COMMONWEALTH OF MASSACHUSETTS
OFFICE OF CONSUMER AFFAIRS AND BUSINESS REGULATION
DIVISION OF ENERGY RESOURCES

RENEWABLE ENERGY PORTFOLIO STANDARD

ANNUAL RPS COMPLIANCE REPORT FOR 2003

FEBRUARY 15, 2005

INTRODUCTION AND SUMMARY

Calendar Year 2003 marks the first year in which retail electricity suppliers in Massachusetts had to meet the new Renewable Energy Portfolio Standard (RPS).[1] All fourteen suppliers met their compliance obligation to provide one percent of their Massachusetts retail sales from new renewable energy generating sources.[2] Of total Massachusetts retail sales of almost 50 million megawatt-hours (MWh) in 2003, one percent – or almost 500 thousand MWh – came from RPS-qualified sources. Sufficient RPS qualified certificates (dubbed in the new RPS marketplace "RECs" for "renewable energy certificates"[3]) were available in the market for 2003 compliance. The process of tracking, submitting data and verifying data worked relatively smoothly, but DOER will make refinements to further simplify its review of compliance filings.[4]

More importantly, DOER's review and its forecast for future compliance indicate the program's success. Renewable resources within the Commonwealth accounted for 40% of the energy used to meet the requirement in 2003, thereby financially benefiting generators in Massachusetts. Beyond that immediate view, the renewable sources used for 2003 compliance, along with additional renewable sources that have come on line since then or that are currently under development, are expected to gradually improve the fuel diversity of the Commonwealth electricity supply. Furthermore, by providing incentives for a more diversified electric generation portfolio for the region, RPS is expected to help reduce, over time, the Commonwealth's dependence on natural gas and the impact of its price increases and volatility.

While DOER's forecast for 2004 indicates shortages in the supply of RECs during the next couple of years, requiring some Alternative Compliance Payments (ACPs), the expected amount of those payments is relatively low and is forecasted to remain approximately level over the next three years if numerous projects in the pipeline can become operational. Some level of shortfall in REC supply is to be expected in the early years of this new program, and appropriate investment of the ACP funds will further the goals of growing the market share of renewable energy, along with its environmental and economic benefits.

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[1] Municipally owned electricity suppliers are conditionally exempt from the RPS obligation.

[2] As explained below, one supplier did use the Alternative Compliance mechanism for 181 MWh of obligation.

[3] See the first section of Appendix One for details regarding RECs.

[4] This report, with its appendices, explains terms introduced in the Introduction and Summary. Specifically, the report describes the RPS obligation, explains how RPS works, narrates how DOER reviewed and verified supplier compliance, summarizes information from the 2003 compliance filings, lists the currently-estimated RPS compliance obligations for 2004 through 2009, provides a compliance forecast for 2004, and discusses the current and future RPS market.

THE MASSACHUSETTS RENEWABLE ENERGY PORTFOLIO STANDARD

RPS was established by the Electric Utility Restructuring Act of 1997.[5] The RPS statute requires that all retail electricity suppliers to end-use customers in Massachusetts include at least a certain minimum percentage from "new renewable" energy generating sources.[6] That obligation began at one percent (1%) for 2003, is one and a half percent (1.5%) for 2004, and rises by one half percent (0.5%) each year through 2009, when the obligation will be four percent (4%). After 2009, the obligation rises by one percent each year until DOER sets a date for freezing the minimum percentage.[7] The statute also specifies what resources and technologies qualify as "new renewable." Following an extended process of stakeholder meetings, consultant white papers, and formal rulemaking, DOER issued final regulations for RPS on April 22, 2002.[8] The regulations require suppliers to submit to DOER Annual Compliance Filings to document their compliance with the RPS obligation, and they require electricity generation owners or operators to obtain from DOER Statements of Qualification to formally recognize their facilities as "new renewable" energy generating sources. Appendix One of this report provides more detail about how RPS operates, and Appendix Two describes the 2003 Annual Compliance Filings.

2003 RPS COMPLIANCE

After detailed review, DOER presents the following summary of the information provided by the fourteen retail electricity suppliers in their Annual Compliance Filings for 2003.[9] Massachusetts retail sales during 2003 totaled 49,834,324 megawatt-hours (MWh).[10] The total 2003 RPS obligation was 498,344 MWh from new renewable energy generation units. That total obligation was met in the aggregate by the suppliers, and each supplier met its own one percent obligation. However, of the 498,344 MWh obligation, only 304,112 MWh was supplied by 2003 new renewable generation because the development of such plants had not yet caught up with the need of their output for retail electricity suppliers' RPS compliance. The balance of the obligation was met by 2002 Early Compliance certificates, totaling 255,069 MWh, supplemented by an Alternative Compliance Payment by one supplier to cover a 181 MWh shortfall. The total of the 2003 new renewable MWh, plus the 2002 Early Compliance MWh, plus the Alternative Compliance Payment MWh yielded 60,918 MWh more than was needed overall for 2003

[5] The RPS provisions of that act are incorporated into law as M.G.L., c. 25A, §11F.

