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Date of Hearing: 2-21-13

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BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO

- - -

In the Matter of the Review of the Alternative Energy Rider Contained in the Tariffs of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company.	: : : : : : :	Case No. 11-5201-EL-RDR

- - -

PROCEEDINGS

before Mr. Gregory Price and Ms. Mandy Chiles, Attorney Examiners, at the Public Utilities Commission of Ohio, 180 East Broad Street, Room 11-A, Columbus, Ohio, called at 9:00 a.m. on Thursday, February 21, 2013.

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VOLUME III

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Massachusetts
Renewable and Alternative Energy Portfolio Standards (RPS & APS)
ANNUAL COMPLIANCE REPORT FOR 2010

JANUARY 11, 2012

Department of Energy Resources
Executive Office of Energy and Environmental Affairs
Commonwealth of Massachusetts

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EXECUTIVE SUMMARY

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

The thirty-five Retail Electricity Suppliers with RPS and APS obligations in 2010 met their obligations with a mix of (a) Certificates purchased from the owners of qualified Generation Units, (b) surplus Attributes banked from 2008 and 2009, and (c) Alternative Compliance Payments (ACPs) in lieu of Certificates. Each RPS Class I and Class II Renewable Energy Certificate (REC), each Solar Carve-Out Renewable Energy Certificate (SREC), and each Waste Energy Certificate (WEC) represents the RPS Attributes of one megawatt hour (MWh)[1] of electricity generated during the Compliance Year from a Generation Unit qualified for the appropriate standard. Alternative Energy Certificates (AECs) represent the APS Attributes of the energy from APS qualified facilities during the Compliance Year, calculated in a manner prescribed in the APS regulations for each specific APS technology.

The supply of 2010 RPS Class I RECs fell slightly short of demand after three years of surplus, 2007-2009. The total retail load obligation in 2010 was 50,026 gigawatt hours (GWh),[2] of which the 4.9321% RPS Class I obligation (net of the 0.067% Solar Carve-Out obligation) was 2,467 GWh. This obligation was met by 2,324 GWh of 2010 Class I RECs purchased by the Suppliers, 381 GWh of banked Attributes from 2008 and 2009 surplus RECs, and 4 GWh of ACPs (costing $241,551) from five Suppliers that fell short of their obligations. The net result was a 241 GWh surplus of 2010 Class I RECs, virtually all of which were eligible to be banked forward for future compliance by twenty-seven Suppliers.

Note that, in addition to the 2,324 GWh of MA RPS Class I RECs documented in the 2010 Filings, another 599 GWh of MA RPS Class I RECs that *also* qualified for RPS in other New England states seem to have been used for RPS in those states, while another 82 GWh of RECs were not used for RPS at all. Of the latter, 61 GWh were used by several MA Suppliers for meeting "green power product" claims, i.e., for providing RECs to customers who signed up for 50% or 100% renewable electricity. The remaining 21 GWh were used for non-MA green products or were left unsold by generators.

Electricity generation from new renewable sources in Massachusetts in 2010 grew only slightly from 2009, in contrast to very large increases from wind farms in Maine and strong growth from wind farms in the Canadian Maritime provinces. Meantime, supplies from northern New England biomass plants reversed their 2009 slide, increasing slightly in 2010. Most RPS Class I RECs came from

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

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

electricity generated by wind turbines (39%), landfill methane fueled power plants (32%), and biomass-fired power plants (25%). The remaining supply came from anaerobic digester plants, hydroelectric plants, and solar photovoltaic (PV) arrays. Geographically, resources in Maine (especially wind farms) supplied 33% of the RECs, while New York resources (landfill methane plants and wind farms) supplied 25%, wind farms in adjacent Canadian provinces 16%, New Hampshire (mostly biomass) 12%, and Massachusetts (mostly landfill methane) 9%.

The supply of SRECs to satisfy the new RPS Solar Carve-Out (SCO) obligation, which began at 0.0679% in 2010, fell far short of the 34 GWh required. While fourteen Suppliers each purchased some of the 3 GWh of SRECs available, all except one of the thirty-five Suppliers met some or all of their SCO obligations with 31 GWh worth of ACPs totaling $11,682,793. DOER expects a robust increase in supply relative to demand over the next several years and a significant decline in use of the ACP for compliance over that period.

The supply of RECs for the RPS Class II Renewable Energy requirement was significantly short of the demand in 2010. With only twenty-one pre-1998 plants qualified for 2010 (mostly hydroelectric), the Suppliers were able to acquire only 104 GWh of RECs towards meeting the obligation of 1,505 GWh. Consequently, 93% of the obligation was met by ACPs, which totaled about $35 million.

The supply of WECs for the RPS Class II Waste Energy requirement, on the other hand, exceeded demand. To meet a total obligation of 1,463 GWh, Suppliers obtained 1,378 GWh and used 330 GWh banked from 2009 surplus, while six Suppliers also used 6 GWh of ACP, costing less than $58 thousand. The net result was a surplus of 252 GWh, of which 238 GWh were eligible to be banked forward for future compliance.

The supply of 227 GWh of AECs for the Alternative Energy Portfolio Standard (APS), even when augmented with 9 GWh banked from 2009 surplus, was significantly short of the 627 GWh demand. Consequently 391 GWh (62%) of the 627 GWh APS obligation were met by ACPs totaling about $7.8 million, while less than 1 GWh of surplus AECs were banked forward for future compliance. As in 2009, almost all AECs came from combined heat and power plants in 2010.

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

Finally, in June of 2010, DOER received the results of its commissioned study on the relative environmental impacts of woody biomass as a fuel, especially regarding the cycling over time of carbon dioxide (CO2), the most important greenhouse gas.[3] Informed by the findings of that study, DOER developed and issued proposed RPS Class I regulatory revisions and guidelines on the eligibility of woody biomass, based on criteria of forest sustainability and life-cycle CO2 emissions. DOER received and considered comments from the public in 2010 and later from the Legislature, each of which has led to further revision. Issuance of the final revised regulation and guidelines is expected early in 2012.[4]

[3] See the Biomass Sustainability and Biomass Policy Study (a.k.a. Manomet Study) webpage.

[4] Information on this process, including further actions, are posted on the RPS Biomass Policy Regulatory Process webpage.

SECTION ONE

INTRODUCTION TO THE RENEWABLE AND ALTERNATIVE ENERGY PORTFOLIO STANDARDS

This section briefly describes the Massachusetts Renewable and Alternative Energy Portfolio Standards (RPS and APS) as structured in 2010 pursuant to the Green Communities Act of 2008.[5] The last paragraph briefly summarizes changes that took effect during 2011, after the period of this report.

The original RPS statute obligated Retail Electricity Suppliers ("Suppliers"), both regulated distribution Utilities and Competitive Suppliers, to obtain for their retail customers a small but growing percentage of electricity (the "Minimum Standard") from sources that qualified as New Renewable Generation Units, namely generators that began operation after 1997 and used eligible resources and technologies – especially solar, wind, landfill methane, and low-emission/advanced technology biomass. The RPS began with an obligation of one percent in 2003 and increased by a half percent annually through 2009, when it reached four percent and was renamed RPS Class I. Since 2009, RPS Class I has increased by one percent annually. The obligation was five percent in 2010 and will be fifteen percent in 2020. In addition to RPS Class I, as of 2009 the Suppliers must comply with three new Energy Portfolio Standards mandated by the Green Communities Act. These Standards are also structured as percentage obligations (Minimum Standards) for Suppliers, but with each Standard having different eligibility criteria and percentage obligations.

In 2009, the changes were implemented in three Regulations, respectively for RPS Class I, RPS Class II, and the Alternative Energy Portfolio Standard.[6] The new Regulation for RPS Class I (formerly RPS) continues to limit eligibility to post-1997 Generation Units, but with some grandfathered Vintage Generation Units from RPS still partially qualified and, as of 2010, with a "carve-out" for post-2008 solar photovoltaic projects (the latter detailed on the next page). The list of RPS eligible resources was expanded to include hydroelectricity plants of small size (up to 25 MW) and low environmental impact[7], as well as geothermal and "marine and hydro-kinetic" facilities. In addition, Behind-the-Meter Units (a.k.a. distributed generation), which formerly had to be located within Massachusetts, qualified as of 2009 for RPS anywhere in the ISO New England (ISO-NE) control area (the New England grid), but all such generation now must be reported to the NEPOOL GIS[8] by an independent third party.[9]

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

[6] The new Regulations – 225 CMR 14.00 (RPS Class I), 15.00 (Class II), and 16.00 (APS) – became effective on an "emergency" basis on January 1, 2009, and the subsequent, formal rulemaking process concluded with the promulgation of final revised Regulations effective on June 12, 2009. The RPS Class I regulation was subsequently revised to include a Solar Carve-Out standard on an emergency basis in January of 2010, launching a formal rulemaking process that culminated in December of 2010. Section One of this report describes RPS Class II and APS in their final, 6/12/09 form and RPS Class I in its 12/10/10 form, incorporating the finalized Solar Carve-Out provisions. A finalized revision of the woody biomass eligibility standards in the Class I Regulation, expected late in 2011, is mentioned but cannot be described in this 2010 report.

[7] Hydroelectric plants in Class I are limited to post-1997 facilities of no more than 25 MW *or* to incremental output at pre-1998 facilities attributable to added capacity or efficiency improvements amounting to no more than 25 MW. However, the capacity for Class II eligibility is limited to no more than 5 MW per facility. In addition, stringent statutory environmental criteria apply to facilities under both Class I and Class II; these are normally met by certification by the Low Impact Hydropower Institute, a non-profit organization located in Portland, ME. See the details for Class I hydropower in 225 CMR 14.05(1)(a)6 and for Class II hydropower in 225 CMR 15.05(1)(a)6.

[8] See http://www.nepoolgis.com.

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

The Alternative Energy Portfolio Standard (APS) is limited to and intended to support certain "alternative," largely non-renewable, technologies and resources whose development the Legislature deemed worthy of incentives modeled on the RPS standards.[10] Two APS technologies are active to date: Flywheel Storage and Combined Heat and Power (CHP, a.k.a., cogeneration).[11] The Alternative Energy Certificates (AECs) earned by a CHP Unit represent the energy saved (in MWh) by operating the Unit as a CHP Unit as compared to separately operating an on-site thermal plant while drawing electricity from the grid.[12] The quantity of AECs earned by a flywheel storage Unit is equal to 65% of the electricity discharged by the Unit and represents a value placed upon the reduction of peak power generation and voltage regulation provided by the Unit.

As of 2010, Suppliers additionally must comply with the new Solar Carve-Out (SCO) Minimum Standard within the Class I Regulation. Each Supplier must demonstrate annually that, *within* its Class I percentage obligation, it has obtained a specified, very small percentage of its electricity from small, on-site, grid-connected, photovoltaic (PV) systems that are installed after 2008 within Massachusetts.[13] The initial SCO percentage obligation was 0.0679% for 2010, and the percentage rises annually through a methodology detailed in the Class I Regulation (225 CMR 14.07(2)). On a dollar per MWh basis, PV is much costlier to install than the other major Class I renewable technologies. That expense is reflected in Alternative Compliance Payment (ACP) rate provisions in the 2010 Class I Regulation, with the intent of providing sufficient incentive to bring 400 MW of new PV generating capacity on line in Massachusetts.[14] With the SCO netted out, the remaining Class I obligation for 2010 was 4.9321%, which is met by RECs from non-SCO, Class I qualified generation.

Suppliers meet their annual RPS and APS obligations by acquiring a sufficient quantity of MA RPS Class I and Class II qualified Renewable Energy Certificates ("RECs"), Solar Carve-Out

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[9] Another substantive change in RPS Class I is the addition of a provision that qualified plants not commit their generation "capacity" to Control Areas other than ISO-NE, with some exceptions. In addition, non-intermittent generators must participate in the ISO-NE Forward Capacity Market except to the extent that their capacity is previously committed elsewhere. For details, see 225 CMR 14,05(1)(e). In the case of plants outside of ISO-NE, the import rules now also include a "round-tripping" prohibition, for which see 225 CMR 14.05(5)(d).

