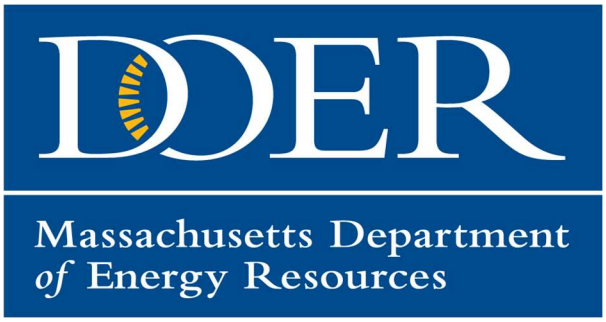

2019 ANNUAL COMPLIANCE REPORT

RENEWABLE ENERGY PORTFOLIO STANDARD (RPS)
ALTERNATIVE ENERGY PORTFOLIO STANDARD (APS)
CLEAN PEAK ENERGY STANDARD (CPS)
CLEAN ENERGY STANDARD (CES)

November 16, 2021

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 Energy Portfolio Standard (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 Alternative Energy Portfolio Standard (APS). The RPS and APS statutes were further modified by the Competitively Priced Electricity Act of 2012,[1] the Renewable Thermal Act of 2014,[2] the Energy Diversity Act of 2016,[3] and the Act to Advance Clean Energy of 2019.[4]

In 2018, the Clean Energy Standard (CES) was successfully introduced to complement the other standards. The CES is administered by the Massachusetts Department of Environmental Protection (MassDEP).[5]

The Clean Peak Standard (CPS), part of An Act to Advance Clean Energy[6] which was signed into law in August 2018, provides incentives to clean energy technologies that can supply electricity or reduce demand during seasonal peak demand periods. However, in 2019 the CPS minimum standard was 0%, so no compliance was necessary.

The statutes regarding the RPS, APS, CPS, and CES require 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, APS, CPS, and CES requirements do not apply to municipal light plants.

The RPS, APS, CPS and CES programs operated successfully in 2019. The number of RPS Class I Renewable Energy Certificates (RECs), net of the Solar Carve-Out (SCO) and Solar Carve-Out II (SCO II) programs, increased by 19.8% over 2018, buoyed by the Solar Massachusetts Renewable Target (SMART) program which is the successor solar program to the SCO and SCO II programs. The SMART program creates RPS Class I renewable certificates as opposed to separate solar renewable certificates within the SCO and SCO II programs. The CES program also met its standard obligation with RPS Class I renewable certificates (RPS Class I RECs qualify for CES compliance). In addition, the number of RPS Class II Renewable RECs increased by 32.2%, mostly due to the additional qualification of hydroelectric plants.

However, four Retail Electricity Suppliers failed to meet their 2019 compliance requirements, three of which were also non-compliant in the previous year. The obligations of the non-compliant suppliers accounted for approximately 2% of the total obligation of the RPS Class I. In response, the Department of Energy Resources (DOER) has proposed modifications to its processes to ensure compliance in the future.

Minimum Standards

The RPS requirements began in 2003 with an obligation of 1% of total retail electricity sales and increased 0.5% annually until it reached 4% in 2009. From 2010 to 2019, the RPS Class I obligation has increased 1% annually. The RPS Class I minimum standard was 14% in 2019.

Since 2010, the RPS Class I minimum standard has included a SCO obligation for in-state solar generation. The minimum standard obligation for the SCO and its 2014 successor program, SCO II, change annually by formulas set in regulation.

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[1] Chapter 209 of the Acts of 2012
[2] Chapter 251 of the Acts of 2014
[3] Chapter 188 of the Acts of 2016
[4] Chapter 227 of the Acts of 2019
[5] In agreement with the Massachusetts Department of Environmental Protection, DOER's annual report on RPS and APS will also serve as the Annual Clean Energy Resource Report as specified in 310 CMR 7.75(9)(b), Clean Energy Standard
[6] An Act to Advance Clean Energy

The RPS Class II renewable energy obligation changes annually per a schedule and formula set in regulation, with a cap of 3.6%. The RPS Class II waste-to-energy obligation is fixed at 3.5% annually. The APS obligation, which was 4.75% in 2019, increases by 0.25% per year. The total obligation for the CES was 18% in 2019, though it is inclusive of the RPS Class I minimum standard. Therefore, the additional obligation from the CES was 4% in 2019. The CES increases by 2% per year. The table below shows the 2019 minimum standard for each class, the resultant renewable obligation in megawatt hours (MWh), and the total amount of Alternative Compliance Payments (ACP) collected by class:

Summary of Minimum Standards, Certificates Used to Meet Obligation, and Alternative Compliance Payments in 2019 (Net of non-compliant Suppliers)

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 (NET)	8.4912%	3,796,084	3,723,951	9	$ 634
RPS SCO *	1.7455%	780,339	741,343	23,868	$ 9,642,672
RPS SCO II *	3.7633%	1,682,417	1,642,310	46,763	$ 15,572,079
RPS CLASS II Renewable	2.6884%	1,201,860	1,165,729	12,602	$ 364,324
RPS CLASS II Waste-to-energy	3.5001%	2,123,562	1,511,623	22,552	$ 262,289
APS	4.7501%	2,073,066	2,073,066	8,880	$ 208,864
CES **	3.2759%	1,464,505	1,406,167	23,675	$ 1,429,842
TOTAL***	**28.2145%**	**13,121,833**	**12,264,189**	**138,349**	**$ 27,480,704**

* Solar carve out requirements are subsets of the overall RPS Class I requirement of 14%
** CES total obligation is 18%. The RPS Class I obligation counts towards meeting the overall obligation making the Incremental minimum standard 4%.
*** 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 four suppliers (See Appendix Two: **COMPLIANCE FILINGS, REVIEW, AND VERIFICATION**) Certificates Used to Meet Obligations 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.[7] 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 Generation Units must be pre-1998 waste-to-energy plants located in Massachusetts and meet certain MassDEP recycling requirements. Eligible APS resources in 2019 included air and ground source heat pumps, solar thermal, biomass, liquid biofuels, biogas, fuel cells, and waste-to-energy thermal in addition to Combined Heat and Power (CHP).

Renewable Energy Certificates (RECs)

To achieve RPS, APS, and CES compliance, each Retail Electricity Supplier must obtain enough renewable generation certificates to satisfy its minimum standard obligation or make an Alternative Compliance Payment for enough credits to satisfy the minimum standard obligation.

Each RPS Class I and Class II REC, Solar Carve-Out Renewable Energy Certificate (SREC), Solar Carve-out II Renewable Energy Certificate (SREC II), and Waste Energy Certificate (WEC) represents the renewable generation attributes of one MWh of electricity generated during the Compliance Year by a qualified

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

Generation Unit (however, the MWh value of some SREC II generation is discounted by SREC factors related to project size or type of location, resulting in only a portion of a facility's output generating SREC IIs).

Under the APS program, an Alternative Energy Certificate (AEC) represents either the MWh-equivalent of the fuel savings in thermal energy or the direct Useful Thermal Energy generated from APS-qualified facilities as determined by the APS regulations for each specific alternative energy technology.

CES Generation Units create Clean Energy Certificates (CECs). In 2019, no separate qualifying generators were eligible to produce stand-alone CECs. Therefore, RPS Class I RECs were used to meet the meet the entire CES obligation.

Total Load Obligation

The total retail load obligation in 2019 was 44,705,757 MWh, a decrease of 3.7% from 2018 (46,409,960 MWh). This is the lowest load obligation since the beginning of the RPS program.

RPS Class I

Total RPS Class I RECs generated (net of SRECs and SREC IIs) equaled 8,355,711, which represents a 19.8% increase over 2018. Some of these RECs also qualify in other jurisdictions 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.[8]

However, as noted above, RPS Class I RECs were also used to meet the CES obligation. Adequate supply of RECs existed in the market to meet the RPS and CES obligations. In fact, only nine Alternative Compliance Credits were utilized for RPS Class I, which resulted in an Alternative Compliance Payment of $634. Suppliers also banked 586,227 Class I RECs and 62,537 CES CECs for future use.

Overall, wind accounted for approximately 53.6% of the total RPS Class I RECs (including SRECs and SREC IIs) while solar photovoltaic arrays contributed 39.7%. Hydroelectric power contributed 3.2% and landfill gas supplied 2.8%, with the remaining 0.7% representing low emission technology biomass.

Solar Carve-Out

The SCO market was tightly balanced in 2019. Suppliers utilized 23,868 ACP credits, up from 20,283 in 2018. As a result, ACP receipts rose from $8.6 million in 2018 to $9.6 million in 2019.

[8] 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 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/.

Solar Carve-Out II (SCO II)

The SCO II program was more out-of-balance in 2019 due to a drop in auction certificates used for compliance from 191,185 in 2018 to 4,732 in 2019. ACP credits went from 22,636 in 2018 to 46,763 in 2019, resulting in an ACP jump from $7.9 million in 2018 to $15.6 million in 2019.

SMART

Beginning in 2018, Massachusetts transitioned to the new Solar Massachusetts Renewable Target (SMART) program, a tariff-based program that incentivizes development of solar in Massachusetts. The program initially targeted 1,600MW capacity of solar, which was increased to a total of 3,200MW in 2020.

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

The RPS Class II Renewable Energy program was comparatively more balanced than previous years because of the increase in RPS Class II RECs generated from newly qualified supply, mostly out-of-region hydroelectric plants. ACP credits fell from 169,016 in 2018 to 12,602 in 2019 and ACP receipts fell from $4.8 million in 2018 to $0.4 million in 2019.

In the RPS Class II waste-to-energy program, suppliers utilized 22,552 ACP credits, resulting in approximately $0.3 million of ACP receipts. Suppliers banked forward 39,756 WECs.

Alternative Portfolio Standard (APS)

The APS was a market mostly in balance, whereas in past years it has been undersupplied. Suppliers utilized only 8,880 ACP credits for ACP payments of $0.2 million, down from $1.0 million in 2018.

Clean Energy Standard (CES)

The CES, which is overseen by MassDEP, was a new standard in 2018. The minimum standard was 18% in 2019. All CECs used to meet the CES obligation were eligible RPS Class I RECs. ACP credits were again used to meet part of the obligation of 1,429,842 MWh (net of Non-Compliance). ACP credits amounted to 23,675 MWh totaling $1.3 million in ACP receipts.

Supplier Compliance

Sixty-four (64) Retail Electricity Suppliers (including the three state-regulated investor-owned utilities) served Massachusetts retail customers in 2019 (see Appendix One**: 2019 Massachusetts Retail Electricity Suppliers**).[9] Sixty (60) suppliers fully discharged their obligations through the purchase of the required number of renewable certificates or by making ACPs. Four suppliers were non-compliant. (see Appendix Two**:** **COMPLIANCE FILINGS, REVIEW, AND VERIFICATION** for further detail).

[9] NStar and Western Massachusetts Electric Co. are reported as Eversource at the request of the company. Massachusetts Electric Co. and Nantucket Electric Co. are reported as National Grid at the request of the company.

1. INTRODUCTION TO THE RENEWABLE PORTFOLIO STANDARD, ALTERNATIVE ENERGY PORTFOLIO STANDARD, CLEAN ENERGY STANDARD AND CLEAN PEAK STANDARD

A. Renewable Energy Portfolio Standard (RPS)

The Electricity Restructuring Act of 1997 mandated the Renewable Energy Portfolio Standard (RPS), one of the earliest such requirements in the nation. The original RPS obligated Retail Electricity Suppliers,[10] (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[11] that had begun operation after 1997.

All minimum standards are structured as a percentage obligation of a Supplier's retail load during a Compliance Year (CY).[12] However, each portfolio minimum standard has different eligibility criteria and percentage obligation.

The RPS program began with an obligation of 1% in 2003, which 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 was increased by 1% annually beginning in 2009. In 2019, the RPS Class I minimum standard was 14%.

The Legislature further amended the RPS Class I minimum standard through Chapter 227 of the Acts of 2019, by increasing the growth rate from 1% per year to 2% per year for the years 2020 through 2029. This was further amended by Chapter 8 of the Acts of 2021, which amended the language further to increase the RPS by 3% per year after 2024 and through 2029. After 2029, the RPS Class I minimum standard reverts to a 1% annual growth rate.[13]

As a result of the Green Communities Act of 2008, Suppliers were required, as of 2009, to comply with three additional energy portfolio standards: (1) RPS Class II Renewable, (2) RPS Class II Waste-to-Energy, and (3) Alternative Energy Portfolio Standard (APS). The RPS Class II Renewable standard would qualify electricity generated from pre-1998 generation units. The RPS Class II Waste-to-Energy standard qualified facilities that had been previously approved by the Massachusetts Department of Environmental Protection (MassDEP) and demonstrated ongoing recycling programs. Waste-to-energy qualified facilities must provide 50% of their renewable generation certificate revenue to MassDEP recycling programs. The APS allows for combined heat and power (CHP), flywheel energy storage, and other efficient technologies to participate.

[10] 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.

[11] 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.

[12] 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.

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

Additionally, the Green Communities Act of 2008 expanded the list of RPS eligible resources to include hydroelectricity plants of small size and low environmental impact,[14] as well as geothermal, marine, and hydro-kinetic facilities. Furthermore, 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")[15] by an independent Third-Party Meter Reader or Independent Verifier.[16]

B. Solar Carve-Out (SCO)

A Solar Carve-Out (SCO) minimum standard was created within Class I as of 2010,[17] and an additional Solar Carve-Out II (SCO II) minimum standard (see C. Solar Carve-Out II below) was created within Class I as of 2014 as a successor program to the Solar Carve-Out.

Under the 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 were installed after 2008 and are connected to the Massachusetts electric grid. 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 SCO II *within* Class I. The start of the SCO II marked the end of the SCO, which eventually qualified a total of 653.3 MW of new solar resources.[18]

C. Solar Carve-Out II

The SCO II is modeled on the SCO regarding project eligibility, except that installation must have commenced after 2012. Within that model, the SCO II has three major differences compared to the SCO: (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 to reflect 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.