[6] See footnote 1 regarding the one exception to the RPS obligation.

[7] The RPS regulations at 225 CMR 14.07(2) provide that DOER will determine no later than December 31, 2007, whether the obligation will increase by one percent per year during 2010 through 2014.

[8] Documents from the stakeholder process, including policy white papers, in additions to other documents from the public process of rulemaking, can be accessed at http://www.mass.gov/doer/rps/delproc.htm. The final regulations, 225 CMR 14.00 et seq., can be accessed at http://www.mass.gov/doer/rps/regs.htm.

[9] The RPS regulations at 225 CMR 14.10(2) actually require a more limited "Annual Energy Resource Report," which must include the prior year's "total retail electrical energy sales" (pursuant to §14.09(1)(a)) and the total "Renewable Generation Attributes" (pursuant to §14.09(1)(h)). Appendix Three contains that required report.

[10] This total does not include the retail sales of municipally owned electric companies (see footnote 1). Their sales account for about 14% of the overall Massachusetts total, which, therefore, is higher than the figure in the text.

compliance. Of that excess amount, 60,353 MWh has been banked for use towards future compliance by twelve of the suppliers.[11] Those figures are listed in Table One.

Table One
Summary of Information from the 2003 RPS Annual Compliance Filings

		MWh
A	Total retail electricity sales in Massachusetts	49,834,324
B	One percent of total electricity retail sales (1% of A)	498,344
C	Total from 2003 New Renewable Generation	304,112
D	Total from Early Compliance (2002)	255,069
E	Total Alternative Compliance	181
F	Total of 2003, 2002, and Alternative Compliance (C+D+E)	559,362
G	Total banked for future Compliance (for 2004 and/or 2005)	60,353

Table Two lists the suppliers that submitted Annual Compliance Filings for 2003. They fall into two categories:

- Regulated utilities (also known as distribution utilities), which provide electricity under the Standard Offer and Default Services to those customers in their franchise territories who do not purchase electricity from competitive suppliers; and
- Competitive suppliers, which compete for and supply electricity to retail customers in any or all of the distribution utility territories.

[11] The quantity of banked RPS Attributes may not exceed 30% of a supplier's RPS obligation in the year in which those Attributes were created. Because that limit pertains separately to each supplier, the MWh actually banked is less than the total excess MWh.

Table Two
2003 Massachusetts Retail Electricity Suppliers

Distribution Utilities	Competitive Suppliers
Boston Edison Company	Constellation NewEnergy
Commonwealth Electric Company and Cambridge Electric Light Company	Dominion Retail, Inc.
Fitchburg Gas & Electric Co. (d/b/a Unitil)	Exelon Energy Company
Massachusetts Electric Company and Nantucket Electric Company	Mirant Americas Retail Energy Marketing, LP
Western Massachusetts Electric Company	Select Energy, Inc., and Select Energy of New York, Inc.
	Sprague Energy Corporation
	Strategic Energy LLC
	Tractebel Energy Services, Inc.
	TransCanada Power Marketing Ltd.

Figure One shows how much of the total output from new renewable generation sources was provided by each type of renewable resource. The largest single share in 2003, 171,025 MWh, came from nine landfill methane energy plants located in four states. The second largest share, 108,106 MWh, came from biomass, which was concentrated in Maine. Anaerobic digester gas was the third largest source, with 24,571 MWh. Wind, the fourth largest source, provided only 533 MWh in 2003.[12]

[12] Although Statements of Qualification were granted for two aggregations of solar photovoltaic systems, all of their certificates were sold into the voluntary green power market, where qualified PV certificates command a premium price.

Figure One
2003 New Renewable Generation by Type

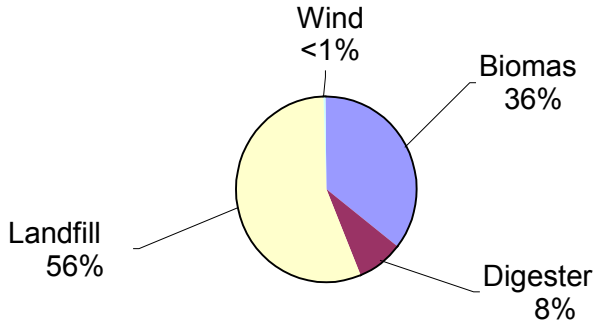
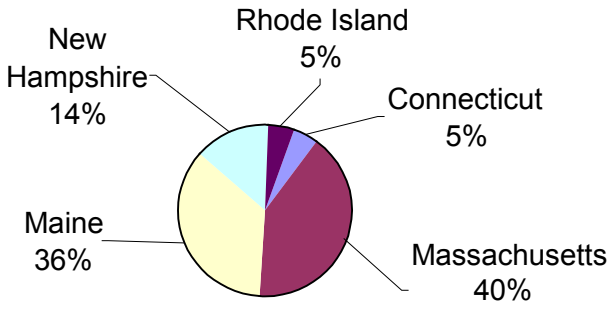


Figure Two shows how much of the output came from Massachusetts and how much from other New England states. Massachusetts provided the largest share in 2003 with 122,958 MWh, mostly from its five qualified landfill methane energy plants – in Attleboro, Fall River, Granby, Plainville, and Randolph – and the anaerobic digester plant at Deer Island. Maine, with its concentration of biomass facilities, was a close second with 108,106 MWh. New Hampshire was the third largest source, entirely from a pair of landfills in Rochester. Connecticut and Rhode Island were roughly tied for fourth, each with supply from one landfill plant. None of the output came from outside of New England during 2003.