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

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

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

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

[14] For more detail about the Solar Carve-Out, visit the RPS/APS homepage. Note that a proposed ten-year forward schedule of Solar Carve-Out ACP Rates was issued on August 3, 2011, with the intention of providing more certainty in the marketplace to facilitate financing the development of SCO-qualified PV. A formal *Guideline on the Solar ACP Rate Schedule* was issued on December 28, 2011, which is to be followed by a narrowly focused rulemaking on the subject.

Renewable Energy Certificates ("SRECs"), Class II Waste Energy Certificates ("WECs"), and APS qualified Alternative Energy Certificates ("AECs"). These certificates are created and recorded at the NEPOOL Generation Information System ("GIS").[15] The GIS tracks all electricity generated within the ISO-NE control area and fed onto the New England grid, as well as electricity exchanged between ISO-NE and adjacent control areas.[16] For each megawatt-hour (MWh) of electricity, whether renewable or not, the GIS creates and deposits one serially-numbered, electronic certificate in the account of the entity that generated or imported the MWh. Any certificate for energy output that qualifies for one or more of the New England states' energy portfolio standards is coded and named accordingly.[17] A Supplier with a Massachusetts portfolio standard obligation purchases RECs, SRECs, WECs, and AECs from qualified generators, either directly or via a broker, and they are then electronically transferred from the generators' GIS accounts to the Supplier's GIS account. Each GIS certificate qualified for a Massachusetts Portfolio Standard can be used for compliance with *only* the Standard for which it is qualified: a Class I REC only for Class I compliance, an SREC only for SCO compliance, etc.

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

Pending as of the date of this Report are changes in the RPS Class I eligibility standards for fuel sourcing and energy conversion efficiency for generation units fueled by woody biomass, based on forest sustainability and life-cycle CO2 emissions criteria. These changes, which do not pertain to 2010 compliance, are expected to be finalized and announced by DOER early in 2012. Some discussion of the impact of these changes in the future RPS Class I market is found in Section Seven of this report.[18]

SECTION TWO

RPS CLASS I COMPLIANCE IN 2010

Summary

The total supply of electricity from RPS Class I Generation (represented by MA Class I RECs) fell slightly short of demand after three years of surplus (2007-2009), which followed, in turn, supply shortages in the first four years of RPS (2003-2006). The 2010 RPS Class I obligation for each Supplier was five percent (5%) of its retail load obligation at the NEPOOL GIS, of which 0.0679% was "carved-out" for SRECs from the new Solar Carve-Out qualified PV projects, leaving a net Class I obligation of 4.9321%. (The Solar Carve-Out compliance in 2010 is separately detailed in Section Three, below.)

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[15] See www.nepoolgis.com.

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

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

[18] DOER's current rulemaking activities can be accessed at DOER's RPS/APS homepage, http://www.mass.gov/energy/rps.

The total retail load obligation in 2010 was 50,026,093 MWh, for which the 4.9321% obligation was 2,467,336 MWh. The Class I REC supply presented for compliance totaled 2,704,433 MWh, which consisted of 2,323,609 RECs from 2010 generation plus 380,824 MWh of Attributes banked from 2008 and 2009. In spite of the surplus, 3,965 MWh of the obligation was met through Alternative Compliance Payments (ACPs) totaling $241,550.52 at the rate of $60.93 per MWh.[19] The resulting 2,708,398 MWh total yielded a surplus of 241,071 MWh, of which 241,061 MWh were eligible to be banked for compliance use in 2011 and 2012. Table Two displays the 2010 figures, along with those of the previous years, and additional details are in Appendix Two, Table B.

The Massachusetts RPS Class I (as well as Class II and APS) has a flexibility provision for any Supplier that holds Compliance Year RECs in excess of its current compliance obligation. The Supplier can "bank" towards its RPS compliance in the following year or two a quantity of RECs that does not exceed 30% of its RPS obligation in the year when the RECs were generated.[20] Given a very small REC shortfall in 2010 and low REC prices during the 2010 REC trading year, along with a sizable quantity of banked surplus from 2008 and 2009, all except eight of the 35 Suppliers acquired more RECs than they needed for 2010 compliance, possibly as a hedge against possible increases in REC supply shortages and consequent price increases in 2011 and 2012. Some Suppliers also might have anticipated a need for more RECs in 2010 than proved to be required to cover their obligations.

The supply of RECs from Class I Renewable Generation in Massachusetts rose only slightly. The rate of that increase has been below the overall rate of increase for the northeast region as a whole. As a result, the *percentage* of total REC supply coming from in-state projects continued to decline.

Note that all figures regarding the quantities and percentages of MA Class I RECs from different *jurisdictions must be understood in the context of a regional market in which the supply of RECs* exceeds the demand and most, but not all, MA Class I RECs can be used for RPS compliance in several New England states. Thus, many more RECs are actually created than are reflected in the MA 2010 RPS compliance figures. Almost 3,005,000 MA Class I RECs were created at the NEPOOL GIS. Of those, about 2,326,000 RECs were submitted in the Filings for MA Class I and Solar Carve-Out compliance. Almost 599,000 RECs were settled into Suppliers' GIS subaccounts for the other New England states where they also qualified; presumably they were used for RPS compliance there (mostly in RI, NH, and CT). In addition, almost 54,000 RECs were settled in MA subaccounts for MA voluntary "green power product" sales, and more than 7,000 RECs were transferred to GIS "Reserved Accounts" for that same purpose, for a total of almost 61,000 "VRECs" (voluntary RECs). A net balance of more than 21,000 RECs either was used for green power products outside Massachusetts or remained unsold by the generators.

Compliance Details

DOER received filings from thirty-five Retail Electricity Suppliers, entities that served retail load in Massachusetts during 2010. These included four investor-owned, distribution companies that are regulated by the Massachusetts Department of Public Utilities (DPU) and thirty-one Competitive

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

[20] For example, if a Supplier had a 2009 RPS Class I retail load obligation of one million MWh, then its 4% RPS obligation for 2009 would be 40,000 MWh. If the Supplier acquired more Class I RECs than it needed to meet the Class I obligation, it could bank up to 12,000 MWh (30% of 40,000 MWh) of those 2009 RECs to use towards its Class I obligations in 2011 and 2012. This same procedure applies to the other classes of RPS and APS. However, for the Solar Carve-Out, bankable surplus is limited to 10% of the Compliance Y\ear obligation.

Suppliers that are licensed but not regulated by the DPU.[21] In Table One, nine Competitive Suppliers new to the Massachusetts RPS market are listed in italics. Of those nine, six were totally new, two acquired the customers and other assets of Suppliers that are no longer listed (see table footnotes), and one, REP Energy, assumed the customers of Horizon Power & Light part-way through 2010. Both REP and Horizon served retail load in 2010, so both were required to submit Filings.[22]

Table One
2010 Massachusetts Retail Electricity Suppliers

Distribution Utilities	
Fitchburg Gas & Electric Co. (Unitil)	NSTAR Electric Co.
Massachusetts and Nantucket Electric Companies, d/b/a National Grid	Western Massachusetts Electric Co.
Competitive Suppliers	
Cianbro Energy, LLC	Horizon Power and Light LLC[23]
Consolidated Edison Solutions, Inc.	*Hudson Energy Services*
Constellation NewEnergy, Inc.	Integrys Energy Services, Inc.
Devonshire Energy LLC	*Just Energy Massachusetts Corporation*
Direct Energy Business, LLC	Liberty Power Holdings LLC
Direct Energy Services, LLC	MXenergy Electric, Inc.
Dominion Retail, Inc.	*NextEra Energy, LLC*[24]
East Avenue Energy LLC	*Noble Americas Energy Solutions*[25]
Easy Energy of Massachusetts LLC	Pepco Energy Services, Inc.
ECM Energy Management LLC	*Public Power, LLC*
GDF Suez Energy Resources NA, Inc.	*REP Energy LLC*[26]
Glacial Energy of New England, Inc.	South Jersey Energy Company.
Hampshire Council of Governments	Spark Energy, LP
Hannaford Energy LLC	TransCanada Power Marketing Ltd.
Harvard Dedicated Energy, Ltd	WFM Intermediary New England Energy LLC
Hess Corporation	–

All Suppliers complied with their RPS obligations, except that Horizon Power and Light failed to comply until October 14, 2011, as discussed in Appendix One. 99.8% of the compliance was met by Class I Renewable Generation. 84.4% came from 2010 generation, while 15.4% came from

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

[22] See Appendix One for further discussion of their divided compliance.

[23] Horizon Power and Light transferred its customer contracts (along with its Banked Attributes), to REP Energy.

[24] NextEra Energy, LLC, bought out Gexa Energy, LLC, assuming its customers and its Banked Attributes.

[25] Noble Americas Energy Solutions bought out Sempra Energy Solutions, including its customers and its Banked Attributes.

[26] See footnote 23.

Attributes/RECs banked from 2008 and 2009 compliance surplus. Only 0.2% was met using the Alternative Compliance mechanism – by making ACPs to the Massachusetts Clean Energy Center (MassCEC),[27] 10% of the RECs from 2010 generation were qualified to be Attributes banked forward for use towards RPS Class I Compliance in 2011 or 2012; compared to 20% of 2009 RECs.

Table Two
Aggregated Information from the RPS Class I Annual Compliance Filings, 2003-2010 (MWh)[28]

	2010	2009	2008	2007	2006	2005	2004	2003
CY Retail Sales (load obligation)[29]	50,026,093	48,301,821	50,321,635	50,978,101	50,143,130	51,558,778	50,063,092	49,834,324
CY total RPS Obligation[30]	2,467,336	1,932,089	1,761,257	1,529,343	1,253,578	1,031,176	750,946	498,343
Total RECs from CY Generation	2,323,609	2,129,918	1,896,008	1,599,533	938,772	644,849	444,680	304,112
minus CY total surplus RECs	(241,062)	(387,664)	(216,550)	(87,957)	(9,458)	(739)	(20,297)	(60,837)
Net CY RECs for CY Obligation	2,082,547	1,742,254	1,679,458	1,511,576	929,314	644,110	424,383	243,275
plus banked from pre-CY surpluses[31]	380,824	189,835	80,605	6,863	1,661	19,531	61,147	255,069
Total RECs used for CY Obligation	2,463,371	1,932,089	1,760,063	1,518,439	930,975	663,641	485,530	498,344
plus total ACP credits	3,965	0	1,208	10,920	322,625	367,858	265,424	181
Total for Compliance Obligation	2,467,336	1,932,089	1,761,271	1,529,359	1,253,600	1,031,499	750,954	498,525
Surplus Attributes banked forward[32]	241,061	386,059	210,580	80,743	9,458	739	20,297	61,314
ACP proceeds (rounded)	$241,551	$0	$70,765	$623,750	$17,786,316	$19,566,367	$13,645,448	$9,056

[27] See footnote 19 regarding the ACP mechanism.

[28] CY is the abbreviation for Compliance Year, which is coterminous with a calendar year. Note that these are aggregated figures. However, compliance is calculated separately for each Supplier, with fractions always rounded upwards. Therefore, the RPS Obligation as calculated on the total "CY Retail Sales" is usually less than the "CY Aggregated Compliance Obligation" Listed in this table and elsewhere in the report.

[29] DOER requires that each supplier use as its "retail electricity sales" the quantity of its "load obligation" assigned at the NEPOOL GIS (see Part 4 of the NEPOOL GIS Operating Rules, available via http://www.nepoolgis.com/). For additional detail, see the *Guideline for Retail Electricity Suppliers on the Determination of Sales to End-use Customers for Calculating the Annual RPS Obligation*, at http://www.mass.gov/doer/rps/rps-compliance-guideline.pdf.