Regarding (2) above, the SCO II program created "Market Sectors" and "SREC Factors" for qualifying projects. Under the SCO II, the highest incentive, namely an SREC Factor of one SREC II per megawatt-hour (MWh) of output, is given to small (25 kW or less) projects, solar canopies, community-shared solar projects providing 100% of its power to low-income housing, and emergency power sites. The SCO II gives a slightly lower SREC Factor to larger building-mounted projects, those that mostly serve an on-site load, and those built on eligible landfills and qualified "brownfields."[19]

Approvals of PV systems under the SCO II were originally capped at 946.7 MW of installed capacity, which was designed to meet the Commonwealth's capacity goal of 1,600 MW by 2020, less the 653.3 MW

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[14] 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.

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

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

[17] 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.

[18] For more details about the Solar Carve-Out and Solar Carve-Out II, see footnote 30, and/or visit the RPS/APS homepage.

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

qualified under the original SCO. However, applications exceeded expectations to the SCO II program, and DOER received enough applications for the SCO II 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, 2019, 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.

D. Solar Massachusetts Renewable Target program

Following the passage of Chapter 75 of the Acts of 2016, DOER promulgated regulations that created the Solar Massachusetts Renewable Target (SMART) Program. The SMART program was designed to create long-term, sustainable incentives that promoted solar development in Massachusetts via a declining block rate tariff framework. On September 12, 2019, the Commonwealth's investor-owned electric distribution companies jointly filed a model rate tariff with the Massachusetts Department of Public Utilities (DPU) for its review and approval. On September 26, 2019, the DPU approved the model rate tariff filed by the distribution companies which began the final steps of the transition process to the SMART program. The official transition to the SMART program occurred in November 2019 and marked the close of new solar projects qualifying for the SCO II Program.

The SMART program does not represent a carve-out to the RPS Class I minimum standard like the SCO and SCO II programs, however all SMART qualified resources do generate RPS Class I RECs.

In 2019, the following number of RPS Class I RECs were generated.

Figure 1 Class I RECs Generated from SMART program, 2019

ELECTRIC DISTRIBUTION COMPANY	SMART CLASS I RECS
EVERSOURCE	22,142
NATIONAL GRID	25,009
FITCHBURG G&E (UNITIL)	353
TOTAL	47,504

E. 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 and capped the minimum standard at 3.6%.

F. RPS Class II Waste-to-Energy

The RPS Class II waste-to-energy provides incentives for pre-1998 waste-to-energy generation. The RPS Class II eligibility of waste-to-energy Generation Units, also known as municipal solid waste plants, is conditioned on recycling and other regulatory criteria specific to Massachusetts. The minimum standard was fixed at 3.5% in 2019. Per updated regulations, it is fixed at 3.7% for the years 2021-2025.

G. Alternative Energy Portfolio Standard

As a result of the Green Communities Act of 2008, the APS was limited to, and intended to support, certain "alternative" technologies and resources which would be supported in an incentive structure modeled on the RPS.[20]

Late in 2014, DOER began to develop changes to 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 through 2017. Chapter 188 of the Acts of 2019 further expanded the list of eligible technologies to include fuel cells and waste-to-energy thermal facilities. The final regulations became effective on December 29, 2017, but eligibility was retroactive to the initial target dates of January 1, 2015, for renewable thermal technologies and January 1, 2017, for fuel cells and waste-to-energy thermal facilities.[21]

H. Clean Energy Standard (CES)

The purpose of the CES is to reduce Massachusetts' reliance on fossil fuel-fired electric power plants by increasing the use of clean energy, namely low- and zero-emissions power generation technologies.

The establishment of the CES grew out of (1) the Massachusetts Global Warming Solutions Act (GWSA), (2) the Massachusetts Supreme Judicial Court's May 2016, decision in Kain v. Department of Environmental Protection, which clarifies the intent and requirements of the GWSA, and (3) Governor Baker's September 2016 Executive Order 569.

In response, the MassDEP promulgated regulations that established obligations on Retail Electricity Suppliers to provide an annually increasing percentage of power from clean energy sources. It also defined clean energy based on a greenhouse gas (GHG) emissions-based performance standard, regardless of the technology used to generate the electricity which included additional low- and zero-emissions generation technologies that are not included in the existing RPS program.

I. Clean Peak Standard (CPS)

The Clean Peak Energy Standard (CPS)[22] is designed to provide incentives to clean energy technologies that can supply electricity or reduce demand during seasonal peak demand periods established by DOER. The Clean Peak Energy Standard was part of An Act to Advance Clean Energy[23], which was signed into law in August 2018. Clean Peak Resources include 1) new RPS Class I renewable energy Generation Units, 2) existing RPS Class I or Class II resources that are paired with an Energy Storage System, 3) stand-alone Energy Storage Systems, or 4) Demand Response resources. Any qualified resource that generates or discharges energy or that reduces the demand for energy to the electric grid during a defined Seasonal Peak Period will create Clean Peak Certificates (CECs). Certain factors may apply to the generation of CECs which may create more than one or less than one CEC per MWh of generation.

J. Renewable Energy Certificates (RECs)

RECs 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

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

[21] 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.

[22] Information on the Clean Peak Standard can be found here: https://www.mass.gov/clean-peak-energy-standard

[23] An Act to Advance Clean Energy

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.[24]

For each MWh of electricity generated, the NEPOOL-GIS creates and deposits one electronic renewable generation certificate in the account of the Generation Unit that generated the MWh in ISO-NE or exported the MWh from an adjacent control area.[25]

To meet the RPS, APS, CES, and CPS requirements, suppliers obtain the appropriate class of renewable generation certificate directly from the generators, or indirectly from brokers. The certificates are electronically transferred from the generators' and brokers' NEPOOL-GIS accounts to the suppliers' NEPOOL-GIS accounts. Each 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, unless it is banked forward. For example, a 2019 generated RPS Class II REC can only be used for 2019 Class II Renewable Energy compliance. However, since SRECs and SREC IIs are "carve-outs" within RPS Class I and are encoded in the NEPOOL-GIS as a type of Class I REC, they also can be used for RPS Class I compliance. As previously noted, RPS Class I certificates can be used to meet the CES obligation.

APS obligations are met through Alternative Energy Certificates (AECs), generated from eligible Generation Units. An AEC may be from a renewable energy system or an efficient system that may be displacing non-renewable resources.

K. Alternative Compliance Payments (ACP)

Alternative Compliance Payments (ACP) are an essential mechanism for RPS, APS, CES, and CPS compliance and overall cost controls. If a Supplier does not acquire enough certificates to meet a given minimum standard, it can comply with the respective program by making a payment at the ACP rate in lieu of purchasing renewable generation certificates. ACPs for RPS, APS, and CPS are made to the Massachusetts Clean Energy Center (MassCEC) which holds the funds on behalf of DOER for the funding of renewable and other related projects. Alternative Compliance Payments for CES are made directly to MassDEP.

This process is intended to acknowledge that enough certificates for a given minimum standard may not always be available in the marketplace and provide an alternative path to compliance for Retail Electric Suppliers. Also, the ACP rate functions, in effect, as a cost containment mechanism by creating a cap on the value of a certificate for each minimum standard.[26]

24 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).

25 Each REC is encoded with Attributes that indicate the Generation Unit name, location, and fuel, energy resource or technology, as well as whether 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 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.

26 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.

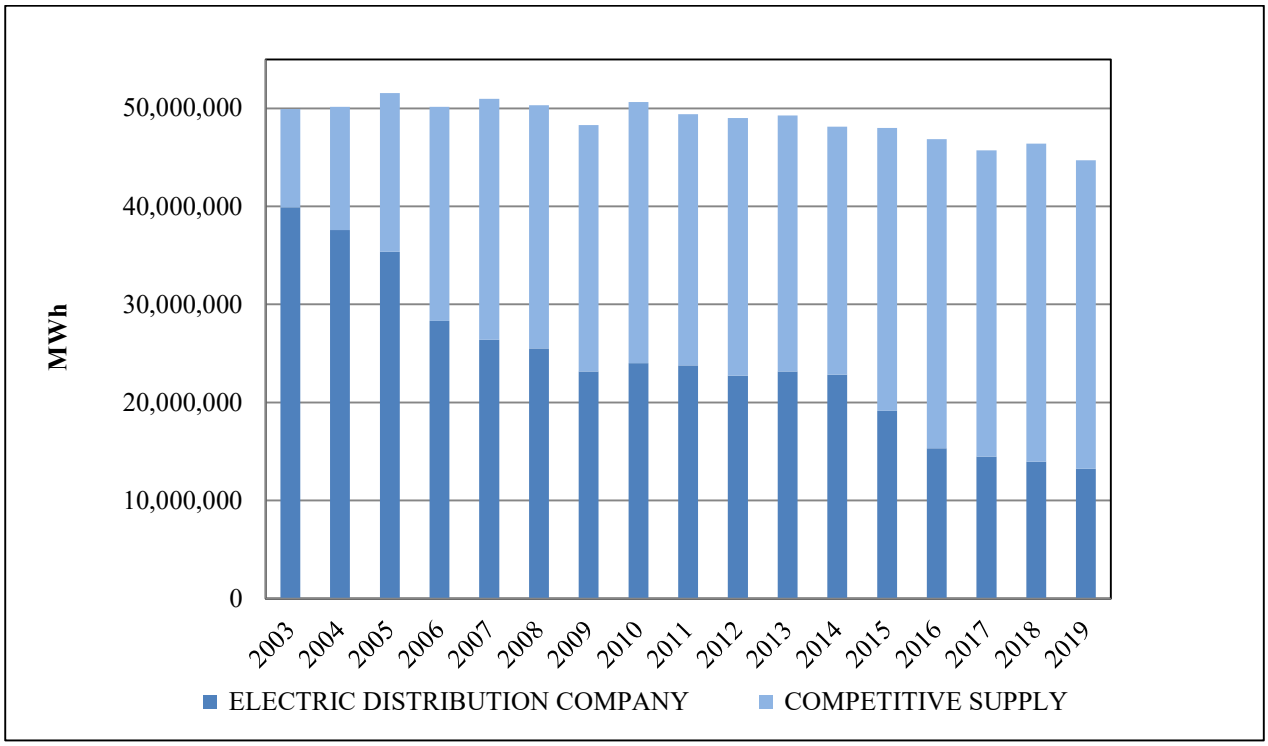
L. Banking

Banking provides compliance flexibility as suppliers may acquire more certificates than required by the minimum standard and "bank" them for compliance towards that *same* minimum standard[27] in either of the following two Compliance Years. Each program has a different banking limit.[28]

M. Retail Load Obligation

The following figure shows the total Retail Load Obligation since 2003, divided between load served by the electric distribution companies and load served by competitive suppliers. There were 64 Retail Electricity Suppliers in 2019, including the three electric distribution companies and the rest were competitive suppliers. Competitive 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, APS, CES, and CPS programs and their combined load is not included here. The total Retail Load Obligation in 2019 was 44,705,757 MWh, a decrease of 3.7% from 2018 (46,409,960 MWh).

Figure 2 Retail Load Obligation by Supplier Type, 2003-2019



The RPS, APS, and CPS requirements are further detailed in the RPS, APS, and CPS regulations and guidelines found on DOER's website. The information on the website describes how facilities become qualified, lists all qualified facilities, explains how Retail Electricity Suppliers demonstrate annually their compliance with the RPS, APS, CES, and CPS, and provides links to the statutes, regulations, and any ongoing regulatory processes. It also contains all past annual reports of the RPS and APS programs.

[27] 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.

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

The CES requirements are found on the MassDEP website.

2. RPS CLASS I RENEWABLE COMPLIANCE IN 2019

A. Compliance Details

DOER received Annual Compliance Filings from 60 of the Retail Electricity Suppliers that sold electricity to retail end users in Massachusetts during 2019, including the three electric distribution companies. Two new Retail Electricity Suppliers began selling electricity in 2019 (see Appendix One: **2019 Massachusetts Retail Electricity Suppliers**). Four suppliers were non-compliant in 2019 and did not submit Annual Compliance Filings (see Appendix Two: **COMPLIANCE FILINGS, REVIEW, AND VERIFICATION** for further detail).

Table 1 below shows the dispensation of RECs, banked RECs, and ACP credits in meeting the RPS Class I Compliance Obligation. In 2019, the minimum standard for RPS Class I was 14%. Because the SCO and SCO II are carve-outs within RPS Class I, their average obligations of 1.7455% and 3.7633% respectively were subtracted from 14% which results in an average net RPS Class I minimum standard of 8.4912%. The SCO and SCO II are average obligations because their exempt load obligations have been combined with their non-exempt load obligations.

Because the amount of Non-Compliance was significant in 2019, DOER has netted the Non-Compliance obligation from the Aggregate Compliance Obligation to show a more reflective accounting of the disposition of RECs. This practice also is carried forward to RPS Class II, APS, and CES.