Figure Two
2003 New Renewable Generation by State



PROJECTIONS OF FUTURE RPS COMPLIANCE OBLIGATIONS

DOER has projected the future RPS compliance obligation, based on the retail load estimates of the ISO-New England.[13] DOER assumed that the share of the total ISO-New England load estimate attributable to the territory served by Massachusetts regulated utilities in 2004 through 2009 would be the same share as in 2002 and 2003.[14] The RPS minimum percentage obligation increases as specified in the statute and regulations.[15] Table Three lists both the projected total retail sales and the resulting projected obligation in megawatt-hours (MWh).

Table Three
Projected RPS Annual Compliance Obligations, 2004-2009

Year	Projected Retail Sales, MWh	RPS % Obligation	RPS MWh Obligation
2004	50,787,300	1.5	761,810
2005	51,578,500	2.0	1,031,570
2006	52,116,000	2.5	1,302,900
2007	52,640,600	3.0	1,579,220
2008	53,160,900	3.5	1,860,630
2009	53,711,300	4.0	2,148,450

FORECAST FOR 2004 RPS COMPLIANCE OBLIGATION AND SUPPLY

The 2004 RPS obligation is one and a half percent (1.5%) of the total retail electricity sales in the Massachusetts territories of the five regulated utility companies. In addition to an increase in the RPS obligation by a half percent, the total retail sales are estimated to have increased, due to economic growth. DOER's estimate of 2004 total retail sales, derived from retail load estimates of the ISO New England (as explained in the previous section), is about

[13] The ISO New England is the not-for-profit corporation responsible for the operation of New England's bulk power generation and transmission system. More information is at http://www.iso-ne.com/.

[14] DOER derived its estimates of 2004 retail electricity demand (and, thereby, sales), as well as its projections for 2005-2009, from data provided in a spreadsheet downloaded from ISO New England's *April 2004 CELT Forecast Data 1980 – 2013* web page, at http://www.iso-ne.com/Historical_Data/forecast/data_files.html. The specific spreadsheet used, "NEPOOL, States, & Regional Transmission Expansion Plan (RTEP) Sub-areas Energy and Seasonal Peak Load – Forecast," is at the following URL: http://www.iso-ne.com/Historical_Data/forecast/NEPOOL_States_RTEP_Web.xls#Energy_Seasonal_Peak_Forecast!A1. DOER assumed that the 14% share of the retail demand supplied by municipally owned utilities in 2002 and 2003 would continue during 2004-2009, leaving 86% to be supplied by companies in the territories of the regulated utilities, which is where the RPS applies.

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

50,787,000 MWh.[16] One and a half percent of that total is about 762,000 MWh. The estimated total New Renewable Generation is about 401,000 MWh. The projected 2004 shortfall of 361,000 MWh can be reduced by 60,353 MWh banked from 2003. The remaining RPS compliance obligation is, therefore, estimated at about 301,000 MWh. However, the actual shortfall could be higher because some suppliers might choose to purchase more than they need for 2004 compliance, in order to have excess to bank towards the 2005 obligation.

The remaining obligation, estimated to be about 301,000 MWh or more, would be met by use of the Alternative Compliance mechanism. The Alternative Compliance Payment (ACP) rate for 2004 was set at $51.41 per MWh.[17] The resultant payments to the MTC in June of 2005 would, thereby, total at least $15 million. DOER and the MTC are currently evaluating alternative strategies to use the ACP funds to maximize commercial development of new renewable energy generation, in accordance with the regulations.[18] One proposal is to integrate the ACP funds to leverage private investment in a Renewable Energy Investment Fund that would provide capital for project construction. A second proposal is to use ACP funds to provide price support for long-term renewable energy certificate contracts, thereby enabling private financing of projects. Both these strategies will be developed further before DOER makes a final decision on how to deploy ACP funds.

The sources of new renewable generation for 2004, according to preliminary estimates, continue to be predominated by landfill gas and biomass, both of whose output increased substantially in absolute terms. Anaerobic digester gas production experienced a temporary dip in 2004, while wind increased (due to imports from a wind farm in New York).

The output of new renewable generation increased substantially in both Massachusetts and Maine, with Maine estimated to have supplied a bit more for 2004. Rhode Island's output also increased substantially, while New Hampshire's output increased slightly and Connecticut's declined slightly. New York facilities (two landfills and one wind farm) entered the Massachusetts RPS certificate supply market and are estimated to have provided about the same quantity as Rhode Island.

