the SREC and SREC-II annual obligations are deducted from the total Class I obligations to show the net Class I REC obligations. The SREC and SREC II obligations take into account actual and projected exempt loads and Minimum Standards that are based on retail contract dates; for details on these nuances, see the spreadsheets linked from the [RPS & APS Minimum Standards page](#), as well as Tables Ten and Eleven.

⁹³ The other programs are summarized at <http://programs.dsireusa.org/system/program1>, using filters to find RPS and particular states.

⁹⁴ See footnote 89 for the source of ISO-NE figures.

change by statute or regulation in their respective states. Finally, note that the MA Class I in this graph *includes* its two solar carve-outs.

Figure Seven
New England Premium RPS Compliance Obligations by State,
Actual (2007-2014) & Projected (2015-2020)

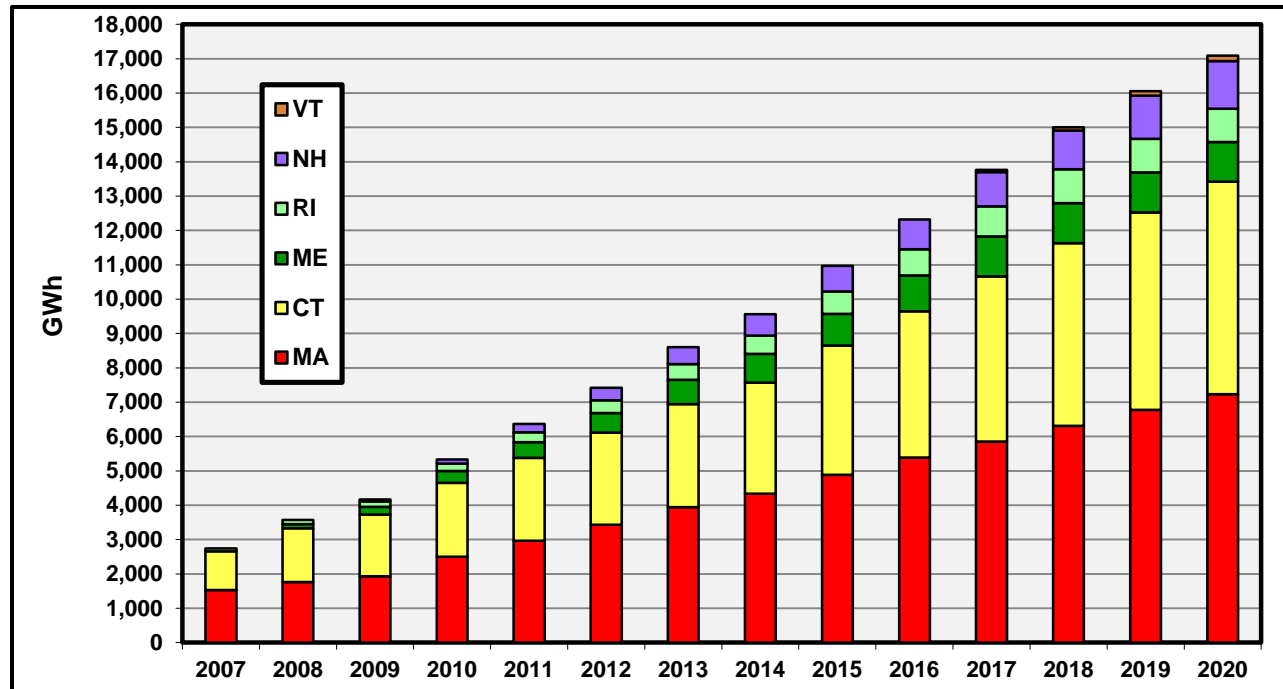


Table Nine lists the 2009-2014 actual retail load obligations for RPS Class II and APS, and retail load obligations projected for 2015 through 2020 (although, like Class I, the standards continue beyond that year). The total load obligation for each year is listed first and is identical to the figures in Table Eight. However, as explained in on page 7, electricity sold under pre-2009 contracts is exempt from the Class II and APS standards. Thus, the projected Exempt Loads provided by Suppliers are then deducted to yield the net load obligations. Note that DOER now expects 2016 to be the last year affected by the Exempt Loads, according to data in the 2014 Filings. Also note that the 2014 projected load obligation in the previous report was 172,529 GWh higher than the 2014 actual, which lowers all of the post-2014 projections, and that the Exempt Load obligation load projections have also changed. This should serve as a reminder that the projections can have a fairly wide range of reliability.

Table Nine next multiplies the net load for each year by the mandated percentage standards. The standard does not rise annually for Class II Waste Energy, since that is for a known, fixed number and capacity of qualified pre-1998 plants. The standard does rise for APS, and, effective for 2013, the Class II Renewable Energy standard was lowered and subsequently began to rise annually, per a 2014 regulatory change⁹⁵.

⁹⁵ See the second paragraph of Section Five for an explanation of this regulatory change.

Table Nine
MA RPS Class II & APS Annual Retail Load & Compliance Obligations, Net of Exempt Load,
Actual (2009-2014) & Projected (2015-2020), in MWh⁹⁶

| Year | Actual/ Projected Load Obligation ⁹⁷ | Actual/ Projected Exempt Load Obligation | Actual/ Projected Net Load Obligation | RPS Class II REC Minimum Standard | RPS Class II RECs as % 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 | 3.6% | 589,801 | 574,368 | 1.00% | 163,844 |
| 2010 | 50,026,093 | 8,233,703 | 41,792,391 | 3.6% | 1,504,526 | 1,462,734 | 1.50% | 626,886 |
| 2011 | 49,386,169 | 3,799,666 | 45,586,504 | 3.6% | 1,641,114 | 1,595,528 | 2.00% | 911,730 |
| 2012 | 48,992,430 | 1,584,015 | 47,408,416 | 3.6% | 1,706,727 | 1,659,318 | 2.50% | 1,185,236 |
| 2013 | 49,252,929 | 973,011 | 48,279,918 | 1.50% | 724,222 | 1,689,821 | 3.00% | 1,448,421 |
| 2014 | 48,129,294 | 79,801 | 48,049,493 | 1.7500% | 840,866 | 1,681,732 | 3.50% | 1,681,732 |
| 2015 | 48,847,294 | 36,019 | 48,811,275 | 2.0000% | 976,226 | 1,708,395 | 3.75% | 1,830,423 |
| 2016 | 48,952,227 | 8,761 | 48,943,466 | 2.5319% | 1,239,200 | 1,713,021 | 4.00% | 1,957,739 |
| 2017 | 48,815,897 | 0 | 48,815,897 | 2.5909% | 1,264,771 | 1,708,556 | 4.25% | 2,074,676 |
| 2018 | 48,562,242 | 0 | 48,562,242 | TBD | TBD | 1,699,678 | 4.50% | 2,185,301 |
| 2019 | 48,366,423 | 0 | 48,366,423 | TBD | TBD | 1,692,825 | 4.75% | 2,297,405 |
| 2020 | 48,204,480 | 0 | 48,204,480 | TBD | TBD | 1,687,157 | 5.00% | 2,410,224 |