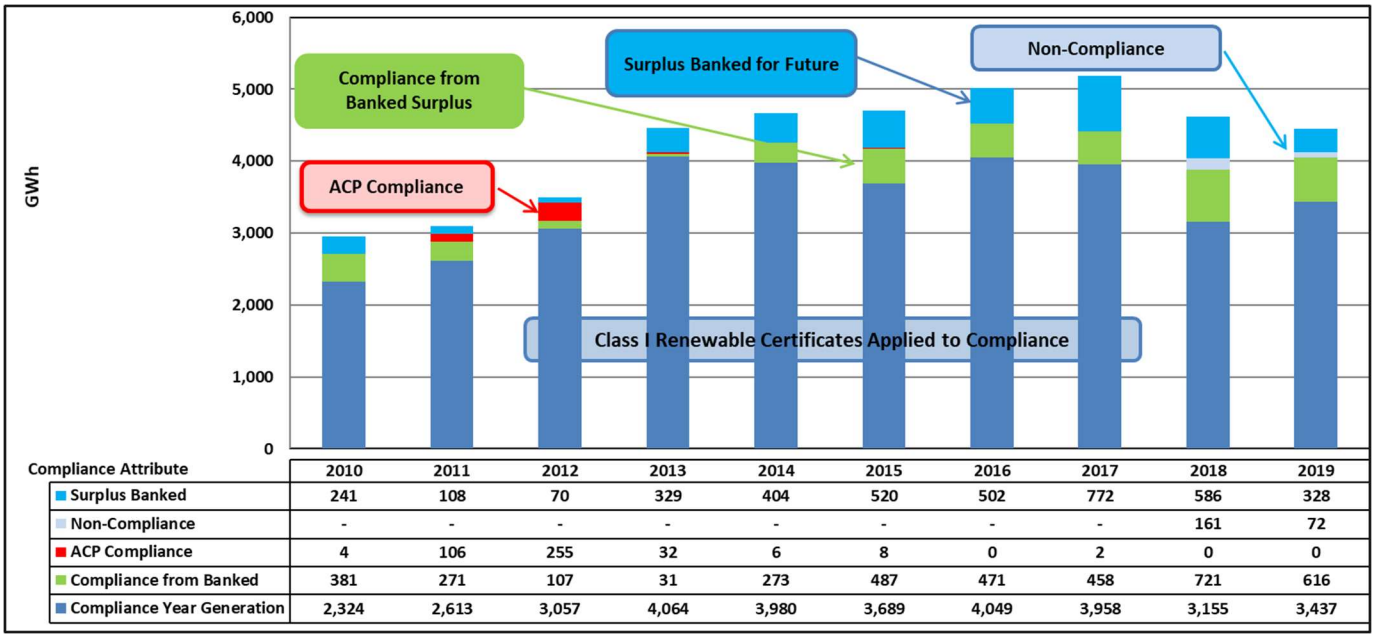
Table 1 Aggregated Data from the RPS Class I Annual Filings, 2015-2019 (excluding Solar Carve-Outs)

CLASS I RENEW COMPLIANCE ANALYSIS	2019	2018	2017	2016	2015
Retail Sales (Retail Load Obligation)	**44,705,757**	46,409,960	45,715,742	46,864,429	48,009,723
Average Net Minimum Standard	***8.4913%***	*7.4633%*	*7.9620%*	*8.5829%*	*7.6498%*
Aggregated Compliance Obligation	**3,796,084**	3,463,696	3,640,026	4,022,346	3,672,667
Non-Compliance	**(72,132)**	(176,911)	(175)	(3,456)	(9,020)
Net Compliance Obligation	**3,723,952**	3,286,785	3,639,851	4,018,890	3,663,647
Class I RECs Settled by LSEs	**3,437,386**	3,155,357	3,958,188	4,049,070	3,688,921
minus Surplus Class I RECs	**(329,731)**	(590,004)	(779,311)	(501,754)	(520,378)
Net Class I RECs for Compliance	**3,107,655**	2,565,353	3,178,877	3,547,316	3,168,543
***plus* Banked from Prior Year Surpluses**	**616,296**	721,430	457,857	471,256	486,857
Total Class I RECs used for Compliance	**3,723,951**	3,286,783	3,636,734	4,018,572	3,655,400
***plus* ACP Credits**	**9**	2	1,676	269	8,247
Total Credits used for Compliance	**3,723,960**	3,286,785	3,638,410	4,018,841	3,663,647
Surplus Attributes Banked Forward	**328,207**	586,227	772,309	501,754	520,378
ACP Receipts	**$634**	$138	$113,465	$18,020	$553,126

The total number of Massachusetts RPS Class I RECs (net of SRECs and SREC IIs) generated in NEPOOL-GIS in 2019 grew by 19.8% over 2018, to 8,355,711, the lowest increase in five years. There were sufficient RPS Class I RECs to meet both the RPS Class I and the CES and additionally, 586,227 RECs were banked forward. Only nine ACP credits were utilized for compliance in 2019, resulting in $634 of ACP.

Figure 3 below shows the composition of compliance over the last 10 years.

Figure 3 RPS Class I Compliance, 2010-2019 (Excluding Solar Carve-outs)



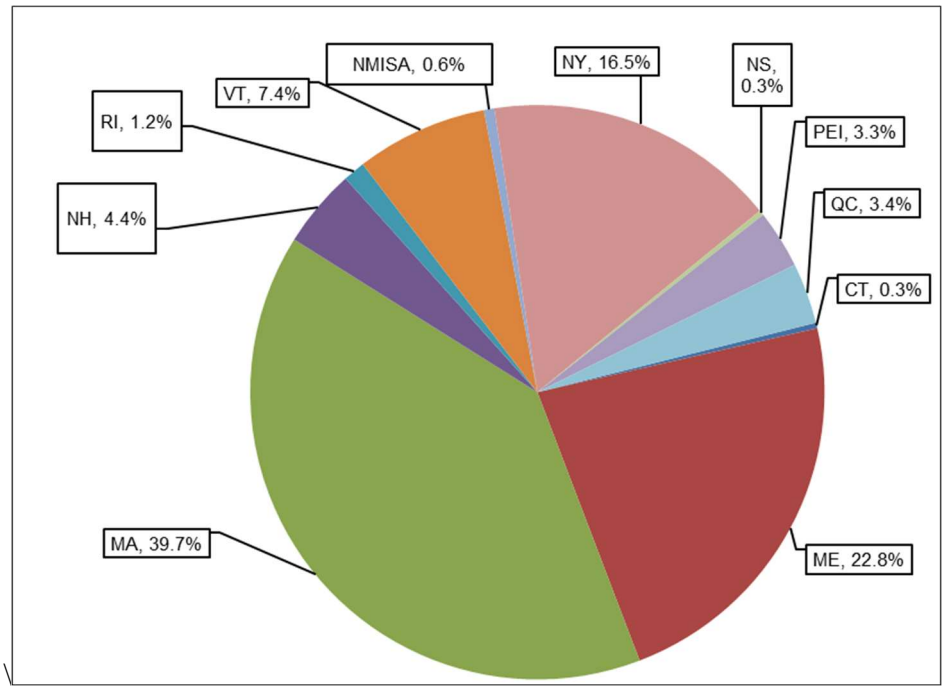
Compliance Attribute	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Surplus Banked	241	108	70	329	404	520	502	772	586	328
Non-Compliance	-	-	-	-	-	-	-	-	161	72
ACP Compliance	4	106	255	32	6	8	0	2	0	0
Compliance from Banked	381	271	107	31	273	487	471	458	721	616
Compliance Year Generation	2,324	2,613	3,057	4,064	3,980	3,689	4,049	3,958	3,155	3,437

B. Generation Sources by Location

Figure 4 below shows the percentages of 2019 RPS Class I RECs (including SRECs and SREC IIs) from the New England states, New York, and Canada.[29]

Massachusetts was again the main state of origin for RPS Class I RECs with 39.7%, down from 41.7% in 2018. Maine again had the second most generation with 22.8% but was down from 26.0% in 2018. New Your state gained 2.7% from 2018 from additional wind resources. Vermont climbed 1.7% from 2018 from increased wind and solar.

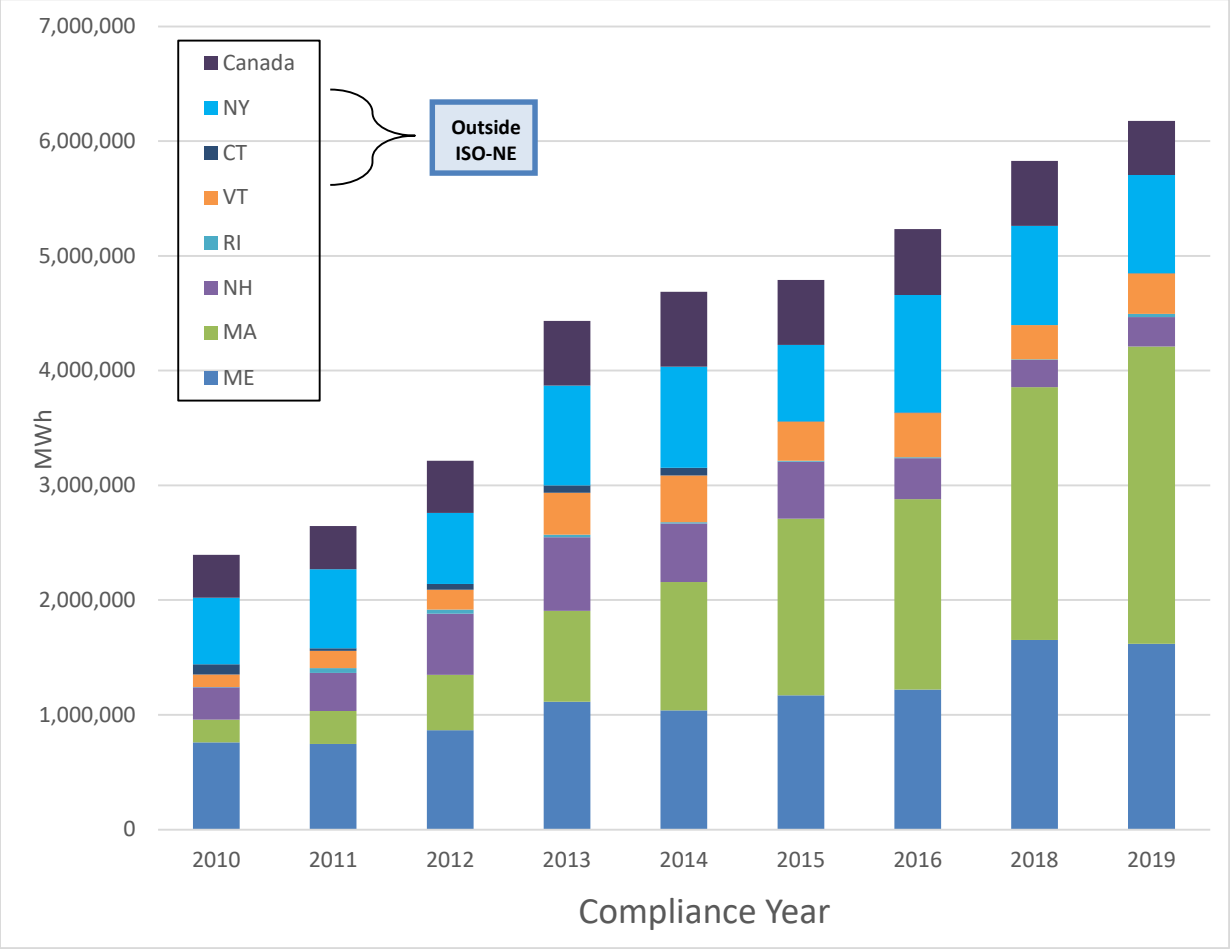
Figure 4 2019 RPS Class I Compliance by Generator Location*



* Includes the Solar Carve-Outs, i.e., all SRECs and SREC IIs.

[29] 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 to earn RECs.

Figure 5 RPS Class I Compliance by Generator Location, 2010-2019*

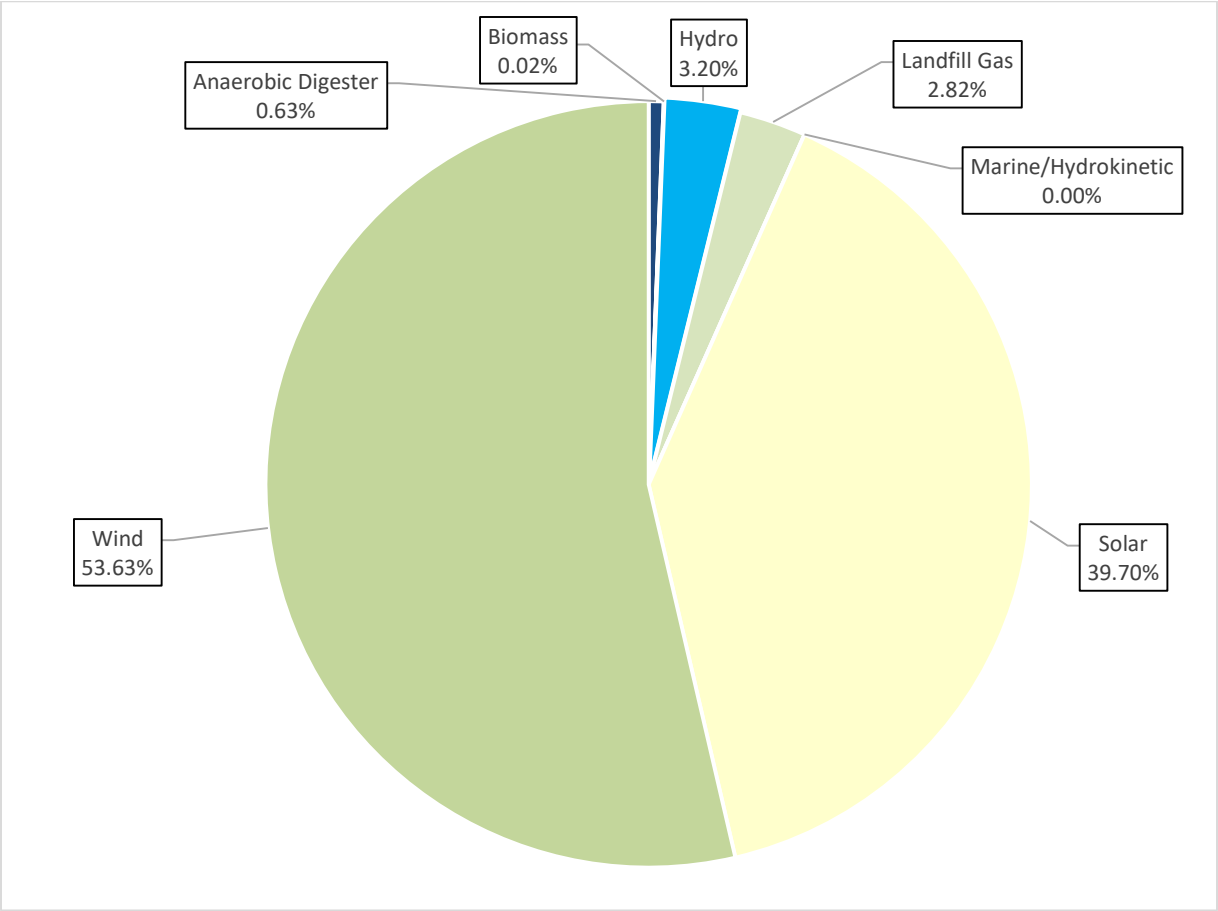


* Includes the Solar Carve-Outs, all SRECs & SREC-IIs.