THE RPS MARKET – SUCCESSES AND CHALLENGES

Developers of new renewable generation units in Massachusetts and the rest of New England must overcome numerous and substantial barriers. Among those barriers are the following:

- Identifying good sites and overcoming local opposition, especially with regard to biomass plants and wind turbines.
- Obtaining attractive or innovative financing of capital for projects whose output would be sold into markets that are relatively new and uncertain (deregulated electricity and RPS certificates), thus entailing a perceived risk to potential investors.

[16] See footnote 14.

[17] The notice of the Alternative compliance Payment rate for 2004, including the method by which it was calculated, is at http://www.mass.gov/doer/rps/acp.htm.

[18] The provision for how funds from Alternative Compliance Payments are to be spent is in the RPS regulations at 225 CMR 14.08(4)(b).

- Establishing long term contracts for both electricity and RPS-qualified RECs with credit-worthy entities, thus enabling project financing.

Such barriers notwithstanding, RPS compliance obligations have provided incentives that have resulted in new renewable generation units being constructed during the past several years or being placed under development. In addition, projects have been undertaken to increase the production at some older landfill energy or biomass plants and to retool biomass plants with advanced technology; as a result, some or all of their output can qualify as new renewable generation and earn RECs.

The following three tables list the plants that DOER has qualified as "new renewable generation units" and that have provided, or soon are expected to provide, RECs. Table Four lists the generation units from which retail suppliers obtained RECs for 2003 compliance.

Table Four
2003 RPS Certificate Sources

Name	State	Fuel / Technology[19]	Capacity MW	Commercial Start Date	Historic Generation Rate, MWh[20]
Deer Island Treatment Plant - STG	***MA***	AD	18.0	7/98	
Indeck West Enfield	ME	BM	27.0	11/87	20,888
CRRA Hartford Energy LLC	CT	LFG	2.8	8/98	
Attleboro Landfill - QF	***MA***	LFG	1.5	1/98	
Randolph/BFG Electric Facility	***MA***	LFG	3.0	3/00	
Granby Sanitary Landfill & Granby LFG Off Grid	***MA***	LFG	2.8	10/01	
Plainville Generating Co., LLC	***MA***	LFG	5.6	3/03	
[Sykes Rd] - GRS - Fall River	***MA***	LFG	5.7	8/00	
Rochester Landfill	NH	LFG	6.4	1/98	16,658[21]
Turnkey Load Reducer [Rochester]	NH	LFG	3.2	3/92	8,329
Johnston Landfill	RI	LFG	12.0	12/89	86,901
Hull Wind Turbine U5	***MA***	Wind	0.66	12/01	

Table Five lists new renewable generation units that were subsequently added to the Massachusetts qualified RPS fleet and that, along with the plants listed for 2003 in Table Four,

[19] AD = anaerobic digestion. BM = biomass. LFG = landfill methane gas.

[20] "Historic Generation Rate," which pertains only to a plant that is RPS-qualified with a Vintage Waiver (as provided in the RPS regulations at 225 CMR 14.05(2)), is the quantity of electricity that a Vintage plant must generate each calendar year before its GIS certificates get coded as MA RPS-qualified and, thereby, eligible to be used by retail suppliers for RPS compliance. The term is defined at 225 CMR 14.02 as the average of a Vintage plant's annual output during 1995-97 or, if it started operation after January 1, 1995, during the plant's first 36 months of operation. A Vintage plant is one that began commercial operation before January 1, 1998.

[21] Although Rochester Landfill has a Commercial Start Date after 1997, it is located at the same site as Turnkey Load Reducer and, therefore, is sharing the latter's Historic Generation Rate, per the regulations at 225 CMR 14.05(1)(d)3.

will have sold RECs to retail suppliers for 2004 compliance. Finally, Table Six lists additional qualified new renewable generation units that are expected to start generating sometime in 2005 (in one case possibly contingent on financing) and, thereby, add to the supply of RECs in 2005 and beyond. Note that these tables do not include some plants to which DOER has granted Statements of Qualification as new renewable generation units but which have not, for various reasons, provided RECs.[22]

Table Five
Additional Sources for RPS Certificates in 2004

Name	State	Fuel / Technology	Capacity MW	Commercial Start Date	Historic Generation Rate, MWh
Indeck Jonesboro [Washington]	ME	BM	27.0	11/87 & restart 5/04	7,884
Chicopee Units 1, 2, & 3	***MA***	LFG	5.7	2/04	
Westfield #1	***MA***	LFG	0.48	12/04	
Dunbarton Road Landfill [Manchester]	NH	LFG	1.3	8/88	4,248
Johnston Landfill Extension	RI	LFG	8.4	2/04	
Model City Energy Facility	NY	LFG	5.6	6/01	
Seneca Falls Landfill Gas	NY	LFG	11.2	3/96	48,130
Fenner Windpower Project	NY	Wind	30	12/01	