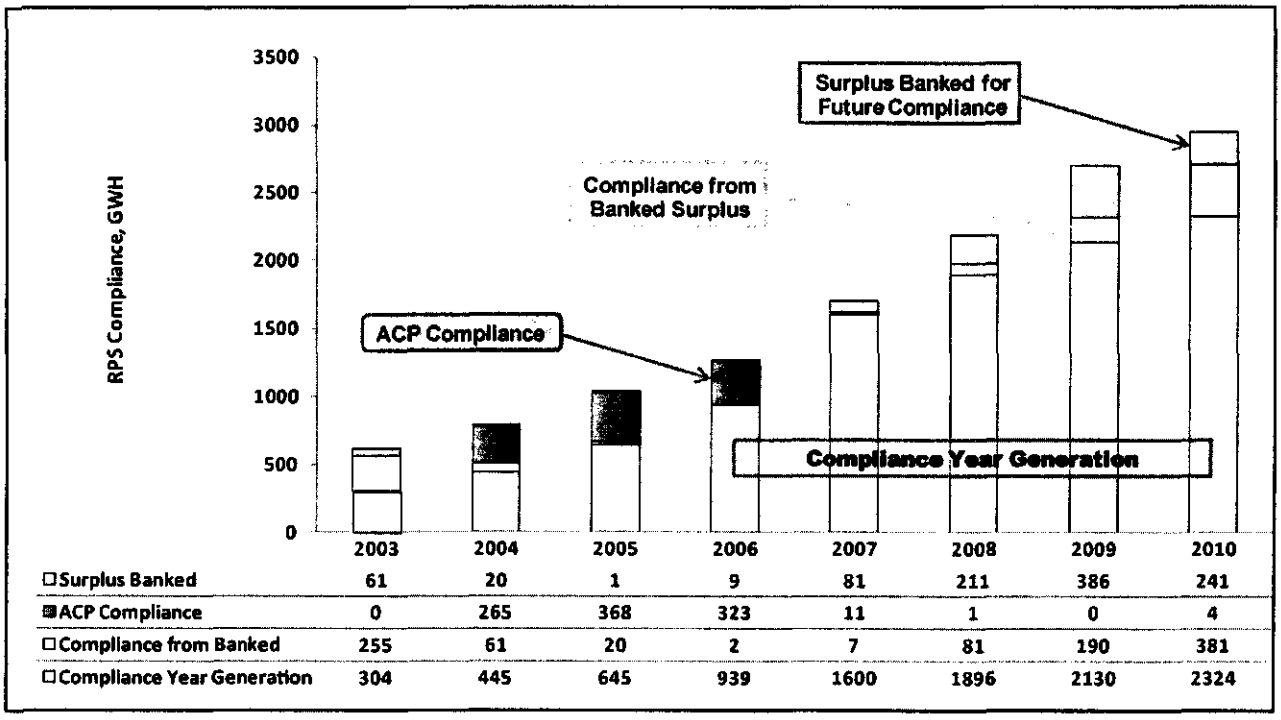
[30] The RPS/RPS Class I Minimum Standard obligation for each of the CYs 2003 through 2010 was, respectively, 1%, 1.5%, 2%, 2.5%, 3%, 3.5%, 4%, and 4.9321% (5% minus the Solar Carve-out Minimum Standard of 0.0679%).

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

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

The detailed compliance figures for all eight of the RPS Compliance Years are in Table Two, with more detail for 2010 in Appendix Two, Table B. The progression of compliance during the first eight years of the program, 2003-10, is illustrated in Figure One. The initial shortage of qualified generation and RECs is evident in the high reliance on ACPs during 2004-06, a trend that was reversed in 2007. The RPS obligation clearly has demonstrated its success in providing incentive for accelerated development of new Renewable Generation Units since the original RPS regulations were issued in April of 2002.

Figure One
RPS Class I Compliance, 2003-2010



	2003	2004	2005	2006	2007	2008	2009	2010
Surplus Banked	61	20	1	9	81	211	386	241
ACP Compliance	0	265	368	323	11	1	0	4
Compliance from Banked	255	61	20	2	7	81	190	381
Compliance Year Generation	304	445	645	939	1600	1896	2130	2324

Generation Sources by Location

The percentages of 2010 RECs from the six New England states, New York, and the adjacent Canadian provinces are illustrated in Figure Two, below. Note that a small portion of northern Maine ("NMISA") is outside of the New England grid and connects to ISO-NE via the New Brunswick control area; therefore, the output of NMISA generators must be imported (via Canada) to ISO-NE in order to earn RECs, as with all generation located in electricity control areas outside of and adjacent to ISO-NE. Figure Three illustrates the eight year trend of RECs, 2003-2010, by location of the generation. Appendix Three has a pair of tables listing the data from which these graphs were generated.

Between 2009 and 2010, the supply of RECs for MA RPS Class I compliance that was sourced from Generation Units inside the ISO-NE control area increased by 15%, while the supply of RECs from electricity imported from Units outside of ISO-NE increased by less than 2%, as contrasted with the previous two year-on-year import increases of 12% and 13%. As a result, the ISO-NE share of the total rose from 56% in 2009 to 59% in 2010, and the imported share fell, ending a six year record of annual increases in the share of RECs from outside ISO-NE. The sources of imports changed considerably: imports from wind farms in Quebec dropped by 40%, those from Prince Edward Island

and NMISA rose by 30%, and those from New York (some from wind but increasingly from landfills) rose by 30%. As a result, New York's share of total imports rose from 56% to 61%.

Figure Two
2010 RPS Class I Compliance by Generator Location

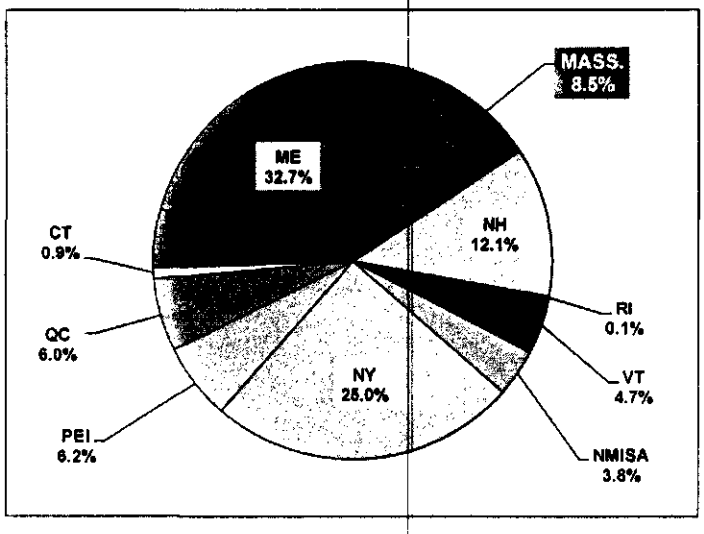
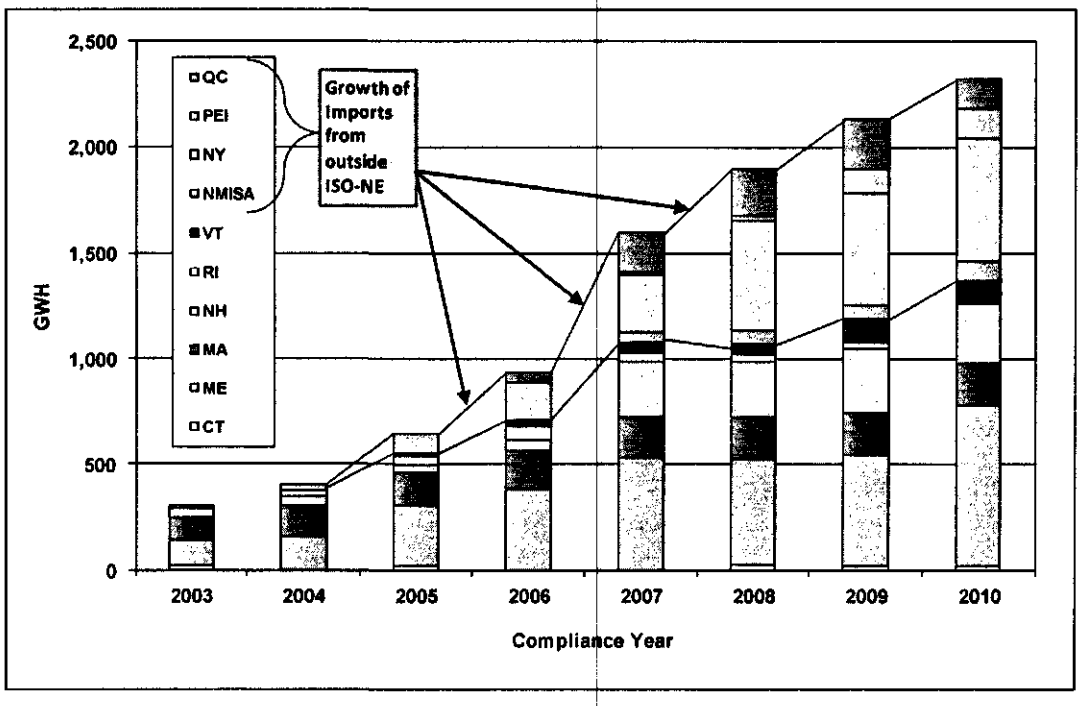


Figure Three
RPS Class I Compliance by Generator Location, 2003-2010



Generation Sources by Type

The percentages of 2010 RECs from the qualified types of renewable resources are illustrated in Figure Four, while Figure Five illustrates the eight year trend of RECs by resource type. Appendix

Three has a pair of tables listing the data from which these graphs were generated. The supply of RECs from biomass increased by only 2.2% from 2009 to 2010, from landfill methane at three times that rate, and from wind at six three times that rate. Hydro and solar rose by 70% but from much smaller bases.

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

The bulk of landfill methane electricity output is from Massachusetts and New York, but with some from landfill projects in most of the other New England states. Landfill output was the largest source of RECs for several years but increased more slowly than that of biomass during 2003-2007 and was overtaken by biomass as the largest source in 2008. However, energy from new landfill plants in New York entered the market in 2008 and has continued to rise, while energy from biomass has declined. At 32%, landfill methane was the second largest REC source in 2010 (having been surpassed by wind in 2009), followed by biomass.

Almost all the RPS-qualified biomass generation is located in Maine (61%) and New Hampshire (38%). Biomass plant output increased substantially from year to year during 2003-2007, overtaking landfill methane in 2007 as the largest single resource type. In 2008, however, while landfill methane generation increased substantially, the output from biomass plants declined. One plant in Maine stopped production at the beginning of 2009, while other plants have had periods of reduced or no operation since 2008. Biomass output did increase as a REC source in 2010, providing 25% of the supply.

Hydroelectricity was added to the qualified mix for RPS Class I in 2009, mostly from post-1998 increases in output at some older plants attributable to capacity and efficiency upgrades. While it provided only 2% of RECs in 2009, its share rose to 3.5% in 2010. Most of the supply is from Vermont and Maine.

In 2010 all of the anaerobic digester output, which provided only 1% of the 2010 RECs, was from the Deer Island Wastewater Treatment Plant. A not inconsiderable anaerobic digester potential may exist at other wastewater treatment plants, as well as food processing and agricultural facilities, in Massachusetts and other states.

Solar photovoltaic arrays, all of them in Massachusetts, provide a small but growing quantity of RECs for MA RPS. That growth has been accelerating, propelled both by focused federal stimulus funding and state financial incentives since the end of 2007, and by the RPS Solar Carve-Out (SCO) launched in January 2010. Generation qualified for RPS Class I (but not for the SCO) rose from 2,420 MWh in 2009 to 4,120 in 2010, a 70% increase.[33] Although the SCO is attracting most new development of PV in Massachusetts, the portion of PV that does not qualify for the SCO is also expected to continue increasing. Several reasons account for this. Some in-state units have received significant MassCEC or ARRA funding that precludes the additional and much higher financial benefits of SCO qualification. In addition, PV installed outside of Massachusetts cannot qualify for the SCO. All units that do not qualify for the Solar Carve-Out on those grounds can qualify for RPS Class I.

[33] If the new Solar Carve-Out is included, then the 2010 total was 6,858 MWh, an overall increase of 183% for PV.