C. Generation Sources by Type

The tables and figures below show the types of Generation Units that made up the RPS Class I RECs, including SRECs and SREC IIs, used for compliance in 2019. Further information on the location of the different types of Generation Units is provided in Table KRPS Class I Compliance Percentage by Generator Type and State, 2019 in Appendix Four**: Data Tables for Compliance by Generation Location and Type**.

Figure 6 RPS Class I Compliance by Generator Type, 2019*



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

Wind power continued to be the largest source of RECs for the RPS Class I, representing 53.6% of the 2019 supply, up almost 1.6% from 2018. Maine accounted for 40% of the total supply of RPS Class I RECs from wind, while New York represented 27%.

Solar photovoltaic arrays accounted for 39.7% of the total RPS Class I RECs in 2019, a decrease of 1% from 2018. Approximately 88.6% of the RPS Class I solar RECs (including SRECs and SREC IIs) originated in Massachusetts. An increasing supply of solar has come from New Hampshire and Vermont.

Landfill methane gas represented 2.8% of RPS Class I RECs in 2019, a decline of 1% from 2018. Older qualified landfill methane gas projects have experienced a decline in production. Approximately 43.8% of the landfill methane gas in RPS Class I originated in New York.

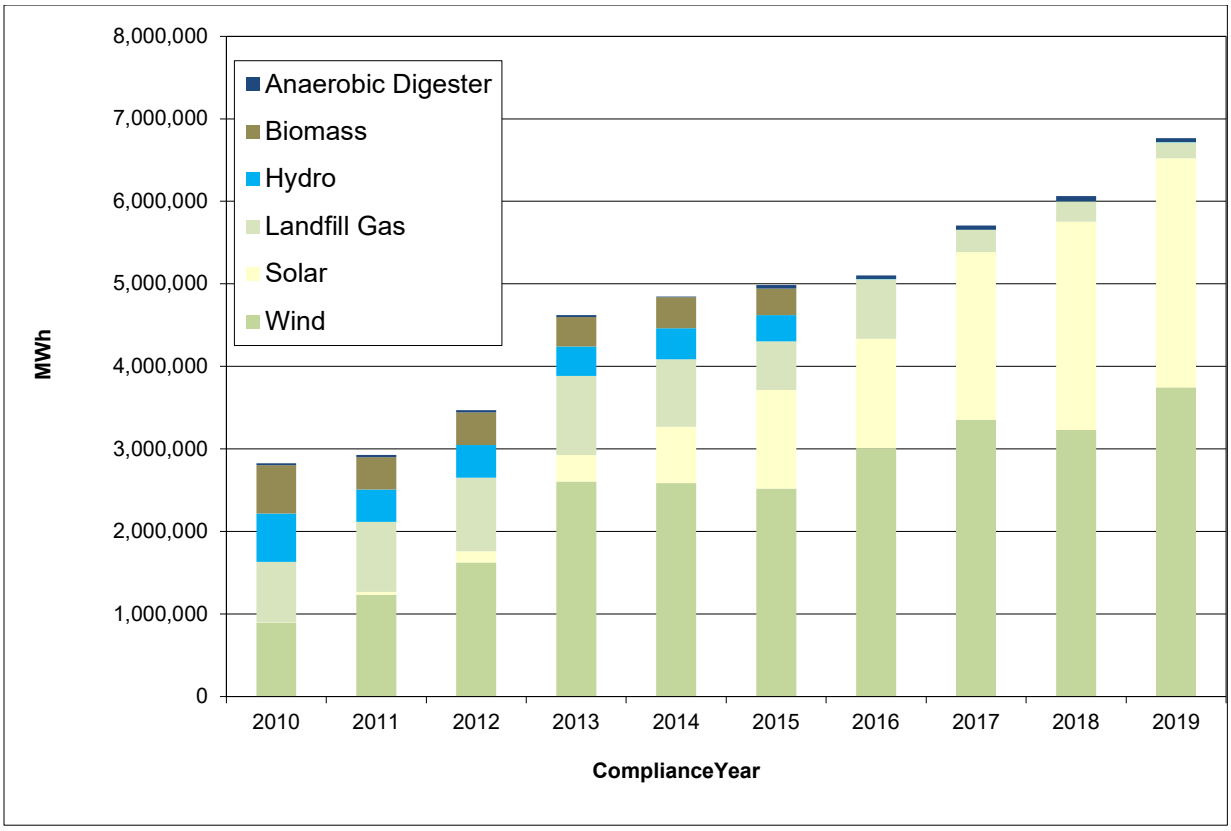
Hydroelectricity as a proportion of supply increased from 2.4% in 2018 to 3.2% in 2019. Most of the supply comes from capacity increases and efficiency upgrades that were performed at post-1997 at older plants. To meet eligibility for RPS Class I, facilities must be 30MW or less and meet Low Impact Hydroelectric Impact (LIHI) certification. Maine accounted for 30.6% of supply while New York accounted for 21.0% and Massachusetts accounted for 20.8%.

Anaerobic digester supply, which accounted for 0.60% of all RPS Class I RECs in 2019, was mostly generated in Massachusetts (95.7%). 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.

Woody Biomass, all located in Massachusetts, represented 0.02% in 2019.

Marine and Hydrokinetic had no production in 2019.

Figure 7 RPS Class I Compliance by Generator Type, 2010-2019*



* Includes the Solar Carve-Outs, i.e., all SRECs and SREC IIs.

Table 2 Percentage of RPS Class I Generation Type, 2017 – 2019

FUEL TYPE	MWh			% of Total		
	2017	2018	2019	2017	2018	2019
Anaerobic Digester	47,412	63,761	43,808	0.81%	1.03%	0.63%
Biomass	2,185	1,421	1,651	0.04%	0.02%	0.02%
Hydro	147,168	149,477	223,854	2.52%	2.41%	3.20%
Landfill Gas	268,910	243,083	196,756	4.60%	3.91%	2.82%
Marine/Hydrokinetic	47	43	0	0.00%	0.00%	0.00%
Solar	2,030,870	2,526,793	2,773,134	34.71%	40.67%	39.70%
Wind	3,353,712	3,228,475	3,746,832	57.33%	51.96%	53.63%
Total	5,850,304	6,213,053	6,986,035	100.00%	100.00%	100.00%

3. RPS SOLAR CARVE-OUT COMPLIANCE IN 2019

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 2019.[30]

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. To avoid penalizing a substantial number 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.[31] In order to maintain the photovoltaic development, DOER subsequently began a rulemaking for a successor SCO II program, described in Section 3 below.

Table 3 below shows the dispensation of SRECs, banked SRECs and ACP credits in meeting the SCO Obligation within the RPS Class I program.

Table 3 Aggregated Data from the Solar Carve-Out (SCO) Compliance Filings, 2015-2019 (MWh)

SCO COMPLIANCE ANALYSIS	2019	2018	2017	2016	2015
Retail Sales (Retail Load Obligation)	**44,705,757**	46,409,960	45,715,742	46,864,429	48,009,723
Average Net Minimum Standard *	**1.7455%**	1.7879%	1.6266%	1.7850%	2.0934%
Aggregated Compliance Obligation	**780,339**	829,784	743,619	813,188	1,005,024
Non-Compliance	**(15,236)**	(59,578)	(419)	(719)	(2,570)
Net Compliance Obligation	**765,103**	770,206	743,200	812,469	1,002,454
SRECs Settled by LSEs	**745,070**	719,703	742,959	839,614	755,018
minus Total Surplus SRECs	**(12,712)**	(9,003)	(34,476)	(36,981)	(12,231)
Net SRECs for Compliance	**732,358**	710,700	708,483	802,633	742,787
***plus* Banked from Prior Year Surpluses**	**8,985**	40,335	34,930	9,767	36,161
Total SRECs Used for Compliance	**741,343**	751,035	743,413	812,400	999,373
Plus Total ACP Credits	**23,868**	20,283	1,167	59	3,084
Total Credits Used for Compliance	**765,211**	771,318	744,580	812,459	1,002,457
Surplus Attributes Banked Forward	**12,712**	8,992	34,280	36,979	12,231
Reminted Auction SRECs Used	**639**	10,984	9,127	49,190	220,425
SRECs Placed in Auction	**103**	632	1,520	18,428	1,898
ACP Receipts	**$9,642,672**	$8,640,558	$522,816	$27,848	$1,529,664

* Average Net minimum standard is less than minimum standard due to exempt load.
** Note that the "Total Credits Used for Compliance" exceeds the "Net Compliance Obligation" because some suppliers had excess SRECs over their Banking Limits or Non-Compliant suppliers settled SRECs but did not complete their filing.

[30] 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.

[31] 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.

Suppliers continued to use ACP credits to fulfill their obligation as the market is producing less SRECs than the obligation. ACP receipts increased from $8.6 million in 2018 to $9.6 million in 2019.

4. RPS SOLAR CARVE-OUT II COMPLIANCE IN 2019

The SCO II minimum standard was established by revised regulations for RPS Class I promulgated on April 25, 2014. The SCO II program set a capacity cap for qualified solar carve-out installations at 1,600 MW in the Commonwealth, inclusive of the SCO 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, there were three levels of exemptions to the SCO II minimum standard:

- The first level of exemption was for contracts executed or extended on or before April 25, 2014. Those contracts had a 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 2.3196% in 2019.
- Any contracts executed or extended after May 8, 2016, were subject to the minimum standard of 3.9141% in 2019 which was a 3.8% decrease from the 2018 minimum standard.

Table 4 below shows the utilization of SREC IIs and ACP credits in meeting the RPS Class I SCO II Compliance Obligation.

Table 4 Aggregated Data from the Solar Carve-Out II Compliance Filings, 2015-2019

SCO II COMPLIANCE ANALYSIS	2019	2018	2017	2016	2015
Retail Sales (Retail Load Obligation)	**44,705,757**	46,409,960	45,715,742	46,864,429	48,009,723
Average Net Minimum Standard *	**3.7633%**	3.7489%	2.4114%	0.8080%	0.3288%
Aggregated SCO II Obligation	**1,682,417**	1,739,857	1,102,398	319,589	123,317
Non-Compliance	**(34,820)**	(135,257)	(734)	(321)	(395)
Net Compliance Obligation	**1,647,597**	1,604,600	1,101,664	319,268	122,922
SREC IIs Settled by LSEs	**1,603,479**	1,571,264	1,107,930	326,308	125,294
minus Total Surplus SREC IIs	**(20,286)**	(18,659)	(29,175)	(10,059)	(3,021)
Net SREC IIs for Compliance	**1,583,193**	1,552,605	1,078,755	316,249	122,273
***plus* Banked from Prior Year Surpluses**	**18,545**	29,902	9,167	3,019	20
Total SREC IIs Used for Compliance	**1,601,738**	1,582,507	1,087,922	319,268	122,293
***plus* Total ACP Credits**	**46,763**	22,636	13,889	5	629
Total Credits Used for Compliance	**1,648,501**	1,605,143	1,101,811	319,273	122,922
Surplus Attributes Banked Forward	**20,286**	18,625	29,027	10,059	3,018
Reminted Auction SREC IIs Used	**4,732**	191,185	109,424	21,773	51
SREC IIs Placed in Auction	**85**	4,626	12,071	243,377	67,046
ACP Receipts	**$15,572,079**	$7,922,600	$4,861,150	$1,750	$235,875

* Average Net Minimum Standard less than marginal minimum standard due to exempt load.
** Note that the "Total Credits Used for Compliance" exceeds the "Net Compliance Obligation" because some Suppliers had excess SREC IIs over their Banking Limits or Non-Compliant Suppliers settled SREC IIs but did not complete their filing.

Like the SREC market, the SREC II market had an increase in ACP credits because the market did not generate enough SREC IIs to match the obligation. ACP credits rose to 46,763 in 2019 from 22,969 in 2018, an increase of 107%. ACP receipts increased respectively to $15.6 million in 2019, compared to $7.9 million in 2018.

5. RPS CLASS II RENEWABLE ENERGY COMPLIANCE IN 2019

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 in the region and waste-to-energy plants located in Massachusetts. RPS Class II renewable energy is generated by the same resources and technologies as RPS Class I. However, hydroelectric plants in RPS Class II are limited to 7.5 MW (versus 30 MW in RPS Class I), pursuant to Chapter 25A, section 11F.

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. RPS Class II Renewable Energy has typically experienced REC shortfalls, so suppliers relied heavily on the ACP mechanism to meet their obligations. DOER reacted to this situation with a RPS 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 but has a maximum cap of 3.6%. For 2019, the RPS Class II minimum standard was 2.6155%.

Table 5 below shows the dispensation of RPS Class II RECs, banked RPS Class II RECs and ACP credits in meeting the RPS Class II obligation.

Table 5 Aggregated Data from the RPS Class II Renewable Energy Filings, 2015-2019

CLASS II RENEW COMPLIANCE ANALYSIS	2019	2018	2017	2016	2015
Retail Sales (Retail Load Obligation)	**44,705,757**	**46,409,960**	45,715,742	46,864,429	48,009,723
Minimum Standard	**2.6884%**	**2.6155%**	2.5909%	2.5319%	2.0000%
Aggregated Compliance Obligation	**1,201,860**	**1,213,892**	1,184,485	1,186,394	959,531
Non-Compliance	**(23,296)**	**(83,188)**	(175)	(1,035)	(2,397)
Net Compliance Obligation	**1,178,564**	**1,130,704**	1,184,310	1,185,359	957,134
Class II RECs Settled by LSEs	**1,236,778**	**1,000,422**	783,698	561,324	539,399
minus total surplus Class II RECs	**(116,773)**	**(46,415)**	(7,867)	(18,017)	(18,488)
Net RECs for Compliance	**1,120,005**	**954,007**	775,831	543,307	520911
***plus* Banked from Prior Year Surpluses**	**45,724**	**7,681**	18,016	7,317	102,901
Total RECs used for Compliance	**1,165,729**	**961,688**	793,847	550,624	623,812
plus total ACP Credits	**12,602**	**169,016**	390,463	634,720	333,322
Total Credits Used for Compliance	**1,178,331**	**1,130,704**	1,184,310	1,185,344	957,134
Surplus Attributes Banked Forward	**116,736**	**46,314**	7,680	18,017	18,288
ACP Receipts	**$364,324**	**$4,783,153**	$10,850,967	$17,454,800	$9,176,355

In 2018, DOER began qualifying numerous hydroelectric dams located in New York. This is reflected in the data by the large increase in RPS Class II RECs that were settled by suppliers. The net result was that the ACP Receipts fell from ~$10.9 million in 2017 to ~$4.8 million in 2018 and to $364,324 in 2019. This is further shown in Figure 8 below, which shows the increase in MWh that were imported from adjacent Control Areas.