Table Six
Additional Expected Sources of RPS Certificates from 2005 on

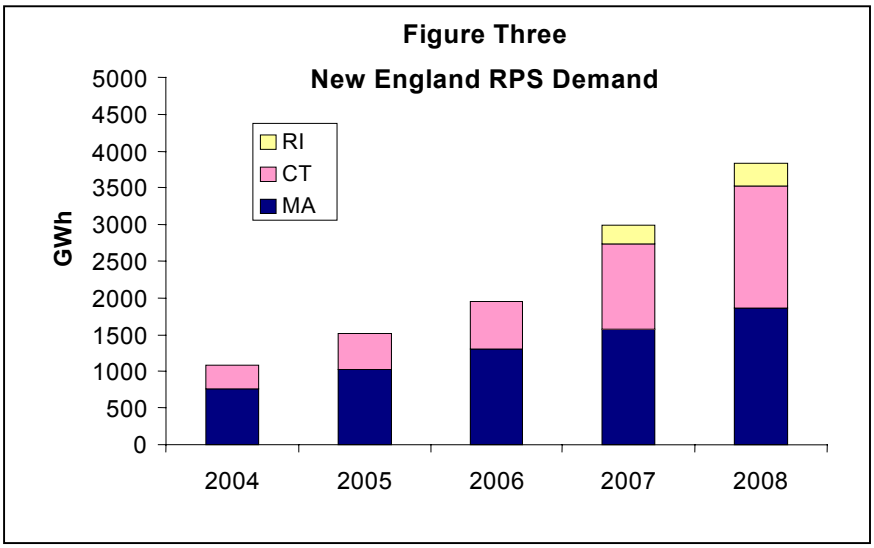
Name	State	Fuel / Technology	Capacity MW	Expected Commercial Start Date	Historic Generation Rate, MWh
Blue Spruce Farm	VT	AD	0.27	On-line 1/05	
Deblois - Worcester Energy	ME	BM	25.85	6/89 & restart Spring 2005	3,126
Ware Cogen	***MA***	BM	8.6	2nd half of 2005	
Greater New Bedford LFG	***MA***	LFG	3.3	late 2005	
Coventry Landfill (SQ pending)	VT	LFG	4.8	Spring 2005	

[22] *All* RPS-qualified plants are listed at DOER's RPS website: http://www.mass.gov/doer/rps/approved.htm.

In addition to the plants already approved, as listed above, some plants that would like to become qualified (including several not yet built) have requested and received Advisory Rulings from DOER as to their likelihood of qualifying for the RPS.[23] DOER expects that other plants that have neither applied for formal RPS qualification nor requested Advisory Rulings are in the planning stages. In all, DOER expects to see a substantial number of additional new renewable generation projects under development achieve operation, including several larger units that are expected to come on-line in 2005 and 2006. If these units can address siting, financing and contract requirement barriers, DOER anticipates the supply of RPS-qualified RECs to rise along with increases in the RPS compliance obligation.

However, this increased capacity has not materialized at a rate sufficient to erase the shortage of certificates likely through at least 2005. Therefore, the need for Alternative Compliance Payments will likely remain for 2005. In 2007, the compliance percentage for the Connecticut RPS will begin to increase at a higher rate than currently, and Rhode Island's RPS obligation will commence; both of those could add pressure on the settling of RPS-qualified certificates in Massachusetts.[24] The relative impacts on RPS demand in New England from Massachusetts, Connecticut, and Rhode Island are presented graphically in Figure Three. Finally, the expected 2006 commencement of the New York State RPS, which is currently under development,[25] could reduce the supply of new renewable generation output exported from New York to New England for the Massachusetts and Connecticut RPS markets.

Figure Three



[23] The latter are listed at this web page: http://www.mass.gov/doer/rps/advisory.htm.

[24] See Appendix Four for information about RPS obligations for Connecticut and Rhode Island.

[25] A detailed record for the development of the New York RPS is at http://www.dps.state.ny.us/03e0188.htm.

CONCLUSIONS

During the first year of the RPS, all retail suppliers achieved compliance with sufficient RECs available in the market.[26] The process of tracking, submitting data and verifying data worked relatively smoothly. Refinements will be made to further simplify DOER's review of compliance filings.

More importantly, the results of DOER's review and forecast for future compliance indicate that the program is successful. The renewable energy used to meet the requirement in 2003 is the equivalent of serving 75,159 households and reducing carbon dioxide (CO_2) emissions by 329,637 tons.[27] Renewable resources within the Commonwealth accounted for 40% of that energy, thereby benefiting and financially supporting generators in Massachusetts.

While DOER's forecast for 2004 indicates shortages in the REC market, requiring some Alternative Compliance Payments (ACPs), the amount is relatively low and is forecast to remain approximately level over the next three years if numerous projects in the pipeline can become operational. Clearly, the existence of the RPS program has stimulated new development activity. The level of ACPs is not an indication of flaws in the program. The RPS REC market is new and maturing, and some level of shortfall in REC supply is to be expected during the first several years of the RPS. The effects of the RPS, as well as similar programs in other states in the region, and the programs implemented by the Massachusetts Technology Collaborative (MTC), will take time to mature and become robust.

In the meantime, the program has begun to provide a more diversified electric generation portfolio for the region. Increased diversification will, over time, reduce the Commonwealth's dependence on natural gas and, thereby, reduce the impact of natural gas price increases and volatility. Further, these new resources will not contribute greenhouse gas levels in the region. This has all been achieved at reasonable cost to consumers.