Figure Four
2010 RPS Class I Compliance by Generator Type

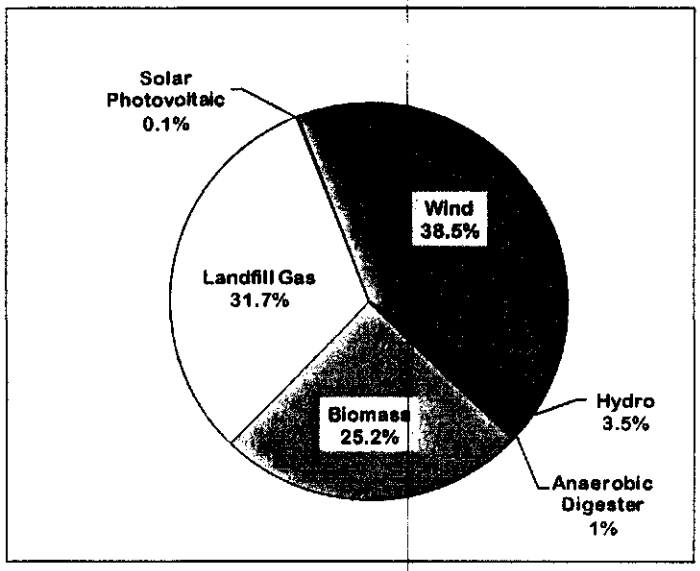
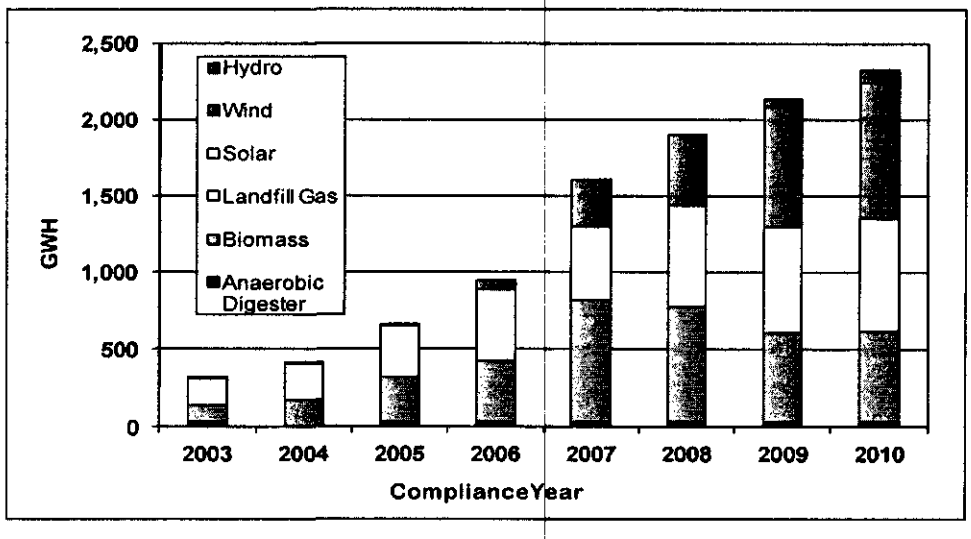


Figure Five
RPS Class I Compliance by Generator Type, 2003-2010



SECTION THREE

RPS SOLAR CARVE-OUT COMPLIANCE IN 2010

As of 2010, the Solar Carve-Out (SCO) was established pursuant to the Green Communities Act of 2008, which provided for a Minimum Standard to be carved out *within* the Class I Minimum Standard for the output of small, on-site, in-state generation, with the details to be determined by DOER via public rulemaking. For reasons discussed in the next paragraph, DOER chose solar photovoltaic (PV) as the eligible technology for the carve-out and issued an Emergency Regulation in January 2010 after an extensive stakeholder process. The public rulemaking process concluded in December 2010. The eligibility requirements for a PV system to qualify include the following: (a) location within

Massachusetts, (b) use of some electricity on-site with the balance of the output connected to the grid, and (c) nameplate capacity (direct current) limited to no more than 6 MW on a single parcel of land. In addition, a system is not eligible if funded by programs administered by the Massachusetts Renewable Energy Trust (subsumed by the Massachusetts Clean Energy Center, a.k.a. MassCEC) prior to 2010 or if more than 67% of its installed cost was funded by the American Reinvestment and Recovery Act (ARRA). (PV systems that do not meet those criteria can still qualify for RPS Class I.)

Among the RPS-qualified renewable energy technologies, PV has the least environmental impact and is the easiest to locate in both urban and rural areas. In addition, the development of PV is a proven job creator in Massachusetts, which is home to a number of PV companies, and PV installation employs more local workers per MW of capacity than other technologies. Accordingly, the administration of Governor Deval Patrick made a commitment in 2007 to achieve 250 MW of total installed PV capacity in Massachusetts by 2017. Pursuant to that goal and consistent with PV's environmental and economic benefits, DOER chose PV for the small, in-state, on-site carve-out provided by the 2008 Act. In addition, in order to provide a sufficient and long-term market that will attract solar business development to Massachusetts, DOER set a higher, final goal of 400 MW.

The installation cost of PV is considerably higher per MW than the other technologies currently participating in RPS Class I and thus presents greater financial challenges. To meet those challenges, DOER developed – and established in Regulation – an innovative design for the SCO Minimum Standard that maintains a reasonable balance of supply and demand, with the intent of assuring a robust development curve. First, DOER established a high Alternative Compliance Payment (ACP) Rate, starting at $600 per MWh in 2010, with potential reductions to be determined by DOER but with such reductions never to exceed 10% between years (however, see the next paragraph). A price floor is provided by an innovative auction mechanism, with a fixed price per SREC of $300, of which $285 per SREC would be transferred to the SREC seller and $15 per SREC applied to administrative costs. The auction mechanism provides a "buyer of last resort" for unsold SRECs whenever a surplus of supply over demand develops for a given Compliance Year. Further details of the auction and other mechanisms are best learned from the Solar Carve-Out pages at the DOER/RPS website.[34]

In an effort to improve the predictability of revenue for PV projects and, thereby, the financability of new PV project development, on August 3, 2011, DOER issued for public comment a ten-year forward schedule for the ACP Rate. On December 28, 2011, DOER issued it as a formal *Guideline on the Solar ACP Rate Schedule*. DOER expects to follow-up early in 2012 with a narrowly-focused, public rulemaking that would codify the schedule in the Class I Regulation.[35]

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

Given financial uncertainty during the year of public rulemaking and the need to establish a robust development pipeline, it came as no surprise that there was a very wide gap between SREC

[34] Also see the Regulation in 225 CMR 14.05(4).

[35] See footnote 14 for a link to the *Guideline* and related information.

supply and demand in 2010. The 0.0679% Minimum Standard required 33,988 MWh of SRECs[36]; however, the 11.9 MW of installed, SCO-qualified, PV capacity (much of it installed later in the year) yielded only 2,738 MWh of SRECs in 2010.[37] Those 2,738 MWh were only 8.1% of the obligation, so 91.9%, of the obligation, 31,250 MWh, was met through ACPs totaling $11,682,793. Only one very small Supplier managed to satisfy its entire, very small obligation by purchasing eight SRECs, while twenty-one of the Suppliers met 100% of their obligations through ACPs, and thirteen used both SRECs and ACPs. The figures are displayed in Table Three, with more detail in Appendix Two, Table B.

In order to ease the compliance cost for Suppliers with previously contracted retail loads, the Regulation was adjusted during the rulemaking to provide a two-tiered ACP Rate, as follows. For the portion of a Competitive Supplier's retail load served under contracts entered *prior* to the January 1, 2010, start of the SCO obligation (with the cost of that obligation not known at that time and not incorporated into contracted rates), the ACP Rate for SREC shortfall is the same as for Class I, $60.93/MWh in 2010. But for any shortfall in serving retail loads under contracts *commencing* during 2010, the Rate in 2010 was $600. Following a methodology provided by DOER for the Annual Compliance Filings, each Supplier was able to calculate its SCO SREC ACP at each of the two rates. Of the total SCO obligation, the shortfall under pre-2010 contracted load was 13,110 MWh, for which the ACP totaled $798,792.67 at the Class I rate of $60.93/MWh, and the shortfall under 2010 contracted load was 18,140 MWh, for which the ACP totaled $10,884,000 at the $600/MWh rate.

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

	2010
CY Retail Sales (load obligation) [38]	50,026,093
CY calculated SCO Obligation (0.0679%)[39]	33,988
Total SRECs from CY Generation	2,738
minus CY total surplus SRECs	0
Net CY SRECs for CY Obligation	2,738
plus banked from pre-CY surpluses[40]	0
Total SRECs used for CY Obligation	2,738
plus total ACP credits	31,250
Total for Compliance Obligation	33,988
Surplus SCO Attributes banked forward	0
ACP proceeds (rounded)	$11,682,793

[36] The 2010 compliance obligation for the Solar Carve-Out was set at 34,164 MWh by Regulation in 225 CMR 14.07(2)(b), which yielded a Minimum Standard of 0.0679% of the 2008 retail load of 50,321,635 MWh under the procedures in 225 CMR 14.07(2)(a). Since the actual retail load for 2010 turned out to be 50,026,093, the resulting compliance obligation for 2010 was 33,968 MWh. However, due to each supplier rounding up its individual SREC obligation, the total for compliance was 33,988 MWh.

[37] However, see Section Seven regarding the accelerating increase in PV development during 2011.

[38] This figure is the same as the Class I figure in Table Two. Note that this figure is not the same as the "2010 Load" figure of 50,025,563 MWh used in "Determination of CY 2012 Total Compliance Obligation" issued by DOER on August 31, 2011. Additional review of the Compliance Filings since that date resulted in a slightly lower figure, but with no impact on calculation of the 2012 Solar Carve-Out Minimum Standard.

[39] See footnote 36 regarding the difference between totaling individual obligations and calculating overall obligation.

[40] No banked SCO Attributes s existed yet, since 2010 was the first year of the standard.

In future years, DOER anticipates that the need for the ACP mechanism will be reduced by a rapidly growing supply.

SECTION FOUR

RPS CLASS II RENEWABLE ENERGY COMPLIANCE IN 2010

RPS Class II was established in the Green Communities Act of 2008 with the purpose of providing incentives for the continued operation of pre-1998 renewable energy plants and Massachusetts waste energy plants. RPS Class II Renewable Energy is generated by the same resources and technologies as Class I, with two exceptions. First, hydroelectric plants in Class II are limited to 5 MW (vs. 25 MW in Class I). Second, biomass plants in Class II share the Class I "low emissions" criteria but omit the Class I "advanced technology" criteria. Because it is only pre-1998 plants that can qualify for Class II, the Minimum Standard (annual compliance percentage) does not rise over time.[41] That standard is 3.6% of total retail sales, as represented by GIS load obligations. (Note that an additional, separate standard of 3.5% applies to the Waste Energy subclass within RPS Class II, described in the next section.)

A major but temporary difference between RPS Class I and all of the new standards (RPS Class II and APS) is a transition mechanism mandated by law to mitigate the price impact of the standards for the Competitive Suppliers. Competitive Suppliers, unlike regulated utilities, are not able to pass the additional compliance costs along to retail customers with whom they were already contracted to deliver electricity at a price that did not include the purchase of the newly-required Class II RECs, WECs, and AECs. A Competitive Supplier, rather than having to comply with RPS Class II or APS for its entire retail load, must meet those standards only for the portion of its load that is served under contracts that were executed or extended on or after January 1, 2009. Accordingly, each Competitive Supplier was required to report in its Filing to DOER the quantity of electricity delivered under pre-2009 contracts (termed Exempt Load) and to subtract that amount from the total load reported for Class I, in order to ascertain the net amount on which to base its 3.6% RPS Class II Renewable Energy obligation. In addition, each Supplier was required to project its Exempt Load for the next five years, 2011-15; these data (for which DOER has promised confidentiality) are reported in Section Seven, Table Eight. This exemption declines rapidly, so that by 2016 all Suppliers will have to comply with RPS Class II and APS for nearly their entire total load obligations.

