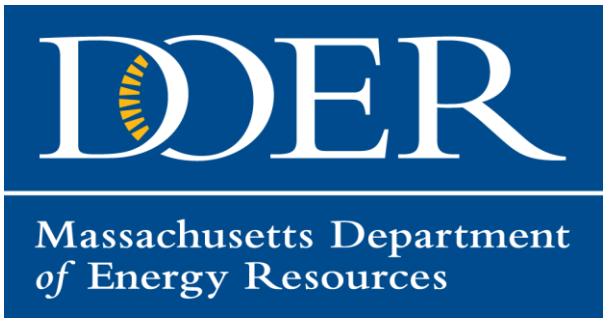


MASSACHUSETTS 2017 RENEWABLE PORTFOLIO STANDARD (RPS) AND ALTERNATIVE PORTFOLIO STANDARD (APS) ANNUAL COMPLIANCE REPORT

March 12, 2020

Renewable and Alternative Energy Division
Department of Energy Resources
Executive Office of Energy and Environmental Affairs
Commonwealth of Massachusetts

TABLES

FIGURES

EXECUTIVE SUMMARY

The Renewable Portfolio Standard (RPS) and Alternative Portfolio Standard (APS) programs continued to incentivize the development of new (and old) renewable generation in 2017. The total number of Massachusetts-qualified RPS Class I (including solar), RPS Class II and APS Generation Certificates available for RPS and APS compliance increased by 27% over 2016.[1]

This increase derives primarily from newly qualified solar facilities in Massachusetts under the Solar Carve-Out II program (SCOII), a carve-out within RPS Class I. The number of SCOII Renewable Energy Certificates (SRECIIs) created in NEPOOL GIS grew by 82%, from 556,497 MWh in 2016 to 1,014,285 MWh in 2017. SCOII generation units can only be located in Massachusetts and SRECIIs can only be used for Massachusetts compliance.

The number of Alternative Energy Certificates (AECs) increased by 113% from 2016, primarily due to the issuance of back-dated AECs (to January 1, 2015) with the adoption of the revised APS regulations in December. Revisions to the APS program incentivized additional (primarily thermal) alternative fuel sources such as air and ground source heat pumps, solar thermal, biomass, liquid biofuels, biogas, fuel cells, and waste-to-energy thermal.

Minimum Standards

The RPS requirements began in 2003 with an obligation of 1% of total retail electricity sales, which increased by 0.5% annually until it reached 4% in 2009. The RPS Class I obligation has increased by 1% annually since 2009 (between 2020 and 2029 it will increase by 2% annually). Since 2010, the Class I standard has included a Solar Carve-Out (SCO) obligation for in-state solar photovoltaic generation. The minimum standard obligation for the SCO and its 2014 successor program, Solar Carve-Out II change annually by formulas set in regulation.

The Class II Renewable Energy obligation rises annually per a schedule and formula set in regulation, while the Class II Waste-to-Energy obligation is fixed at 3.5% annually. The APS obligation, which was 4% in 2017, increases by 0.25% per year. The table below shows the 2017 minimum standard for each class, the resultant renewable obligation in MWh, and the total amount of Alternative Compliance Payments collected by class:

[1] Some of these Certificates also may be qualified in other states and hence used for compliance in other states and not necessarily Massachusetts.

Summary of Minimum Standards, Certificates Used to Meet Obligation, Alternative Compliance Payments

RPS/APS Class	Minimum Standard *	Total Obligation (MWh)	Certificates Used to Meet Obligations (MWh)	ACP Credits Used to Meet Obligations (MWh)	Alternative Compliance Payments ($)
RPS CLASS I	12.0000%	3,640,026	3,636,734	1,676	$113,465
RPS SCO **	1.6313%	743,619	743,413	1,167	$522,816
RPS SCO II **	2.8628%	1,102,398	1,087,922	13,889	$4,861,150
RPS CLASS II Renewable	2.5909%	1,184,485	793,847	390,463	$10,850,967
RPS CLASS II Waste-to-energy	3.5000%	1,600,090	1,588,887	10,816	$120,274
APS	4.2500%	1,942,959	1,800,115	141,974	$3,156,082
TOTAL* **	**21.0319%**	**10,213,577**	**9,650,918**	**559,985**	**$ 19,624,754**

* Total obligation may differ from calculated obligation because of contract exemptions, carveouts, or rounding of individual supplier obligations.
** Solar carve out requirements are subsets of the overall RPS Class I 12% requirement.
*** Total number of certificates and ACP credits does not exactly match total obligation due to 1) rounding of individual obligations, and 2) the non-compliance of a few suppliers (See Appendix Two). Totals of certificates used also includes banked certificates from prior compliance years.

Eligible Resources

Eligible RPS Class I resources include post-1997 renewable generation units located in New England or in adjacent electricity control areas.[2] Eligible resources for RPS Class II Renewable Energy include pre-1998 renewable plants (primarily small hydropower) located in New England or in adjacent electricity control areas. Eligible Class II Waste-to-Energy facilities must be pre-1998 waste-to-energy plants located in Massachusetts which meet certain MassDEP recycling requirements. Eligible APS resources in 2017 included those described above that were adopted at the end of 2017, as well as the traditional Combined Heat and Power (CHP).

Renewable Energy Certificates (RECs)

In order to achieve RPS and APS compliance, each retail electricity supplier must obtain enough renewable generation certificates to satisfy its renewable load obligation or make an Alternative Compliance Payment (ACP).

Each RPS Class I and Class II Renewable Energy Certificate (Class I and II RECs), Solar Carve-Out Renewable Energy Certificate (SRECs), Solar Carve-out II Renewable Energy Certificate (SRECIIs), and Waste-to-Energy Certificate (WECs) represents the renewable generation attributes of one megawatt hour (MWh) of electricity generated during the Compliance Year by a qualified generation unit (however, the MWh value of some SRECIIs generation is discounted by SREC factors related to project size and type of location, resulting in only a portion of a facility's output generating SRECIIs).

An AEC represents the MWh-equivalent of the fuel savings in thermal energy from APS-qualified facilities as determined by the APS regulations for each specific alternative energy technology.

Total Load Obligation

The total retail load obligation in 2017 was 45,715,742 MWh, which was 2.5% less than the retail load obligation in 2016 of 46,864,429 MWh.

[2] These include New York (NYISO), Quebec, New Brunswick, and Northern Maine (NMISA).

RPS Class I

Total Class I RECs generated (net of SRECs and SRECIIs) equaled 6,809,217, a 22% increase over 2016. However, some of these RECs also qualify in other states and may have been used for compliance in other New England states (mostly Connecticut, New Hampshire, and Rhode Island). In addition, some were used to meet voluntary green product products that exceed RPS requirements.[3] Even so, supply in 2017 significantly exceeded demand. Suppliers banked 772,309 Class I RECs for future use. To meet the total compliance obligation of 3,640,026 MWh, only 1,676 Alternative Compliance Credits were used, which resulted in an Alternative Compliance Payment of $113,465.

Resources located in Maine supplied 28% (mostly wind) of all Class I RECs (including SRECs and SRECIIs) used for compliance, the largest contribution of any state. Massachusetts provided 24% of all RPS Class I RECs (mostly solar) while New York contributed 15% (mostly wind).

Overall, wind accounted for approximately 57% of the total RPS Class I RECs (including SRECs and SRECIIs), about the same as 2016. Solar photovoltaic arrays contributed 35%, an increase of 10% over the previous year. Landfill gas supplied 5% of the total RPS Class I REC supply while hydroelectric contributed 2% and anaerobic digesters provided 1%.

Solar Carve-Out

For the RPS SCO, the number of SRECs generated within the Compliance Year exceeded the obligation. In addition, total settlements exceeded the obligation. For compliance, Suppliers utilized 9,417 re-minted auction SRECs originally generated in prior years, and 34,930 previously banked SRECs. In 2017, 1,167 ACP credits were used while only 59 were utilized in 2016. This resulted in $522,816 of ACP compared to $27,848 in ACPs in 2016. One of the primary drivers of the market oversupply was that the average Minimum Standard decreased from 2.0934% to 1.7850% between 2015 and 2017.

Solar Carve-Out II (SCOII)

Massachusetts met its 2020 goal of 1,600 MW of installed capacity by February of 2016. The new Solar Massachusetts Renewable Target (SMART) program targets another 1,600 MW of solar installation beginning in 2018.

For the fourth year of the Solar Carve-Out II program, the supply of SRECIIs exceeded demand even though the obligation has increased by an 8-fold factor between 2015 and 2017. In 2017, 13,889 ACP credits were used towards meeting compliance, resulting in $4,861,150 in ACPs, up from $1,750 in 2016. Suppliers also banked 29,027 vintage 2017 SRECIIs.

RPS Class II Renewable and RPS Class II Waste-to-energy

The number of RPS Class II Renewable Energy RECs settled for compliance were well short of the obligation. In 2017, 793,847 Class II Renewable Energy certificates were utilized towards meeting the obligation of 1,184,485. ACP credits totaled 390,463, or 33% of the obligation. This amounted to ACPs of $10.9 million.

[3] These Class I RECs retired as "Voluntary Renewable Energy (VRE) purchases," from both the 2017 Filings and NEPOOL GIS Reserved Certificates Report, were 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 34,913 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 CO_2 Budget Trading Program Auction Regulations, 225 CMR 13.14. More information about RGGI can be found at http://www.rggi.org/.

The supply of WECs settled for the RPS Class II Waste-to-Energy requirement fell slightly short of the obligation. In 2017, 1,588,887 WECs were settled against an obligation of 1,600,090, with 44,496 WECs banked forward. Suppliers used 10,816 ACP credits, resulting in $120,274 of ACPs.

Alternative Portfolio Standard (APS)

As noted above, the APS issued back-dated AECs in 2017 with the adoption of new regulations. In 2017, 1,800,115 AECs were used to meet the obligation of 1,942,959 MWh. In addition, Suppliers utilized 141,974 ACP credits for ACP payments of $3.2 million.

Supplier Compliance

Seventy-one (71) Retail Electricity Suppliers (including the four (4) state-regulated investor-owned utilities) served Massachusetts retail customers in 2017 (see Appendix 1). Sixty-seven suppliers fully discharged their obligations through the purchase of the required number of certificates or by making ACPs by the filing deadline. Four suppliers were non-compliant at the deadline. Subsequently, two of these Suppliers became compliant. The other two remain in non-compliant status (see Appendix Two for further detail).

Legislative Background

The RPS Class I is a statutory obligation created by the Electricity Restructuring Act of 1997 and activated by regulations in 2002. The statute was first revised by the Green Communities Act of 2008, which added a second class of RPS (Class II) and the APS. The RPS and APS statutes were further modified by the Competitively Priced Electricity Act of 2012,[4] the Renewable Thermal Act of 2014,[5] and the Energy Diversity Act of 2017,[6] and the Act to Advance Clean Energy of 2018.[7] The statute requires Massachusetts Retail Electricity Suppliers to obtain each year a certain percentage of their retail customers' electricity supply from resources qualified under each portfolio standard. The RPS and APS requirements do not apply to municipal light districts.

[4] Chapter 209 of the Acts of 2012
[5] Chapter 251 of the Acts of 2014
[6] Chapter 188 of the Acts of 2017
[7] Chapter 227 of the Acts of 2018

1. INTRODUCTION TO THE RENEWABLE PORTFOLIO STANDARD AND ALTERNATIVE ENERGY PORTFOLIO STANDARD

A. Renewable Portfolio Standard (RPS)

The Electricity Restructuring Act of 1997 mandated the Renewable Energy Portfolio Standard, or RPS, one of the earliest such mandates in the nation. The original RPS obligated Retail Electricity Suppliers[8] ("Suppliers"), to obtain for their retail customers a small but growing percentage of electricity (the "Minimum Standard") from qualified renewable generation sources, e.g., solar, wind, landfill methane, and low-emission/advanced technology biomass[9] that had begun operation after 1997.

All the Minimum Standards are structured as percentage obligation of a Supplier's retail load, but each Minimum Standard has different eligibility criteria and percentage obligations.

The RPS program began with an obligation of 1% in 2003, that increased annually by 0.5% through 2009, when it reached 4%. Under the Green Communities Act of 2008, the RPS was renamed **RPS Class I**, and the Minimum Standard would be increased by one percent (1%) annually beginning in 2009. The RPS Class I Minimum Standard was 12% in 2017.

By Chapter 227 of the Acts of 2018, the legislature further amended the RPS Class I Minimum Standard by increasing the growth rate from 1% per year to 2% per year for the years 2020 through 2029. After 2029, the RPS Class I Minimum Standard reverts to a 1% annual growth rate.[10]

As a result of the Green Communities Act of 2008, suppliers were required, as of 2009, to comply with three new energy portfolio standards: (1) RPS Class II Renewable, (2) RPS Class II Waste-to-Energy, and (3) Alternative Energy Portfolio Standard. The RPS Class II Renewable qualified electricity generated from pre-1998 generation units. As a condition of eligibility, the RPS Class II Waste-to-Energy qualified facilities had received approval from the MassDEP of the unit's participation in or operation of an authorized recycling program among other things. The Alternative Energy Portfolio Standard allowed thermal generation sources from CHP, as well as other thermal technologies and flywheel energy storage.

Also as a result of the Green Communities Act of 2008, the list of RPS eligible resources was expanded to include hydroelectricity plants of small size and low environmental impact[11], 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 within Massachusetts, could be located anywhere in the ISO New England ("ISO-NE") control area (the New England grid), but all such generation must be reported to the NEPOOL Generation Information System ("GIS")[12] by an independent Third Party Meter Reader or Independent Verifier.[13]

[8] Defined in CMR 14.02 as a person or entity that sells electrical energy to End-use Customers in Massachusetts including but not limited to electric utility distribution companies supplying basic service…A Municipal Lighting Plant…shall be exempt from the obligations of a Retail Electricity Supplier.