Projecting 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 federal incentives, regulations, and decisions affecting all resources and types of electricity generation, as well as changes in the price of competing conventional electricity and continued uncertainties in the broader national and global economies. DOER does expect growth in Massachusetts and elsewhere in the region from onshore and offshore wind farm development, as well as from hydropower, anaerobic digestion, and solar projects. While it is expected that the region will eventually develop offshore wind projects, the size and timing of such projects are not known at this time. Decisions regarding new transmission lines, natural gas pipelines, and utility long-term contracting may impact the growth of more remote wind farms, hydropower, and offshore wind, as well as the price of electricity from competing natural gas generation. A very significant factor will be upcoming and yet-unknown decisions in the State of New York regarding the output of large wind farms whose in-state NY RPS contracts are scheduled to end over the next ten years. The New York decisions will affect how much of a potentially large quantity of RPS-qualified wind power will be exported to ISO-NE. The potential for new or incremental hydroelectric projects that meet the environmental standards of the program is difficult to predict. Finally, a largely untapped potential for anaerobic digester gas projects exists at agricultural, food processing, food service, and wastewater treatment facilities.⁹⁸

Accelerated solar PV development began to show up in the RPS market in 2010 and has been accelerating rapidly since then. DOER expects further strong growth in the years ahead, boosted by the Solar Carve-Out II that commenced in 2014, by the new [Solar Loan Program announced by Governor](#)

⁹⁶ 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.

⁹⁷ The Load Obligation projections here are the same those for RPS Class I in Table Seven. See explanation and reference in footnote 44 regarding the use of “load obligation” for “retail sales.”

⁹⁸ In fact, DOER has been partnering with the MassDEP and MassCEC to identify, evaluate, and promote these opportunities under the [Clean Energy Results Program \(CERP\)](#).

[Charlie Baker on December 17, 2015](#),⁹⁹ and by favorable equipment and installation cost trends. This growth rate also may be affected by legislation signed into law on April 11, 2016, that increases net metering caps, reduces future net metering credit values, and directs DOER to develop and implement a successor incentive program to the SCO II program, a process which is already underway¹⁰⁰. The December 2015 extension of the federal Investment Tax Credit will also certainly provide additional incentives for solar PV into the next decade.

The 2012 changes in the RPS Class I eligibility of woody biomass fueled plants introduced challenging, overall efficiency requirements on the development of new biomass projects and should focus development activities on such technologies as CHP. Although the new standards do not apply to already qualified plants until 2016 (except for the requirement and documentation of sustainable fuel sourcing, which was effective on January 1, 2013), several of the qualified plants in northern New England already had ceased operation or reduced output well before 2013. Note that those decisions seemingly resulted from the decline in electricity prices due to lower natural gas prices and softening electricity demand. DOER expects most of the biomass plants that were temporarily grandfathered from the efficiency requirements of the new standards to become unqualified at the end of 2015, which will further reduce the quantity of woody biomass sourced RPS Class I RECs available to the market in 2016 and perhaps some time thereafter.

The **Solar Carve-Out** had a third year of surplus generation in 2014 after shortfalls during the development ramp-up years of 2010 and 2011, not unlike the original RPS in its early years, followed by a sharply upward development curve. While only 26,598 SRECs were generated in 2011, 118,356 were generated in 2012, 300,816 in 2013, and 605,969 in 2014. During 2015, 757,012 SRECs were generated, according to NEPOOL GIS. This dramatic increase in generation is the result of a rapid increase in installed capacity. While only 12 MW of new solar capacity were installed in 2010, 39 MW were installed in 2011, 135 MW in 2012, 230 MW in 2013, and 215 MW in 2014. With the final SCO qualifications granted in the summer of 2014, only 27 MW came on line during 2015, and the final 5.9 MW came on line in February 2016. This dramatic increase in installed capacity led to a significant market oversupply that began in 2012 and continued through 2014.

However, current spot market prices seem to indicate a period of shortage after 2014. The shortage results from two consecutive years of the Solar Credit Clearinghouse Auction requiring all three rounds before clearing. When this occurs, the volume of certificates deposited into the auction is added to the following year's compliance obligation twice. This is designed to (a) ensure that there is adequate demand for the auction to clear and (b) encourage retail Suppliers to place bids in earlier rounds of the auction to avoid a large demand increase that exceeds available supply. By not placing sufficient bids in the earlier rounds of the 2012 and 2013 auctions, Suppliers essentially guaranteed that the 2015 and/or 2016 Compliance Years were likely to see significant SREC shortages.

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 Ten). 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 rate (\$66.16 per MWh for 2014), while any shortfall under 2010 and later contracts can be met by ACPs under a higher SCO rate (\$550 for 2011-2013, \$523 in 2014, and continuing to decline by regulation).

⁹⁹ For information on the Solar Loan Program, visit these two pages: [here](#) and www.masssolarloan.com.

¹⁰⁰ See [Chapter 75 of the Acts of 2016](#).

Table Ten
MA Solar Carve-Out Loads Served under Pre-2010 & More Recent Retail Contracts,
Actual (2010-2014) & Projected (2015-2019), in MWh¹⁰¹

| Year | Actual/Projected Total Load Obligation | Load Served under pre-2010 Retail Contracts, Actual/Projected | Load Served under 2010 or later Retail Contracts, Actual/Projected |
|-------------|---|--|---|
| 2010 | 50,026,093 | 19,323,329 | 30,702,764 |
| 2011 | 49,386,169 | 7,248,357 | 30,099,623 |
| 2012 | 48,992,430 | 2,506,922 | 46,485,508 |
| 2013 | 49,252,929 | 1,547,374 | 47,705,645 |
| 2014 | 48,129,294 | 327,144 | 47,802,150 |
| 2015 | 48,847,294 | 41,244 | 48,806,050 |
| 2016 | 48,952,227 | 8,761 | 48,943,466 |
| 2017 | 48,815,897 | - | 48,815,897 |
| 2018 | 48,562,242 | - | 48,562,242 |
| 2019 | 48,366,423 | - | 48,366,423 |
| 2020 | 48,204,480 | - | 48,204,480 |

The **Solar Carve-Out II** commenced on April 25, 2014, providing the incentive for continued PV development, and projects are getting qualified and implemented at a rapid pace. Up until now, the speed has been driven, in part, by the impending end of the federal Investment Tax Credit. In 2014, 97.4 MW of qualified capacity came on line, while more than 296.4 MW came on line in 2015, continuing the SCO's PV development pace of 2013-14. Further rapid supply growth is expected, especially with the mid-December extension of the federal incentive and the new January 8, 2017, construction deadline for all generators qualified under the emergency regulation expansion to the program. While only 15,908 SREC IIs were generated in 2014, the rapid installation rate in 2014 and 2015 led to the generation of 192,855 SREC IIs in 2015, considerably more than a 1,000% increase. As a result, DOER expects a significant market oversupply in 2015.