In 2010, the net (non-exempt) load for the Class II Renewable Energy obligation was 41,792,390 MWh, and the total of all 35 Suppliers' 3.6% Class II Renewable Energy obligations was 1,504,607 MWh. The Class II REC supply was very short of the demand. Only four small Competitive Suppliers met their full obligations by acquiring 644 Class II RECs and using 54 MWh banked from 2009 surplus (which provided them a net surplus of 63 RECs to bank forward). Ten other Suppliers acquired 103,193 Class II RECs, for a total of 103,837 RPS Class II RECs. Thirty-one Suppliers had a total shortfall of 1,400,117 RECs. The overall total of 103,837 RECs from 2010, plus 653 from 2009 surplus, minus 63 banked forward was 104,427 MWh for 2010 compliance, which amounted to only 7% of the total Class II Renewable Energy obligation, The remaining 1,400,117 MWh (93%) of the obligation was met by the Alternative Compliance mechanism, that is, by making ACPs to the MassCEC at the rate of $25 per MWh, totaling $35,002,925. These figures are displayed in Table Four, with more detail in Appendix Two, Table C, and in Appendix Three, Tables H and I.

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

Table Four
Aggregated Data from the RPS Class II Renewable Energy Compliance Filings, 2009-2010 (MWh)

	2010	2009
CY Retail Sales (load obligation)[42]	50,026,093	48,301,821
Exempt Load	8,233,703	31,918,771
Net Load	41,792,390	16,383,050
CY aggregated RPS II RE Obligation, at 3.6%[43]	1,504,544	589,801
Total Class II RECs from CY Generation	103,837	35,543
minus CY total surplus Class II RECs	63	653
Net CY RECs for CY Obligation	103,774	34,890
plus banked from pre-CY surpluses	653	0
Total Class II RECs used for CY Obligation	104,427	34,890
plus total ACP credits	1,400,117	554,911
Total for Compliance Obligation	1,504,544	589,801
Surplus Attributes banked forward[44]	63	653
ACP proceeds	$35,002,925	$13,872,775

The above facts indicate a significant shortage of qualified Class II Renewable Energy generation. 2010 began with only 13 MW of capacity from seven hydropower units and ended with 56 MW from 17 hydropower plants and four landfill methane plants. So far in 2011, an additional 17.5 MW have become qualified: 8.5 MW from three hydropower plants, 3 MW from two landfill plants, and 6 MW from one wind farm. In 2010, 93% of the Class II RECs came from pre-1998 hydropower generation, 7% from landfill methane electricity generation. DOER has 6.7 MW of capacity in the application pipeline at this time and expects still more for 2011. However, with insufficient qualifying generators and a declining exempt load, DOER expects another substantial shortfall for 2011, which is a matter to be further reviewed and analyzed by DOER.

SECTION FIVE

RPS CLASS II WASTE ENERGY COMPLIANCE IN 2010

RPS Class II Waste Energy is a separate sub-class within RPS Class II. This means that each Supplier must comply separately with both the Renewable Energy subclass and the Waste Energy subclass. Qualification is limited to plants that meet the Massachusetts Department of Environmental Protection regulations for such facilities.[45] The MassDEP regulations, in addition to provisions for municipal solid waste handling, emissions, etc., provide for enhanced sorting and recycling and for the

[42] This figure is the same as the Class I figure in Table Two.

[43] See footnote 28 regarding the difference between totaling individual obligations and calculating an overall obligation.

[44] Any surplus RPS Class II Attributes (measured as quantities of qualified surplus RECs) beyond the 30% banking limit can be applied to compliance only with the RPS Class II Renewable Energy obligation, not any other portfolio standard. See footnote 20 regarding the 30% limit.

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

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

In 2010, the net load for the Class II Waste Energy obligation was 41,792,390, and the total of the 35 Suppliers' Class II Waste Energy obligations of 3.5% was 1,462,750 MWh. To comply with that obligation, the Suppliers acquired 1,378,219 WECs, which, combined with the use of 330,288 Attributes banked from 2009 surplus WECs, yielded a surplus of 251,544 WECs, of which 237,667 were eligible to bank towards Class II Waste Energy compliance over the next two Compliance Years. The surplus notwithstanding, five very small Suppliers acquired no WECs, while one large Supplier and one very small one failed to purchase enough WECs. Those seven Suppliers met their total shortfall of 5,797 WECs by making ACPs to the MassCEC at the ACP rate of $10 per MWh, for total payments of $57,970. These figures are displayed in Table Five, with more detail in Appendix Two, Table D.

The continued surplus in 2010 was due to the large, albeit declining, Exempt Load mandated in the Green Communities Act and discussed above in the second paragraph of Section Four. In fact, about 369 GWh of WECs went unsold to Suppliers for that reason. As the Exempt Load declines sharply over the next five years, the net load and, thereby, the demand for WECs will rise, which should bring supply and demand into a rough parity.

Table Five
Aggregated Data from the RPS Class II Waste Energy Compliance Filings, 2009-2010 (MWh)

	2010	2009
CY Retail Sales (load obligation) [46]	50,026,093	48,301,820
Exempt Load	8,233,703	31,891,115
Net Load	41,792,390	16,410,706
CY aggregated RPS II WE Obligation, at 3.5% [47]	1,462,750	574,384
Total WECs from CY Generation	1,378,219	1,046,833
minus CY total surplus WECs	251,554	473,177
Net CY WECs for CY Obligation	1,126,665	573,656
plus banked from pre-CY surpluses	330,288	0
Total WECs used for CY Obligation	1,456,953	573,656
plus total ACP credits	5,797	728
Total for Compliance Obligation	1,462,750	574,384
Surplus WE Attributes banked forward [48]	237,667	330,288
ACP proceeds (rounded)	$57,970	$7,280

[46] This figure is the same as the Class I figure in Table Two.

[47] See footnote 28 regarding the difference between totaling individual obligations and calculating an overall obligation.

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

SECTION SIX

APS ALTERNATIVE ENERGY COMPLIANCE IN 2010[49]

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

In 2010, the net (non-Exempt) load for the APS obligation was 41,792,390 MWh, for which the 35 Suppliers' 1.5% APS obligations totaled 626,902 MWh. To comply with that obligation, 18 of the 35 Suppliers purchased 227,134 AECs, while 17 purchased none. A shortfall of 391,470 AECs by twenty-eight Suppliers was met by making ACPs to the MassCEC at the rate of $20 per MWh. The payments totaled $7,829,400. While the total supply of AECs was short, 5 Suppliers acquired a surplus totaling 520 AECs, of which 515 AECs were banked towards APS compliance over the next two Compliance Years. Of the 227,134 AECs, 99.1% came from CHP plants, while only 0.9% came from flywheel storage units. These figures are displayed in Table Six; more detail is in Appendix Two, Table E, and in Appendix Three, Table J.

Table Six

Aggregated Data from the APS Compliance Filings, 2009-2010 (MWh)

	2010	2009
CY Retail Sales (load obligation)[50]	50,026,093	48,301,821
Exempt Load[51]	8,233,703	31,918,771
Net Load	41,792,390	16,383,050
CY calculated APS AEC Obligation (1.0% in 2009, 1.5% in 2010)[52]	626,902	163,844
Total AECs from CY Generation	227,134	129,925
minus CY total surplus AECs	520	10,600
Net CY AECs for CY Obligation	226,614	119,325
plus banked from pre-CY surpluses	8,818	0
Total AECs used for CY Obligation	235,432	119,325
plus total ACP credits	391,470	44,519
Total for Compliance Obligation	626,902	163,844
Surplus Alternative Energy Attributes banked forward	515	8,838
ACP proceeds	$7,829,400	$890,380

[49] See Section One, page 6, for a description of the APS and an explanation of how AECs are determined for CHP plants.

[50] This figure is the same as the Class I figure in Table Two.

[51] See Section Three for an explanation of Exempt and Net Load.

[52] See footnote 28 regarding the difference between totaling individual obligations and calculating an overall obligation.

SECTION SEVEN

PROJECTION OF FUTURE RPS AND APS COMPLIANCE OBLIGATIONS AND SUPPLY

DOER provides here one possible scenario for the future RPS and APS compliance obligations through 2016. This scenario is based on the ISO-NE reference case for load growth in the 2011 CELT Report,[53] following the approach of the RPS Annual Compliance Report for 2009, and differs from the scenario presented in the RPS Annual Compliance Reports for 2007 and 2008, wherein the scenarios had been adjusted to account for the mandates for energy efficiency under the Green Communities Act of 2008. Any scenario is determined by one's choice of assumptions, which can be subject to substantial uncertainty. For example, important variables affecting load include: (a) temperature and weather, (b) national and regional economic conditions, (c) the degree of success in implementing energy efficiency programs, and (d) the degree of electric vehicle penetration into the market. In general, presenting a single scenario offers simplicity but misrepresents the degree of uncertainty in these variables. Rather than developing multiple load scenarios, which is outside the scope of this report, DOER chose to base its RPS reference case on the ISO-NE 2011 reference case. Other analysts can easily replace the ISO-NE reference case with other ISO-NE scenarios or alternative scenarios altogether to see the affect of various assumptions on the RPS obligation.

Table Seven lists both the actual (2003-10) and projected (2011-2016) total retail sales – as load obligation[54] – and the resulting actual and projected RPS Class I obligation. The RPS Class I minimum percentage obligations increase as specified in the statute and regulations.[55] This table provides figures only through 2016, although the annually increasing RPS Class I obligation continues indefinitely.

Figure Six shows DOER's projection for the growth in demand for RECs by the "premium" RPS mandates of the five New England states that have similar, albeit not identical, mandates for new renewable energy generation. Those mandates consist of the CT RPS Class I, the ME RPS, the NH RPS Classes I and II, and the mandate for new facilities in the RI Renewable Energy Standard.[56] All figures are based on ISO-NE load growth projections from the 2011 CELT Report.[57]

Table Eight lists the 2009 and 2010 actual load obligations for the recently commenced RPS Class II and APS, and load obligations projected for 2011 through 2016 (although, like Class I, the standards continue beyond that date). The total load obligation for each year is listed first and is identical to the figures in Table Six. However, since, as explained in Section Three, electricity sold under pre-2009 contracts is exempt from these standards, the projected Exempt Load provided by Suppliers is then deducted to yield a net load obligation. Then the net load for each year is multiplied by the mandated percentage standard. That standard does not rise for Class II, since that is for qualified pre-1998 plants, but it does rise for APS.

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[53] The ISO-NE figures are from Tab 2, column R in the 2011 CELT Report at http://iso-ne.com/trans/celt/fsct_detail/2011/isone_fcst_data_2011.xls.

[54] See explanation and reference in footnote 29 regarding the use of "load obligation" for "retail sales."

[55] The minimum percentages for RPS compliance are in the regulations at 225 CMR 14.07(1).

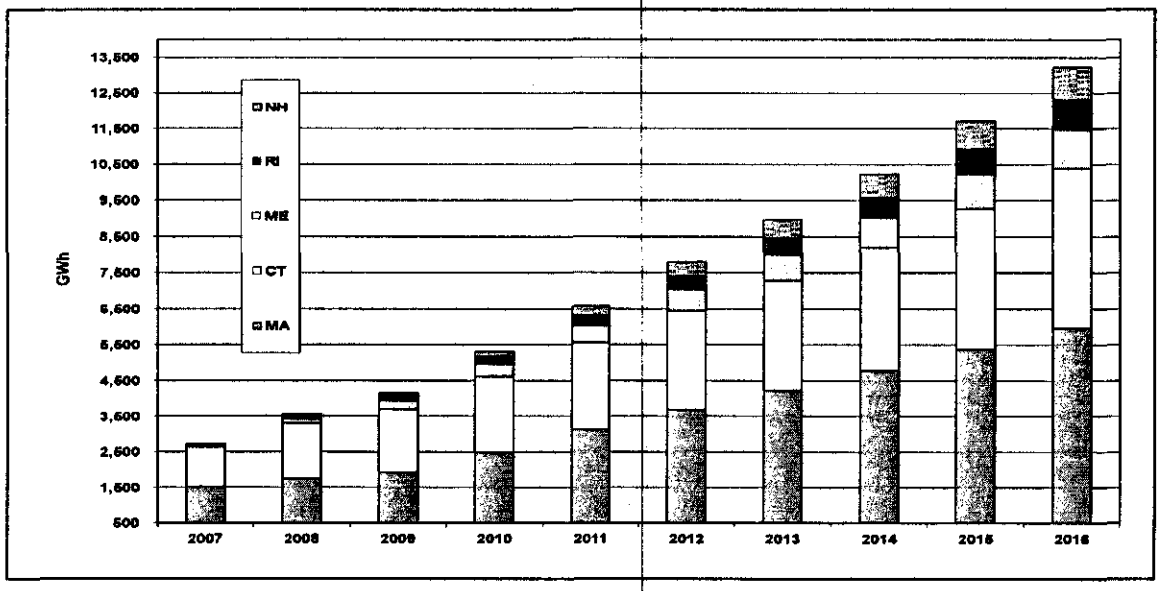
[56] Details on the other programs are available via http://www.dsireusa.org/incentives/index.cfm?SearchType=RPS&&EE=0&RE=1.