[9] Since 2012, the regulations for woody biomass have included detailed fuel sourcing and energy conversion efficiency standards based on forest sustainability and life-cycle carbon dioxide 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.

[10] The RPS law and regulations do not include final limits or ending dates except for the Solar Carve-Out & Solar Carve-Out II regulations.

[11] Under the 2012 Act, 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; these criteria 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.

[12] See http://www.nepoolgis.com, as well as the Generation Certificates paragraph on page 8.

[13] Third Party Meter Readers will provide meter data directly to the GIS Administrator via a secure internet portal.

B. Solar Carve-Out

A Solar Carve-Out Minimum Standard was created within Class I as of 2010[14], and an additional Solar Carve-Out II Minimum Standard was created within Class I as of 2014 (as a successor program to the Solar Carve Out)

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 percentage of its electricity from solar photovoltaic (PV) systems that are connected to the Massachusetts electric grid and that were installed after 2008. The SCO percentage obligation changes annually through a methodology detailed in the Class I Regulations.

Following an interim extension by emergency regulations and then by conventional rulemaking, DOER commenced on April 25, 2014, the SCOII within Class I. The start of the SCOII marked the end of the SCO, which eventually qualified a total of 653.3 MW of new solar resources.[15]

C. Solar Carve-Out II

The SCOII is modeled on the SCO regarding project eligibility, except that installation must have commenced after 2012. Within that model, SCOII has three major differences: (1) the Clearinghouse Auction Account prices undergo scheduled reductions to reflect declining development costs; (2) some types and sizes of projects are provided less incentive than others, reflecting 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 or bust pattern of development.

Approvals of PV systems under the SCOII were originally capped at 946.7 MW of installed capacity, which was designed to meet the Commonwealth's new capacity goal of 1,600 MW by 2020 less the 653.3 MW qualified under the original SCO. However, the market reacted robustly to the SCOII program, and DOER received enough applications for the SCOII program to reach the 1,600 MW program capacity cap in February 2016.

In response, DOER filed emergency regulations for Class I on April 8, 2016. That rulemaking, which concluded on June 1, 2017, removed the capacity cap, provided conditional construction deadlines, and extended the program until the start of the next solar program. The extension provided lower SREC Factors for projects that were able to achieve certain milestones by established deadlines.

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 an 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". [16]

DOER has since promulgated a regulation establishing the framework for a new program, as required by an Act Relative to Solar Energy.[17] The Solar Massachusetts Renewable Target (SMART) Program is designed to create long-term, sustainable incentives that promote solar development in Massachusetts via a declining block tariff incentive framework. The SMART rulemaking commenced on June 5, 2017, with the final regulation

[14] Each year's Class I obligation equals the obligation scheduled in regulation, 225 CMR 14.07(1), minus the Solar Carve-Out and Solar Carve-Out II obligations that are *calculated* per a method specified in regulation, 225 CMR 14.07(2) and (3). Also see the second paragraph of Section Two of this Report.

[15] For more details about the Solar Carve-Out and Solar Carve-Out II, see footnote 31, and/or visit the RPS/APS homepage.

[16] See Current Status of the Solar Carve-Out II Program for more details.

[17] "An Act Relative to Solar Energy" is at https://malegislature.gov/Laws/SessionLaws/Acts/2017/Chapter75.

promulgated on August 25, 2017.[18] On September 12, 2017, the Commonwealth's investor owned electric distribution companies jointly filed a model tariff with the Massachusetts Department of Public Utilities (DPU) for its review and approval. On September 26, 2018, the DPU approved the model tariff filed by the distribution companies, allowing the final steps of the transition process to begin. The official transition to SMART occurred in November 2018 and marked the close of new solar projects qualifying for the SCOII Program.

D. RPS Class II Renewable Energy

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** Generating Units meet the same technology, resource, and location criteria as Class I, but with a lower MW capacity limit (7.5) for hydropower. A Class II regulatory revision in 2014 established a methodology to calculate the Minimum Standard for RPS Class II Renewable Energy in future years.

E. RPS Class II Waste-to-Energy

The **RPS Class II Waste-to-Energy** provides incentives for pre-1998 Waste-to-Energy generation. The Class II eligibility of Waste-to-Energy Generation Units, also known as trash-to-energy or municipal solid waste plants, is conditioned on recycling and other regulatory criteria specific to Massachusetts.

F. Alternative Energy Portfolio Standard (APS)

As a result of the Green Communities Act of 2008, the APS was limited to, and intended to support, certain "alternative" technologies and resources, including thermal technologies, which would be supported in an incentive structure modeled on RPS.[19]

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. The Act mandated these regulations to go into effect on January 1, 2015, but the diverse set of disparate technologies necessitated extensive stakeholder meetings and internal work in 2014 and 2017. Chapter 188 of the Acts of 2017 further expanded the list of eligible technologies to include fuel cells, waste-to-energy thermal facilities, and 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. The final regulations became effective on December 29, 2017.[20]

APS obligations are met through AECs which may not be generated from renewable sources and represent thermal efficiencies that may be displacing non-renewable resources. These certificates are created, recorded (each one receives a unique serial-number), and tracked by the New England Power Pool Generation Information System (NEPOOL-GIS). The NEPOOL-GIS tracks all electricity generated within the Independent System Operator New England (ISO-NE) control area as well as electricity imported into the ISO-NE control area from adjacent control areas.[21]

[18] Both the 2017 Emergency rulemaking for SCOII and the development of the new solar PV incentive are linked from this web page.

[19] The APS statute is at http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter25A/Section11F1~2.

[20] The statute for renewable thermal energy technologies is at https://malegislature.gov/Laws/SessionLaws/Acts/2014/Chapter251. The regulatory process for this change, including public documents, is presented at this webpage.

[21] 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).

For each megawatt-hour (MWh) of electricity generated the NEPOOL-GIS creates and deposits one electronic certificate in the account of the generation unit that generated the MWh in ISO-NE or exported the MWh from an adjacent control area.[22]

Suppliers with Massachusetts RPS and APS obligations purchase the appropriately coded renewable generation certificate directly from generators holding such certificates, or indirectly from brokers. The certificates are electronically transferred from the generator's or broker's NEPOOL-GIS account to the Supplier's NEPOOL-GIS account. Each NEPOOL-GIS certificate qualified for a Massachusetts portfolio standard can only be used for compliance with the standard for which it is qualified and for the Compliance Year in which it was generated. For example, a 2017 generated Class II REC can only be used for 2017 Class II Renewable Energy compliance. However, since SRECs and SREC-IIs are "carve-outs" within Class I and are encoded in the NEPOOL-GIS as a type of Class I REC, they also can be used for Class I Renewable Energy compliance. This is the only exception.

Transition provisions were allowed when a new Minimum Standard was added to the original RPS. Suppliers may have had long term contracts to deliver electricity at prices that did not include the obligation of the new standards. In 2017, a Supplier could exempt for SCO the quantity of electricity delivered under any contracts executed or extended on or before 6/28/2013, and for SCOII it could exempt any contracts executed or extended on or before 4/25/2014 as well as any contracts entered between 4/26/2014 and 5/8/2016.

Alternative Compliance Payments serve as an essential mechanism for RPS and APS compliance and overall cost controls. If a Supplier does not acquire enough renewable generation certificates to meet a given Minimum Standard, then it can reach compliance by making a payment at the ACP rate in lieu of purchasing certificates. Payments are made to the Massachusetts Clean Energy Center (MassCEC) which holds the funds on behalf of DOER for the funding of renewable projects. This process is intended to acknowledge that enough certificates for a given Minimum Standard may not always be available in the marketplace. The ACP Rate also functions, in effect, as a cost containment mechanism by creating a cap on the value of certificates for each Minimum Standard.[23]

Banking provides for RPS and APS compliance flexibility. Suppliers may acquire more renewable generation certificates than required by the Minimum Standard may "bank" them for compliance towards that *same* Minimum Standard[24] in either of the following two Compliance Years. Each class has a different banking limit.[25]

The following figure shows the total **Retail Load Obligation** of Suppliers since the RPS program began broken down by load served by investor owned utilities (generally Basic Service) and competitive suppliers. There were 71 Retail Electricity Suppliers in 2017, including the four investor-owned utilities (see Appendix One). The other 67 are competitive suppliers. Competitive retail suppliers have been increasingly serving a larger proportion of total retail load (as noted above, Municipal Light Plants (MLPs) are currently exempt from the RPS and APS programs). The total Retail Load Obligation in 2017 was 45,715,742 MWh.

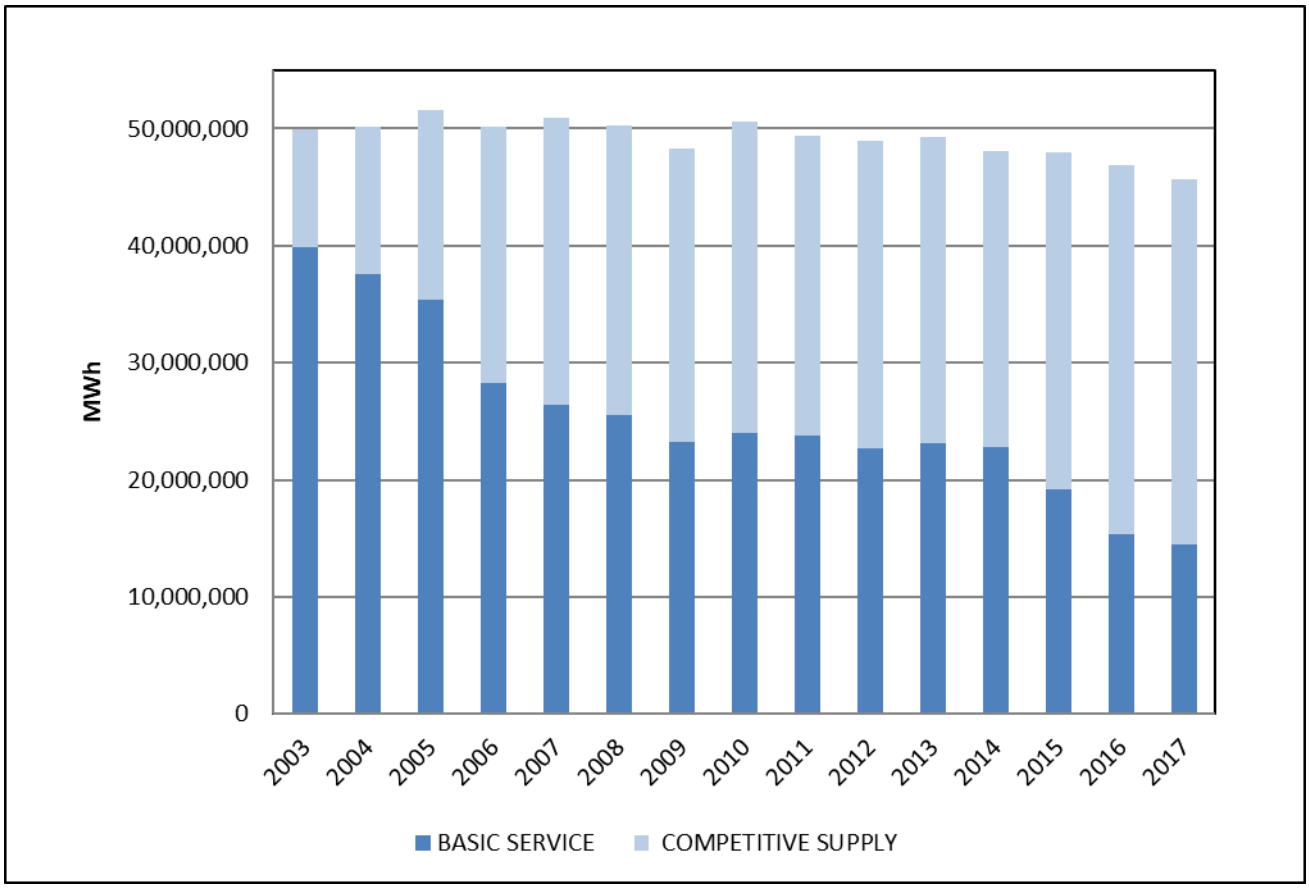
[22] Each REC is encoded with Attributes that indicate the Generation Unit name, location, and fuel, energy resource or technology, as well as whether or not the Generation Unit and its RECs are qualified for *each* of the several New England state RPSs. A Massachusetts qualified REC that is also qualified 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.

[23] See the ACP webpage for additional details, and see the regulations in 225 CMR 14.07, 15.07, and 16.07. In addition, see Section Nine of this report for details about ACP collection and expenditure.

[24] 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.

[25] See 225CMR 14.08(2), 15.08(2) or 16.07(2)

Figure 1 Retail Load Obligation by Supplier Type, 2003-2017



The RPS and APS requirements are further detailed in the RPS and APS regulations and guidelines found on DOER's website. These regulations and guidelines describe how facilities become qualified, list all qualified facilities, explain how Retail Electricity Suppliers demonstrate annually their compliance with RPS and APS, and provide links to the statutes and regulations and to any ongoing regulatory processes.

2 RPS CLASS I RENEWABLE COMPLIANCE IN 2017

DOER received complete Annual Compliance Filings from 67 Retail Electricity Suppliers that sold electricity to retail end users in Massachusetts during 2017. There were six (6) new Retail Electricity Suppliers in 2017 (see Appendix One). Four Suppliers[26] did not submit a Compliance Filing or submitted an incomplete one (i.e., they did not make the relevant ACP payment to meet full compliance. See Appendix Two for a summary of these situations).