Demand for SREC-IIs is affected over the next few years by the "exempt load" provisions in the regulation, meant to avoid any undue penalty for Suppliers' retail contracts already in force when this Minimum Standard became effective. Since the program officially started on April 25, 2014, partway into the Compliance Year, the regulation provided that all retail load under contracts on or before that date would be exempt from Solar Carve-Out II compliance. The April 8, 2016 emergency regulations also include an additional exemption that is not expected to take effect until Compliance Year 2018. Under this exemption, any load served under contracts entered into on or before May 8, 2016 will be exempt from incremental load obligations resulting from the program expansion.

Supplier-projected exempt load estimates are shown in Table Eleven.

¹⁰¹ Also see footnote 55 and more detailed information at the URL provided there regarding still other ways in which the Minimum Standard may differ in relation to the amounts of retail load served under different contract dates.

Table Eleven
MA Solar Carve-Out II Net Retail Load Obligations Served under
Post-4/25/2014 Retail Contracts, Actual (2014) & Projected (2015-2020), in MWh¹⁰²

| Year | Total Retail Load Obligation | Exempt Load, served under pre-4/26/14 Retail Contracts | Net Retail Load Obligation |
|------|------------------------------|--|----------------------------|
| 2014 | 48,129,294 | 23,171,635 | 24,957,659 |
| 2015 | 48,847,294 | 11,865,442 | 36,981,852 |
| 2016 | 48,952,227 | 6,529,910 | 42,422,317 |
| 2017 | 48,815,897 | 3,612,904 | 45,202,993 |
| 2018 | 48,562,242 | 2,062,567 | 46,499,675 |
| 2019 | 48,366,423 | 1,492,780 | 46,873,643 |
| 2020 | 48,204,480 | TBD | TBD |

Class II RECs have been in short supply since the beginning of this Minimum Standard in 2009. The absolutely limiting fact is that the total pre-1998 installed capacity cannot rise, but some additional *portion* of that capacity is expected to qualify for Class II over time. The unknown factors for future supply are (a) how *much* of that capacity, mostly from hydroelectric plants, will succeed in the future to meet the MA RPS Class II environmental criteria, and (b) how much of the MA Class II REC qualified or qualifiable supply will be used for compliance with classes of RPS in *other* New England states for which they are also qualified and some of which have higher ACP rates for pre-1998 capacity. The percentage of such loss to other states, mostly Connecticut and New Hampshire, for 2010 through 2014 has been 19%, 24%, 28%, 16%, and 19% respectively¹⁰³.

Class II WECs are likely to remain in surplus for another year or two, while the net load obligation rises toward rough parity with the annual supply. The desired approach to parity has been undermined heretofore by the effects of considerable banking forward of WECs prior to expiration of the Exempt Load. By means of the Class II rulemaking that concluded on June 20, 2014, DOER instituted a two year hiatus in banking (2014-2015), during which the quantity of already-banked WEC attributes would become zero (by compliance use or expiration). When banking resumes, it will be limited to 5% of a Supplier's WEC obligation, not the current 30%. Although DOER projects the Exempt Load to reach zero by 2017, a slow decline in total retail load after 2016 may result in a slowly growing surplus but only a limited balance of WECs being banked forward, due to the 5% limit.

APS is experiencing a growing rate of applications for CHP Units. In 2014, the output was 56% higher than in 2013. The rate of deployment of new CHP systems is highly dependent on the pace at which projects receive incentive awards for capital expenses from the Massachusetts Energy Efficiency Program administered by [Mass Save](#) for the electric utilities. As of late 2014, the following indicate that higher levels of CHP output can be expected in the future:

- Late in 2014 DOER qualified the incremental output of about 40 MW thermal from the existing 255 MW Kendall Generating Station, a district energy CHP plant in Cambridge. The increased output is a consequence of the plant's recent interconnection to a large district steam system in Boston, to which it now supplies steam.
- In 2015 more than 15 MW^e of new CHP projects have come on line in Massachusetts.

¹⁰² Also see footnote 55 and more detailed information at the URL provided there regarding still other ways in which the Minimum Standard may differ in relation to the amounts of retail load served under different contract dates.

¹⁰³ See footnote 71.

- A number of large new CHP projects in the pipeline could add up to 90 MW^e of generating capacity.

The growing supply of AECs will have to chase a growing net load obligation, as the Exempt Load declines during the next several years, and the Minimum Standard continues rising, albeit at a lower rate than heretofore: 0.25% annually instead of 0.5%, beginning with 3.75% for 2015.

In 2014 the legislature mandated DOER to add Renewable Thermal technologies to the APS as of 2015. After a number of months developing what has proven to be a technically challenging new standard, DOER will launch the necessary rulemaking in spring 2016 and hopes to complete the process by the end of the year. Thereafter, DOER anticipates the generation of AECs from projects of a wide range of sizes utilizing solar domestic hot water and space heating, wood pellet heating, heat pumps, and other qualifying technologies. AECs from Renewable Thermal projects are expected to provide increasing shares of the supply demanded for the rising APS Minimum Standard during the years ahead, even while CHP development continues increasing.

SECTION NINE ALTERNATIVE COMPLIANCE PAYMENT FUNDS

The Alternative Compliance mechanism for meeting RPS and APS obligations in CY 2014 resulted in total ACP proceeds of almost \$28.5 million, as detailed in Table Twelve. Although substantial, this total is \$4 million less than in 2013. Below are observations on ACP trends.