Figure 8 2014 - 2019 RPS Class II Compliance by Control Area

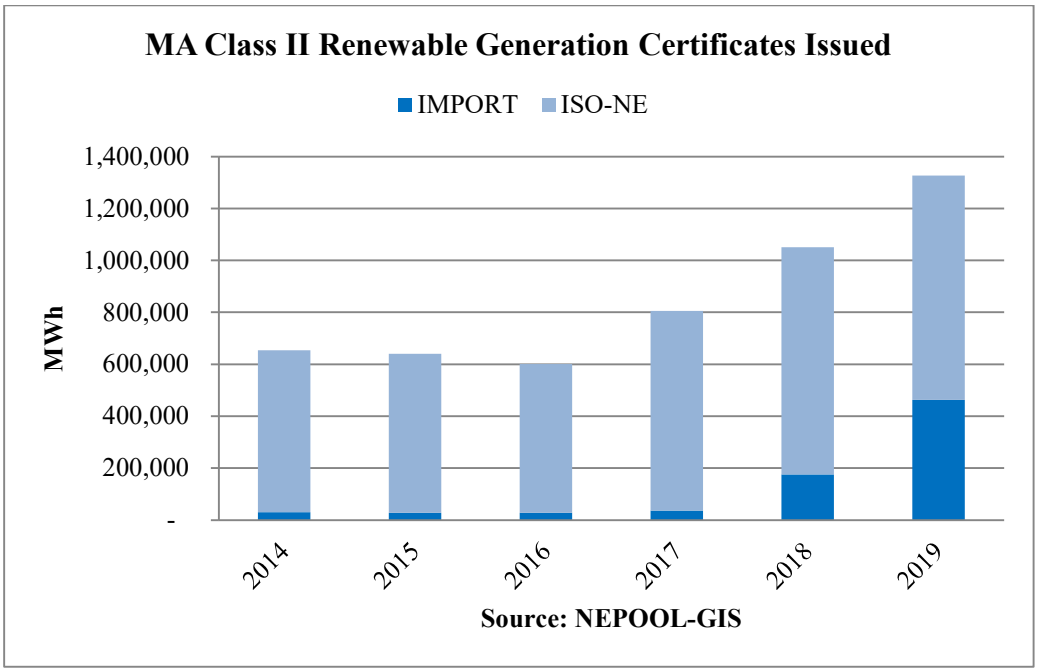


Figure 9 below shows the distribution of generator type for RPS Class II RECs. In 2019, 98% of RPS Class II RECs were generated by hydroelectricity, while 2% was generated from landfill gas. Figure 10 shows that the location of the Generation Units, i.e., hydroelectric were well distributed across the region.

Figure 9 2019 RPS Class II Compliance by Generator Type

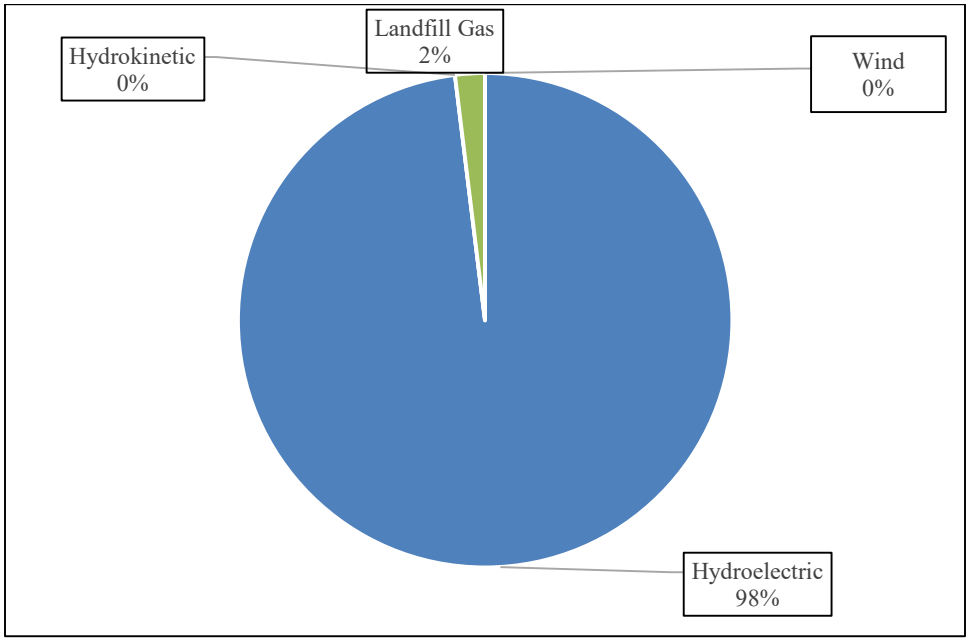
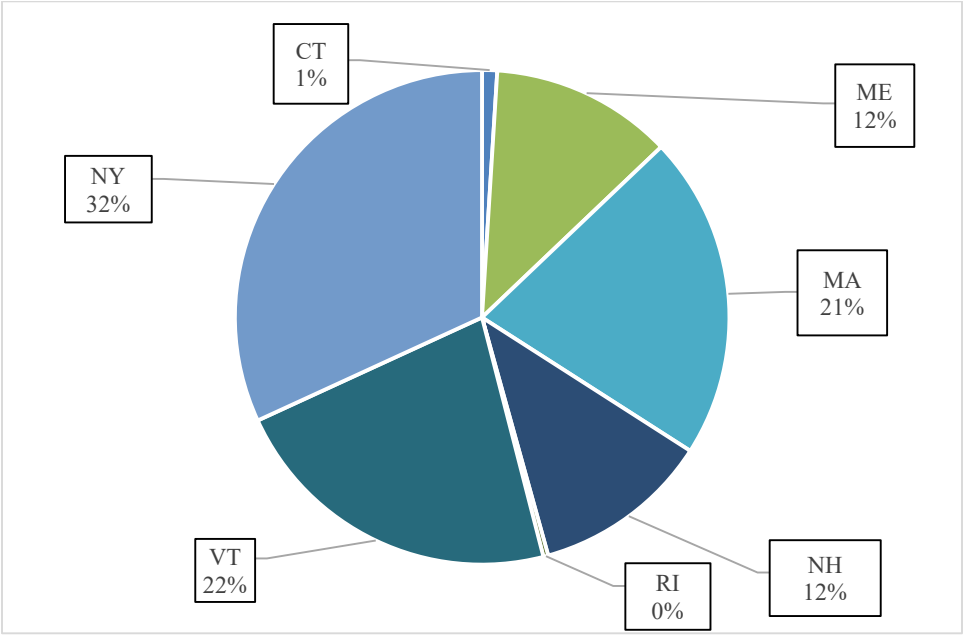


Figure 10 2019 RPS Class II Compliance by Location



6. RPS CLASS II WASTE ENERGY COMPLIANCE IN 2019

RPS Class II Waste Energy is a separate sub-class within RPS Class II. Each Supplier must comply separately with both the Renewable Energy sub-class and the Waste-to-Energy sub-class. Qualification is limited to waste-to-energy plants that meet MassDEP regulations for such facilities.[32] The MassDEP regulations provide for enhanced sorting and recycling and for each plant to remit to the MassDEP 50% of the proceeds from its RPS Class II Waste-to-Energy certificates. The MassDEP uses the funds to help support municipal recycling programs.

The RPS Class II Waste-to-Energy minimum standard was fixed at 3.5% in 2019, and the banking limit is 5%.

Table 6 below shows the dispensation of WECs, banked WECs and ACP credits in meeting the RPS Class II Waste-to-Energy obligation.

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

Table 6 Aggregated Data from RPS Class II Waste Energy Compliance, 2015-2019

CLASS II WASTE COMPLIANCE ANALYSIS	2019	2018	2017	2016	2015
Retail Sales (Retail Load Obligation)	**44,705,757**	**46,409,960**	45,715,742	46,864,429	48,009,723
Minimum Standard	**3.5001%**	**3.5000%**	3.5000%	3.5000%	3.5000%
Aggregated WEC Obligation	**1,564,736**	**1,624,385**	1,600,090	1,640,016	1,679,161
Non-Compliance	**(30,330)**	**(109,421)**	(238)	(1,431)	(4,195)
Net Compliance Obligation	**1,534,406**	**1,514,964**	1,599,852	1,638,585	1,674,966
WECs Settled by LSEs	**1,492,667**	**1,545,740**	1,617,739	1,651,769	1,620,112
minus total surplus WECs	**(41,138)**	**(69,694)**	(44,496)	(20,111)	(15,706)
Net WECs for Compliance	**1,451,529**	**1,476,046**	1,573,243	1,631,658	1,604,406
***plus* Banked from Prior Year Surpluses**	**60,094**	**27,163**	15,644	0	53,440
Total WECs used for Compliance	**1,511,623**	**1,503,209**	1,588,887	1,631,658	1,657,846
***plus* total ACP Credits**	**22,552**	**11,755**	10,816	7,362	17,120
Total Credits Used for Compliance	**1,534,175**	**1,514,964**	1,599,703	1,639,020	1,674,966
Surplus Attributes Banked Forward	**39,850**	**61,217**	44,496	20,566	0
ACP Receipts	**$262,289**	**$133,067**	$120,274	$80,982	$188,491

7. ALTERNATIVE ENERGY PORTFOLIO STANDARD COMPLIANCE IN 2019

The APS regulation, 225 CMR 16.00, was established on January 1, 2009, pursuant to the Green Communities Act of 2008, codified at M.G.L. c. 25A, § 11F½.

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 2019, the minimum standard was 4.75%, which currently increases by 0.25% each year.

When it began the APS was comprised mostly of 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 the 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. Eligibility was retroactive to the initial target dates of January 1, 2015, for renewable thermal technologies and January 1, 2017, for fuel cells and waste-to-energy thermal facilities.

With the expansion of eligible technologies under the APS, a material number of AECs were created. ACP credits, which traditionally had covered 50% of the obligation, declined substantially. Consequently, ACP receipts fell as well. In 2019, this trend continued as from the generation output of large CHP units and the on-going increase in the generation of AECs from the newly eligible technologies. The over-supply of AECs in the APS market led to 355,382 AECs being banked forward, and a reduction of ACP receipts from about ~$1 million in 2018 to $0.2 million in 2019.

The APS regulations required DOER to complete a review or the APS regulations no later than December 31, 2020. The review included an examination of the costs and benefits of the program to ratepayers, an examination of the effectiveness of the program in meeting the energy and environmental goals of the Commonwealth, and an evaluation of whether the minimum standard or its rate of increase should be adjusted.

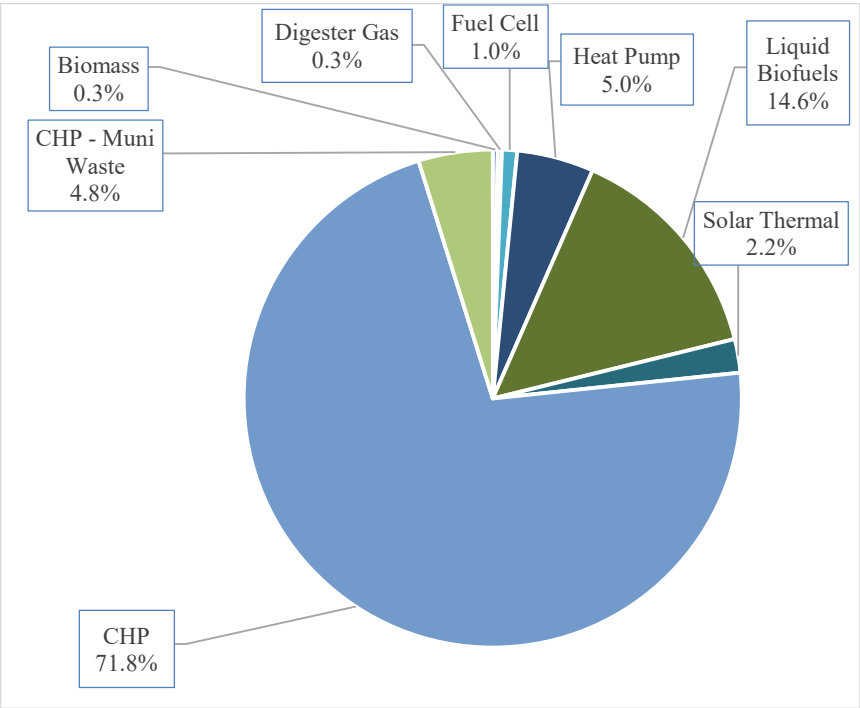
Table 7 below shows the dispensation of AECs, banked AECs and ACP credits in meeting the APS obligation.