A. Compliance Details

Table 1 below shows the dispensation of RECs, banked RECs and ACP credits in meeting the RPS Class I Compliance Obligation. In 2017, the Minimum Standard for RPS Class I was 12%. Because SCO and SCOII are carve-outs within RPS Class I, in Table 1 the average Solar Carve-Out obligation of 1.6266% and the average

[26] Four suppliers submitted incomplete Annual Compliance Filings: Abest Power & Gas, LLC, Mint Energy, Sunwave Gas & Power Massachusetts, Inc., and Union Atlantic Electricity, LLC. See Appendix Two for a description of the resolution of these incomplete filings.

Solar Carve-Out II obligation of 2.4114% were subtracted from 12%, leaving an average net Class I Minimum Standard of 7.9620%.

Table 1 Aggregated Data from the RPS Class I Annual Filings, 2013-2017 (w/o Solar Carve-Outs)[27]

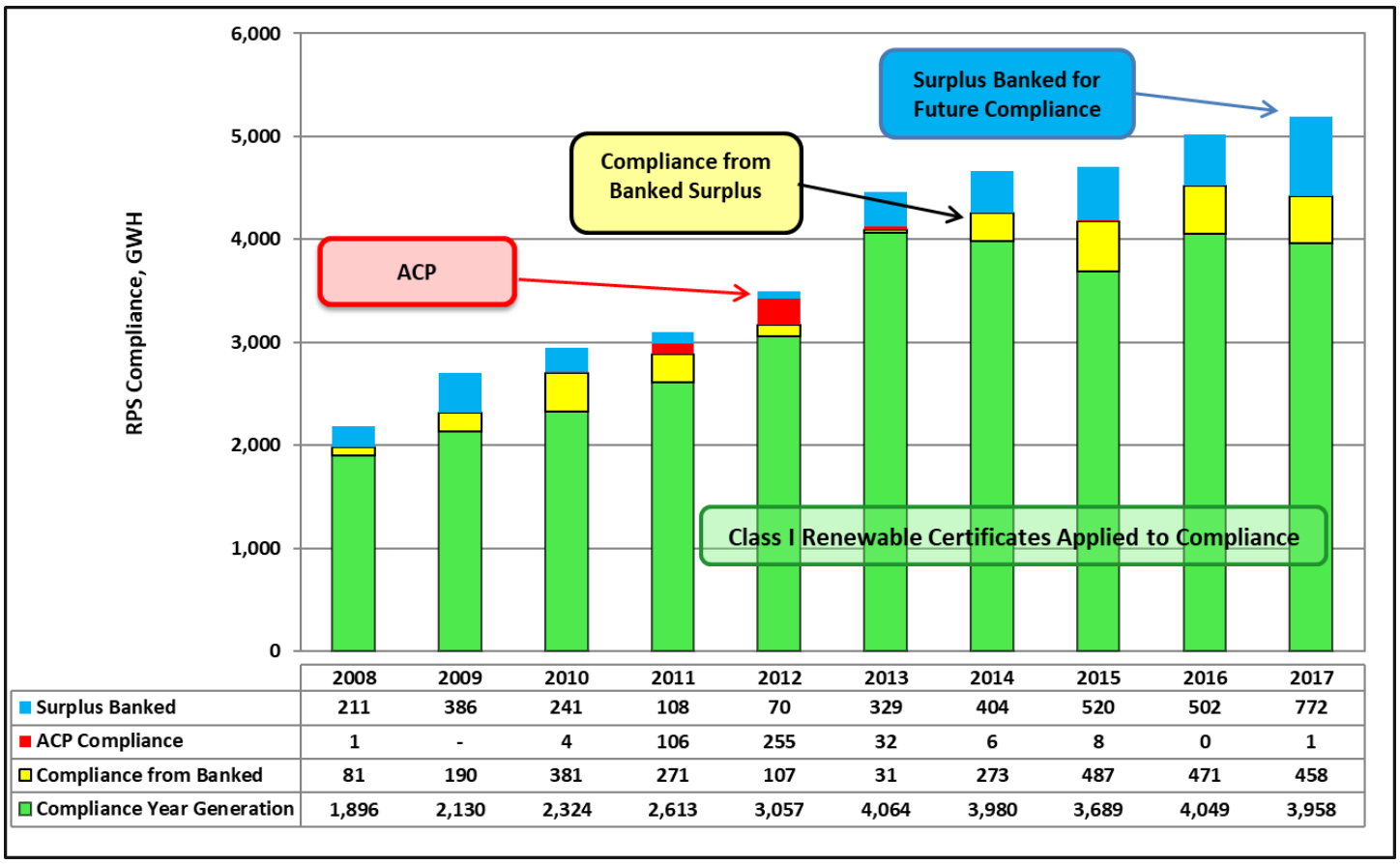
OBLIGATION ANALYSIS	**2017**	**2016**	**2015**	**2014**	**2013**
Retail Sales (Retail Load Obligation)	**45,715,742**	46,864,429	48,009,723	48,129,294	49,252,929
CY Average Net Minimum Standard	***7.9620%***	*8.5829%*	*7.6498%*	*8.0081%*	*7.7140%*
Aggregated Compliance Obligation	**3,640,026**	4,022,346	3,672,667	3,854,245	3,799,402
CY Class I RECs Settled by LSEs	**3,958,188**	4,049,070	3,688,921	3,575,825	3,733,771
minus CY Surplus Class I RECs	**(779,311)**	(501,754)	(520,378)	(404,133)	(330,272)
Net Class I RECs for CY Obligation	**3,178,877**	3,547,316	3,168,543	3,575,825	3,733,771
***plus* Banked from pre-CY Surpluses**	**457,857**	471,256	486,857	272,660	31,102
Total Class I RECs used for CY Obligation	**3,636,734**	4,018,572	3,655,400	3,848,485	3,764,873
***plus* ACP Credits**	**1,676**	269	8,247	5,719	31,642
Total Credits used for CY Obligation	**3,638,410**	4,018,841	3,663,647	3,854,204	3,796,515
Surplus Attributes Banked Forward	**772,309**	501,754	520,378	403,976	328,984
ACP Receipts	**$113,465**	$18,020	$553,126	$378,369	$2,065,273

The total number of Massachusetts RPS Class I RECs generated in NEPOOL-GIS in 2017 grew by 22% over 2016, to 6,809,217. Not all these RECS are settled in Massachusetts as some generation units are also qualified in other states. However, it demonstrates that enough RECs were available in the marketplace. This explains why few ACP credits are utilized for compliance and more RECs were banked forward than in 2016.

Figure 2 below shows the buildup of compliance over the last 10 years.

[27] CY is the abbreviation for Compliance Year, which is equal to 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. For data from earlier years, see DOER's website.

Figure 2 RPS Class I Compliance, 2008-2017 (Excluding Solar Carve-outs)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Surplus Banked	211	386	241	108	70	329	404	520	502	772
ACP Compliance	1	-	4	106	255	32	6	8	0	1
Compliance from Banked	81	190	381	271	107	31	273	487	471	458
Compliance Year Generation	1,896	2,130	2,324	2,613	3,057	4,064	3,980	3,689	4,049	3,958

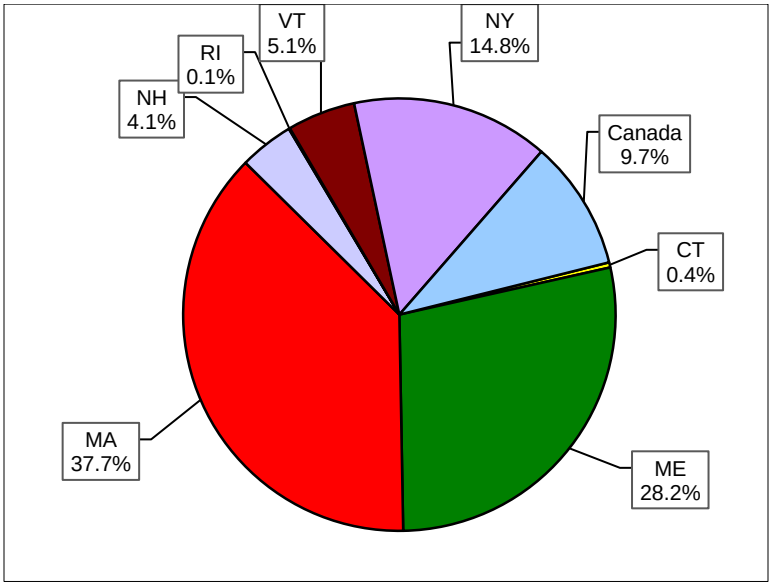
B. Generation Sources by Location

Figure 3 below shows the percentages of 2017 Class I RECs (including SRECs and SRECIIs) from the New England states, New York, and Canada.[28] Figure 4 illustrates the recent trend in the location of REC generation. Table G in Appendix Four lists the data from which these graphs were generated.

Massachusetts was again the main state of origin for Class I RECs with 37.7%, up from 31.7% in 2016, mostly due to increased Solar. Maine again placed second with 28.2% (mostly Wind).

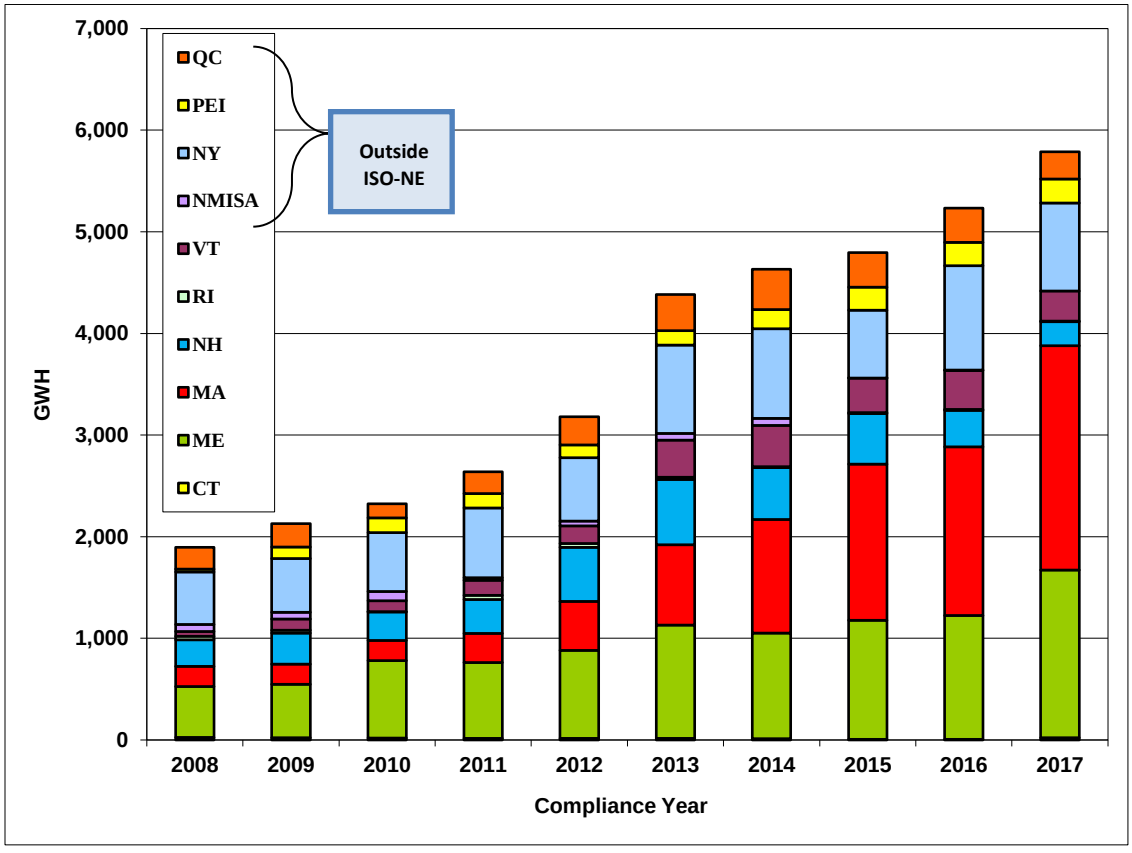
[28] Note that the transmission grid in two northern Maine counties is outside of the ISO New England control area, is separately managed by the Northern Maine Independent System Administrator ("NMISA"), and connects to the ISO-NE grid via the Maritime Areas grid, which is managed by the New Brunswick System Operator. Therefore, the output of NMISA-located generators must be imported via Canada to ISO-NE in order to earn RECs.

Figure 3 2017 RPS Class I Compliance by Generator Location*



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

Figure 4 RPS Class I Compliance by Generator Location, 2008-2017*

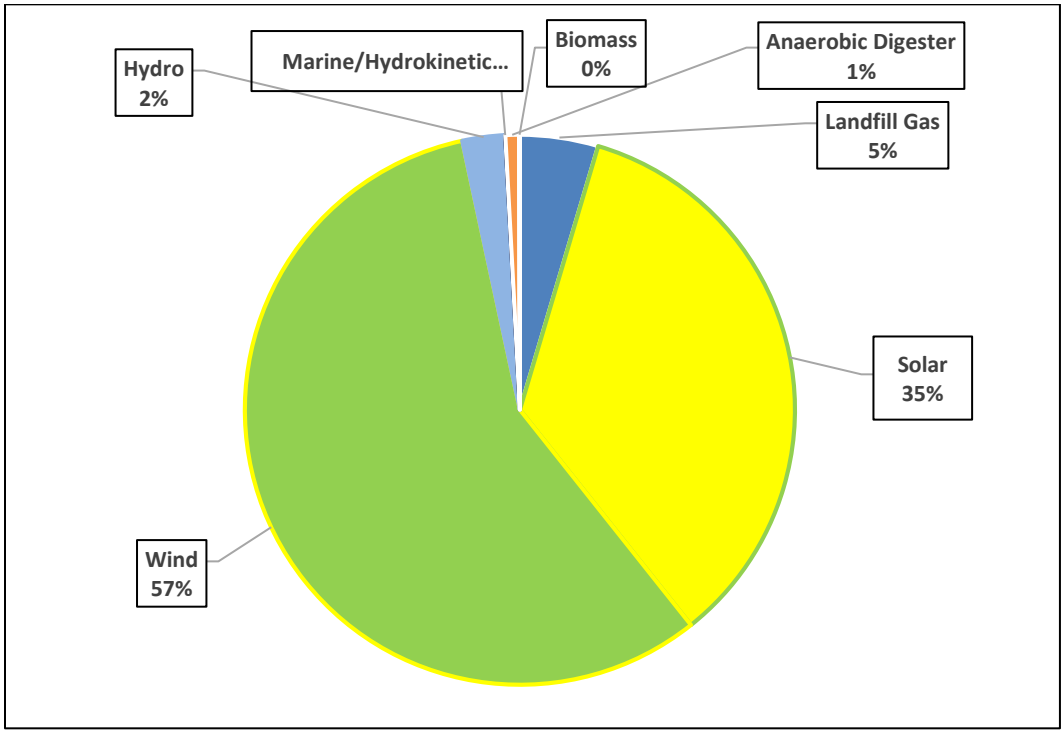


* Includes the Solar Carve-Outs, all SRECs & SREC-IIs.