- **RPS Class I:** After two years of undersupply and higher ACPs in 2011 and 2012, the supply rebounded robustly in 2013 (especially from wind projects), PV generation continued accelerating, and the use of ACPs plummeted in both 2013 and 2014.
- **RPS Class I Solar-Carve Out:** The high ACP total in 2010 and 2011 were due to the commencement of this obligation in 2010 and the delay of supply emerging from the PV development pipeline. However, rapidly accelerating development of PV arrays was more than enough to eliminate the shortfall and resulted in a market oversupply and minimal use of ACP for 2012, a trend that continued through 2013 and 2014, meeting DOER's expectations. However, as noted in the paragraph at the top of page 29, shortages may develop in 2015.
- **RPS Class I Solar-Carve Out II:** A significant ACP total was expected for 2014, this obligation's start-up year. However, project applications, qualifications, and installations are rapidly accelerating, which should result in ACP reductions.
- **RPS Class II Renewable Energy:** The shortage is due to continued technical and financial issues for hydropower plants, especially a preference for settling certificates in the RPS programs of certain other New England states on the part of some Units that do or could qualify for MA RPS Class II. That preference is due to differences between the programs with regard to eligibility standards and REC prices.¹⁰⁴ However, the use of ACPs did decline substantially for 2013 and again for 2014, due to DOER's sharp downward revision in the Minimum Standard through a rulemaking that ended on June 20, 2014, but whose applicability began with CY 2013.
- **RPS Class II Waste Energy:** There should be very little or no need for the ACP mechanism, due to the continued substantial oversupply of WECs until the Exempt Load disappears in 2017. Although even less ACP was paid for 2014 than for 2013 compliance, more than 343,000 WECs of 2014 vintage were still left unsold by the owners of the Generation Units. Thus, although no need for ACP exists, actual behavior of individual market participants may perpetuate at least some use of the ACP mechanism and may prevent WEC prices from falling very low.

¹⁰⁴ For more extensive discussion, see DOER's 12/31/12 report to the Legislature: [Evaluation of the Massachusetts RPS Class II Program](#).

- **APS:** The annually increasing ACP totals through 2013 were due to an increased non-Exempt retail load subject to the obligation (noted above for Class II), combined with annual increases in the obligation and a slow emergence of projects from the development pipeline. However, in 2014 the AEC supply increased and the shortfall decreased, due to a full year's output of previously qualified CHP projects and the APS-qualified incremental thermal output of the very large Kendall Generating Station in Cambridge, which commenced late in 2014. The large supply shortfall and dependence on ACPs should decline over the coming years, assisted by only small increases and then decreases in electricity demand, by a smaller annual Minimum Standard increase that begins in 2015 – 0.25% instead of 0.5% – and by the 2016 arrival and future growth of AECs from Renewable Thermal projects. Continued increases of CHP should also contribute to this turnaround.

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 under the terms of agreements between the two entities and under any limitations specified in the regulations.¹⁰⁵ The regulations provide that the 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 the 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, among other things, local and state-level clean energy projects and activities of DOER’s Green Communities Division.

Table Twelve
ACP Proceeds per Portfolio Standard, 2010-2014
(rounded to the nearest dollar)

| Program/Class | 2014 | 2013 | 2012 | 2011 | 2010 |
|--------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| RPS Class I | \$ 378,369 | \$ 2,065,273 | \$ 16,350,132 | \$ 6,598,386 | \$ 241,551 |
| RPS Class I Solar Carve-Out | \$ 553,512 | \$ 306,518 | \$ 245,360 | \$ 23,887,474 | \$ 11,682,793 |
| RPS Class I Solar Carve-Out II | \$ 2,115,001 | N/A | N/A | N/A | N/A |
| RPS Class II Renewable Energy | \$ 7,288,033 | \$ 10,207,169 | \$ 38,347,727 | \$ 35,862,072 | \$ 35,002,925 |
| RPS Class II Waste Energy | \$ 32,232 | \$ 148,236 | \$ 253,993 | \$ 24,113 | \$ 57,970 |
| APS (Alternative Energy) | \$ 18,147,169 | \$ 19,750,452 | \$ 17,397,429 | \$ 12,116,514 | \$ 7,829,400 |
| Total¹⁰⁶ | \$ 28,514,316 | \$ 32,477,648 | \$ 72,594,641 | \$ 78,488,558 | \$ 54,814,638 |

The *ACP Spending Plan* plan for each year since 2010 is made available at the [Annual Compliance Reports page](#), accessible via DOER’s [RPS & APS homepage](#). Any future *Plans* will be posted there when they are ready.

¹⁰⁵These provisions are found in the Regulations for RPS Class I, RPS Class II, and APS respectively, as follows: 225 CMR 14.08(3)(d), 225 CMR 15.08(3)(b), 225 CMR 15.08(4)(b), and 225 CMR 16.08(3)(b).

¹⁰⁶ Each of the totals, as rounded, is correct.

APPENDIX ONE

RPS and APS 2015 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 2014 were required to submit their Annual Compliance Filings for 2014 by Wednesday, July 1, 2015. DOER issued forms and instructions for the Filings on May 29, 2015, just over two weeks before the end of the NEPOOL GIS trading period for the fourth quarter of 2014. By July 1st DOER had received emailed Filings from all four regulated utilities and from 48 of the 52 Competitive Suppliers, with the remaining four arriving on July 2nd, 6th, 13th, and 21st. No Supplier failed to file, although one, Perigee Energy, did not make its Alternative Compliance Payment (ACP) until August 19th, and another, Glacial Energy, has not provided its ACP and has been found by DOER to be in Non-compliance with its RPS and APS obligations; see the last paragraph, below.

The review encompassed both printed and electronic copies of Filers' compliance 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 available to verify the electronic versions of those reports. DOER contacted fewer than half of the Suppliers for corrected or additional information, documentation, explanations, and clarifications. Most of the issues had to do with inadequate or incorrect exempt load information and delayed or incorrectly formatted submission of GIS reports. There was much less confusion than in 2013 regarding the spreadsheets by which DOER tried to help Suppliers sort their Retail Load Obligations as required for use of the correct SCO percentage obligations. In addition, there was much less confusion regarding what to do with surplus SRECs than in 2013, which was the first year of a high SREC surplus. By 2014, all Suppliers realized the value of transferring them to the SCC Auction Account at the GIS, from which they were all sold in the first round as Reminted Auction SRECs with a two year shelf life, and none were used for non-SCO Class I compliance. The revised method for ascertaining annual compliance, introduced for 2011 and depending on good cooperation from the regulated utilities, has simplified the task of Suppliers in calculating their obligations.