[57] See footnote 53 for the ISO-NE figures.

Table Seven
MA RPS Class I Annual Compliance Obligations, Actual (2003-2010) & Projected (2011-2016)[58]

Year	Actual/*Projected* Load Obligation, MWh[59]	RPS Class I % Obligation	RPS Class I MWh Obligation[60]	Solar Carve-Out % Obligation
2003	49,834,324	1.0%	498,343	
2004	50,063,092	1.5%	750,954	
2005	51,558,778	2.0%	1,031,176	
2006	50,143,130	2.5%	1,253,578	
2007	50,978,101	3.0%	1,529,343	
2008	50,321,635	3.5%	1,761,257	
2009	48,301,821	4.0%	1,932,089	
2010	**50,026,093**	**5.0%**	**2,501,305**	**0.0679%**
2011	*50,126,145*	6.0%	*3,007,569*	0.1627%
2012	*50,677,533*	7.0%	*3,547,427*	0.1630%
2013	*50,728,210*	8.0%	*4,058,257*	TBD
2014	*51,134,036*	9.0%	*4,602,063*	TBD
2015	*51,645,376*	10.0%	*5,164,538*	TBD
2016	*52,161,830*	11.0%	*5,737,801*	TBD

Figure Six
New England Premium RPS Compliance Obligations by State, Actual (2003-2010) & Projected (2011-2016)



[58] The actual figures for 2003 through 2010 are from RPS annual compliance filings. The projections starting in 2011 are from the ISO-NE load growth projections in its 2011 CELT Report (see footnote 53), with the portion of the Massachusetts load attributable to the municipally owned companies netted out. In this table, the Solar Carve-Out annual obligation is not deducted from the Class I obligation (from 2010 onward), although it is deducted for compliance purposes.

[59] See explanation and reference in footnote 5 regarding the use of "load obligation" for "retail sales."

[60] Actual total obligation is the sum of individual obligations, which may be larger than the calculation of an overall RPS obligation from total sales (as GIS load). The figures through 2010 are the former; the projected obligations are the latter.

Table Eight

MA RPS Class II & APS Annual Compliance Obligations, Net of Exempt Load, Actual (2009-2010) & *Projected (2011-2016)*

(Obligations as MWh)

Year	Actual/ *Projected* Load Obligation[61]	Actual/ *Projected* Exempt Load Obligation[62]	Actual/ *Projected* Net Load Obligation	RPS Class II RECs at 3.6% of Net Load Obligation	RPS Class II WECs at 3.5% of Net Load Obligation	APS Minimum Standard	APS AECs per % of Net Load Obligation
2009[63]	48,301,821	31,918,771	16,383,050	589,801	574,368	1.0%	163,844
2010[64]	**50,026,093**	**8,233,703**	**41,792,391**	**1,504,526**	**1,462,734**	**1.50%**	**626,886**
2011	*50,126,145*	*7,512,556*	*42,613,589*	*1,534,089*	*1,491,476*	2.00%	*852,272*
2012	*50,677,533*	*3,931,877*	*46,745,656*	*1,682,844*	*1,636,098*	2.50%	*1,168,641*
2013	*50,728,210*	*2,049,922*	*48,678,288*	*1,752,418*	*1,703,740*	3.00%	*1,460,349*
2014	*51,134,036*	*518,482*	*50,615,554*	*1,822,160*	*1,771,544*	3.50%	*1,771,544*
2015	*51,645,376*	*99,465*	*51,545,911*	*1,855,653*	*1,804,107*	3.75%	*1,932,972*
2016	*52,161,830*	*TBD*	*52,161,830*	*1,877,826*	*1,825,664*	4.00%	*2,086,473*

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

Although the pending regulatory changes in the RPS Class I eligibility of woody biomass fueled plants (expected to be promulgated early in 2012) will end the current moratorium on biomass project qualifications, those changes are expected to add to significant constraints on the development of new biomass projects and to redirect development activities to smaller CHP applications. Meanwhile, although the new standards will not apply to already qualified plants until after a date to be stated in the final version of the revised regulation, several of the qualified "merchant" plants in northern New

[61] The Load Obligation projections here are the same those for RPS Class I in Table Seven. See explanation and reference in footnote 5 regarding the use of "load obligation" for "retail sales."

[62] DOER did not request 2016 exempt load obligation figures from the Filers but assumes that the figure will be at or approaching zero by then, as contracts continue to expire. DOER made the same assumption for 2015 in the report for 2009, but the actual figure for 2015 did not, in fact, reach zero.

[63] Each of the 2009 REC, WEC, and AEC obligations is the total of 28 individual obligations and, due to consistent upward rounding, is greater than the result of multiplying the total load obligation by the Minimum Standard.

[64] Each of the 2010 REC, WEC, and AEC obligations is the total of 35 individual obligations and, due to consistent upward rounding, is greater than the result of multiplying the total load obligation by the Minimum Standard.

England have ceased operation or reduced output – due to the decline in electricity prices derived from lower natural gas prices and reduced electricity demand during the recession, as well as higher feedstock supply costs derived from higher costs for diesel fuel to harvest and transport that supply.

Finally, although the relatively low price for Class I RECs – as low as $10-15 per REC – has had a dampening effect on new project development during the last year or two, the price for 2011 RECs increased to around $30 during the first quarter of REC trading, July 15 - September 15, 2011. Among the possible reasons for this price increase may be the reduced supply of biomass RECs discussed in the previous paragraph and the reduced supply of RECs from qualified projects in New York State, where in-state RPS demand has increased. If the Class I REC price continues to increase, that could, in turn, provide incentives for new development, increased production at qualified, existing biomass plants, and increased imports from adjacent control areas.

The Solar Carve-out is new and, like the original RPS in its early years, has exhibited a shortage of generation as the project development process has taken time. The development curve has moved sharply upward since 2010. In fact, during the first quarter of 2011, the reported SREC-qualified production was already 2,358 MWh, nearly matching the 2,738 MWh produced in all of 2010, and the second quarter production was 7,141 MWh, more than three times the Q1 output, bringing the total to 9,499 MWh for the first half of the year. According to DOER's projection from August of 2011, another 19,557 MWh should be generated through the end of 2011.

Although the 2011 supply of SRECs is projected to be short in relation to demand, it continues to accelerate. Given that fact, combined with the Minimum Standard and other adjustments provided in the Regulations, DOER anticipates an eventual approach to parity. If supply exceeds demand, those same adjustment mechanisms are designed to trigger an upward turn in the Minimum Standard, which would increase demand and reduce or eliminate surpluses, thus restoring the supply and demand balance.

With regard to Class II RECs, the pre-1998 installed capacity cannot rise, so the unknown factor is how much of that capacity potentially can qualify for Class II and can be brought into the program over the months ahead. This is a matter under review within DOER. In any case, Class II REC shortfalls are anticipated to continue for Compliance Year 2011.

Class II WECs are likely to remain in surplus for several more years, while the net load obligation rises to the desired point of rough parity.

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

SECTION EIGHT

USES OF THE ALTERNATIVE COMPLIANCE PAYMENT FUNDS

The Alternative Compliance mechanism for meeting RPS and APS obligations in CY 2010 resulted in total ACP proceeds of $54.8 million, as detailed in Table Nine. This was a substantial increase compared to the ACP total for 2009. The large ACP increases from 2009 to 2010 were attributable to the following:

- For RPS Class II Renewable Generation, a significant reduction in the quantity of "exempt load" – that is, load served under retail contracts executed prior to 2009 – as

such contracts expired (explained in the second paragraph of Section Four of this report), as well as a continued substantial shortage in Class II-qualified generation, largely due to technical and financial issues for biomass-fired plants.

- For the RPS Class I Solar-Carve Out obligation, the commencement of this obligation in 2010 and the concomitant delay of supply emerging from the project development pipeline.
- For APS, a decreased non-exempt retail load subject to the obligation (noted above for Class II), an increase in the obligation from 1% to 1.5%, and a delay in supply emerging from the project development pipeline of this relatively new program.

Table Nine
ACP Proceeds per Portfolio Standard, 2010

Program/Class	ACP Received ($)
RPS Class I	241,551
RPS Class I Solar Carve-Out	11,682,793
RPS Class II Renewable Energy	35,002,925
RPS Class II Waste Energy	57,970
APS (Alternative Energy)	7,829,400
Total[65]	**$54,814,638**

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

DOER is developing and soon will publish a plan for expenditure of the substantial funds from Alternative Compliance with the 2010 RPS and APS obligations.

[65] This total is correct. It appears to be one dollar short because the other figures are all rounded.

APPENDIX ONE

RPS and APS 2010 Compliance Filings, Review, and Verification

All Suppliers that sold retail electricity to end-use customers in the territories of the four Massachusetts regulated utilities during 2010 were required to submit their Annual Compliance Filings for 2010 by July 1, 2011. DOER issued forms and instructions for the Filings on May 27th, eighteen days before the end of the NEPOOL GIS trading period for the fourth quarter of 2010. By July 1st DOER had received Filings from all four regulated utilities and from 32 of the 35 Competitive Suppliers. Of the remaining three, Consolidated Edison Solutions filed on July 13th, Easy Energy of Massachusetts on July 15th, and Horizon Power & Light, LLC, on August 5th. Only Horizon merits any further account, which is provided below.

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

Although almost all Filings continued to show improvement over the previous years, some Competitive Suppliers *still* did not correctly assign "load" in their GIS sub-accounts. Therefore, in order to verify the figures provided in their Filings, DOER has continued to rely on data submitted on a confidential basis by the regulated utilities.

Benefiting from improved staffing and sophisticated data management, most of the 2010 Filings – with exceptions noted above – were submitted, reviewed, supplemented, corrected, clarified, and accepted smoothly. DOER is now considering methods of adding further efficiencies.

Non-compliance by Horizon Power and Light, LLC, July 2 to October 14, 2011[1]

Horizon informed DOER in May 2011 of its withdrawal as a Competitive Supplier and asked to be forgiven its 2010 obligations. On June 3rd, DOER informed Horizon that it could not do so. Horizon failed to submit an Annual Compliance Filing on July 1st. Meanwhile, the Filing from REP Energy, LLC, along with data from National Grid and NSTAR, in whose franchise territories both REP and Horizon had retail sales, showed that Horizon had transferred its customers to REP as of the fourth quarter of 2010 (for which quarter REP documented its compliance). DOER required in letters dated July 15 and July 22, 2011, to Neil Leibman, CEO, and Rod Danielson, President of both Horizon and REP, that the Filing, including the required documentation, be submitted by August 5, 2011; DOER also questioned Horizon's relationship with REP. The Filing was received electronically on that date, by mail on August 8th. However, the Filing did not include the required documentation of the Attributes required for compliance in the first three quarters of 2010. Horizon subsequently provided documentation of August 12th Alternative Compliance Payments (ACPs) for its RPS Solar Carve-Out, RPS Class II, and APS obligations, but not for its Class I obligations.