With demand for RECs set not by the interaction of market forces, nor influenced by market prices, supply can catch up to demand only as quickly as constraints on the development of new renewable projects allow. Those constraints include the challenges of site location and acceptance, financing of projects, and obtaining long term contracts for both electricity and RPS-qualified RECs. DOER believes a balance of supply and demand can be achieved in the foreseeable future, provided that these challenges can be successfully addressed.

In 2004 DOER expects approximately $15M in ACPs. These funds will be used to further the development of new renewable generation, thus ensuring the availability of these resources for many years to come. DOER, in coordination with the MTC, will ensure that these funds are invested wisely and on terms calculated to yield economic results for consumers. DOER intends

[26] As explained above, one supplier did use the Alternative Compliance mechanism for 181 MWh of obligation.

[27] The figures in this sentence are based on 559,181 MWh of new renewable generation for 2003 compliance, which includes 2002 Early Compliance MWh but not the 181 MWh Alternative Compliance Payment. The equivalent number of households was calculated using 620 kWh per month per average household, from DOER's internal analysis of its Electric Power Customer Migration data (available on-line at http://www.mass.gov/doer/pub_info/migrate.htm). The CO_2 displacement figure was calculated using the 2003 marginal emission rate for CO_2 of 1,179 lbs/MWh, from Table 5.3 of *The 2003 NEPOOL Marginal Emission Rate Analysis for the NEPOOL Environmental Planning Committee,* December 2004 (available at http://www.iso-ne.com/Planning_Reports/Emissions/Marginal_Emissions_Analysis_2003.pdf).

to continue to work on developing solutions to the challenges noted above and will continue to evaluate and assess the likelihood of meeting future RPS target levels. DOER will report on this evaluation as appropriate, but at least annually, and looks forward to its continued role in facilitating the implementation of this critical program.

APPENDIX ONE

HOW THE RPS OPERATES

Role of the New England GIS

The RPS regulations rely on a system known as the New England Generation Information System ("GIS")[28] to separate (or "unbundle") new renewable generation "attributes" from the actual electricity generated by a qualified new renewable generation unit. The new renewable attributes are represented by on-line, serial-numbered, electronic certificates. DOER determined that both it and the RPS participants could more reliably track the purchase and sale of such certificates than attempt to track the purchase and sale of electricity.[29] In addition, Massachusetts environmental regulators, as well as regulators in other New England states, could make use of the electronic certificates, with their encoded non-energy attributes, to facilitate compliance with other regulatory requirements. Therefore, DOER worked with other New England regulators and electric utilities to develop the GIS as a system for creating and tracking certificates to serve the various needs of both its accountholders and the state agencies that regulate their activities.

All electricity generation units and all electricity suppliers on the New England grid have electronic accounts in the GIS. The GIS creates an electronic certificate for each megawatt-hour (MWh) of electricity that is generated within or imported into the New England electric power grid. Each certificate is coded for the non-energy attributes of the electricity, including the identity of the unit that generated the electricity and whether it qualifies as a "new renewable generation unit" under the MA RPS.[30] Since the GIS also serves the needs of other energy and environmental regulatory programs, those attributes also include the unit's fuels, its air emissions, and whether it qualifies under the RPS regulations of Connecticut and Maine.

Six months after the end of each calendar quarter (after all information about electricity generation, air emissions, and electricity sales have been reported, verified, and adjusted), the GIS creates and deposits into each generation unit's account the certificates for the MWh of electricity it generated during that quarter. At the same time, the GIS deposits into the account of each retail supplier the total quantity of its retail load obligation, also in MWh, for the same period. A two month trading period ensues, during which suppliers purchase from qualified generators any certificates that they need to comply with regulatory obligations (including RECs for complying with the MA RPS) or market claims (such as green power products). Purchased certificates are then transferred from generator accounts to supplier accounts. Many certificates are transferred at the beginning of a trading period under previously arranged, short or long term, purchase contracts.

[28] Called the NE-GIS in the RPS regulations, and also known as the NEPOOL GIS. The GIS can be accessed at https://www.nepoolgis.com/.

[29] See "Renewable Energy Credit Report" at http://www.mass.gov/doer/rps/delproc.htm.

[30] A GIS certificate that is coded as qualifying for MA RPS is generally called a "Mass REC" or just ""REC" in the new RPS market.

Annual Compliance Filings and Methods of Compliance

By the end of the GIS trading period for the fourth quarter of each year (June 15th of the following year), each supplier knows if it has acquired enough certificates from new renewable generation units to meet its RPS obligation for the year. For 2003 compliance, they were required to demonstrate ownership of a quantity of RPS qualified certificates equal to at least one percent of their total Massachusetts retail sales. Suppliers documented both retail sales and certificate ownership by submitting to DOER in the 2003 Annual Compliance Filing copies of their otherwise-confidential, electronic reports from the GIS.[31]

DOER knew, however, that the newly mandated RPS requirements would not cause sufficient new renewable generation to be available at the outset, and that some suppliers would be unable to find and purchase enough certificates to meet their 2003 RPS obligations. To address that problem, the regulations provide that certificates from qualified new renewable generation units created during 2002, a year in which suppliers had no RPS compliance obligation, could be purchased during the 2002 GIS trading periods, documented in Early Compliance Filings to DOER, and used towards 2003 RPS compliance (but not thereafter).[32]