One Supplier, Glacial Energy of New England, Inc., submitted its Filing thirteen days late and did not make the required Alternative Compliance Payments to cover the portion of its obligation not met by Certificate purchases, referencing a bankruptcy proceeding. Upon subsequent failure to provide any promises or assurance regarding payment, on September 21, 2015, DOER sent to Glacial and posted at the RPS homepage a formal [Notice of Non-Compliance](#). During the week that followed, DOER received further communications from Glacial and also learned that on September 23, Glacial had withdrawn its Massachusetts Competitive Supplier license at the Department of Public Utilities. DOER has since learned that Glacial was sold to Platinum Partners in a bankruptcy auction on June 16, 2014, and Platinum Partners sold Glacial to Agera Energy, LLC, two days later. Agera then applied for competitive supplier licenses in several states where Glacial had operated, with the stated intention of assuming Glacial's retail contracts; the application for Massachusetts was submitted on September 24, 2014, and approved on April 3, 2015. Having learned of Agera's assumption of Glacial's contracts and, consequently, its regulatory responsibilities, on December 15, 2015, DOER sent Agera's General Counsel, Michael J. Nordlicht, a new Non-Compliance Notice of Agera's responsibility to comply with its RPS and APS obligations for 2014. DOER notes that Glacial continued serving Massachusetts retail customers during part of 2015, so this issue may carry over to the 2015 Compliance Year with Agera.

APPENDIX TWO

2013 RPS and APS Compliance Summaries¹⁰⁷

Table A
RPS Class I Compliance Summary, 2014 (MWh)¹⁰⁸

| | RETAIL SALES | CLASS I RENEWABLE GENERATION ATTRIBUTES | | | | | 8.0081% RPS CLASS I NET OBLIGATION | BANKING FOR FUTURE COMPLIANCE | | |
|------------------------------------|-----------------------------------|---|------------------------------|------------------------------|--------------------------------------|------------------------------------|--|----------------------------------|---------------------------|----------------------|
| RETAIL ELECTRICITY SUPPLIERS | Load Obligation from Filing | 2014 Class I RECs | 2012 Banked Attributes | 2013 Banked Attributes | Alternative Compliance Credits | Total RPS Class I Attributes | | Excess Attributes | Banking Limit (30%) | Banked Attributes |
| DISTRIBUTION COMPANIES | | | | | | | | | | |
| Fitchburg Gas & Electric | 222,171 | 14,410 | - | 3,480 | - | 17,890 | 17,701 | 189 | 5,311 | 189 |
| National Grid | 11,395,971 | 855,706 | - | 68,298 | - | 924,004 | 907,985 | 16,019 | 272,396 | 16,019 |
| NSTAR | 9,305,005 | 744,120 | - | 59,008 | - | 803,128 | 741,385 | 61,743 | 222,416 | 61,743 |
| W Mass Electric | 1,905,000 | 152,897 | - | - | 32 | 152,929 | 152,929 | - | 45,879 | - |
| SUBTOTALS | 22,828,147 | 1,767,133 | - | 130,786 | 32 | 1,897,951 | 1,820,000 | 77,951 | 546,002 | 77,951 |
| COMPETITIVE SUPPLIERS | | | | | | | | | | |
| SUBTOTALS | 25,301,147 | 2,212,825 | 38,814 | 103,060 | 5,687 | 2,360,386 | 2,034,245 | 326,182 | 610,294 | 326,025 |
| TOTALS | 48,129,294 | 3,979,958 | 38,814 | 233,846 | 5,719 | 4,258,337 | 3,854,245 | 404,133 | 1,156,296 | 403,976 |

Table B
RPS Solar Carve-Out Renewable Energy Compliance Summary, 2014 (MWh)

| | RETAIL SALES | SOLAR CARVE-OUT RENEWABLE GENERATION ATTRIBUTES | | | | | 0.9481% RPS SCO Obligation | BANKING FOR FUTURE COMPLIANCE | | |
|------------------------------------|--------------------------------------|--|--------------------------|------------------------------|--------------------------------------|--------------------------------|----------------------------------|----------------------------------|---------------------------|----------------------|
| RETAIL ELECTRICITY SUPPLIERS | Load Obligation from Filing | 2014 SRECs | 2012Banked Attributes | 2013 Banked Attributes | Alternative Compliance Credits | Total RPS SCO Attributes | | Excess Attributes | Banking Limit (10%) | Banked Attributes |
| DISTRIBUTION COMPANIES | | | | | | | | | | |
| Fitchburg Gas & Electric | 222,171 | 2,150 | 32 | 66 | - | 2,248 | 2,107 | 141 | 211 | 141 |
| National Grid | 11,395,971 | 115,382 | - | 3,453 | - | 118,835 | 108,046 | 10,789 | 10,805 | 10,789 |
| NSTAR | 9,305,005 | 94,645 | - | 2,397 | - | 97,042 | 88,222 | 8,820 | 8,823 | 8,820 |
| W Mass Electric | 1,905,000 | 18,065 | - | - | - | 18,065 | 18,062 | 3 | 1,807 | 3 |
| SUBTOTALS | 22,828,147 | 230,242 | 32 | 5,916 | - | 236,190 | 216,437 | 19,753 | 21,646 | 19,753 |
| COMPETITIVE SUPPLIERS | | | | | | | | | | |
| SUBTOTALS | 25,301,147 | 250,511 | 78 | 2,133 | 3,657 | 256,379 | 239,910 | 16,469 | 24,014 | 16,469 |
| TOTALS | 48,129,294 | 480,753 | 110 | 8,049 | 3,657 | 492,569 | 456,347 | 36,222 | 45,660 | 36,222 |

¹⁰⁷ 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. Names of all Retail Electricity Suppliers are listed in Table One in Section Two.

¹⁰⁸ Solar Carve-Out & Solar Carve-Out II are netted out from the Class I table, although included in Tables G, H, and I of Appendix Three.

Table C
RPS Solar Carve-Out II Renewable Energy Compliance Summary, 2014 (MWh)