On August 25th, DOER sent Horizon a formal Notice of Non-Compliance for RPS Class I, effective as of July 2nd, based on its failure to meet the Minimum Standard, and posted that Notice on the DOER website. DOER set a final deadline of October 14th for Horizon to document that it had made an ACP sufficient to meet its 1,352 MWh of compliance shortfall – failing which DOER would recommend to the MA DPU that it re-consider its having granted a Competitive Supplier license to REP, which is managed by the same principals and serves the same retail customers as Horizon, in light of the actions of Horizon regarding its 2010 RPS obligations. Horizon subsequently met that deadline by remitting to the MassCEC four payments, totaling $82,377.36, which provided the required 1,352 MWh of Alternative Compliance Credits. Accordingly, the state of Non-Compliance ended on October 14, 2011.

[1] This information is provided pursuant to the provisions in 225 CMR 14.12(2), which includes publication of any Notice of Non-compliance at the DOER website and in any other medium DOER deems appropriate.

APPENDIX TWO[2]
2010 RPS and APS Compliance Summaries

Table A: RPS Class I Compliance Summary, 2010

	RETAIL SALES	CLASS I RENEWABLE GENERATION ATTRIBUTES					CY 2010 4.9321% RPS CLASS I OBLIGATION	BANKING FOR FUTURE COMPLIANCE		
RETAIL ELECTRICITY SUPPLIERS	Load Obligation from Filing	2010 MA Class I RECs	2008 Banked Attributes	2009 Banked Attributes	Alternative Compliance Credits	Total RPS Class I Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
DISTRIBUTION COMPANIES										
Fitchburg Gas & Elec.	266,915	11,100	0	2,077	0	13,177	13,164	13	3,950	13
National Grid	12,374,394	562,836	0	77,315	0	640,151	610,317	29,834	183,096	29,834
NSTAR	9,415,844	495,456	0	108,264	0	603,720	464,399	139,321	139,320	139,320
W Mass Electric (NU)	1,940,069	93,114	0	0	2,572	95,686	95,686	0	28,706	0
SUBTOTALS	23,997,222	1,162,506	0	187,656	2,572	1,352,734	1,183,566	169,168	355,072	169,167
COMPETITIVE SUPPLIERS										
Cianbro Energy										
Consolid. Edison Solutions										
Constellation NewEnergy										
Devonshire Energy										
Direct Energy Business										
Direct Energy Services										
Dominion Retail										
East Avenue Energy										
Easy Energy of Mass.										
GDF Suez Energy Resources										
Glacial Energy of NE										
Hampshire Council of Gov'ts										
Hannaford Energy										
Harvard Dedicated Energy										
Hess Corporation										
Horizon Power & Light										
Hudson Energy Services										
Integrys Energy Services										
Just Energy Mass.										
Liberty Power Holdings										
MXenergy Electric										
NextEra Energy										
Noble Americas En. Sols.										
Pepco Energy Services										
Public Power										
REP Energy										
Sempra Energy Solutions										
South Jersey Energy										
Spark Energy										
TransCanada Power Mktg										
WFM Intermediary NE										
SUBTOTALS	26,028,871	1,161,103	24,338	168,830	1,393	1,355,664	1,283,770	71,894	385,143	71,894
TOTALS	50,026,093	2,323,609	24,338	356,486	3,965	2,708,398	2,467,336	241,062	740,215	241,061
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh

[2] 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 Regulation, 225 CMR 14.09(2)(b). Data for the regulated distribution utility companies is made public in filings at the MA Department of Public Utilities. All five tables have the same Competitive Suppliers, but they are listed only in the first table. See Table One for the complete names of the Suppliers.

Table B
RPS Solar Carve-Out Renewable Energy Compliance Summary, 2010

	Retail Sales	Solar Carve-Out Renewable Generation Attributes					CY 2010 0.0679% RPS SCO Obligation	Banking for Future Compliance		
RETAIL ELECTRICITY SUPPLIERS	Load Obligation from Filing	2010 MA SRECs	2008 Banked Attributes	2009 Banked Attributes	Alternative Compliance Credits	Total RPS SCO Attributes		Excess Attributes	Banking Limit (10%)	Banked Attributes
Distribution Companies										
Fitchburg Gas & Electric (Unitil)	266,915	181			1	182	182	0	19	0
National Grid	12,374,394	717			7,686	8,403	8,403	0	841	0
NSTAR	9,415,844	540			5,854	6,394	6,394	0	640	0
W Mass Electric	1,940,069	421			897	1,318	1,318	0	132	0
SUBTOTALS	**23,997,222**	**1,859**			**14,438**	**16,297**	**16,297**	**0**	**1,632**	**0**
Competitive Suppliers										
SUBTOTALS	**26,028,871**	**879**			**16,812**	**17,691**	**17,691**	**0**	**1,786**	**0**
TOTALS	**50,026,093**	**2,738**			**31,250**	**33,988**	**33,988**	**0**	**3,418**	**0**
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh

Table C
RPS Class II Renewable Energy Compliance Summary, 2010

	Retail Sales			Class II Renewable Energy Attributes					3.6% RPS Class II RE Obligation	Banking for Future Compliance		
RETAIL ELECTRICITY SUPPLIERS	Load Obligation from Filing	Exempt Retail Load	Net Retail Load	2010 MA Class II RECs	2008 Banked Attributes	2009 Banked Attributes	Alternative Compliance Credits	Total RPS Class II RE Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
Distribution Companies												
Fitchburg Gas & Elec.	266,915	0	266,915	3,433		0	6,176	9,609	9,609	0	2,883	0
National Grid	12,374,394	0	12,374,394	54,059		0	391,420	445,479	445,479	0	133,644	0
NSTAR	9,415,844	0	9,415,844	18,706		0	320,265	338,971	338,971	0	101,692	0
W Mass Electric	1,940,069	0	1,940,069	1,526		0	68,317	69,843	69,843	0	20,953	0
SUB-TOTALS	**23,997,222**	**0**	**23,997,222**	**77,724**		**0**	**786,178**	**863,902**	**863,902**	**0**	**259,172**	**0**
Competitive Suppliers												
SUB-TOTALS	**26,028,871**	**8,233,703**	**17,795,168**	**26,113**		**653**	**613,939**	**640,705**	**640,642**	**63**	**192,205**	**63**
TOTALS	**50,026,093**	**8,233,703**	**41,792,390**	**103,837**		**653**	**1,400,117**	**1,504,607**	**1,504,544**	**63**	**451,377**	**63**
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh

Table D
RPS Class II Waste Energy Compliance Summary, 2010

	Retail Sales			Class II Waste Energy Attributes					3.5% RPS Class II WE Obligation	Banking for Future Compliance		
RETAIL ELECTRI-CITY SUPPLI-ERS	Load Obligation from Filing	Exempt Retail Load	Net Retail Load	2010 MA Class II WECs	2008 Banked Attributes	2009 Banked Attributes	Alternative Compliance Credits	Total RPS Class II WE Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
Distribution Companies												
Fitchburg Gas & Elec.	266,915	0	266,915	9,100		257	0	9,357	9,343	14	2,803	14
National Grid	12,374,394	0	12,374,394	211,145		267,095	0	478,240	433,104	45,136	129,932	45,136
NSTAR	9,415,844	0	9,415,844	398,021		30,401	0	428,422	329,555	98,867	98,867	98,867
W Mass Electric	1,940,069	0	1,940,069	67,907		0	0	67,907	67,903	4	20,371	4
SUB-TOTALS	**23,997,222**	**0**	**23,997,222**	**686,173**		**297,753**	**0**	**983,926**	**839,905**	**144,021**	**251,973**	**144,021**
Competitive Suppliers												
SUB-TOTALS	**26,028,871**	**8,233,703**	**17,795,168**	**692,046**		**32,535**	**5,797**	**730,378**	**622,845**	**107,533**	**186,866**	**93,646**
TOTALS	**50,026,093**	**8,233,703**	**41,792,390**	**1,378,219**		**330,288**	**5,797**	**1,714,304**	**1,462,750**	**251,554**	**438,839**	**237,667**
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh

Table E
APS Alternative Energy Compliance Summary, 2010

	Retail Sales			APS Alternative Energy Attributes					1.5% APS Obligation	Banking for Future Compliance		
RETAIL ELECTRI-CITY SUPPLI-ERS	Load Obligation from Filing	Exempt Retail Load	Net Retail Load	2010 APS AECs	2008 Banked Attributes	2009 Banked Attributes	Alternative Compliance Credits	Total APS Attributes		Excess Attributes	Banking Limit (30%)	Banked Attributes
Distribution Companies												
Fitchburg Gas & Elec.	266,915	0	266,915	0		279	3,725	4,004	4,004	0	1,202	0
National Grid	12,374,394	0	12,374,394	90,000		0	95,616	185,616	185,616	0	55,685	0
NSTAR	9,415,844	0	9,415,844	74,188		1,046	66,004	141,238	141,238	0	42,372	0
W Mass Electric	1,940,069	0	1,940,069	1,416		0	27,686	29,102	29,102	0	8,731	0
SUB-TOTALS	**23,997,222**	**0**	**23,997,222**	**165,604**		**1,325**	**193,031**	**359,960**	**359,960**	**0**	**107,990**	**0**
Competitive Suppliers												
SUB-TOTALS	**26,028,871**	**8,233,703**	**17,795,168**	**61,530**		**7,493**	**198,439**	**267,462**	**266,942**	**520**	**80,098**	**515**
TOTALS	**50,026,093**	**8,233,703**	**41,792,390**	**227,134**		**8,818**	**391,470**	**627,422**	**626,902**	**520**	**188,088**	**515**
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh

APPENDIX THREE

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

The first two tables below provide the data from which the graphs in Figures Two through Five were generated.

Table F
RPS Class I Compliance by Generation Location, 2003-2010

Year / Location	2003 MWh	2004 MWh	2005 MWh	2006 MWh	2007 MWh	2008 MWh	2009 MWh	2010 MWh	2010 %
Massachusetts	108,106	146,228	157,022	184,777	192,200	197,949	197,530	**197,748**	**8.5%**
Connecticut	15,209	13,810	14,353	13,204	10,180	25,333	21,371	**20,146**	**0.9%**
Maine	122,958	142,715	285,289	367,298	520,821	500,479	526,906	**760,476**	**32.7%**
New Hampshire	42,845	45,800	40,677	53,556	265,062	261,468	307,909	**282,308**	**12.1%**
Rhode Island	15,117	26,521	42,659	62,230	42,562	34,848	26,061	**1,182**	**0.1%**
Vermont	0	0	14,476	26,595	46,915	49,207	112,670	**108,849**	**4.7%**
Northern Maine ISA (NMISA)	0	0	0	455	54,079	66,418	66,071	**89,405**	**3.8%**
New York	0	26,369	90,373	175,961	265,299	517,427	527,751	**580,683**	**25.0%**
Prince Edward Island	0	0	0	0	16,922	28,111	113,282	**144,549**	**6.2%**
Quebec	0	0	0	54,696	85,493	215,835	230,367	**138,263**	**6.0%**
Total	**304,235**	**401,443**	**644,849**	**938,772**	**1,599,533**	**1,896,811**	**2,129,918**	**2,323,609**	**100%**

Table G
RPS Class I Compliance by Generation Type, 2003-2010

Year / Type	2003 MWh	2004 MWh	2005 MWh	2006 MWh	2007 MWh	2008 MWh	2009 MWh	2010 MWh	2010 %
Anaerobic Digester	24,571	20,662	23,710	27,115	27,511	26,328	28,204	**24,292**	**1.0%**
[other] Biomass[68]	108,106	146,228	285,289	395,856	782,315	743,882	571,757	**584,505**	**25.2%**
Hydroelectricity	0	0	0	0	0	0	47,490	**80,823**	**3.5%**
Landfill Gas	171,025	230,553	335,151	449,633	486,558	660,937	690,851	**736,298**	**31.7%**
Solar	0	0	6	216	803	1,799	2,420	**4,116**	**0.2%**
Wind	533	4,000	693	65,952	302,346	463,865	789,196	**893,575**	**38.5%**
Totals	**304,235**	**401,443**	**644,849**	**938,772**	**1,599,533**	**1,896,811**	**2,129,918**	**2,323,609**	**100.0%**

[68] Note that the Massachusetts RPS statute and regulations include "biogas", which is the product of anaerobic digestion of non-fossil-derived organic fuels, within the list of Eligible Biomass Fuels. However, DOER has been tracking anaerobic digester generation separately since the beginning of the program. Landfill gas, which is included within "biomass" in some state RPS programs, is listed separately from biomass in the Massachusetts RPS statute and regulations.