The regulations provide a similar mechanism for subsequent compliance years, namely Banked Compliance.[33] Under the Banked Compliance provision, if a supplier can demonstrate in its Annual Compliance Filing that it owns more new RPS-qualified certificates than it needs for compliance in that year, that supplier can "bank" those certificates towards compliance in one or both of the next two years. However, the amount that can be banked is limited to no more than 30% of the compliance obligation in the year in which the excess certificates were created. This limit is meant (a) to prevent potential hoarding of certificates by any one supplier, and (b) to prevent the market for certificates from being flooded by banked certificates in any one year. An additional intended market result of this limit is to reduce any possible negative effect that banking might have on incentives to develop more new renewable generation units in the future.

Finally, the regulations provide a mechanism that meets the needs of supplier compliance when insufficient new renewable generation is available, as well as when uneven purchasing among suppliers might result in insufficient certificates available for some suppliers. Under the Alternative Compliance provision, if a supplier has insufficient certificates to demonstrate compliance, that supplier can make an Alternative Compliance Payment to the Massachusetts Technology Collaborative (MTC) in an amount of $50 per MWh for 2003 (and increasing annually with the Consumer Price Index).[34] The MTC then provides a receipt to document for compliance the payment and the quantity of MWh for which it paid. In addition to providing a hedge to suppliers with insufficient certificates, this mechanism imposes a price cap, in effect,

[31] Information about the 2003 RPS Annual Compliance Filing, including forms and instructions, can be accessed at http://www.mass.gov/doer/rps/ff.htm. The Filing requirements are in the RPS regulations at 225 CMR 14.08(1) and 14.09(1).

[32] The Early Compliance provisions of the RPS regulations are at 225 CMR 14.08(2) and 14.09(2). The Early Compliance Filings were due to DOER by July 1, 2003.

[33] The Banked Compliance provisions of the RPS regulations are at 225 CMR 14.08(3).

[34] Early each year DOER calculates the Alternative Compliance Payment rate for that year in accordance with changes in the Consumer Price Index. The notice of the Alternative compliance Payment rate for 2005, including the method by which it was calculated, is at http://www.mass.gov/doer/rps/acp.htm.

that limits the financial impact of RPS for both suppliers and retail customers. In accordance with the regulations, the funds collected under this mechanism must be used by the MTC under DOER oversight in a way that maximizes the commercial development of new renewable generation units.[35]

Qualifying New Renewable Generation Units

In order for suppliers to purchase certificates from RPS-qualified, new renewable generation units, those units need to become formally qualified.[36] They do this by submitting to DOER applications for Statements of Qualification. DOER reviews those applications to ascertain that the units meet the regulatory requirements. That means, first of all, that the energy resource or technology of the unit must be one of those identified in the statute and regulations as "new renewable," namely the following:

- Solar photovoltaic (PV) or solar thermal electric energy;
- Wind energy;
- Ocean thermal, wave or tidal energy;
- Fuel cells using an eligible new renewable fuel (not natural gas);
- Landfill methane gas and anaerobic digester gas;
- Low-emission, advanced biomass power conversion technologies using an eligible biomass fuel.

In addition, the unit must have started generating electricity after the end of 1997. However, in the case of a pre-1998 generator that meets all other criteria and can generate more now than it did historically (1995-97 annual average), its output each year that exceeds its historical generation rate can qualify as "new."[37]

Finally, the electricity generated has to be delivered to, or at least be able to reach, end-users in Massachusetts. To meet this qualification, the electricity can be generated anywhere on the New England power grid. However, if the unit is "behind the meter" (e.g., a rooftop PV system) or is not connected to the power grid, then it must be located in Massachusetts.[38] If it is outside of the New England power grid, such as in New York, then the power must be transmitted into the New England power grid and an Import Generator account opened for it at the GIS by the New England supplier that is importing the electricity.[39]

Once DOER grants a Statement of Qualification to an applicant and the applicant has opened an account at the GIS, DOER enters the relevant information into that account. From that time on, as long as the generation unit continues to meet RPS qualification criteria, including any conditions included by DOER in its Statement of Qualification, its output will result in the

[35] The Alternative Compliance provisions of the RPS regulations are at 225 CMR 14.08(4). Information about the MTC is at http://www.masstech.org/.

[36] See the RPS regulations at 225 CMR 14.05 for the eligibility criteria for new renewable generation units.

[37] See the RPS regulations at 225 CMR 14.05(1)(d)3 and 14.05(2) for the Vintage Waiver provisions.

[38] See the RPS regulations at 225 CMR 14.05(1)(d)1 and 2 regarding off-grid and behind-the-meter generation.

[39] See the RPS regulations at 225 CMR 14.05(5) for the provisions pertaining to generation units located outside the New England grid (technically known as the ISO New England Control Area).

creation of certificates that are coded as coming from a MA RPS-qualified, new renewable generation unit.[40]

[40] Statement of Qualification information is at http://www.mass.gov/doer/rps/qual.htm.