| | RETAIL SALES | | | SOLAR CARVE-OUT II RENEWABLE GENERATION ATTRIBUTES | | | | | 0.0843% RPS SCO-II Obligation | BANKING FOR FUTURE COMPLIANCE | | |
|--|-----------------------------------|-----------------------|--------------------|--|-------------|-------------|--------------------------------------|-----------------------------------|-------------------------------------|----------------------------------|---------------------------|----------------------|
| RETAIL ELECTRI- CITY SUPPLI- ERS | Load Obligation from Filing | Exempt Retail Load | Net Retail Load | 2014 SREC-IIs | 2012 Banked | 2013 Banked | Alternative Compliance Credits | Total RPS SCO-II Attributes | | Excess Attributes | Banking Limit (10%) | Banked Attributes |
| DISTRIBUTION COMPANIES | | | | | | | | | | | | |
| Fitchburg Gas & Electric | 222,171 | - | 222,171 | 187 | | | 1 | 188 | 188 | - | 19 | |
| National Grid | 11,395,971 | - | 11,395,971 | 6,308 | | | 3,299 | 9,607 | 9,607 | - | 961 | |
| NSTAR | 9,305,005 | - | 9,305,005 | 6,683 | | | 1,162 | 7,845 | 7,845 | - | 785 | |
| W. Mass Electric | 1,905,000 | 1,361,448 | 543,552 | 453 | | | 6 | 459 | 459 | - | 46 | |
| SUB- TOTALS | 22,828,147 | 1,361,448 | 21,466,699 | 13,631 | | | 4,468 | 18,099 | 18,099 | 0 | 1,811 | |
| COMPETITIVE SUPPLIERS | | | | | | | | | | | | |
| SUB- TOTALS | 25,301,147 | 21,801,960 | 3,499,187 | 2,002 | | | 1,008 | 3,010 | 2,977 | 187 | 324 | 21 |
| TOTALS | 48,129,294 | 23,163,408 | 24,965,886 | 15,633 | | | 5,476 | 21,109 | 21,076 | 187 | 2,135 | 21 |

Table D
RPS Class II Renewable Energy Compliance Summary, 2014 (MWh)

| | RETAIL SALES | | | CLASS II RENEWABLE ENERGY ATTRIBUTES | | | | | 1.75% RPS Class II RE Obligation | BANKING FOR FUTURE COMPLIANCE | | |
|------------------------------|-----------------------------|--------------------|-----------------|--------------------------------------|-------------|------------------------|--------------------------------|----------------------------------|--|-------------------------------|---------------------|-------------------|
| RETAIL ELECTRICITY SUPPLIERS | Load Obligation from Filing | Exempt Retail Load | Net Retail Load | 2014 Class II RECs | 2012 Banked | 2013 Banked Attributes | Alternative Compliance Credits | Total RPS Class II RE Attributes | | Excess Attributes | Banking Limit (30%) | Banked Attributes |
| DISTRIBUTION COMPANIES | | | | | | | | | | | | |
| Fitchburg Gas & Electric | 222,171 | 0 | 222,171 | 4,617 | 0 | 0 | 0 | 4,617 | 3,888 | 729 | 1,167 | 729 |
| National Grid | 11,395,971 | 0 | 11,395,971 | 76,878 | 0 | 0 | 122,552 | 199,430 | 199,430 | 0 | 59,829 | 0 |
| NSTAR | 9,305,005 | 0 | 9,305,005 | 54,109 | 0 | 0 | 108,729 | 162,838 | 162,838 | 0 | 48,852 | 0 |
| W. Mass Electric | 1,905,000 | 0 | 1,905,000 | 30,374 | 0 | 0 | 2,964 | 33,338 | 33,338 | 0 | 10,002 | 0 |
| SUB-TOTALS | 22,828,147 | 0 | 22,828,147 | 165,978 | 0 | 0 | 234,245 | 400,223 | 399,494 | 729 | 119,850 | 729 |
| COMPETITIVE SUPPLIERS | | | | | | | | | | | | |
| SUB-TOTALS | 25,301,147 | 79,801 | 25,221,346 | 360,437 | 0 | 104,498 | 34,092 | 499,027 | 441,399 | 61,672 | 132,444 | 41,306 |
| TOTALS | 48,129,294 | 79,801 | 48,049,493 | 526,415 | 0 | 104,498 | 268,337 | 899,250 | 840,893 | 62,401 | 252,294 | 42,035 |

Table E
RPS Class II Waste Energy Compliance Summary, 2014 (MWh)

| | RETAIL SALES | | | CLASS II WASTE ENERGY ATTRIBUTES | | | | | 3.5% RPS Class II WE Obligation | BANKING FOR FUTURE COMPLIANCE | | |
|---|-----------------------------------|-----------------------|--------------------|----------------------------------|-------------|---------------------------|--------------------------------------|--|---------------------------------------|-------------------------------|---|----------------------|
| RETAIL ELECTRI -CITY SUPPLI- ERS | Load Obligation from Filing | Exempt Retail Load | Net Retail Load | 2014 Class II WECs | 2012 Banked | 2013 Banked Attributes | Alternative Compliance Credits | Total RPS Class II WE Attributes | | Excess Attributes | NO Banking in 2014 or 2015 (5% limit thereafter) | Banked Attributes |
| DISTRIBUTION COMPANIES | | | | | | | | | | | | |
| Fitchburg Gas & Electric | 222,171 | 0 | 222,171 | 7,720 | 0 | 39 | 17 | 7,776 | 7,776 | 0 | 0 | 0 |
| National Grid | 11,395,971 | 0 | 11,395,971 | 308,767 | 0 | 90,092 | 0 | 398,859 | 398,859 | 0 | 0 | 0 |
| NSTAR | 9,305,005 | 0 | 9,305,005 | 237,169 | 0 | 88,507 | 0 | 325,676 | 325,676 | 0 | 0 | 0 |
| W. Mass Electric | 1,905,000 | 0 | 1,905,000 | 66,678 | 0 | 0 | 0 | 66,678 | 66,675 | 3 | 0 | 0 |
| SUB- TOTALS | 22,828,147 | 0 | 22,828,147 | 620,334 | 0 | 178,638 | 17 | 798,989 | 798,986 | 3 | 0 | 0 |
| COMPETITIVE SUPPLIERS | | | | | | | | | | | | |
| SUB- TOTALS | 25,301,147 | 79,801 | 25,221,346 | 820,336 | 0 | 73,355 | 2,951 | 896,642 | 882,773 | 13,870 | 0 | 0 |
| TOTALS | 48,129,294 | 79,801 | 48,049,493 | 1,440,670 | 0 | 251,993 | 2,968 | 1,695,631 | 1,681,759 | 13,873 | 0 | 0 |