Table 7 Aggregated Data from the APS Compliance Filings, 2015-2019 (MWh)

APS COMPLIANCE ANALYSIS	2019	2018	2017	2016	2015
Retail Sales (Retail Load Obligation)	**44,705,757**	**46,409,960**	45,715,742	46,864,429	48,009,723
Minimum Standard	**4.7501%**	**4.5000%**	4.2500%	4.0000%	3.7500%
Aggregated Compliance Obligation	**2,123,562**	**2,088,490**	1,942,959	1,874,294	1,799,094
Non-Compliance	**(41,158)**	**(134,422)**	(1,090)	(1,635)	(4,195)
Net Compliance Obligation	**2,082,404**	**1,954,068**	1,941,869	1,872,659	1,794,899
AECs Settled by LSEs	**2,179,879**	**2,015,993**	2,017,892	945,003	894,602
***minus* Surplus AECs**	**(356,480)**	**(317,987)**	(221,624)	(3,873)	(2,869)
Net AECs for Compliance	**1,823,399**	**1,698,006**	1,796,268	941,130	891,733
***plus* Banked from Prior Year Surpluses**	**249,667**	**212,217**	3,847	2,869	261
Total AECs used for Compliance	**2,073,066**	**1,910,223**	1,800,115	943,999	891,994
***plus* ACP Credits**	**8,880**	**43,845**	141,974	928,636	902,605
Total Credits Used for Compliance	**2,081,946**	**1,954,068**	1,942,089	1,872,635	1,794,599
Surplus Attributes Banked Forward	**355,382**	**317,814**	221,624	3,873	2,869
ACP Receipts	**$208,864**	**$992,651**	$3,156,082	$20,429,992	$19,875,362

Figure 11 below shows the generator type of the AECs settled for APS compliance.

Figure 11 2019 APS Compliance by Generator Type



8. CLEAN ENERGY STANDARD COMPLIANCE IN 2019

In August 2017, EEA and MassDEP finalized 310 CMR 7.75: *Clean Energy Standard* to require retail sellers of electricity to provide increasing quantities of clean electricity to their customers in Massachusetts. The standard is defined as a percentage of electricity sales and increases from 16% in 2018 to 80% in 2050 by 2% each year. The CES regulation includes specific eligibility requirements, including an emissions-based qualification threshold and a requirement that eligible generators must have commenced commercial operation after 2010.

RPS Class I RECs are eligible as a Clean Energy Certificate (CEC), which are used to meet the CES obligation. In 2019, no separate qualifying generators were eligible to produce stand-alone CECs. Subsequently, all CECs used to meet the CES obligation were eligible RPS Class I RECs. Pursuant to CPS regulations, any ACP funds collected shall be expended to support programs and projects to reduce greenhouse gas emissions to mitigate the impacts of climate change.

Table 8 below shows the dispensation of CECs and ACP credits in meeting the CES obligation. The abundance of RPS Class I RECs allowed suppliers to meet the CES obligation easily. Banking was allowed in 2019; however, the 2019 banked certificates cannot be used for 2020 compliance. They can be used for 2021 compliance. ACP receipts were $1.3 million, a $1.0 million increase over the $0.3 million collected for 2018.

Table 8 Aggregated Data from the CES 2019 Compliance Filing (MWh)

CES COMPLIANCE ANALYSIS	2019	2018
Retail Sales (Retail Load Obligation)	44,705,757	46,409,960
Exempt Load	(8,094,023)	(17,908,671)
Net Load	52,799,780	64,318,631
Incremental Minimum Standard *	3.28%	3.00%
Aggregated Compliance Obligation	1,464,505	855,077
Non-Compliance	(34,663)	(95,416)
Net Compliance Obligation	1,429,842	759,661
CECs Settled by LSEs	1,468,704	755,715
minus Surplus CECs	(62,537)	(39)
Net CECs for Obligation	1,406,167	755,676
plus Banked from Prior Year Surpluses	0	0
Total CECs used for Compliance	1,406,167	755,676
plus ACP Credits	23,675	3,985
Total CECs used for Compliance	1,429,842	759,661
Surplus Attributes Banked Forward	62,537	0
ACP Receipts	$1,250,752	$179,779

* Report of Incremental Minimum Standard is less than 4% due to exempt load

9. 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 2019 CELT Report.[33] This process follows the approach of the RPS/APS Annual Compliance Reports for 2009 through 2017. These forecasts assume normalized weather and normalized economic drivers.

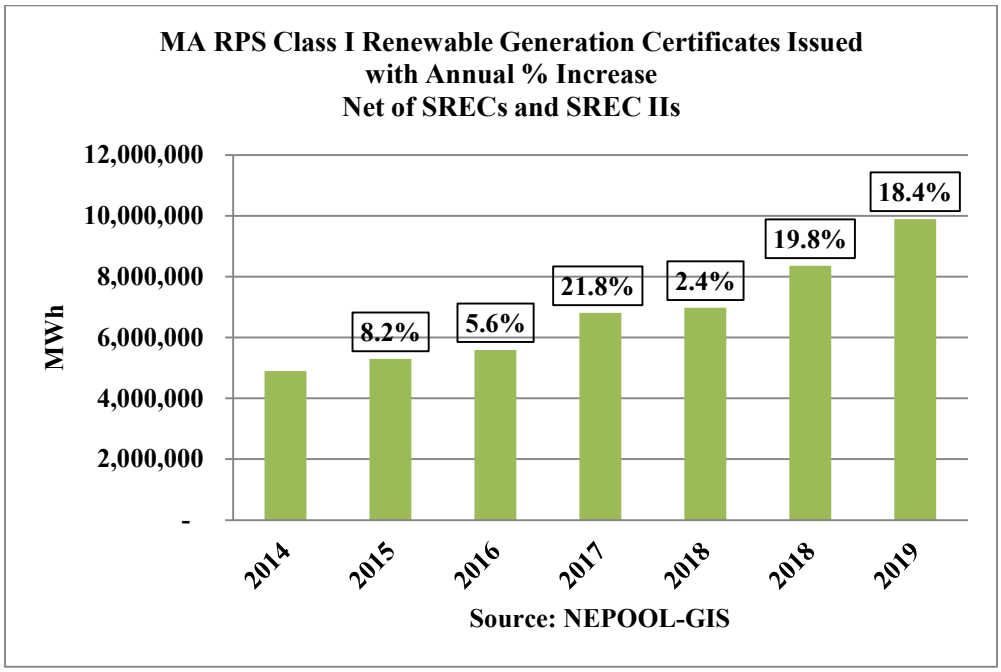
A. Projection of Class I Renewable Generation Supply

Figure 12 shows that steady growth has occurred in the generation of RPS Class I RECs (net of SCO and SCO II) through 2019. Note, however, that not all Massachusetts qualified RPS 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. [34]

[33] Based on *2019 CELT Report* dated 4/30/2019, which is listed at http://www.iso-ne.com/system-planning/system-plans-studies/celt. Loads have been adjusted for the exempt municipal load.

[34] 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 SREC IIs, deposited into DOER's SREC Clearinghouse Auction Accounts.

Figure 12 MA Class I Renewable Generation Certificates with Annual Percent Increase



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 not limited to the following:

- Changes in federal policy, including tax incentives,
- Significant renewable projects being developed or considered,
- The evolution of renewable energy procurements pursuant to 83C[35],
- Transmission development that may allow new generation to be constructed,
- Regional market dynamics that alter the export decisions for REC retirement,
- Solar growth in the Commonwealth, and
- Interaction between the RPS Class I minimum standard and the CES regulation.

For these reasons, projections of RPS Class I REC supply are limited to the anticipated obligation based on forecasted retail loads (Table 9 below).

[35] Pursuant to Chapter 188 of the Acts of 2016, electric distribution companies were required to solicit and, if cost effective, to execute long term contracts for offshore wind generation up to 1,600 MW since amended for another 1,600 MW.

Table 9 MA RPS Class I Actual and Projected Retail Load and Compliance Obligations[36]

Year	Actual/ Projected Retail Load Obligation	RPS Class I (including Solar Carve-Outs)		Solar Carve-Out and Solar Carve-Out II			RPS Class I Renewable Net of SCO and SCO II	
		Minimum Standard	REC Obligation	SREC Obligation	SREC-II Obligation	Total Obligations	Net REC Obligation	Net Minimum standard
2018	46,409,960	13.00%	6,033,294	829,714	1,739,857	2,569,571	3,643,153	7.85%
2019	**44,705,757**	**14.00%**	**6,258,807**	**780,339**	**1,682,417**	**2,462,756**	**3,463,696**	**7.75%**
2020	*43,535,434*	*16.00%*	*6,965,670*	*701,617*	*1,667,022*	*2,368,639*	*4,597,031*	*10.56%*
2021	*42,694,771*	*18.00%*	*7,685,059*	*709,971*	*1,841,788*	*2,551,759*	*5,133,300*	*12.02%*

Italicized is projected.

B. Projection of SCO Generation Supply

Accelerated solar PV development began to emerge in the RPS market in 2010 and has been increasing rapidly through 2019. DOER expects further strong growth of solar PV in the years ahead, boosted by the SMART Program[37] (see below). However, current solar systems may experience equipment degradation and output in the future.

Table 10 shows the historical SCO load obligation and the projected load obligation for the coming years.

Table 10 Solar Carve-Out Actual and Projected Load Obligations*[38]

Year	Actual/ Projected Retail Load Obligation	Load Served Under pre-6/28/13 Retail Contracts	Minimum Standard for pre 6/28/13 Retail Contracts	Pre 6/28/13 SCO Load Obligation	Load Served Under post 6/27/13 Contracts	Minimum Standard for post-6/27/13 Contracts	Post 6/27/13 SCO Load Obligation	SCO Total Load Obligation
2018	46,409,960	*175,807*	1.4110%	*2,481*	*46,234,153*	1.7903%	827,730	829,784
2019	**44,705,757**	***0***	**1.0978%**	***0***	***44,705,757***	**1.7458%**	**780,473**	**780,339**
2020	*43,535,434*	*0*	0.9867%	*0*	*43,535,434*	1.6116%	*701,617*	*701,617*
2021	*42,694,771*	*0*	1.0181%	*0*	*42,694,771*	1.6629%	*709,971*	*709,971*

Italicized is projected.

[36] Actual Retail Load Obligation through 2019. Actual compliance figures through 2019 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 33) and excludes municipal light plants which are exempt from the RPS and APS programs. In this table, the SCO and SCO II annual obligations are deducted from the total Class I obligation to show the net Class I REC obligation. The SCO and SCO II obligations take into account actual and projected exempt loads and minimum standards that are based on retail contract dates.

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

[38] The projected SCO obligations do not take account of the proposed changes to the 225 CMR 14.00 and are subject to change. For further information please visit RPS Class I and II Rulemaking.

C. Projection of SCO II Generation Supply

The SCO II program commenced on April 25, 2014, providing the incentive for continued PV development. Similar to the SCO program, an exemption was allowed for contracts that were entered into prior to the start of the program. Table 11 shows the historical SCO II load obligation and the projected load obligation for the coming years.

Table 11 Solar Carve-Out II Actual and Projected Load Obligations*

Year	Retail Sales	Exempt Load Served Under pre-4/26/14 Retail Contracts	Load Served Under pre-5/9/16 Retail Contracts	Minimum Standard for pre-5/9/16 Retail Contracts	Pre-5/9/16 SCO II Load Obligation	Load Served Under post-5/8/16 Retail Contracts	Minimum Standard for post-5/8/16 Retail Contracts	Post-5/8/16 SCO II Load Obligation	Total SCO II Load Obligation
2018	46,409,960	2,102,988	4,526,695	2.6823%	121,420	39,780,277	4.0683%	1,618,382	1,739,857
2019	**44,705,757**	**1,053,307**	**1,644,582**	**2.3196%**	***38,148***	***42,007,868***	**3.9141%**	***1,644,230***	**1,682,417**
2020	*44,705,757*	*456,144*	*936,058*	2.2040%	*20,630*	*43,313,555*	3.8011%	*1,646,392*	*1,667,022*
2021	*44,705,757*	*266,863*	*504,615*	2.2672%	*11,441*	*43,934,279*	3.9284%	*1,830,347*	*1,841,788*

* *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 purpose of the SMART program is to establish a tariff incentive program to encourage the continued development of solar across the residential, commercial, government and industrial sectors in the Commonwealth. The SMART program began accepting applications on November 26, 2019.

The SMART Program initially supported 1,600 MW of new solar generating capacity. SMART facilities must use solar technology and be interconnected with the electric distribution grid in Massachusetts. The maximum capacity of a SMART facility is 5 MW Alternating Current (AC).

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 RPS Class II and APS Supply

RPS Class II renewable market has generally been undersupplied since the beginning of the program in 2009. The pre-1998 installed capacity amount automatically limits the amount of capacity that can qualify. However, beginning in 2018, DOER qualified its first Class II Renewable hydroelectric facilities outside of the New England grid (all in New York), which resulted in an increase in supply from new imported certificates.

There are a host of factors which make it difficult to project the future supply of RPS Class II RECs. These factors include, but are not limited to, the following: (a) whether eligible Generation Units, namely hydroelectric plants, will continue to meet the RPS Class II environmental requirements, and (b) whether eligible RPS Class II RECs will be used for compliance in other New England states. Some of the other New England states have higher ACP rates for pre-1998 capacity. Also, recent changes to New York's CES program could keep the production of New York qualified hydroelectric facilities in New York.

For the RPS Class II Waste-to-Energy market, the total number WECs in 2019 closely matched the minimum standard obligation as shown in Table 12. Due to banking limitations in the program, DOER expects that supply will continue to closely match demand in future years.

For the APS, historically there have not been enough AECs in the market for suppliers to meet their obligations and, as a result, compliance was met through the ACP. However, since 2018, several large CHP units were approved for APS, as well as an increasing number of renewable thermal air source heat pumps and liquid biofuel Generation Units. The growing supply of AECs has eliminated the historical shortfall of AECs, a situation which is expected to carry forward in the near future.

Table 12 shows the historical load obligation for RPS Class II and APS programs, and the projected load obligations for the coming years.

Table 12 RPS Class II and APS Actual and Projected Compliance Obligations

Year	Actual/ Projected Load Obligation	RPS Class II Renewable Minimum Standard	RPS Class II Renewable Load Obligation	RPS Class II Waste-to-Energy Obligation @ 3.5% of Load Obligation	APS Minimum Standard	APS Compliance Obligation
2018	*46,409,960*	2.6155%	1,213,892	1,624,385	4.50%	2,088,490
2019	***44,705,757***	**2.6833%**	**1,201,860**	**1,295,104**	**4.75%**	**2,123,562**
2020	*43,535,434*	3.2056%	*1,395,572*	*1,523,740*	5.00%	*2,176,772*
2021	*42,694,771*	3.5634%	*1,521,385*	*1,494,317*	5.25%	*2,241,475*

Italicized is projected.