C. Generation Sources by Type

The Tables and Graphs below show the types of generation units that made up RPS Class I RECs, SRECs and SRECIIs.

Figure 5 2017 RPS Class I Compliance by Generator Type*



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

Wind power continued to be the largest source of RECs for RPS, representing 57.3% of the 2017 supply, a slight decrease from 2016. Maine accounted for 44% of total wind supply, while New York represented 23%.[29]

Solar photovoltaic arrays provided the most rapidly increasing share of RECs, amounting to 35% of total Class I RECs in 2017, an increase of 10% over 2016. This accelerating growth has been propelled by several factors in the last few years, including declining equipment costs, federal and state tax incentives, and, the growth of the RPS Solar Carve-Out II launched in April 2014.[30]

Ninety-two percent (92%) of the RPS Class I solar RECs (including SRECs and SRECIIs) originated in Massachusetts.

Landfill methane gas represented 4.6% of Class I RECs, a 9.2% decrease from 2016. Older qualified landfill methane gas projects have experienced a decline in production. Most landfill methane Class I RECs originated in New York (38.5%) and Massachusetts (28.5%).

Hydroelectricity was added to the qualified mix of RPS Class I resources in 2009, with most supply coming from capacity increases and efficiency upgrades that were performed post-1997 at older plants. To meet eligibility for Class I facilities must be less than 30MW and meet Low Impact Hydroelectric Impact (LIHI)

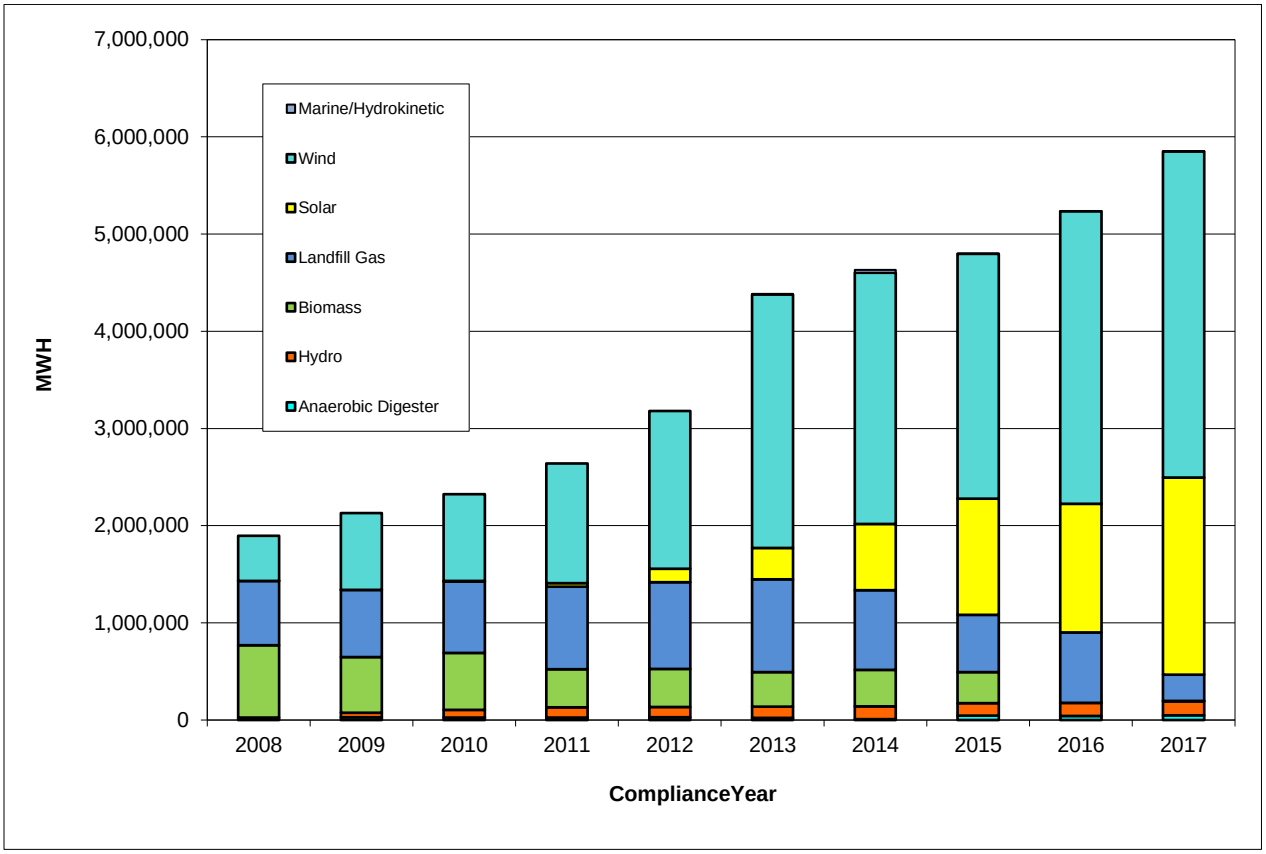
[29] See Table M in Appendix Four
[30] In addition to RPS, MA has other programs helping to drive PV development. See the Solar page at DOER's website.

certification, Hydroelectricity represented 2.5% of Class I RECs in 2017. Maine accounted for 31.5% of supply while Vermont accounted for 30.3%. Massachusetts accounted for 23.2%.

Anaerobic digester supply, which accounted for 0.8% of all Class I RECs in 2017, was mostly generated in Massachusetts (81.2%). Anaerobic digester potential exists at wastewater treatment plants, at facilities that generate organic waste and locations where organic waste can be easily transported to the Generation Unit. DOER is collaborating with the Massachusetts Department of Agricultural Resources (MDAR), Massachusetts Department of Environmental Protection (MassDEP), and MassCEC to identify and encourage expanded production of digester gas, so long as sufficient feedstocks are available.

Marine and Hydrokinetic projects began in 2013 with small turbines within Massachusetts water supply conduits. Only 47 MWh were generated in 2017, all in Massachusetts.

Figure 6 RPS Class I Compliance by Generator Type, 2008-2017*



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

Table 2 Percentage Change in RPS Class I Generation Type, 2015 – 2017

FUEL TYPE	MWh			% of Total		
	2015	2016	2017	2015	2016	2017
Anaerobic Digester Gas	43,837	42,099	47,412	0.9%	0.8%	0.8%
Other Biomass	320,801	2,501	2,185	6.7%	0.0%	0.0%
Hydroelectric	129,810	133,389	147,168	2.7%	2.5%	2.5%
Landfill Gas	587,790	722,539	268,910	12.3%	13.8%	4.6%
Marine & Hydrokinetic	47	48	47	0.0%	0.0%	0.0%
Solar PV	1,194,925	1,324,578	2,030,870	24.9%	25.3%	34.7%
Wind	2,518,915	3,009,326	3,353,712	52.5%	57.5%	57.3%
Totals	4,796,172	5,234,480	5,850,304	100.0%	100.0%	100.0%

3. RPS SOLAR CARVE-OUT COMPLIANCE IN 2017

Pursuant to the Green Communities Act of 2008, the SCO program, which commenced in 2010, is a "carve-out" of RPS Class I (i.e., the SCO Minimum Standard is included in each year's overall RPS Class I Minimum Standard). It was originally intended to provide incentive for 400 MW of PV to be installed within Massachusetts by 2017.[31]

The qualified installations surpassed the original program cap of 400 MW in 2013, four years ahead of the date anticipated by DOER. As the 400 MW cap approached, DOER received a rapid acceleration of applications in the spring of 2013. In order to avoid penalizing a substantial amount of investments made in good faith, DOER issued an emergency revision of the Class I regulations in June 2013, to set rules for raising the cap. [32] In order to maintain the PV development, DOER subsequently began a rulemaking for a successor Solar Carve-Out II program, described in Section 3 below.

[31] 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.

[32] The revised cap became 653.3 MW. For a detailed list of SCO projects, visit http://www.mass.gov/eea/docs/doer/rps-aps/solar-carve-out-units.xlsx.

Table 3 (MWh) **Aggregated Data from the Solar Carve-Out (SCO) Compliance Filings, 2013-2017**

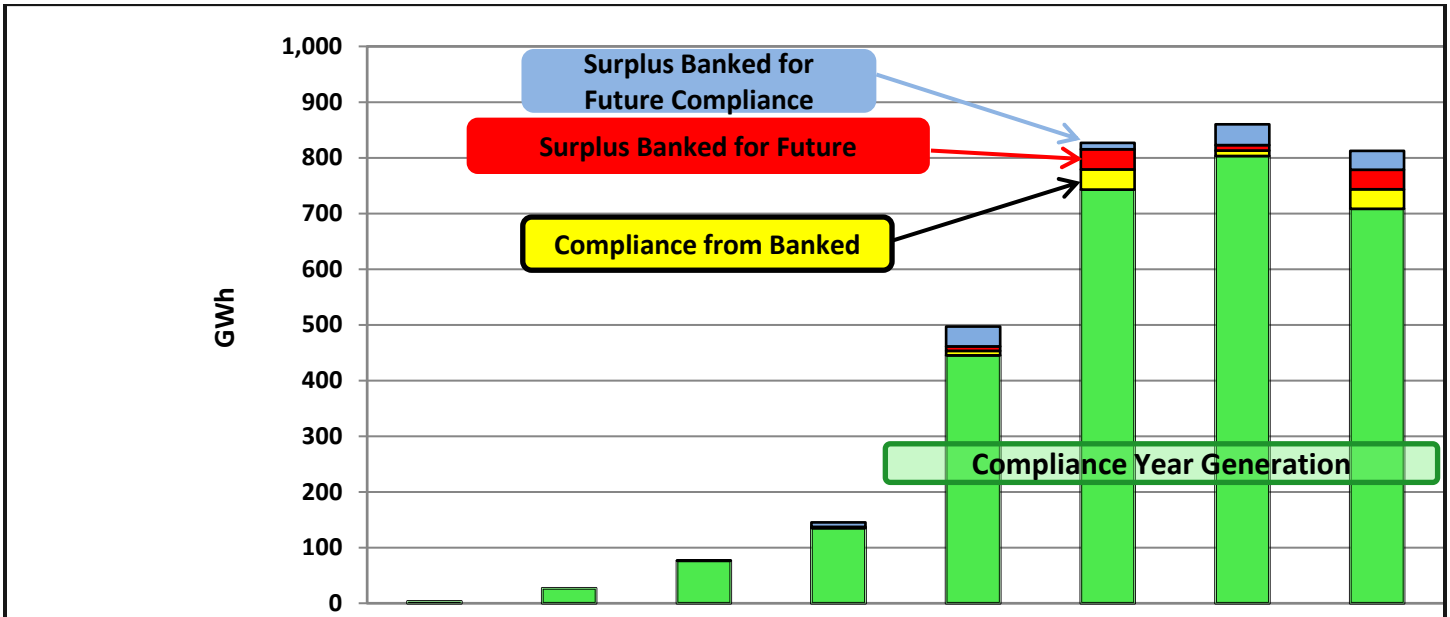
OBLIGATION ANALYSIS	2017	2016	2015	2014	2013
Retail Sales (Retail Load Obligation)	**45,715,742**	46,864,429	48,009,723	48,129,294	49,252,929
Average Net Minimum Standard *	***1.6266%***	*1.7850%*	*2.0934%*	*0.9481%*	*0.2860%*
Aggregated Compliance Obligation	**743,619**	813,188	1,005,024	456,347	140,855
CY SRECs Settled by LSEs	**742,959**	839,614	755,018	480,744	143,589
minus CY Total Surplus SRECs	**(34,476)**	(36,981)	(12,231)	(36,222)	(8,334)
Net CY SRECs for CY Obligation	**708,483**	802,633	742,787	444,522	135,255
plus Banked from pre-CY Surpluses	**34,930**	9,767	36,161	8,159	1,294
Total SRECs Used for CY Obligation	**743,413**	812,400	999,373	452,690	173,997
Plus Total ACP Credits	**1,167**	59	3,084	3,657	4,206
Total Credits Used for CY Obligation	**744,580**	812,459	1,002,457	456,347	178,203
Surplus Attributes Banked Forward	**34,280**	36,979	12,231	36,222	8,066
Reminted Auction SRECs Used	**9,417**	49,190	220,425	9	0
SRECs Placed in Auction	**1,520**	18,428	1,898	124,831	142,786
ACP Receipts	**$522,816**	$27,848	$1,529,664	$553,512	$306,518

* Average Net Minimum Standard less than Minimum Standard due to exempt load of 356,771 MWh

In 2017, the Compliance Obligation fell by 8.6% from 2016 (i.e., 813,188 to 743,619) because the Average Net Minimum Standard dropped from 1.7850% in 2016 to 1.6266% in 2017, and the Retail Load Obligation fell as well. The SREC market is somewhat in balance.