Table F
APS Alternative Energy Compliance Summary, 2014 (MWh)

| | RETAIL SALES | | | APS ALTERNATIVE ENERGY ATTRIBUTES | | | | | 3.5% APS Obligation | BANKING FOR FUTURE COMPLIANCE | | |
|------------------------------|-----------------------------|--------------------|-----------------|-----------------------------------|-------------|------------------------|--------------------------------|----------------------|---------------------|-------------------------------|---------------------|-------------------|
| RETAIL ELECTRICITY SUPPLIERS | Load Obligation from Filing | Exempt Retail Load | Net Retail Load | 2014 APS AECs | 2012 Banked | 2013 Banked Attributes | Alternative Compliance Credits | Total APS Attributes | | Excess Attributes | Banking Limit (30%) | Banked Attributes |
| DISTRIBUTION COMPANIES | | | | | | | | | | | | |
| Fitchburg Gas & Electric | 222,171 | 0 | 222,171 | 7,169 | 0 | 607 | 0 | 7,776 | 7,776 | 0 | 2,333 | 0 |
| National Grid | 11,395,971 | 0 | 11,395,971 | 285,198 | 0 | 0 | 113,661 | 398,859 | 398,859 | 0 | 119,658 | 0 |
| NSTAR | 9,305,005 | 0 | 9,305,005 | 281,526 | 0 | 0 | 44,150 | 325,676 | 325,676 | 0 | 97,703 | 0 |
| W. Mass Electric | 1,905,000 | 0 | 1,905,000 | 36,420 | 0 | 0 | 30,255 | 66,675 | 66,675 | 0 | 20,003 | 0 |
| SUB-TOTALS | 22,828,147 | 0 | 22,828,147 | 610,313 | 0 | 607 | 188,066 | 798,986 | 798,986 | 0 | 239,697 | 0 |
| COMPETITIVE SUPPLIERS | | | | | | | | | | | | |
| SUB-TOTALS | 25,301,147 | 79,801 | 25,221,346 | 220,767 | 0 | 6,740 | 647,439 | 874,946 | 882,773 | 261 | 264,853 | 261 |
| TOTALS | 48,129,294 | 79,801 | 48,049,493 | 831,080 | 0 | 7,347 | 835,505 | 1,673,932 | 1,681,759 | 261 | 504,550 | 261 |

APPENDIX THREE

Data Tables for RPS and APS Compliance by Generation Location and Type¹⁰⁹

The first three tables below provide the data from which the Class I graphs in Figures Two through Five were generated. Those graphs and these tables include SREC data for the Solar Carve-Out (SCO), which is within Class I. SREC data beginning in 2012 also includes SRECs that were transferred to the Auction Account at the GIS, becoming Reminted Auction SRECs, which are available to use for SCO compliance in the two or three years after their generation year. Note the 2013 arrival of Marine & Hydrokinetic.

Table G
RPS Class I Compliance by Generation Location, 2005-2014

| | 2005 MWh | 2006 MWh | 2007 MWh | 2008 MWh | 2009 MWh | 2010 MWh | 2011 MWh | 2012 MWh | 2013 MWh | 2014 MWh | % |
|----------------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------|
| CT | 14,353 | 13,204 | 10,180 | 25,333 | 21,371 | 20,146 | 16,414 | 16,070 | 16,452 | 11,397 | 0.2 |
| ME | 285,289 | 367,298 | 520,821 | 500,479 | 526,906 | 760,476 | 746,648 | 864,227 | 1,114,355 | 1,039,509 | 22.4 |
| MASS | 157,022 | 184,777 | 192,200 | 197,949 | 197,530 | 197,748 | 286,115 | 483,925 | 791,088 | 1,118,406 | 24.1 |
| NH | 40,677 | 53,556 | 265,062 | 261,468 | 307,909 | 282,308 | 331,996 | 531,430 | 640,808 | 508,841 | 11.0 |
| RI | 42,659 | 62,230 | 42,562 | 34,848 | 26,061 | 1,182 | 41,952 | 37,131 | 23,288 | 11,059 | 0.2 |
| VT | 14,476 | 26,595 | 46,915 | 49,207 | 112,670 | 108,849 | 149,505 | 173,191 | 364,691 | 407,497 | 8.8 |
| NMISA ¹¹⁰ | 0 | 455 | 54,079 | 66,418 | 66,071 | 89,405 | 22,742 | 49,144 | 64,629 | 67,369 | 1.5 |
| NY | 90,373 | 175,961 | 265,299 | 517,427 | 527,751 | 580,683 | 688,039 | 620,904 | 870,508 | 880,859 | 19.0 |
| PEI | 0 | 0 | 16,922 | 28,111 | 113,282 | 144,549 | 142,688 | 125,713 | 142,478 | 189,578 | 4.1 |
| QC | 0 | 54,696 | 85,493 | 215,835 | 230,367 | 138,263 | 213,713 | 278,794 | 356,139 | 397,130 | 8.6 |
| Total | 644,849 | 938,772 | 1,599,533 | 1,896,811 | 2,129,918 | 2,323,609 | 2,639,812 | 3,180,529 | 4,384,436 | 4,631,645 | 100 |

Table H
RPS Class I Compliance by Generation Type, 2005-2014

| Type ¹¹¹ | 2005 MWh | 2006 MWh | 2007 MWh | 2008 MWh | 2009 MWh | 2010 MWh | 2011 MWh | 2012 MWh | 2013 MWh | 2014 MWh | % |
|------------------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------|
| Anaerobic Digester Gas | 23,710 | 27,115 | 27,511 | 26,328 | 28,204 | 24,292 | 25,115 | 27,373 | 22,853 | 9,868 | 0.2 |
| Other Biomass | 285,289 | 395,856 | 782,315 | 743,882 | 571,757 | 584,505 | 392,629 | 394,754 | 357,575 | 375,109 | 8.1 |
| Hydroelectric | N/A | N/A | N/A | N/A | 47,490 | 80,823 | 105,484 | 105,326 | 113,936 | 129,790 | 2.8 |
| Landfill Gas | 335,151 | 449,633 | 486,558 | 660,937 | 690,851 | 736,298 | 848,229 | 891,798 | 954,656 | 820,001 | 17.7 |
| Marine & Hydrokinetic | N/A | N/A | N/A | N/A | 0 | 0 | 0 | 0 | 6,837 | 28,959 | 0.6 |
| Solar PV | 6 | 216 | 803 | 1,799 | 2,420 | 4,116 | 36,688 | 138,159 | 323,164 | 681,502 | 14.7 |
| Wind | 693 | 65,952 | 302,346 | 463,865 | 789,196 | 893,575 | 1,231,667 | 1,623,119 | 2,605,415 | 2,586,416 | 55.8 |
| Totals | 644,849 | 938,772 | 1,599,533 | 1,896,811 | 2,129,918 | 2,323,609 | 2,639,812 | 3,180,529 | 4,384,436 | 4,631,645 | 100 |

¹⁰⁹ Note that regularly updated tables listing all RPS and APS qualified Generation Units, including their locations and types, are available for viewing and downloading via DOER's RPS/APS homepage, www.mass.gov/energy/rps.

¹¹⁰ NMISA is the Northern Maine Independent System Administrator, regarding which see footnote 49.