10. USES OF THE ALTERNATIVE COMPLIANCE PAYMENT FUNDS

The proceeds from ACP are held in an account at MassCEC. DOER oversees the expenditure of the ACP funds. The regulations[39] provide that the expenditure of ACP funds from RPS Class I and the Solar Carve-Outs 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 RPS 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 13 shows the historic collection of ACP for each of the different portfolio standards. ACP receipts for the CES are collected by the MassDEP. Please see Section 8 for a description of their uses of the ACP.[40]

[39] 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).
[40] See 310 CMR 7.75 5(c)2.

Table 13 ACP Proceeds per Portfolio Standard, 2015-2019 (rounded to the nearest dollar)

RENEWABLE STANDARD	2019	2018	2017	2016	2015
RPS CLASS I	**$ 634**	$138	$113,465	$18,020	$553,126
RPS SCO	**$ 9,642,672**	$8,640,558	$522,816	$27,848	$1,529,664
RPS SCO II	**$ 15,572,079**	$7,922,600	$4,861,150	$1,750	$235,875
RPS CLASS II	**$ 364,324**	$4,783,153	$10,850,967	$17,454,800	$9,176,355
RPS CLASS II Waste-to-Energy	**$ 262,289**	$133,067	$120,274	$80,982	$188,491
APS	**$ 208,864**	$992,651	$3,156,082	$20,429,992	$19,875,362
TOTAL	**$ 26,050,862**	$22,472,166	$19,624,754	$38,013,392	$31,558,873

11. 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. 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 14 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 the total amount of ACP collected by class. The estimated total cost impact of all the portfolio standards to ratepayers in 2019 likely fell somewhere between $750 million and slightly over $1.1 billion. DOER does not monitor the actual amounts paid by suppliers for their certificates.

The solar programs SCO and SCO II account for between 80 and 90 percent of the costs depending on the scenarios outlined below.

Table 14 Estimated RPS Compliance Costs (Low and High-Cost Scenarios), 2019

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	RPS Class I	$634	$10.00	37,239,510	$37,240,144	0.08	4.9%
	SREC	$9,642,672	$320.00	237,229,760	$246,872,432	0.55	32.2%
	SREC II	$15,572,079	$270.00	443,423,700	$458,995,779	1.03	59.8%
	RPS Class II Renewable	$364,324	$10.00	11,657,290	$12,021,614	0.03	1.6%
	RPS Class II Waste	$260,701	$5.00	7,558,115	$7,818,816	0.02	1.0%
	APS	$205,394	$2.00	4,146,132	$4,351,526	0.01	0.6%
	TOTAL	**$26,045,804**	**N/A**	**$741,254,507**	**$767,300,311**	**1.72**	**100.0%**
High Certificate Cost	RPS Class I	$138	$45.00	167,577,795	$167,577,933	0.36	14.9%
	SREC I	$8,640,558	$404.00	299,502,572	$308,143,130	0.66	27.4%
	SRECII	$7,922,600	$333.00	546,889,230	$554,811,830	1.20	49.3%
	RPS Class II Renewable	$4,783,153	$28.00	32,640,412	$37,423,565	0.08	3.3%
	RPS Class II Waste	$133,067	$10.00	15,116,230	$15,249,297	0.03	1.4%
	APS	$992,651	$20.00	41,461,320	$42,453,971	0.09	3.8%
	TOTAL	**$22,472,166**	**N/A**	**$1,103,187,559**	**$1,125,659,725**	**2.43**	**100.0%**

Table 15 represents DOER's estimate of the range of total costs of compliance for ratepayers during the period from 2015 through 2019 using the same methodology that was used to estimate the 2019 costs above. Costs have increased over time because of increasing minimum standards. It is noteworthy that the analysis indicates that RPS Class I program costs have declined over this time period due to the decline in REC prices.

Table 15 Estimated Total RPS/APS Compliance Costs (Low and High-Cost Scenarios), 2015 – 2019

Scenario	RPS/APS Class	2019	2018	2017	2016	2015
Low Certificate Cost	RPS Class I	$37,240,144	$31,553,708	$54,664,475	$80,999,420	$148,109,966
	SREC I	$246,872,432	$238,945,518	$238,414,976	$268,704,328	$341,287,764
	SRECII	$458,995,779	$432,163,880	$298,600,090	$88,104,910	$32,812,315
	RPS Class II Renewable	$12,021,614	$14,787,373	$29,903,295	$30,926,576	$22,121,931
	RPS Class II Waste	$7,818,816	$7,861,767	$8,064,709	$8,339,827	$8,289,051
	APS	$4,351,526	$21,152,581	$31,957,922	$38,385,049	$36,872,800
	TOTAL	**$767,300,311**	**$746,464,826**	**$661,605,467**	**$515,460,110**	**$589,493,827**
High Certificate Cost	RPS Class I	$167,577,933	$126,214,418	$145,582,825	$161,980,820	$221,888,386
	SREC I	$308,143,130	$267,733,638	$268,151,496	$302,288,888	$363,938,304
	SRECII	$554,811,830	$447,876,520	$309,479,310	$91,367,990	$37,824,075
	RPS Class II Renewable	$37,423,565	$32,794,969	$33,078,683	$32,610,548	$23,740,128
	RPS Class II Waste	$15,249,297	$15,590,467	$16,009,144	$16,598,672	$16,389,611
	APS	$42,453,971	$41,312,511	$39,158,382	$40,275,055	$38,662,004
	TOTAL	**$1,125,659,725**	**$931,522,522**	**$811,459,840**	**$645,121,973**	**$702,442,508**

Table 16 represents DOER's estimates of the average cents per kWh cost of compliance for ratepayers during the period of 2015 through 2019.

Table 16 Estimated RPS/APS Compliance Costs, (Cents per kWh), 2015 – 2019

Scenario	RPS/APS Class	2019	2018	2017	2016	2015
Low Certificate Cost	RPS Class I	0.08	0.07	0.12	0.17	0.31
	SREC I	0.55	0.51	0.52	0.57	0.71
	SRECII	1.03	0.93	0.65	0.19	0.07
	RPS Class II Renewable	0.03	0.03	0.07	0.07	0.05
	RPS Class II Waste	0.02	0.02	0.02	0.02	0.02
	APS	0.01	0.05	0.07	0.08	0.08
	TOTAL	**1.72**	**1.61**	**1.45**	**1.10**	**1.23**
High Certificate Cost	RPS Class I	0.36	0.27	0.32	0.35	0.46
	SREC I	0.66	0.58	0.59	0.65	0.76
	SRECII	1.20	0.97	0.68	0.20	0.08
	RPS Class II Renewable	0.08	0.07	0.07	0.07	0.05
	RPS Class II Waste	0.03	0.03	0.04	0.04	0.03
	APS	0.09	0.09	0.09	0.09	0.08
	TOTAL	**2.43**	**2.01**	**1.78**	**1.38**	**1.46**

APPENDIX ONE: 2019 Massachusetts Retail Electricity Suppliers[41]

Electric Distribution Companies

Fitchburg Gas and Electric Co. d/b/a Unitil	NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource
Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid	

Competitive Retail Suppliers

Agera Energy LLC	Everyday Energy, LLC	Public Power, LLC
Ambit Northeast, LLC	First Point Power, LLC	Reliant Energy Northeast LLC
Astral Energy LLC	Green Mountain Energy Company	**Renaissance Power and Gas, Inc.**
Atlantic Energy MA LLC	Hampshire Council of Governments	Residents Energy, LLC
BBPC d/b/a Great Eastern Energy, LLC)	Harborside Energy of Massachusetts, LLC	SFE Energy Massachusetts Inc.
Calpine Energy Solutions, LLC	Harvard Dedicated Energy Limited	SmartEnergy Holdings, LLC
Champion Energy Services, LLC	Hudson Energy Services, LLC	South Jersey Energy Company
Clean Choice Energy, Inc	Inspire Energy Holdings, LLC	Spark Energy, LP
Clearview Electric, Inc.	Interstate Gas Supply, Inc.	Starion Energy, Inc.
Connecticut Municipal Electric Energy Cooperative (CMEEC)	Just Energy Massachusetts Corp.	Summer Energy Northeast, LLC
Constellation New Energy, Inc.	Liberty Power Holdings LLC	Sunwave Gas & Power Massachusetts, Inc.
Devonshire Energy LLC	Major Energy Electric Services, LLC	Texas Retail Energy, LLC.
Direct Energy Business, LLC	Massachusetts Gas & Electric, Inc.	Titan Gas, LLC
Direct Energy Services, LLC	Mega Energy Holdings, LLC	Town Square Energy, LLC
Discount Power, Inc.	Messer Energy Services, Inc.	Utility Expense Reduction
Dynegy Energy Services (East), LLC	National Gas & Electric, LLC	Verde Energy USA Massachusetts, LLC
EDF Energy Services, LLC	NextEra Energy Services Massachusetts, LLC	Viridian Energy, LLC
Eligo Energy MA, LLC	Nordic Energy Services, LLC	Wattifi, Inc.
Energy Plus Holdings	Oasis Power, LLC	Xoom Energy Massachusetts, LLC
ENGIE Resources LLC	Palmco Power MA, LLC d/b/a Indra Energy	
ENGIE Retail, LLC, d/b/a Think Energy	Provider Power MASS, LLC	

[41] New Suppliers since 2018 are shown in **bold**.

APPENDIX TWO: COMPLIANCE FILINGS, REVIEW, AND VERIFICATION

Four suppliers did not submit enough renewable energy certificates or purchase enough ACP to be in full compliance with the RPS, APS, and/or CES standards. A summary of the ACP owed by the non-compliant suppliers is shown below in Table 17.

Table 17 Total ACP Owed by Non-Compliant Suppliers*

Retail Electricity Supplier	RPS and APS	CES
Agera Energy, LLC	$20,251,772.20	$1,515,322.89
BBPC, LLC d/b/a Great Eastern Energy	$3,866,952.10	$289,349.91
Hampshire Council of Governments	$331,537.55	$25,675.38
Utility Expense Reduction, LLC	$11,908.97	$898.11
Total	**$24,462,170.82**	**$1,831,246.29**

* Numbers account for any settled certificates, banked certificates or load exemption (CES only) attributable to the supplier.
**CES calculations assume full compliance with RPS

DOER and MassDEP issued Notices of Non-Compliance to all four Suppliers.

Agera Energy, LLC filed for Chapter 11 bankruptcy in the US Bankruptcy Court for the Southern District of New York on October 4, 2019. DOER subsequently filed claims against Agera's bankruptcy estate in the amount of $61,692,657.09 as an unsecured claim and $2,699,982.00 as an administrative claim for Alternative Compliance Payments (ACPs) due to DOER for Compliance Years 2018 and 2019. MassDEP filed a claim against Agera in the same court for $3,653,582.66, as an unsecured claim and $220,018.79, as an administrative claim, assuming payments were also made to DOER. Considering the risks, costs and delay of continued litigation in the bankruptcy proceeding, DOER and MassDEP entered into an agreement with Agera to settle the ACP claims owed to the Commonwealth, which the court approved on June 24, 2020.

Hampshire Council of Governments entered into an agreement with the state whereby it paid $93,000 to DOER for the RPS and APS ACP amounts outstanding and it paid $7,000 to MassDEP to cover the CES ACP amount outstanding (payments are not reflected in its amounts of Table 17).

These non-compliant suppliers no longer hold competitive supplier licenses with the DPU. The ACP amounts for Great Eastern and Utility Expense Reduction remain outstanding.

APPENDIX THREE: 2019 RPS and APS Compliance Summaries (MWh)[42]

Table A RPS Class I Compliance Summary[43]

RPS CLASS I	Load Obligation from Filing	2019 MA Class I RECs	2017 Banked Attributes	2018 Banked Attributes	Alternative Compliance Credits	Total RPS Class I Attributes	RPS Class I Net Obligation	Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES										
Eversource	6,498,707	546,079	-	33,233	-	579,312	541,999	37,313	162,599	37,313
Fitchburg_G&E	168,462	14,366	-	713	-	15,079	14,049	1,030	4,214	1,030
National_Grid	6,561,377	437,412	-	109,814	-	547,226	547,225	1	164,167	1
SUBTOTALS	13,228,546	997,857	0	143,760	0	1,141,617	1,103,273	38,344	330,980	38,344
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	2,438,005	156,413	316,123	72,132	2,984,198	2,692,811	291,387	807,812	289,863
GRAND TOTAL	44,705,757	3,435,862	156,413	459,883	72,132	4,125,815	3,796,084	329,731	1,138,792	328,207

Table B RPS Solar Carve-Out Renewable Energy Compliance Summary

RPS CLASS I SOLAR CARVE-OUT (SCO)	Load Obligation from Filing	2019 MA SRECs	2017 Banked Attributes	2018 Banked Attributes	Alternative Compliance Credits	Total RPS SCO Attributes	SCO Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
Eversource	6,498,707	121,854	-	159	-	122,013	113,455	8,558	11,345	8,558
Fitchburg_G&E	168,462	3,000	-	39	-	3,039	2,942	97	294	97
National_Grid	6,561,377	113,230	-	-	1,319	114,549	114,549	-	11,454	-
SUBTOTALS	13,228,546	238,084	0	198	1,319	239,601	230,946	8,655	23,093	8,655
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	506,986	60	8,727	37,677	553,450	549,393	4,057	54,912	4,057

Table C RPS Solar Carve-Out II Renewable Energy Compliance Summary

RPS CLASS I SOLAR CARVE-OUT II (SCOII)	Load Obligation from Filing	2019 MA SREC IIs	2017 Banked Attributes	2018 Banked Attributes	Alternative Compliance Credits	Total RPS SCOII Attributes	SCOII Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
Eversource	6,498,707	270,875	-	148	-	271,023	254,366	16,657	25,436	16,657
Fitchburg_G&E	168,462	6,704	-	150	-	6,854	6,594	260	659	260
National_Grid	6,561,377	256,819	-	-	-	256,819	256,819	-	25,681	-
SUBTOTALS	13,228,546	534,398	0	298	0	534,696	517,779	16,917	51,776	16,917
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	1,069,081	16	18,231	80,679	1,168,007	1,164,638	3,369	116,430	3,369
GRAND TOTAL	44,705,757	1,603,479	16	18,529	80,679	1,702,703	1,682,417	20,286	168,206	20,286

[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: **COMPLIANCE FILINGS, REVIEW, AND VERIFICATION**.