Changes in the manner of compliance from 2010 to 2017 are depicted in Figure 7 below.

Figure 7 RPS Class I Solar Carve-Out Certificate Disposition, 2010-2017



	2010	2011	2012	2013	2014	2015	2016	2017
Surplus Banked	0	0	1	8	36	12	37	34
ACP Compliance	0	0	0	1	8	36	10	35
Compliance from Banked	0	0	0	1	8	36	10	35
Compliance Year Generation	3	27	76	135	445	743	803	708

4. RPS SOLAR CARVE-OUT II COMPLIANCE IN 2017

The Solar Carve-Out II Minimum Standard was established by revised regulations for RPS Class I promulgated on April 25, 2014. The SCOII program set a capacity cap for qualified solar carve-out installations at 1,600 MW in the Commonwealth, inclusive of the prior Solar Carve-Out capacity (653.3 MW), with a goal of reaching that overall cap by 2020. As noted, the cap was reached in early 2016 and emergency regulations were promulgated on April 8, 2016, that removed the cap and extended the program.

As a result, in 2017, two exempt levels were established:

- The first level of exemption was for contracts executed or extended on or before April 25, 2014. Those contracts had a zero percent (0%) Minimum Standard.
- The second level of contract exemptions was for the period between April 26, 2014 and May 8, 2016 (30 days after the filing of the emergency regulations). These contracts were subject to a Minimum Standard of 2.0197%.
- Any contracts executed or extended after May 8. 2016, were subject to the Minimum Standard of 2.8628% in 2017.

Table 4 below shows the utilization of RECs and ACP credits in meeting the RPS Class I SCOII Compliance Obligation.

Table 4 Aggregated Data from the Solar Carve-Out II Compliance Filings, 2014-2017

OBLIGATION ANALYSIS	2017	2016	2015	2014
Retail Sales (Retail Load Obligation)	**45,715,742**	46,864,429	48,009,723	48,129,294
Exempt Load	**3,459,060**	6,162,098	10,516,104	23,163,408
Net Load	**42,256,682**	39,553,644	37,493,621	24,965,886
Average Net Minimum Standard	***2.4114%***	*0.8080%*	*0.3288%*	*0.0843%*
CY Aggregated SCO II Obligation	**1,102,398**	319,589	123,317	21,076
CY SRECIIs Settled by LSEs	**1,107,930**	326,308	125,294	15,633
minus CY Total Surplus SRECIIs	**(29,175)**	(10,059)	(3,021)	(187)
Net CY SREC-IIs for CY Obligation	**1,078,755**	316,249	122,273	15,446
***plus* Banked from pre-CY Surpluses**	**9,167**	3,019	20	0
Total SRECIIs Used for CY Obligation	**1,087,922**	319,268	122,293	15,446
***plus* Total ACP Credits**	**13,889**	5	629	5,476
Total Credits used for CY Obligation	**1,101,811**	319,273	122,922	20,922
Surplus Attributes Banked Forward	**29,027**	10,059	3,018	21
Reminted Auction SREC IIs Used	**109,418**	21,766	51	0
SREC IIs Placed in Auction	**12,071**	243,377	67,046	
ACP Receipts	**$4,861,150**	$1,750	$235,875	$2,115,001

* Average Net Minimum Standard less than marginal Minimum Standard due to exempt load.
** Note the "Surplus Attributes Banked Forward" does not equal the "CY total surplus SRECIIs" because some Suppliers had excess SRECIIs over their Banking Limits.

5. RPS CLASS II RENEWABLE ENERGY COMPLIANCE IN 2017

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 Waste-to-Energy plants located in Massachusetts. RPS Class II Renewable Energy is generated by the same resources and technologies as Class I. However, hydroelectric plants in Class II are limited to 7.5 MW (versus 30 MW in Class I), pursuant to the Competitively Priced Electricity Act of 2012.

The quantity of pre-1998 renewable energy generation that DOER originally had projected to qualify did not materialize as anticipated during the early years of the program. Class II Renewable Energy has experienced REC shortfalls, so Suppliers relied heavily on the ACP mechanism to meet their obligations. DOER reacted to this situation 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. After 2015, the Minimum Standard is set annually by a formula that responds to changing market conditions. For 2017, the Class II Minimum Standard was 2.5909%.

In 2017, 97% of Class II RECs originated in Massachusetts and of that amount 92% was generated by hydroelectricity. Almost all Class II RECs generated were settled for Massachusetts compliance. Table 6 below shows the dispensation of RPS Class II credits to meet the obligation.

Table 5 Aggregated Data from the RPS Class II Renewable Energy Filings, 2013-2017

OBLIGATION ANALYSIS	2017	2016	2015	2014	2013
Retail Sales (Retail Load Obligation)	**45,715,742**	46,864,429	48,009,723	48,129,294	49,252,929
Minimum Standard	**2.5909%**	2.5319%	2.0000%	1.7500%	1.5000%
CY Aggregated Obligation	**1,184,485**	1,186,394	959,531	840,893	724,222
Class II RECs Settled by LSEs	**783,698**	561,324	539,399	526,415	509,609
minus CY Total Surplus SCO RECs	**(7,867)**	(18,017)	(18,488)	(62,401)	(167,874)
Net CY RECs for CY Obligation	**775,831**	543,307	520,911	464,014	351,735
plus Banked from pre-CY Surpluses	**18,016**	7,317	102,901	104,498	919
Total Class II RECs used for CY Obligation	**793,847**	550,624	623,812	568,512	352,654
plus total ACP Credits	**390,463**	634,720	333,322	268,337	381,007
Total Credits used for CY Obligation	**1,184,310**	1,185,344	957,134	836,849	733,661
Surplus Attributes Banked Forward	**7,680**	18,017	18,288	42,035	167,874
ACP Receipts	**$10,850,967**	$17,454,800	$9,176,355	$7,288,033	$10,207,169

6. RPS CLASS II WASTE-TO-ENERGY COMPLIANCE IN 2017

RPS Class II Waste-to-Energy is a separate sub-class within RPS Class II. Each Supplier must comply separately with both the Renewable Energy subclass and the Waste-to-Energy subclass. Qualification is limited to plants that meet the Massachusetts Department of Environmental Protection regulations for such facilities.[33] The MassDEP regulations 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 Waste-to-Energy Credits (WECs). The MassDEP uses those funds to help support municipal recycling programs.

[33] The MassDEP regulations are in 310 CMR 7.08(2) and 310 CMR 19.000.

Table 6 Aggregated Data from RPS Class II Waste-to-Energy Compliance, 2013-2017

OBLIGATION ANALYSIS	2017	2016	2015	2014	2013
Retail Sales (Retail Load Obligation)	**45,715,742**	46,864,429	48,009,723	48,129,294	49,252,929
CY Aggregated WEC Obligation (3.5%)	**1,600,090**	1,640,016	1,679,161	1,681,759	1,689,821
Class II WECs Settled by LSEs	**1,617,739**	1,651,769	1,620,112	1,440,670	1,703,780
minus CY total surplus WECs	**(44,496)**	(20,111)	(15,706)	(13,873)	(307,868)
Net CY WECs for CY Obligation	**1,573,243**	1,631,658	1,604,406	1,426,797	1,395,912
***plus* Banked from pre-CY Surpluses**	**15,644**	0	53,440	251,993	278771
Total WECs used for CY Obligation	**1,588,887**	1,631,658	1,657,846	1,678,790	1,674,682
***plus* total ACP Credits**	**10,816**	7,362	17,120	2,968	13,828
Total Class II WECs used for CY Obligation	**1,599,703**	1,639,020	1,674,966	1,681,758	1,688,511
Surplus Attributes Banked Forward	**44,496**	20,566	0	0	305,433
ACP Receipts	**$120,274**	$80,982	$188,491	$32,232	$148,236

In order to eliminate what DOER had earlier concluded to be a permanent and inherently large WEC surplus that Suppliers were carrying forward (banking) from year-to-year, DOER, through its RPS Class II rulemaking in 2014, enacted a banking moratorium for Compliance Years 2014 and 2015. It then lowered the banking limit from 30% to 5% in subsequent years, beginning in 2017.

7. ALTERNATIVE ENERGY PORTFOLIO STANDARD COMPLIANCE IN 2017

The Alternative Energy Portfolio Standard (APS) was established as of January 1, 2009, under the Green Communities Act of 2008, now codified at M.G.L. c. 25A, § 11F½ (Statute). DOER first promulgated the regulations of 225 CMR 16.00: Alternative Energy Portfolio Standards in 2009 to implement the Statute.

In general, the APS offers an opportunity for Massachusetts residents, businesses and government entities to receive an incentive for using certain types of alternative energy technologies. These alternative energy technologies contribute to the Commonwealth's clean energy goals by increasing energy efficiency and reducing the need for conventional fossil fuel-based power generation or heating systems.

The APS requires a certain percentage of the state's electric load to be met by these eligible technologies. In 2017, the Minimum Standard was 4.25%, and currently increases by 0.25% each year.

When it began, APS was comprised mostly with CHP systems, and Flywheel Storage. Historically, the market did not have enough certificates to meet the annual obligation, resulting in the collection of significant ACPs each year.

Revised APS regulations were promulgated in 2017, which expanded eligible technologies to include fuel cells, waste-to-energy thermal facilities, and 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. These projects were eligible to receive APS generation credits back to January 1, 2015, which NEPOOL-GIS issued in the fourth quarter of 2017, after passage of the revised regulations.

As a result, a material number of AECs were created, and ACP credits, which traditionally had covered 50% of the obligation, declined substantially. Consequently, ACP receipts fell as well.

Table 7 Aggregated Data from the APS Compliance Filings, 2013-2017 (MWh)

OBLIGATION ANALYSIS	2017	2016	2015	2014	2013
Retail Sales (Retail Load Obligation)	**45,715,742**	46,864,429	48,009,723	48,129,294	49,252,929
Exempt Load	**0**	7,892	34,578	79,801	973,011
Net Load	**45,715,742**	46,856,537	47,975,145	48,049,493	48,279,918
CY average net Minimum Standard	**4.25%**	4.00%	3.75%	*3.50%*	*3.00%*
Aggregated Compliance Obligation	**1,942,959**	1,874,294	3,672,667	3,854,245	3,799,402
AECs Settled by LSEs	**2,017,892**	945,003	894,602	831,080	531,781
***minus* CY Surplus AECs**	**(221,624)**	(3,873)	(2,869)	(261)	(7,347)
Net AECs for CY Obligation	**1,796,268**	941,130	891,733	830,819	524,434
***plus* Banked from Prior Year Surpluses**	**3,847**	2,869	261	7,347	1239
Total AECs used for CY Obligation	**1,800,115**	943,999	891,994	838,166	525,673
***plus* ACP Credits**	**141,974**	928,636	902,605	835,505	921,626
Total Credits used for CY Obligation	**1,942,089**	1,872,635	1,794,599	1,673,671	1,447,299
Surplus Attributes Banked Forward	**221,624**	3,873	2,869	261	7,347
ACP Receipts	**$3,156,082**	$19,875,362	$18,147,169	$19,750,452	$17,397,429

8. PROJECTION OF FUTURE RPS AND APS COMPLIANCE OBLIGATIONS AND SUPPLY

DOER projections of future RPS and APS compliance obligations are detailed in the Tables below. These projections are based on the ISO-NE "reference case" for load growth in the 2018 CELT Report.[34] This process follows the approach of the RPS/APS Annual Compliance Reports for 2009 through 2016. These forecasts assume normalized weather and normalized economic drivers.

A. Projection of Class I Renewable Generation Supply 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, including but certainly not limited to the following:

- Changes in federal policy, including tax incentives;
- Significant renewable projects being developed or considered;
- Transmission development that may allow new generation to be constructed;
- Regional market dynamics that alters the export decisions for REC retirement;
- Solar growth in the Commonwealth;
- Development of anaerobic digester gas projects supplied from agricultural, food processing, food service, and wastewater treatment facilities, for which Massachusetts provides incentives; and
- Interaction between the RPS Class I Minimum Standard and the Clean Energy Standard regulation recently promulgated by the MassDEP.[35]

Despite these variables, Figure 9 shows that steady growth has occurred in the generation of Class I Renewable Generation Certificates (net of SCO and SCOII) through 2017. (Note, however, that not all

[34] The ISO-NE figures are from Tab 2C, (Energy (GWh)) in the *2018 CELT Report* document titled "Forecast Data 2018", dated 5/1/2018, which is listed at http://www.iso-ne.com/system-planning/system-plans-studies/celt. They have been adjusted for the exempt municipal load.

[35] See the MassDEP Clean Energy Standard webpage.