¹¹¹ Note that the Massachusetts RPS statute and regulations include "biogas" (including anaerobic digestion gas) within the list of Eligible Biomass Fuels. However, DOER tracks anaerobic digester generation separately. Landfill gas, which is included within "biomass" in some state RPS programs, is listed separately from Biomass in the Massachusetts RPS statute and regulations. Note that, as of 2012, the Solar PV figures include SRECs that were transferred to the Auction and became Reminted Auction SRECs. The latter were not included in this table of the original 2012 report, but the 2012 data are updated here and in a corrected 2012 report.

Table I
RPS Class I Compliance by Generation Location and Type, 2014 (MWh)

| Type Location | Anaerobic Digester Gas | Other Biomass | Hydro- electric | Landfill Methane Gas | Marine & Hydro- kinetic | Solar Photo- voltaic | Wind | Total |
|-------------------------------|------------------------------|------------------|--------------------|----------------------------|-------------------------------|----------------------------|------------------|------------------|
| Connecticut | 0 | 0 | 242 | 10,253 | 0 | 902 | 0 | 11,397 |
| Maine | 2,907 | 228,429 | 63,513 | 25,686 | 0 | 1,077 | 717,897 | 1,039,509 |
| MASSACHUSETTS | 5,875 | 1,372 | 17,710 | 187,854 | 28,959 | 645,754 | 230,882 | 1,118,406 |
| New Hampshire | 0 | 145,308 | 0 | 20,008 | 0 | 900 | 342,625 | 508,841 |
| Rhode Island | 0 | 0 | 1,108 | 0 | 0 | 1,307 | 8,644 | 11,059 |
| Vermont | 1,086 | 0 | 47,217 | 57,916 | 0 | 31,562 | 269,716 | 407,497 |
| Northern Maine ISA (NMISA) | 0 | 0 | 0 | 0 | 0 | 0 | 67,369 | 67,369 |
| New York | 0 | 0 | 0 | 453,998 | 0 | 0 | 426,861 | 880,859 |
| Prince Edward Island | 0 | 0 | 0 | 0 | 0 | 0 | 189,578 | 189,578 |
| Quebec | 0 | 0 | 0 | 64,286 | 0 | 0 | 332,844 | 397,130 |
| TOTAL | 9,868 | 375,109 | 129,790 | 820,001 | 28,959 | 681,502 | 2,586,416 | 4,631,645 |

Table J
RPS Class II Renewable Energy Compliance by Generation Location, 2009-2014

| Year Location | 2009 MWh | 2010 MWh | 2011 MWh | 2012 MWh | 2013 MWh | 2014 MWh | % |
|------------------|---------------|----------------|----------------|----------------|----------------|----------------|--------------|
| Connecticut | 805 | 2,378 | 11,178 | 2,933 | 5,848 | 6,557 | 1.2 |
| Maine | 0 | 18,605 | 42,540 | 72,014 | 171,754 | 110,517 | 21.0 |
| MASSACHUSETTS | 483 | 14,711 | 21,200 | 61,082 | 97,982 | 184,538 | 35.1 |
| New Hampshire | 33,514 | 29,369 | 69,674 | 55,454 | 86,931 | 96,101 | 18.3 |
| Rhode Island | 741 | 3,040 | 3,524 | 1,448 | 1,597 | 2,524 | 0.5 |
| Vermont | 0 | 28,837 | 30,610 | 53,106 | 145,497 | 126,143 | 24.0 |
| New York | 0 | 6,897 | 57,856 | 0 | 0 | 0 | 0 |
| Totals | 35,543 | 103,837 | 236,582 | 246,037 | 509,609 | 526,380 | 100.0 |

Table K
RPS Class II Renewable Energy Compliance by Generation Type, 2009-2014

| Year Type | 2009 MWh | 2010 MWh | 2011 MWh | 2012 MWh | 2013 MWh | 2014 MWh | % |
|---------------------|---------------|----------------|----------------|----------------|----------------|----------------|---------------|
| Hydropower | 35,543 | 96,552 | 172,051 | 246,037 | 509,462 | 526,097 | 99.95 |
| Landfill Methane | 0 | 7,285 | 64,531 | 0 | 0 | 0 | 0 |
| Marine/Hydrokinetic | 0 | 0 | 0 | 0 | 147 | 240 | 0.05 |
| Solar PV | 0 | 0 | 0 | 0 | 0 | 36 | 0.01 |
| Wind | 0 | 0 | 0 | 0 | 0 | 7 | 0.00 |
| Totals | 35,543 | 103,837 | 236,582 | 246,037 | 509,609 | 526,380 | 100.00 |

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

Table L
APS Compliance by Generation Type, 2009-2014
(all located in Massachusetts)

| Type¹¹² | Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | |
|------------------------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|
| | | MWh | MWh | MWh | MWh | MWh | MWh | % |
| CHP-- Biomass | | 0 | 0 | 0 | 0 | 2,689 | 2,797 | 0.34 |
| CHP – Natural Gas | | 128,922 | 225,104 | 324,619 | 347,993 | 529,462 | 826,966 | 99.52 |
| CHP – Waste to Energy | | 0 | 0 | 0 | 0 | 0 | 855 | 0.10 |
| Flywheel Storage | | 1,003 | 2,030 | 303 | 3,186 | 489 | 377 | 0.05 |
| Totals | | 129,925 | 227,134 | 324,922 | 351,179 | 532,640 | 830,995 | 100.00 |

Table M
Voluntary Renewable Energy Certificate Retirements for RGGI
by Generation Location & Type, 2014 (MWh)¹¹³

| Type | Anaerobic Digester Gas | Other Biomass | Hydro- electric | Landfill Methane Gas | Marine & Hydro- kinetic | Solar Photo- voltaic | Wind | Total |
|----------------------------------|---------------------------------------|--------------------------|----------------------------|-------------------------------------|--|-------------------------------------|---------------|---------------|
| Location | | | | | | | | |
| Connecticut | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maine | 0 | 0 | 65 | 0 | 0 | 0 | 11,243 | 11,308 |
| MASSACHUSETTS | 910 | 0 | 0 | 0 | 0 | 2,544 | 6,793 | 10,247 |
| New Hampshire | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rhode Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vermont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No. Maine ISA (NMISA) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New York | 0 | 0 | 0 | 0 | 0 | 0 | 9,559 | 9,559 |
| Prince Edward Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Quebec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 910 | 0 | 65 | 0 | 0 | 2,544 | 27,595 | 31,114 |

¹¹² CHP = Combined Heat and Power.

¹¹³ These RPS Class I RECs were documented in the Filings and/or NEPOOL GIS reports and are qualified to be retired by the MassDEP for the Regional Greenhouse Gas Initiative. For additional details, see footnote 40.