[43] Solar Carve-Out and Solar Carve-Out II are netted out from the Class I table, although included in Tables H, I, J, and K of Appendix Four: **Data Tables for Compliance by Generation Location and Type**.

Table D RPS Class II Renewable Energy Compliance Summary

RPS CLASS II	Load Obligation from Filing	2019 MA Class II RECs	2017 Banked Attributes	2018 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	6,498,707	174,259	0	4,371	0	178,630	174,705	3,925	52,411	3,925
National Grid	168,462	4,600	0	63	0	4,663	4,529	134	1,358	134
NSTAR	6,561,377	198,365	0	30,817	0	229,182	176,390	52,792	52,917	52,792
SUBTOTALS	13,228,546	377,224	0	35,251	0	412,475	355,624	56,851	106,686	56,851
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	859,554	0	10,473	35,898	906,158	846,236	59,922	253,841	59,885
GRAND TOTAL	44,705,757	1,236,778	0	45,724	35,898	1,318,633	1,201,860	116,773	360,527	116,736

Table E RPS Class II Waste-to-Energy Compliance Summary

RPS CLASS II WASTE-TO-ENERGY	Load Obligation from Filing	2019 MA Class II WECs	2017 Banked Attributes	2018 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	6,498,707	227,000	0	11,299	0	238,299	227,455	10,844	11,372	10,844
National Grid	168,462	6,000	0	94	0	6,094	5,897	197	294	197
NSTAR	6,561,377	229,000	0	11,328	0	240,328	229,649	10,679	11,482	10,679
SUBTOTALS	13,228,546	462,000	0	22,721	0	484,721	463,001	21,720	23,148	21,720
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	1,030,667	12,880	24,493	52,882	1,121,153	1,101,735	19,418	55,060	18,130
GRAND TOTAL	44,705,757	1,492,667	12,880	47,214	52,882	1,605,874	1,564,736	41,138	78,208	39,850

Table F APS Alternative Energy Compliance Summary

APS	Load Obligation from Filing	2019 MA APS AECs	2017 Banked Attributes	2018 Banked Attributes	Alternative Compliance Credits	Total RPS APS Attributes	APS Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes
DISTRIBUTION COMPANIES										
F G & E	6,498,707	323,742	0	7,203	0	330,945	308,689	22,256	92,606	22,256
National Grid	168,462	8,347	0	49	0	8,396	8,002	394	2,400	394
NSTAR	6,561,377	312,438	0	92,154	0	404,592	311,666	92,926	93,499	92,926
SUBTOTALS	13,228,546	644,527	0	99,406	0	743,933	628,357	115,576	188,505	115,576
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	1,535,352	9,437	140,824	50,038	1,736,109	1,495,205	240,904	448,532	239,806
GRAND TOTAL	44,705,757	2,179,879	9,437	240,230	50,038	2,480,042	2,123,562	356,480	637,037	355,382

Table G Clean Energy Standard Compliance Summary

CES	Load Obligation from Filing	2019 MA CES CECs	2017 Banked Attributes	2018 Banked Attributes	Alternative Compliance Credits	Total CES Attributes	CES Net Obligation	Excess Attributes	Banking Limit (10%)	Banked Attributes *
DISTRIBUTION COMPANIES										
Eversource	6,498,707	259,949	0	0	0	259,949	259,949	0	77,984	0
Fitchburg G&E	168,462	6,739	0	0	0	6,739	6,739	0	2,021	0
National Grid	6,561,377	262,456	0	0	0	262,456	262,456	0	78,736	0
SUBTOTALS	13,228,546	529,144	0	0	0	529,144	529,144	0	158,741	0
COMPETITIVE SUPPLIERS										
SUBTOTALS	31,477,211	939,560	0	0	58,338	997,898	935,361	62,537	279,253	62,537
GRAND TOTAL	44,705,757	1,468,704	0	0	58,338	1,527,042	1,464,505	62,537	437,994	62,537

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

The first four tables below provide the data from which the RPS Class I graphs in Figure 3 through Figure 7 were generated. Those graphs and these tables include SREC and SREC II data for the SCO and SCO II programs. 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 H RPS Class I Compliance by Generation Location, 2012-2019

	2012	2013	2014	2015	2016	2017	2018	2019	
CT	16,070	16,452	11,397	5,973	6,829	22,481	39,593	21,911	0.3%
ME	864,227	1,114,355	1,039,509	1,170,728	1,219,261	1,651,113	1,618,008	1,591,327	22.8%
MA	483,925	791,088	1,118,406	1,538,702	1,659,136	2,204,208	2,592,432	2,774,876	39.7%
NH	531,430	640,808	508,841	495,212	358,956	237,805	256,838	309,443	4.4%
RI	37,131	23,288	11,059	9,496	8,210	5,081	26,532	87,006	1.2%
VT	173,191	364,691	407,497	342,023	382,949	297,852	354,224	518,315	7.4%
NMISA	49,144	64,629	67,369	353	5,166	0	1,037	40,461	0.6%
NY	620,904	870,508	880,859	666,330	1,025,674	864,280	856,288	1,154,161	16.5%
NS	0	0	0	0	1,173	64,400	23,700	19,500	0.3%
PEI	125,713	142,478	189,578	227,942	230,705	236,727	241,214	229,854	3.3%
QC	278,794	356,139	397,130	339,366	336,421	266,357	203,187	239,181	3.4%
Total	3,180,529	4,384,436	4,631,645	4,796,125	5,234,480	5,850,304	6,213,053	6,986,035	100.0%

Table I RPS Class I Compliance by Generation Type, 2012-2019

	2012	2013	2014	2015	2016	2017	2018	2019	
Anaerobic Digester	27,373	22,853	9,868	43,837	42,099	47,412	63,761	43,808	0.6%
Biomass	394,754	357,575	375,109	320,801	2,501	2,185	1,421	1,651	0.0%
Hydro	105,326	113,936	129,790	129,810	133,389	147,168	149,477	223,854	3.2%
Landfill Gas	891,798	954,656	820,001	587,790	722,539	268,910	243,083	196,756	2.8%
Marine/Hydrokinetic	0	6,837	28,959	47	48	47	43	0	0.0%
Solar	138,159	323,164	681,502	1,194,925	1,324,578	2,030,870	2,526,793	2,773,134	39.7%
Wind	1,623,119	2,605,415	2,586,416	2,518,915	3,009,326	3,353,712	3,228,475	3,746,832	53.6%
Total	3,180,529	4,384,436	4,631,645	4,796,125	5,234,480	5,850,304	6,213,053	6,986,035	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 J RPS Class I Compliance by Generation Location and Type, 2019 (MWh)[45]

	Anaerobic Digester	Bioenergy	Hydrokinetic	Hydropower	Landfill Gas	Solar PV	Solar Thermal	Wind	Total
CT	0	0	0	77	640	21,194	0	0	21,911
ME	544	0	0	68,505	14,215	23,742	0	1,484,321	1,591,327
MA	41,945	1,651	0	46,513	37,584	2,458,206	0	188,977	2,774,876
NH	0	0	0	20,871	12,965	39,668	3	235,936	309,443
NMISA	0	0	0	0	0	0	0	40,461	40,461
NY	0	0	0	47,036	86,256	0	0	1,020,869	1,154,161
NS	0	0	0	0	0	0	0	19,500	19,500
PE	0	0	0	0	0	0	0	229,854	229,854
QC	0	0	0	0	24,661	0	0	214,520	239,181
RI	0	0	0	96	0	61,248	3	25,659	87,006
VT	1,319	0	0	40,756	20,435	169,070	0	286,735	518,315
TOTAL	43,808	1,651	0	223,854	196,756	2,773,128	6	3,746,832	6,986,035

Table K RPS Class I Compliance Percentage by Generator Type and State, 2019

	Anaerobic Digester	Bioenergy	Hydrokinetic	Hydropower	Landfill Gas	Solar PV	Solar Thermal	Wind
CT	0.0%	0.0%	0.0%	0.0%	0.3%	0.8%	0.0%	0.0%
ME	1.2%	0.0%	0.0%	30.6%	7.2%	0.9%	0.0%	39.6%
MA	95.7%	100.0%	0.0%	20.8%	19.1%	88.6%	0.0%	5.0%
NH	0.0%	0.0%	0.0%	9.3%	6.6%	1.4%	50.0%	6.3%
NMISA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%
NY	0.0%	0.0%	0.0%	21.0%	43.8%	0.0%	0.0%	27.2%
NS	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
PE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.1%
QC	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	5.7%
RI	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	50.0%	0.7%
VT	3.0%	0.0%	0.0%	18.2%	10.4%	6.1%	0.0%	7.7%
TOTAL	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table L RPS Class II Renewable Energy Compliance by Generation Location, 2012-2019

	2012	2013	2014	2015	2016	2017	2018	2019	
CT	2,933	5,848	6,557	4,410	14,461	19,439	18,822	12,180	1.0%
ME	61,082	171,754	184,538	213,229	112,269	130,374	152,452	147,406	11.9%
MA	72,014	97,982	110,517	104,395	180,920	246,270	291,645	261,855	21.2%
NH	55,454	86,931	96,101	94,336	87,538	133,297	130,095	143,651	11.6%
NY	1,448	1,597	2,524	1,709	2,777	35,132	170,819	394,040	31.9%
RI	53,106	145,497	126,143	119,155	151,251	3,478	3,933	3,992	0.3%
VT	0	0	0	0	0	216,021	232,655	273,654	22.1%
Total	246,037	509,609	526,380	537,234	549,216	784,011	1,000,421	1,236,778	100.0%

[45] Table J (RPS Class I) and Table P (CES) are identical and include all RPS Class I RECs used to comply with RPS and CES.

Table M RPS Class II Renewable Energy Compliance by Generation Type, 2012-2019

	2012	2013	2014	2015	2016	2017	2018	2019	
Hydroelectric	246,037	509,462	526,097	535,799	525,392	724,199	943,142	1,212,562	98.0%
Marine &	0	147	240	242	244	258	235	0	0.0%
Landfill Gas	64,531	0	0	0	26,965	52,689	51,378	24,216	2.0%
Wind	0	0	7	1,193	8,723	6,865	5,666	0	0.0%
Total	310,568	509,609	526,344	537,234	561,324	784,011	1,000,421	1,236,778	100.0%

Table N RPS Class II Compliance by Generation Location and Type, 2019 (MWh)

	Hydroelectric	Hydrokinetic	Landfill Gas	Wind	TOTAL
CT	12,180	0	0	0	12,180
ME	147,406	0	0	0	147,406
MA	261,855	0	0	0	261,855
NH	143,651	0	0	0	143,651
RI	3,992	0	0	0	3,992
VT	273,637	0	17	0	273,654
NY	369,841	0	24,199	0	394,040
TOTAL	1,212,562	0	24,216	0	1,236,778

Table O APS Compliance by Generation Type, 2012-2019

	2012	2013	2014	2015	2016	2017	2018	2019	
Biomass	0	0	2,797	3,138	2,548	5,495	6,525	6,735	0.3%
Digester Gas	0	0	855	531	893	152	5,578	4,309	0.2%
Fuel Cell	0	0	0	0	0	0	19,758	38,970	1.8%
Flywheel Storage	303	3,186	377	98	2,724	0	0	0	0.0%
Heat Pump - Air	0	0	0	0	0	2,087	28,416	53,366	2.4%
Heat Pump - Ground	0	0	0	0	0	0	71,910	51,301	2.4%
Liquid Biofuels	0	0	0	0	0	406,673	294,337	434,334	19.9%
Solar Thermal	0	0	0	0	0	121	44,198	21,966	1.0%
CHO - Biomass	0	2,689	2,797	3,138	2,548	1,659	1,924	2,298	0.1%
CHP - Natural Gas	324,619	347,993	826,966	890,835	938,838	1,495,505	1,446,495	1,478,712	67.8%
CHP - Muni Waste	0	0	0	0	0	105,658	96,936	87,866	4.0%
CHP - Waste Energy	0	0	855	531	893	486	30	22	0.0%
TOTAL	324,922	353,868	834,647	898,271	948,444	2,017,836	2,016,107	2,179,879	100.0%

Table P CES Compliance by Generation Location and Type, 2019 (MWh)[46]

	Anaerobic Digester	Bioenergy	Hydrokinetic	Hydropower	Landfill Gas	Solar PV	Solar Thermal	Wind	Total
CT	0	0	0	77	640	21,194	0	0	21,911
ME	544	0	0	68,505	14,215	23,742	0	1,484,321	1,591,327
MA	41,945	1,651	0	46,513	37,584	2,458,206	0	188,977	2,774,876
NH	0	0	0	20,871	12,965	39,668	3	235,936	309,443
NMISA	0	0	0	0	0	0	0	40,461	40,461
NY	0	0	0	47,036	86,256	0	0	1,020,869	1,154,161
NS	0	0	0	0	0	0	0	19,500	19,500
PE	0	0	0	0	0	0	0	229,854	229,854
QC	0	0	0	0	24,661	0	0	214,520	239,181
RI	0	0	0	96	0	61,248	3	25,659	87,006
VT	1,319	0	0	40,756	20,435	169,070	0	286,735	518,315
TOTAL	43,808	1,651	0	223,854	196,756	2,773,128	6	3,746,832	6,986,035

Table Q Voluntary Renewable Energy Certificates Retired for RGGI by Generation Location and Type, 2019 (MWh)[47]

State	Hydropower	Solar Photovoltaic	Wind	Grand Total
ME		368	2,323	2,691
MA	1,366	2,019	716	4,101
NY			16,307	18,090
RI	96	108	2,141	2,345
Grand Total	**3,245**	**2,495**	**21,487**	**27,227**

[46] See footnote 48

[47] 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 8.