Massachusetts qualified Class I RECs will be settled in Massachusetts. These RECs also may be qualified in other states. If they are settled in other states, they cannot be claimed in Massachusetts.) [36]

Figure 8 MA Class I Renewable Generation Certificates with Annual Percent Increase

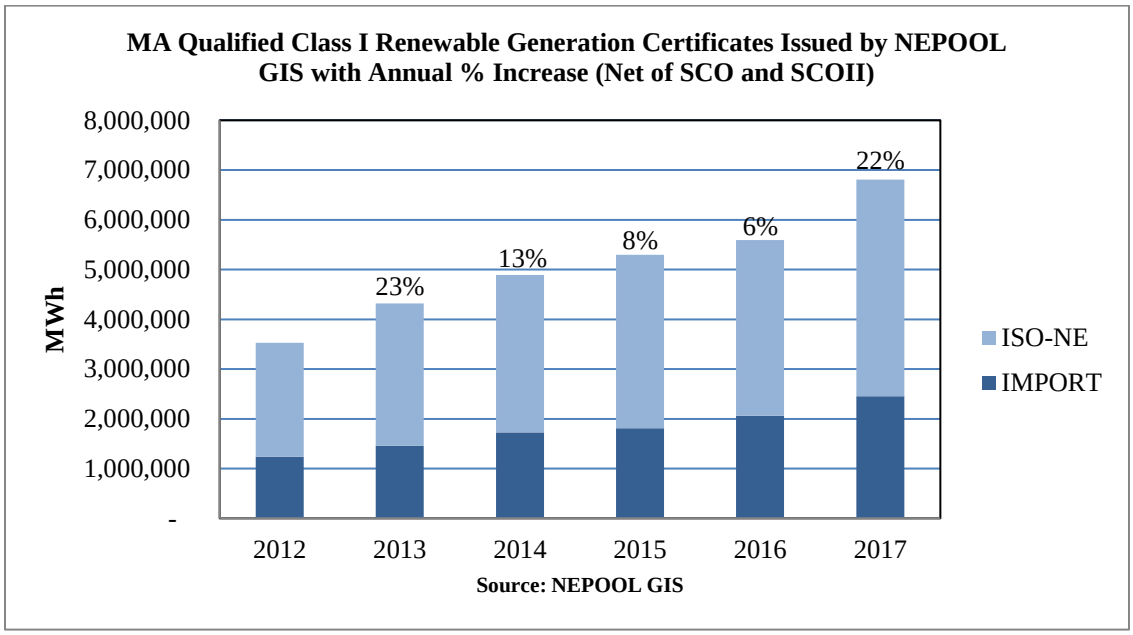


Table 8 shows four years of actual total retail sales (2014-2018) and two years of projected total retail sales (2019-2020) with the resulting actual and projected RPS Class I obligation. SCO and SCOII Minimum Standards are only available through 2019 at the time of this report's publication.

Table 8 MA RPS Class I Actual and Projected Retail Load and Compliance Obligations[37]

Year	Actual / *Projected* Retail Load Obligation	RPS Class I (including Solar Carve-Outs)		Solar Carve-Out and Solar Carve-Out II			RPS Class I – net of the SCO & SCOII	
		Minimum Standard	REC Obligation	SREC Obligation	SREC-II Obligation	Total Obligations	Net REC Obligation	Net Minimum Standard
2014	48,129,294	9.00%	4,331,636	456,347	0	456,347	3,854,245	8.0081%
2015	48,009,723	10.00%	4,800,972	1,005,024	123,317	1,128,341	3,672,631	7.6498%
2016	46,864,429	11.00%	5,155,087	813,188	319,589	1,132,777	4,022,346	8.5829%
2017	**45,715,742**	**12.00%**	**5,485,889**	**743,619**	**1,102,398**	**1,846,017**	**3,640,026**	**7.9623%**
2018	46,380,499	13.00%	*6,029,465*	*829,939*	*1,731,499*	*2,561,438*	*3,468,027*	*7.4773%*
2019	*45,951,935*	14.00%	*6,433,271*	*802,082*	*1,716,744*	*2,518,826*	*3,914,445*	*8.5186%*
2020	*44,934,476*	15.00%	*6,740,172*	*724,055*	*1,671,625*	*2,395,680*	*4,344,492*	*9.6685%*

B. Projection of SCO I Generation Supply

[36] Note that not all certificates issued by NEPOOL GIS are settled in MA for compliance as many are settled elsewhere, voluntarily retired, or if SRECs or SRECIIs, deposited into DOER's SREC Clearinghouse Auction Accounts.

[37] Actual Retail Load Obligation through 2018. Actual compliance figures through 2017 are from RPS annual compliance filings. The retail load obligation projections starting in 2019 are based on the ISO-NE load growth projections in its *CELT Report* (see footnotes 34)), not including the load attributable to the RPS/APS-exempt municipally owned companies. 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 SRECII obligations take into account actual and projected exempt loads and Minimum Standards that are based on retail contract dates.

Accelerated solar PV development began to emerge in the RPS market in 2010 and has been increasing rapidly since. DOER expects further strong growth of solar PV in the years ahead, boosted by the new SMART Program[38] (see below). However, it also anticipates that the supply of SRECs and SRECIIs will begin to decline as both programs will have reached their cap by 2018 and systems reach their end life within the programs. Equipment degradation also will likely lead to reduced output on average in the future.

In Table 9, DOER projects that the SCO Load Obligation will remain relatively constant over the next three years.

Table 9 Solar Carve-Out Actual and Projected Load Obligations*

Year	Actual / *Projected* Load Obligation	Load Served Under pre-6/29/13 Retail Contracts	Minimum Standard for pre-6/29/13 Retail Contracts	Pre-6/29/13 SCO Load Obligation	Load Served Under post 6/28/13 Retail Contracts	Minimum Standard for post-6/28/13 Retail Contracts	Post-6/28/13 SCO Load Obligation	SCO Total Load Obligation
2015	*48,009,723*	*4,019,550*	1.5359%	*61,749*	*43,990,173*	2.1442%	943,275	1,005,024
2016	*46,864,431*	*1,308,729*	0.9801%	*12,833*	*45,555,702*	1.7568%	800,355	813,188
2017	***45,715,742***	***356,771***	**0.9861%**	***3,518***	***45,358,971***	**1.6313%**	**739,941**	**743,619**
2018	46,380,499	*108,541*	1.4110%	*1,532*	*46,271,958*	1.7903%	828,407	829,939
2019	*45,951,935*	*22,591*	*1.0978%*	*248*	*45,929,344*	*1.7458%*	*801,834*	*802,082*
2020	*44,934,476*	*17,452*	*0.9867%*	*172*	*44,917,024*	*1.6116%*	*723,883*	*724,055*

* *Italicized is projected.* The Minimum Standard for pre 4/26/14 contracts is zero percent.

C. Projection of SCOII Generation Supply

The Solar Carve-Out II program commenced on April 25, 2014, providing the incentive for continued PV development.

Demand for SRECIIs will be affected over the next few years by the "exempt load" provisions in the regulations, 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 regulations provided that all retail load under contracts on or before that date would be exempt from Solar Carve-Out II compliance.

Total SRECIIs generated in NEPOOL-GIS in 2017 was 1,014,285, slightly less than the Minimum Obligation. Note that the Minimum Standard bumps significantly in 2018, raising the Minimum Obligation.

[38] See Chapter 75 of the Acts of 2017 and DOER's webpage, Development of the Next Solar Incentive.

Table 10 Solar Carve-Out II Actual and Projected Load Obligations*

Year	Actual / *Projected* Load Obligation	Exempt Load Served Under pre-4/26/14 Retail Contracts	Exempt Load Served Under post 4/25/14 and pre-5/9/16 Retail Contracts	Minimum Standard for post 4/25/14 and pre-5/9/16 Retail Contracts	Post 4/25/14 and pre-5/9/16 SCOII Load Obligation	Load Served Under post-5/8/16 Retail Contracts	Minimum Standard for post-5/8/16 Retail Contracts	Post-5/8/16 SCOII Load Obligation	Total SCOII Load Obligation*
2015	48,009,723	10,516,104	0	0.0000%	0	37,493,619	0.3288%	123,317	123,317
2016	46,864,429	6,162,098	0	0.0000%	0	40,702,331	0.7851%	319,589	319,589
2017	**45,715,742**	***3,459,060***	***12,735,216***	**2.0197%**	***257,214***	***29,521,466***	**2.8628%**	***845,141***	**1,102,398**
2018	46,380,499	*1,732,957*	*6,125,417*	*2.6823%*	*164,303*	*38,522,125*	*4.0683%*	*1,567,196*	*1,731,499*
2019	*45,951,935*	*981,597*	*2,724,437*	*2.3196%*	*63,197*	*42,245,901*	*3.9141%*	*1,653,547*	*1,716,744*
2020	*44,934,476*	*395,433*	*1,336,799*	*2.2040%*	*29,464*	*43,202,244*	*3.8011%*	*1,642,161*	*1,671,625*

* *Italicized is projected*. The Minimum Standard for pre 4/26/14 contracts is zero percent (0%).

D. Projection of the Generation Supply for the SMART Program

The SMART program, which is the successor to the SCOII program, was adopted on August 28, 2017. Its purpose is to establish a statewide solar tariff-driven incentive program to encourage the continued use and development of solar photovoltaic technology by residential, commercial, governmental and industrial electricity customers throughout the Commonwealth. Transition from the SCOII program to SMART began on November 26, 2018.

The SMART Program will support 1,600 MW of new solar generating capacity. SMART facilities must use solar photovoltaic technology and be interconnected with the electric grid in the Commonwealth of Massachusetts. The aggregate maximum capacity of a SMART facility is five (5.0) MW.

All Solar Tariff Generation Units with capacities greater than 25 kW AC will be eligible to receive compensation for 20 years from the Solar Tariff Generation Unit's RPS Effective Date. All Solar Tariff Generation Units with capacities less than or equal to 25 kW AC will be eligible to receive compensation for 10 years from the Solar Tariff Generation Unit's RPS Effective Date.

E. Projection of Renewable Class II Supply

Renewable Class II Generation Certificates have been generally undersupplied since the beginning of this program in 2009. Because the total pre-1998 installed capacity cannot rise, it limits the amount of capacity that can qualify. However, some additional portion of that capacity is expected to qualify for Class II over time, especially from hydroelectric imports. In early 2018, DOER qualified its first Class II Renewable hydroelectric facilities outside of the New England grid (New York), which could result in an increase in supply from new imported certificates.

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 supply will be used for compliance with classes of RPS in other New England states for which they are also qualified. Some of the other New England states have higher ACP rates for pre-1998 capacity.

However, in 2017, 97% of Massachusetts-qualified Class II RECs generated were settled in Massachusetts for compliance.[39]

Table 11 Class II and APS Actual and Projected Compliance Obligations

Year	Actual / *Projected* Load Obligation	Actual/ Projected Exempt Load Obligation	Actual/ Projected Net Load Obligation	RPS Class II Renewable 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 Compliance Obligation (AECs)
2014	48,129,294	79,801	48,049,493	1.7500%	840,866	1,681,732	3.50%	1,681,732
2015	48,009,723	34,578	47,975,145	2.0000%	959,503	1,679,130	3.75%	1,799,068
2016	46,864,429	7,892	46,856,537	2.5319%	1,186,361	1,639,979	4.00%	1,874,261
2017	**45,715,742**	**0**	**45,715,742**	**2.5909%**	**1,184,485**	**1,600,090**	**4.25%**	**1,184,485**
2018	46,380,499	*0*	*46,380,499*	*2.6155%*	*1,213,082*	*1,623,317*	*4.50%*	*2,087,123*
2019	*45,951,935*	*0*	*45,951,935*	*2.6833%*	*1,233,029*	*1,608,318*	*4.75%*	*2,182,717*
2020	*44,934,476*	*0*	*44,934,476*	*3.2056%*	*1,440,420*	*1,572,707*	*5.00%*	*2,246,724*

F. Projection of Renewable Class II Waste-to-Energy Supply

The total number WECs in 2017 closely matched the Waste-to-Energy Standard as shown in Table 6. Banking resumed in 2017 with Suppliers banking 20,566 WECs; however banking is now limited to 5% of a Supplier's WEC obligation while it was 30% before a regulatory change reduced it to 0% in 2014 and 2015.

G. Projection of Alternative Energy Portfolio Standard Supply

Historically there have not been enough AECs in the market for Suppliers to meet their obligations and, as a result, the Suppliers had to make Alternative Compliance Payments. However, since 2017 there have been several large APS-qualified CHP approved, and renewable thermal, fuel cell and waste-to-energy facilities began contributing to the APS. This growing supply of AECs should lower and possibly eliminate entirely the shortfall in AECs in the future.

[39] The percentages of MA Class II RECs settled in other states are based on data from a confidential Regulator's Report at the NEPOOL GIS.

9. USES OF THE ALTERNATIVE COMPLIANCE PAYMENT FUNDS

The ACP mechanism for meeting RPS and APS obligations in CY 2017 fell by roughly half from 2016 (see Table 12 below).

The greatest absolute and percentage decline occurred in APS. In the fourth quarter of 2017, the APS program minted backdated AECs to January 2015. This increase in supply, as well as large CHP facilities becoming qualified, resulted in the APS ACP proceeds falling by $17.3 million, or about 85%.

RPS Class II ACP also fell by about $6.6 million, or approximately 38%. During 2017, several Class II hydroelectric projects were approved, including a significant portion from New York state, which increased supply of Class II RECs.

The proceeds from ACP are held in a separate account from its other funds by the MassCEC. DOER oversees the expenditure of this ACP fund under agreement between DOER and MassCEC and under any limitations specified in the regulations.[40]

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." 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 generally 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 12 ACP Proceeds per Portfolio Standard, 2013-2017 (rounded to the nearest dollar)

PORTFOLIO STANDARD	2017	2016	2015	2014	2013
RPS CLASS I	**$113,465**	$18,020	$553,126	$378,369	$2,065,273
RPS SCO	**$522,816**	$27,848	$1,529,664	$553,512	$306,518
RPS SCOII	**$4,861,150**	$1,750	$235,875	$2,115,001	$0
RPS CLASS II	**$10,850,967**	$17,454,800	$9,176,355	$7,288,033	$10,207,169
RPS CLASS II WECS	**$120,274**	$80,982	$188,491	$32,232	$148,236
APS	**$3,156,082**	$20,429,992	$19,875,362	$18,147,169	$19,750,452
TOTAL	**$19,624,754**	$38,013,392	$31,558,873	$28,514,316	$32,477,648

10. ESTIMATED RATEPAYER COSTS OF COMPLIANCE

The costs of RPS and APS compliance are passed on to ratepayers through their energy supply rates by several mechanisms, including 1) a bilateral contract with a competitive retail supplier, 2) participation in a municipal energy aggregation, or 3) their basic service rate (if their local distribution company is their Supplier). The RPS and APS compliance costs are generally not broken out as separate line items on electric bills but are embedded into the cost of energy supply.