No table is provided for the RPS Solar Carve-Out because all of the qualified units are of the same type (PV), and all are located in Massachusetts.

Table H
RPS Class II Renewable Energy Compliance by Generation Location, 2009-2010

Year / Location	2009 MWh	2010 MWh	2010 %
Massachusetts	483	14,711	14.2%
Connecticut	805	2,378	2.3%
Maine	0	18,605	17.9%
New Hampshire	33,514	29,369	28.3%
Rhode Island	741	3,040	2.9%
Vermont	0	28,837	27.8%
New York	0	6,897	6.6%
Total	35,543	103,837	100.0%

Table I
RPS Class II Renewable Energy Compliance by Generation Type, 2009-2010

Year / Type	2009 MWh	2010 MWh	2010 %
Hydropower	35,543	96,552	93.0%
Landfill Methane	0	7,285	7.0%
Totals	35,543	103,837	100.0%

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

Table J
APS Compliance by Generation Type, 2009-2010
(all Massachusetts in 2010)

Year / Type	2009 MWh	2010 MWh	2010 %
Combined Heat & Power	128,922	225,104	99.1%
Flywheel Storage	1,003	2,030	0.9%
Totals	129,925	227,134	100.0%

No table is provided for APS Generation Location because all of the qualified units in 2010 were in Massachusetts.

APPENDIX FOUR

MA RPS and APS Qualified Generation Units

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

SIXTH EDITION

ECONOMICS

PRINCIPLES AND POLICY

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point yields a price of $7—well above the minimum price at which some input supply would be forthcoming. The difference must constitute a rent to the input suppliers, who get paid more than the minimum amount required to induce them to work.

Almost all employees earn some rent. What sorts of factors earn no rent? Those that can be exactly reproduced by a number of producers at constant cost. No supplier of ball bearings will ever receive any rent on a ball bearing, at least in the long run, because any desired number of them can be produced at (roughly) constant costs—say 50 cents each. If one supplier tried to charge a price above 50 cents, another manufacturer would undercut the first supplier and take its customers away. Hence the competitive price will include no rent.

RENT CONTROLS: THE MISPLACED ANALOGY

Why is the analysis of economic rent important? Because only economic rent can be taxed away without reducing the quantity of the input supplied. And here common English gets in the way of sound reasoning. Many people feel that the *rent* that they pay to their landlord is economic rent. After all, their apartments will still be there if they pay $500 per month, or $300, or $100. This view, while true in the short run, is quite myopic.

ECONOMIC RENT is the portion of the earnings of a factor of production that exceeds the minimum amount necessary to induce any of that factor to be supplied.

Like the ball-bearing producer, the owner of a building cannot expect to earn *economic* rent because there are too many other potential owners whose costs of construction are roughly the same as her own. If the market price temporarily included some economic rent—that is, if price exceeded production costs plus the opportunity cost of the required capital—other builders would start new construction that would drive the price down. Thus, far from being in perfectly *inelastic* (vertical) supply, like raw land, buildings come rather close to being in perfectly *elastic* (horizontal) supply, like ball bearings. As we have learned from the theory of rent, this means that builders and owners of buildings cannot collect economic rent in the long run.

Since apartment owners collect very little economic rent, the payments that tenants make in a free market must be just enough to keep those apartments on the market. (This is the definition of zero economic rent.) If rent controls push these prices down, the apartments will start disappearing from the market.[4] Among other unfortunate results, we can therefore expect rent controls to contribute to the problem of homelessness—though it is, of course, not the only factor behind this distressing phenomenon.

ISSUE: ARE PROFITS TOO HIGH OR TOO LOW?

This completes our analysis of rent. We turn next to business profits, a subject whose discussion seems to elicit more passion than logic. With the exception of

[4]None of this is meant to imply that temporary rent controls in certain locations cannot have salutary effects in the short run. In the short run, the supply of apartments and houses really is fixed, and large shifts in demand would hand windfall gains to landlords—gains that are true economic rents. Controls that eliminate such windfalls should not cause serious problems. But knowing when the "short run" fades into the "long run" can be a tricky matter. "Temporary" rent control laws have a way of becoming rather permanent.

Economic rent

From Wikipedia, the free encyclopedia

In economics, **Economic rent** typically describes the difference between the amount paid for the *inputs* to a production process and the amount that would be paid for those *inputs* assuming a unitary (or greater) elasticity of supply.[1]

Economic rent (which in production analysis is always seen as a cost of *inputs*) is affected by *any* production only minimally, if at all. Economic rent is a fact of natural or contrived exclusivity. For labor, economic rent could be created by the existence of guilds or labor unions (e.g. higher pay for workers, where political action creates a scarcity of such workers); for a produced commodity, economic rent may also be due to the legal ownership of a patent (a politically enforced right to the use of a process or ingredient); for operating licenses, it is the cost of permits and licenses that are politically controlled as to their number of licenses regardless of competence and willingness of those who wish to compete in the area being licensed; for most other production including agriculture, economic rent is due to natural scarcity. When economic rent is privatized, the recipient of economic rent is referred to as a **rentier**.

By contrast, if there is no exclusivity and there is perfect competition, there are no economic rents, as competition drives prices down to their floor.[2][3] Economic rent is different from other unearned and passive income, including contract rent. This distinction has important implications for public revenue and tax policy.[4] [5][6] As long as there is sufficient accounting profit, governments can collect a portion of economic rent for the purpose of public finance. For example, economic rent can be collected by a government as royalties or extraction fees in the case of resources such as minerals and oil and gas. Historically, theories of rent have always applied to rent received by different factor owners within a single economy. Hossein Mahdavy was the first to introduce the concept of "External Rent" whereby one economy received rent from other economies.[7]

Contents

Definitions

According to Robert Tollison (1982), economic rents are "excess returns" above "normal levels" that take place in competitive markets. More specifically, it is "a return in excess of the resource owner's opportunity cost".[8]

Henry George, best known for his proposal for a single tax on land, defined *rent* as "the part of the produce that accrues to the owners of land (or other natural capabilities) by virtue of ownership" and as "the share of wealth given to landowners because they have an exclusive right to the use of those natural capabilities."[9]

Professors of law Lucian Bebchuk and Jesse Fried define the term "to refer to extra returns that firms or individuals obtain due to their positional advantages."[10]

Classical factor rent

Classical factor rent is primarily concerned with the fee paid for the use of fixed (e.g. natural) resources. The classical definition is expressed as any excess payment above that required to induce or provide for production.

- "A payment for the services of an economic resource which is not necessary as an incentive for its production"[11]
- "Any payment that does not affect the supply of the input"[12]
- "A payment to any factor in perfectly inelastic supply"[12]

Neoclassical Paretian rent

Neoclassical economics extends the concept of rent to include factors other than natural resource rents. But the labeling of this version of "rent" may be somewhat opportunistic or simply incorrect in that Vilfredo Pareto, the economist for whom this kind of rent was named, may or may not have proffered any conceptual formulation of rent.[13][14]

- "The excess earnings over the amount necessary to keep the factor in its current occupation"[1]
- "The difference between what a factor of production is paid and how much it would need to be paid to remain in its current use"[15]
- "A return over and above opportunity costs, or the normal return necessary to keep a resource in its current use" [16]

Monopoly rent

Some returns are associated with legally enforced monopolies like patents or copyrights. In addition, companies like Microsoft and Intel have important de facto monopolies that can be quite valuable. The American Medical Association has traditionally regulated the number of students each US medical school can graduate, and has been accused of maintaining the high income of doctors by restricting the

supply of new doctors.[citation needed] Some businesses like public utilities are by their very nature monopolies. George Stigler estimated the impact of rents from non-labor monopolies on the US economy to be fairly low.[citation needed]

Land rent

In political economy including physiocracy, classical economics, and other schools of economic thought excepting neoclassical economics, land is recognized as an inelastic factor of production. Rent is the distribution paid to freeholders for "allowing" production on the land they control.

> "As soon as the land of any country has all become private property, the landlords, like all other men, love to reap where they never sowed, and demand a rent even for its natural produce. The wood of the forest, the grass of the field, and all the natural fruits of the earth, which, when land was in common, cost the labourer only the trouble of gathering them, come, even to him, to have an additional price fixed upon them. He must then pay for the licence to gather them; and must give up to the landlord a portion of what his labour either collects or produces. This portion, or, what comes to the same thing, the price of this portion, constitutes the rent of land ...."
>
> — Adam Smith: *The Wealth of Nations*[17]

David Ricardo is credited with the first clear and comprehensive analysis of differential land rent and the associated economic relationships (Law of Rent).

Johann Heinrich von Thünen was especially influential in developing the spatial analysis of rents, which highlighted the importance of centrality and transport. Simply put, it was density of population increasing the profitability of commerce and providing for the division and specialization of labor that commanded higher municipal rents. And the high rents determined that land in a central city would not be allocated to farming, but would be allocated instead to more profitable residential or commercial uses.

Observing that a tax on the unearned rent of land would not distort economic activities, Henry George proposed that publicly collected land rents (land value taxation) should be the primary (or only) source of public revenue; though he also advocated public ownership, taxation and regulation of natural monopolies and monopolies of scale that cannot be eliminated by regulation.

Hypothetical example

The generalization of the concept of rent to include opportunity cost has served to highlight the role of political barriers in creating and privatizing rents. For example, a person seeking to become a member of a medieval guild makes a huge investment in training and education, which has limited potential application outside of that guild. In a competitive market, the wages of a member of the guild would be set where the expected net return on the investment in training would be just enough to justify making the investment. In a sense, the required investment is a natural barrier to entry, discouraging some would -be members from making the necessary investment in training to enter the competitive market for the services of the guild. This is a natural "free market" self-limiting control on the number of guild members and/or the cost of training necessitated by certification. Some of those who would have opted for a particular guild may well decide to choose a different guild or occupation.

However, a political restriction on the numbers of people entering into the competitive market for services of the guild has the effect of raising the return on investments in the guilds training, especially for those already practising, by creating an artificial scarcity of guild members. To the extent that a constraint on entrants to the medieval guild actually increases the returns to guild members as opposed to ensuring competence, then to that extent the practice of limiting entrants to the field is a **rent seeking** activity, and the excess return realized by the guild members is economic rent as defined.

Terminology relating to rent

Gross rent

Gross rent refers to the rent paid for the services of land and the capital invested on it. It consists of economic rent, interest on capital invested for improvement of land and reward for risk taken by the landlord in investing his capital.

Scarcity rent

Scarcity rent refers to the price paid for the use of the homogeneous land when its supply is limited in relation to demand. If all units of land are homogeneous, but demand exceeds supply, the entire land will earn economic rent by virtue of its scarcity.

Differential rent

Differential rent refers to that rent, which arises owing to differences in fertility of land. The surplus that arises due to difference between the marginal and intra-marginal land is the differential rent. It is accrued generally under extensive cultivation of land. The term was first stated by David Ricardo.

Contract rent

Contract rent refers to that rent which is mutually agreed upon between the land-owner and the user. It may be equal to the economic rent of the factor.

See also

- List of economics topics
- Quasi-rent
- Rent seeking
- FIRE economy
- Rentier state
- Hotelling rent
- Ricardian rent
- Schumpeterian rent
- Johann Heinrich von Thünen
- Differential and absolute ground rent

External links

- Definition of economic rent at Economist.com (http://www.economist.com/research/Economics/alphabetic.cfm?LETTER=R#rent)
- The Art of Rent (http://www.generation-online.org/other/artofrent.htm) , a series of seminars at Queen Mary University of London.
- *Rent-Seeking Network* (http://www.Rent-seeking.net) Rent-Seeking papers by Behrooz Hassani

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