Table 13 represents DOER's estimate of the costs of compliance for ratepayers by estimating low and high values for certificates by class, multiplying those values by the number of certificates purchased, and adding

[40]These 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).

the total amount of ACP collected by class. As can be seen, the estimated total cost impact of all the portfolio standards to ratepayers in 2017 likely fell somewhere between $661 million and $811 million.

The solar programs, SCO and SCOII, account for between 70 and 80 percent of the costs depending on the scenario. RPS Class I accounts for between 7 and 19 percent depending on the scenario.

Table 13 Estimated RPS Compliance Costs (Low and High Cost Scenarios), 2017

Scenario	RPS/APS Class	ACP Collected ($)	Estimated Certificate Value ($/MWh)	Estimated Total Value of Certificates ($)	Estimated Total Cost Impact ($)	Estimated Average Ratepayer Impact (Cents/kWh)	% of Total
Low Certificate Cost Scenario	RPS Class I	$113,465	$15.00	$54,551,010	$54,664,475	0.120	8.00%
	SREC I	$522,816	$320.00	$237,892,160	$238,414,976	0.522	36.00%
	SRECII	$4,861,150	$270.00	$293,738,940	$298,600,090	0.653	45.00%
	RPS Class II Renewable	$10,850,967	$24.00	$19,052,328	$29,903,295	0.065	5.00%
	RPS Class II Waste	$120,274	$5.00	$7,944,435	$8,064,709	0.018	1.00%
	APS	$3,156,082	$16.00	$28,801,840	$31,957,922	0.070	5.00%
	TOTAL	**$19,624,754**	**N/A**	**$641,980,713**	**$661,605,467**	**1.447**	**100.00%**
High Certificate Cost Scenario	RPS Class I	$113,465	$40.00	$145,469,360	$145,582,825	0.318	18.00%
	SREC I	$522,816	$360.00	$267,628,680	$268,151,496	0.587	33.00%
	SRECII	$4,861,150	$280.00	$304,618,160	$309,479,310	0.677	38.00%
	RPS Class II Renewable	$10,850,967	$28.00	$22,227,716	$33,078,683	0.072	4.00%
	RPS Class II Waste	$120,274	$10.00	$15,888,870	$16,009,144	0.035	2.00%
	APS	$3,156,082	$20.00	$36,002,300	$39,158,382	0.086	5.00%
	TOTAL	**$19,624,754**	**N/A**	**$791,835,086**	**$811,459,840**	**1.775**	**100.00%**

Table 14 represents DOER's estimate of the range of total costs of compliance for ratepayers during the period from 2013 through 2017 using the same methodology that was used to estimate the 2017 costs above. Costs have increased over time because of increasing Minimum Standards and the addition of the higher cost SCO and SCOII programs. It is worth noting that the program costs have declined for Class I Renewable because of the decline in REC prices between 2013 and 2017.

Table 14 Estimated Total RPS/APS Compliance Costs (Low and High Cost Scenarios), 2013 – 2017

Scenario	RPS/APS Class	2017	2016	2015	2014	2013
Low Certificate Cost Scenario	RPS Class I	$54,664,475	$80,999,420	$148,109,966	$143,411,369	$151,416,113
	SREC I	$238,414,976	$268,704,328	$341,287,764	$130,354,392	$36,203,768
	SRECII	$298,600,090	$88,104,910	$32,812,315	$7,430,221	N/A
	RPS Class II Renewable	$29,903,295	$30,926,576	$22,121,931	$19,921,993	$21,928,176
	RPS Class II Waste	$8,064,709	$8,339,827	$8,289,051	$7,235,582	$8,667,136
	APS	$31,957,922	$38,385,049	$36,872,800	$33,937,689	$29,854,291
	TOTAL	**$661,605,467**	**$515,460,110**	**$589,493,827**	**$342,291,246**	**$248,069,484**
High Certificate Cost Scenario	RPS Class I	$145,582,825	$161,980,820	$221,888,386	$214,927,869	$223,091,533
	SREC I	$268,151,496	$302,288,888	$363,938,304	$144,776,712	$39,075,548
	SRECII	$309,479,310	$91,367,990	$37,824,075	$7,899,211	N/A
	RPS Class II Renewable	$33,078,683	$32,610,548	$23,740,128	$21,501,238	$23,457,003
	RPS Class II Waste	$16,009,144	$16,598,672	$16,389,611	$14,438,932	$17,186,036
	APS	$39,158,382	$40,275,055	$38,662,004	$35,599,849	$30,917,853
	TOTAL	**$811,459,840**	**$645,121,973**	**$702,442,508**	**$439,143,811**	**$333,727,973**

Table 15 represents DOER's estimates of the average cents per kWh cost of compliance for ratepayers during the period of 2013 through 2017. While estimated cents per kWh have increased since 2013, the programs now collectively support significantly more renewable and alternative energy generation.

Table 15 Estimated RPS/APS Compliance Costs, ($/kWh), 2013 – 2017

Scenario	RPS/APS Class	2017	2016	2015	2014	2013
Low Certificate Cost Scenario	RPS Class I	$0.00120	$0.00173	$0.00308	$0.00298	$0.00307
	SREC I	$0.00522	$0.00573	$0.00711	$0.00271	$0.00074
	SRECII	$0.00653	$0.00188	$0.00068	$0.00015	N/A
	RPS Class II Renewable	$0.00065	$0.00066	$0.00046	$0.00041	$0.00045
	RPS Class II Waste	$0.00018	$0.00018	$0.00017	$0.00015	$0.00018
	APS	$0.00070	$0.00082	$0.00077	$0.00071	$0.00061
	TOTAL	**$0.01448**	**$0.01100**	**$0.01227**	**$0.00711**	**$0.00505**
High Certificate Cost Scenario	RPS Class I	$0.00318	$0.00346	$0.00462	$0.00447	$0.00453
	SREC I	$0.00587	$0.00645	$0.00758	$0.00301	$0.00079
	SRECII	$0.00677	$0.00195	$0.00079	$0.00016	N/A
	RPS Class II Renewable	$0.00072	$0.00070	$0.00049	$0.00045	$0.00048
	RPS Class II Waste	$0.00035	$0.00035	$0.00034	$0.00030	$0.00035
	APS	$0.00086	$0.00086	$0.00081	$0.00074	$0.00063
	TOTAL	**$0.01775**	**$0.01377**	**$0.01463**	**$0.00913**	**$0.00678**

APPENDIX ONE: 2017 Massachusetts Retail Electricity Suppliers[41]

Distribution Utilities

Fitchburg Gas & Electric Co. (Unitil)	NSTAR Electric Co. dba NSTAR
Massachusetts & Nantucket Electric Companies dba National Grid	Western Mass Electric Company dba National Grid

Competitive Suppliers

Abest Power & Gas, LLC	ENGIE Resources LLC	Palmco Power MA, LLC
Agera Energy LLC	ENGIE Retail, LLC, dba Think Energy	Perigee Energy, LLC
Ambit Northeast, LLC	**Everyday Energy, LLC**	Provider Power MASS, LLC
Atlantic Energy MA LLC	First Point Power, LLC	Public Power, LLC
Blue Rock Energy, Inc.	Great Eastern Energy (BBPC,,LLC)	Reliant Energy Northeast LLC
Calpine Energy Solutions, LLC	Green Mountain Energy Company	Residents Energy, LLC
Champion Energy Services, LLC	Hampshire Council of Governments	SFE Energy Massachusetts Inc.
Clean Choice	Harborside Energy of Massachusetts, LLC	SmartEnergy Holdings, LLC
Clearview Electric, Inc.	Harvard Dedicated Energy Limited	South Jersey Energy Company
Connecticut Municipal Electric Energy Cooperative (CMEEC)	Hudson Energy Services, LLC	Spark Energy, LP
Consolidated Edison Solutions, Inc.	Interstate Gas Supply, Inc.	Starion Energy, Inc.
Constellation Energy Power Choice, Inc.	Inspire Energy Holdings, LLC	Summer Energy Northeast, LLC
Constellation Energy Services, Inc.	Just Energy Massachusetts Corp.	Sunwave Gas & Power Massachusetts, Inc.
Constellation New Energy, Inc.	Liberty Power Holdings LLC	Texas Retail Energy, LLC.
Devonshire Energy LLC	**Linde Energy Services, Inc.**	Town Square Energy, LLC
Direct Energy Business Marketing, LLC	Major Energy Electric Services, LLC	TransCanada Power Marketing Ltd
Direct Energy Services, LLC	Massachusetts Gas & Electric, Inc.	Union Atlantic Electricity, LLC
Discount Power, Inc.	Mega Energy Holdings, LLC	**Utility Expense Reduction**
Dynegy	Mint Energy, LLC	Verde Energy USA Massachusetts, LLC
East Avenue Energy	**National Gas & Electric, LLC**	Viridian Energy, LLC
EDF	NextEra Energy Services Massachusetts, LLC	Xoom Energy Massachusetts, LLC
Eligo Energy MA, LLC	Nordic Energy Services, LLC	
Energy Plus Holdings	Oasis Power, LLC	

[41] New Suppliers since 2016 are shown in **bold**.

APPENDIX TWO: COMPLIANCE FILINGS, REVIEW, AND VERIFICATION

Abest Power and Gas, LLC (Abest) submitted a compliance filing for 2017 but did not show any acquisition of certificates enough to cover its Minimum Standard obligations, nor did it make any Alternative Compliance Payments to cover its RPS and APS compliance obligations for 2017. Abest's outstanding ACP obligation was $57,599.53.

Abest had a previous outstanding ACP obligation from 2016 of $774,321.95. DOER had found Abest to be in non-compliance in 2016 pursuant to the non-compliance provisions of 225 CMR 14.12, 225 CMR 15.12 and 225 CMR 16.11 and filed a petition with the Department of Public Utilities (DPU) requesting that Abest's license to sell electricity be revoked or suspended pursuant to 220 CMR 11.07(4)(c)1, *Licensure Action*, due to its state of non-compliance. The DPU responded to DOER by noting that Abest's license was revoked shortly after DOER filed its petition due to an unrelated matter, rendering DOER's petition moot.

Mint Energy, LLC submitted a 2017 Compliance Filing but failed to make its ACP of $446,336.80 by July1. Mint Energy eventually paid its ACP in October 2017, so DOER considered Mint to be in compliance. This payment is reflected in all information in this report related to ACP receipts.

Sunwave Energy submitted a 2017 Compliance filing but failed to make its outstanding ACP of $1,002,689.34 by July 1, 2018. DOER filed a petition with the Department of Public Utilities (DPU) pursuant to 220 CMR 11.07(4)(c)1, *Licensure Action*, requesting that Sunwave's license to sell electricity in Massachusetts be revoked or suspended due to its non-compliance. The DPU subsequently entered into an informal agreement with Sunwave whereby Sunwave would pay its 2017 ACP plus interest, and it would file on time its 2018 Compliance Filing that would be in compliance. In the meantime, Sunwave would not be able to register new accounts. Both conditions were met, and the ACP payment is reflected in all information in this report related to ACP receipts.

Union Atlantic Electricity, LLC (Union Atlantic) submitted a 2017 Compliance filing but failed to make its ACP obligation of $449,905.79 by July 1, 2018. DOER filed a petition with the DPU pursuant to 220 CMR 11.07(4)(c)1., *Licensure Action*, requesting that Union Atlantic's license to sell electricity in Massachusetts be revoked or suspended, due to its non-compliance. The DPU opened a formal proceeding with Union Atlantic pursuant to Chapter 30A which is ongoing.

DOER continues to explore other potential avenues to obtain the ACP that it is owed by Abest and Union Atlantic.

APPENDIX THREE: 2017 RPS and APS Compliance Summaries[42]

TABLE A RPS CLASS I COMPLIANCE SUMMARY, 2017 (MWH)[43]

RPS CLASS I	Load Obligation from Filing	2016 Class I RECs	2015 Banked Attributes	2016 Banked Attributes	Alternative Compliance Credits	Total RPS Class I Attributes	RPS Class I Net Obligation	Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	172,364	12,988	-	1	-	12,989	12,937	52	3,881	52
National Grid	6,820,375	595,401	-	70,284	-	665,685	520,037	145,648	156,011	145,648
NSTAR	6,124,884	572,174	-	21	-	572,195	459,727	112,468	137,918	112,468
W MASS Electric	1,367,751	105,257	-	-	-	105,257	105,257	-	31,577	-
SUBTOTALS	14,485,374	1,285,820	0	70,306	0	1,356,126	1,097,958	258,168	329,387	258,168
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,230,368	2,655,111	61,628	325,923	2,189	3,063,211	2,542,068	521,143	762,589	514,141
GRAND TOTAL	45,715,742	3,940,931	61,628	396,229	2,189	4,419,337	3,640,026	779,311	1,091,976	772,309

TABLE B RPS SOLAR CARVE-OUT RENEWABLE ENERGY COMPLIANCE SUMMARY, 2017 (MWH)

RPS CLASS I SOLAR CARVE-OUT (SCO)	Load Obligation from Filing	2017 MA SRECs	2015 Banked Attributes	2016 Banked Attributes	Alternative Compliance Credits	Total RPS SCO Attributes	SCO Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	172,364	2,827	-	32	-	2,859	2,812	47	281	47
National Grid	6,820,375	109,683	-	10,262	-	119,945	111,261	8,684	11,126	8,684
NSTAR	6,124,884	99,920	-	-	-	99,920	99,916	4	9,991	4
W MASS Electric	1,367,751	22,313	-	-	-	22,313	22,313	-	2,231	-
SUBTOTALS	14,485,374	234,743	0	10,294	0	245,037	39	0	3	0
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,230,368	506,838	32,369	22,075	1,584	533,058	743,580	34,476	74,332	34,280
GRAND TOTAL	45,715,742	741,581	32,369	32,369	1,584	778,095	743,619	34,476	74,335	34,280

[42] 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 Regulations, 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 Appendix Two.

[43] Solar Carve-Out and Solar Carve-Out II are netted out from the Class I table, although included in Tables G, H, and I of Appendix Four.

TABLE C RPS SOLAR CARVE-OUT II RENEWABLE ENERGY COMPLIANCE SUMMARY, 2017 (MWH)

RPS CLASS I SOLAR CARVE-OUT II (SCOII)	Load Obligation from Filing	2017 MA SREC IIs	2015 Banked Attributes	2016 Banked Attributes	Alternative Compliance Credits	Total RPS SCOII Attributes	SCOII Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	172,364	5,001	-	27	-	5,028	4,935	93	493	93
National Grid	6,820,375	200,907	-	-	-	200,907	187,147	13,760	18,714	13,760
NSTAR	6,124,884	175,291	-	53	-	175,344	175,344	-	17,534	-
W MASS Electric	1,367,751	36,550	-	11	-	36,561	36,561	-	3,656	-
SUBTOTALS	14,485,374	417,749	0	91	0	417,840	403,987	13,853	40,397	13,853
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,230,368	688,602	0	9,076	14,483	713,733	698,411	15,322	69,813	15,174
GRAND TOTAL	45,715,742	1,106,351	0	9,167	14,483	1,131,573	1,102,398	29,175	110,210	29,027

TABLE D RPS CLASS II RENEWABLE ENERGY COMPLIANCE SUMMARY, 2017 (MWH)

RPS CLASS II	Load Obligation from Filing	2017 MA Class II RECs	2015 Banked Attributes	2016 Banked Attributes	Alternative Compliance Credits	Total RPS Class II RE Attributes	RPS Class II Net Obligation	Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	172,364	4,540	0	0	0	4,540	4,466	74	1,339	74
National Grid	6,820,375	180,173	0	548	0	180,721	176,710	4,011	53,013	4,011
NSTAR	6,124,884	27,444	0	0	131,246	158,690	158,690	0	47,607	0
W MASS Electric	1,367,751	6,129	0	0	29,309	35,438	35,438	0	10,631	0
SUBTOTALS	14,485,374	218,286	0	548	160,555	379,389	375,304	4,085	112,590	4,085
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,230,368	565,412	0	17,468	230,083	812,963	809,181	3,782	242,724	3,595
GRAND TOTAL	45,715,742	783,698	0	18,016	390,638	1,192,352	1,184,485	7,867	355,314	7,680

TABLE E RPS CLASS II WASTE-TO-ENERGY COMPLIANCE SUMMARY, 2017 (MWH)

RPS CLASS II WASTE-TO-ENERGY	Load Obligation from Filing	2017 MA Class II WECs	2015 Banked Attributes	2016 Banked Attributes	Alternative Compliance Credits	Total RPS Class II WE Attributes	RPS Class II Waste-to-Energy Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	172,364	6,130	0	0	0	6,130	11,935	161	0	0
National Grid	6,820,375	238,647	0	228	0	43	10,718	43	0	0
NSTAR	6,124,884	214,178	0	236	0	0	2,393	0	0	0
W MASS Electric	1,367,751	47,822	0	50	0	5,704	4	0	0	0
SUBTOTALS	14,485,374	506,777	0	514	0	11,877	25,050	204	0	0
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,230,368	1,110,962	0	15,130	10,805	1,632,709	1,575,040	44,292	79,972	35,573
GRAND TOTAL	45,715,742	1,617,739	0	15,644	10,805	1,644,586	1,600,090	44,496	79,972	35,573

TABLE F APS ALTERNATIVE ENERGY COMPLIANCE SUMMARY, 2017 (MWH)

APS	Load Obligation from Filing	2017 MA APS AECs	2015 Banked Attributes	2016 Banked Attributes	Alternative Compliance Credits	Total RPS APS Attributes	APS Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	172,364	7,440	0	0	0	7,440	7,326	114	2,197	114
National Grid	6,820,375	346,090	0	0	0	346,090	289,866	56,224	86,959	56,224
NSTAR	6,124,884	312,208	0	0	0	312,208	260,308	51,900	78,092	51,900
W MASS Electric	1,367,751	58,130	0	0	0	58,130	58,130	0	17,439	0
SUBTOTALS	14,485,374	723,868	0	0	0	723,868	615,630	108,238	184,687	108,238
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,230,368	1,289,421	0	3,847	143,008	1,440,879	1,327,329	113,550	398,170	113,386
GRAND TOTAL	45,715,742	2,013,289	0	3,847	143,008	2,164,747	1,942,959	221,788	582,857	221,624

APPENDEX FOUR: Data Tables for Compliance by Generation Location and Type[44]

The first four tables below provide the data from which the Class I graphs in Figures 2 through 6 were generated. Those graphs and these tables include SREC data (both SREC and SRECII) for the SCO and SCOII programs, which are 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.

TABLE G RPS CLASS I COMPLIANCE BY GENERATION LOCATION, 2010-2017

STATE	2010	2011	2012	2013	2014	2015	2016	2017	
CT	20,146	16,414	16,070	16,452	11,397	5,973	6,829	22,481	0.4%
ME	760,476	746,648	864,227	1,114,355	1,039,509	1,170,728	1,219,261	1,651,113	28.2%
MA	**197,748**	**286,115**	**483,925**	**791,088**	**1,118,406**	**1,538,702**	**1,659,136**	**2,204,208**	**37.7%**
NH	282,308	331,996	531,430	640,808	508,841	495,212	358,956	237,805	4.1%
RI	1,182	41,952	37,131	23,288	11,059	9,496	8,210	5,081	0.1%
VT	108,849	149,505	173,191	364,691	407,497	342,023	382,949	297,852	5.1%
NMISA	89,405	22,742	49,144	64,629	67,369	353	5,166	-	0.0%
NY	580,683	688,039	620,904	870,508	880,859	666,330	1,025,674	864,280	14.8%
NS	-	-	-	-	-	-	1,173	64,400	1.1%
PEI	144,549	142,688	125,713	142,478	189,578	227,942	230,705	236,727	4.0%
QC	138,263	213,713	278,794	356,139	397,130	339,366	336,421	266,357	4.6%
TOTAL	2,323,609	2,639,812	3,141,663	4,384,436	4,631,645	4,796,125	5,234,480	5,850,304	100%

TABLE H RPS CLASS I COMPLIANCE BY GENERATION TYPE, 2010-2017

FUEL TYPE	2010	2011	2012	2013	2014	2015	2016	2017	
Anaerobic Digester Gas	24,292	25,115	27,373	22,853	9,868	43,837	42,099	47,412	0.8%
Other Biomass	584,505	392,629	394,754	357,575	375,109	320,801	2,501	2,185	0.0%
Hydroelectric	80,823	105,484	105,326	113,936	129,790	129,810	133,389	147,168	2.5%
Landfill Gas	736,298	848,229	891,798	954,656	820,001	587,790	722,539	268,910	4.6%
Marine & Hydrokinetic	-	-	-	6,837	28,959	47	48	47	0.0%
Solar PV	4,116	36,688	138,159	323,164	681,502	1,194,925	1,324,578	2,030,870	34.7%
Wind	893,575	1,231,667	1,623,119	2,605,415	2,586,416	2,518,915	3,009,326	3,353,712	57.3%
Totals	2,323,609	2,639,812	3,180,529	4,384,436	4,631,645	4,796,172	5,234,480	5,850,304	100.0%

[44] 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 Qualified Generation Units webpage.

TABLE I RPS CLASS I COMPLIANCE BY GENERATION LOCATION AND TYPE, 2017 (MWH)

	Anaerobic Digester Gas	Other Biomass	Hydroelectric	Hydrokinetic	Landfill gas	Solar PV	Wind	TOTAL
CT	-	-	285	-	2,974	19,222	-	22,481
ME	7,891	-	46,385	-	13,202	7,280	1,576,355	1,651,113
MA	38,486	2,185	34,094	47	76,526	1,869,476	183,379	2,204,208
NH	-	-	21,713	-	23,688	23,474	168,927	237,805
NY	-	-	-	-	106,172	-	758,108	864,280
NS	-	-	-	-	-	-	64,400	64,400
PE	-	-	-	-	-	-	236,727	236,727
QC	-	-	-	-	38,153	-	228,204	266,357
RI	-	-	31	-	-	1,558	3,492	5,081
VT	1,035	-	44,660	-	8,195	109,067	134,120	297,852
TOTAL	**47,412**	**2,185**	**147,168**	**47**	**268,910**	**2,030,870**	**3,353,712**	**5,850,304**

TABLE J 2017 RPS CLASS I COMPLIANCE PERCENTAGE BY GENERATOR TYPE AND STATE

	Anaerobic Digester Gas	Other Biomass	Hydroelectric	Hydrokinetic	Landfill Gas	Solar PV	Wind
CT	0.0%	0.0%	0.2%	0.0%	1.1%	0.9%	0.0%
ME	16.6%	0.0%	31.5%	0.0%	4.9%	0.4%	47.0%
MA	81.2%	100.0%	23.2%	100.0%	28.5%	92.1%	5.5%
NH	0.0%	0.0%	14.8%	0.0%	8.8%	1.2%	5.0%
NY	0.0%	0.0%	0.0%	0.0%	39.5%	0.0%	22.6%
NS	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%
PE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%
QC	0.0%	0.0%	0.0%	0.0%	14.2%	0.0%	6.8%
RI	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
VT	2.2%	0.0%	30.3%	0.0%	3.0%	5.4%	4.0%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

TABLE K RPS CLASS II RENEWABLE ENERGY COMPLIANCE BY GENERATION LOCATION, 2010-2017

STATE	2010	2011	2012	2013	2014	2015	2016	2017	
CT	2,378	11,178	2,933	5,848	6,557	4,410	14,461	19,439	2.5%
ME	18,605	42,540	72,014	171,754	110,517	104,395	112,269	130,374	16.6%
MA	14,711	21,200	61,082	97,982	184,538	213,229	180,920	246,270	31.4%
NH	29,369	69,674	55,454	86,931	96,101	94,336	87,538	133,297	17.0%
RI	3,040	3,524	1,448	1,597	2,524	1,709	2,777	35,132	4.5%
VT	28,837	30,610	53,106	145,497	126,143	119,155	151,251	3,478	0.4%
NY	6,897	57,856	0	0	0	0	12,108	216021	27.6%
TOTAL	103,837	236,582	246,037	509,609	526,380	537,234	561,324	784,011	100%

TABLE L RPS CLASS II RENEWABLE ENERGY COMPLIANCE BY GENERATION TYPE, 2010-2017

FUEL TYPE	2010	2011	2012	2013	2014	2015	2016	2017	
Hydroelectric	96,552	172,051	246,037	509,462	526,097	535,799	525,392	724,199	17.5%
Landfill Gas	0	7,285	64,531	0	0	0	26,965	52,689	1.3%
Marine & Hydrokinetic	0	0	0	147	240	242	244	258	0.0%
Wind	0	0	0	0	7	1,193	8,723	3,353,712	81.2%
Totals	96,552	179,336	310,568	509,609	526,380	537,234	561,324	4,130,858	100.0%

TABLE M RPS CLASS II COMPLIANCE BY GENERATION LOCATION AND TYPE, 2017 (MWH)

STATE / FUEL TYPE	Hydroelectric	Hydrokinetic	Landfill Gas	Wind	TOTAL	
CT	11,393	-	8,046	-	19,439	2.5%
ME	130,374	-	-	-	130,374	16.6%
MA	246,012	258	-	-	246,270	31.4%
NH	124,343	-	8,954	-	133,297	17.0%
RI	-	-	35,132	-	35,132	4.5%
VT	3,478	-	-	-	3,478	0.4%
NY	208,599	-	557	6,865	216,021	27.6%
TOTAL	**724,199**	**258**	**52,689**	**6,865**	**784,011**	**100.0%**

TABLE N APS COMPLIANCE BY GENERATION TYPE, 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017	
Biomass	-	-	-	2,689	2,797	3,138	2,548	5,495	0.3%
Digester gas	-	-	-	-	855	531	893	152	0.0%
Flywheel Storage	2,030	303	3,186	489	377	98	2,724	-	0.0%
Heat Pumps	-	-	-	-	-	-	-	2,087	0.1%
Liquid biofuels	-	-	-	-	-	-	-	406,673	20.2%
Solar Thermal	-	-	-	-	-	-	-	121	0.0%
CHP – Biomass	-	-	-	2,689	2,797	3,138	2,548	1,659	0.1%
CHP – Natural Gas	225,104	324,619	347,993	529,462	826,966	890,835	938,838	1,495,505	74.1%
CHP – Muni Waste	-	-	-	-	-	-	-	105,658	5.2%
CHP – Waste to Energy	-	-	-	-	855	531	893	486	0.0%
Total	227,134	324,922	351,179	535,329	834,647	898,271	948,444	2,017,836	100.0%

TABLE O VOLUNTARY RENEWABLE ENERGY CERTIFICATES RETIRED FOR RGGI BY GENERATION LOCATION AND TYPE, 2017 (MWH)[45]

	Anaerobic Digester Gas	Hydroelectric	Landfill Gas	Solar Photovoltaic	Wind	Total
Connecticut	-	-	-	115	-	115
Maine	-	-	-	712	12,638	13,350
Massachusetts	99	626	-	2,326	5,857	8,908
New Hampshire	-	-	-	-	-	-
Rhode Island	-	31	-	51	-	82
Vermont	-	-	-	825	-	825
New York	-	-	-	-	290	290
Quebec	-	-	1,722	-	-	1,722
TOTAL	99	657	1,722	4,029	18,785	25,292

[45] 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 3.