APPENDIX TWO

RPS 2003 COMPLIANCE FILINGS, REVIEW, AND VERIFICATION

All suppliers that sold retail electricity to end-use customers in the territories of the five Massachusetts regulated utilities during 2003 were required to file their Annual Compliance Filings for 2003 by July 1, 2004. DOER issued forms and instructions for the Filings on May 28th, two and a half weeks before the end of the GIS trading period for the fourth quarter of 2003. By July 1st DOER had received Filings from all five of the regulated utility companies and from five competitive suppliers. An additional four suppliers filed after that date for reasons that can be summarized as combinations of the following:

- The supplier had stopped selling electricity at retail in Massachusetts.
- The supplier's responsible staff had been replaced.
- The supplier's staff was unaware of, or inattentive to, RPS regulatory requirements and DOER announcements (at both the DOER and GIS websites).

By August 3rd, DOER had made contact with and obtained Filings from three of those suppliers. However, a fourth supplier, which was no longer active in the Massachusetts market, was not discovered by DOER staff until September, a contact person located on October 21st, and the Filing received on November 9th.

During the summer and into the fall, DOER staff reviewed the paper Filings submitted by the suppliers, including printed and electronic copies of their GIS reports. The electronic files in spreadsheet format enabled DOER to aggregate, analyze, and summarize the information in the Filings, while the printed versions were used to verify that the electronic versions had not been altered. DOER contacted suppliers about mathematical errors and about errors that reflected misunderstandings of the forms and instructions, and those were corrected.

DOER also undertook a process to verify the figures provided for retail product sales, as required by the RPS regulations.[41] This was done in a manner intended to minimize the reporting burden on competitive suppliers. DOER requested, and the utilities agreed to provide (on a confidential basis), "retail supplier product load" data files for themselves and for all of the competitive suppliers operating within their territories.[42] This is reporting that the utilities had voluntarily offered to the Massachusetts Department of Telecommunications and Energy (DTE). An Order on that matter is pending under DTE Docket 03-62.[43] An additional set of data was

[41] See 225 CMR 14.09(1)(b) for this requirement and for the verification and documentation provisions.

[42] DOER and the utilities executed confidentiality agreements under which the information provided may not be seen by any person who has not been bound by the agreements, nor provided to persons at other entities except as further agreed by the utilities, and must be destroyed upon completion of DTE Docket 03-62 (see footnote 43 regarding that docket). The foregoing sentence is, of course, an incomplete summary of the more complex legal agreements. Also, note that the five regulated utilities already report the same information to other regulatory agencies with considerable enforcement powers.

[43] The Report of the Working Group addressing such reporting (7/16/04) and other documents filed under this open DTE Docket 03-62, "Inquiry by the Department of Telecommunications and Energy, on its own motion, pursuant to G.L. c. 164, § 1F to investigate the use of the New England Generation Information System," are at http://www.mass.gov/dte/catalog/7091.htm.

provided in the GIS electronic spreadsheets submitted by all fourteen suppliers with their Compliance Filings.

DOER compared the information in the Filing forms, the information in the GIS files included with the Filings, and the retail supplier load information from the utilities. DOER found that the information for each of the utility companies tended to vary only slightly among those three data sources, while it varied more for some of the competitive suppliers and substantially for several of them. Close examination of the data showed that the wider variances between Filing information and the GIS information resulted from a failure of some suppliers to manage their GIS accounts diligently. Due to that failure, the retail supplier load information from the utilities was a better standard of comparison with actual retail sales as reported in the Filings than was the GIS information. However, that load information from the utilities was almost always higher than the actual retail sales, which are based on retail meter readings, because of line losses.[44] In order to supply the electricity measured at a retail meter, a supplier must transmit a slightly larger amount to the transformer facility between the high voltage transmission system and the local distribution system that carries the power to the retail customer's meter. It is those larger amounts that the utilities provided in their reports of retail product load.

Because line losses can vary widely, DOER decided that variances of less than two percent between retail sales figures from the utility load reports and from the Filings were within a range that is clearly accountable by such losses. For several suppliers with larger variances, DOER did request explanations of the amounts by which their reported retail sales were below the utility load report figures and/or corrected retail sales figures based on their own internal data reviews. The two suppliers with the largest variances did provide corrected Filings, and explanations were received from all requested. As a result, DOER is satisfied that the Filings were acceptable for the first year of compliance with regulations of what is a new program.

DOER is, however, not entirely satisfied with this method of verification for future Compliance Filings. Therefore, DOER will review the 2003 results further and consult with both the utilities and the competitive suppliers before providing instructions for the 2004 Annual Compliance Filings. The goals are better data management by suppliers, clearer instructions for the Filings, fewer errors and more accuracy in the Filings, and a more reliable and facilitated verification procedure.

[44] Electricity traveling through wires loses a small fraction of its energy as heat.

APPENDIX THREE

2003 ANNUAL RENEWABLE ENERGY RESOURCE REPORT

This Appendix reports certain information from the Annual Compliance Filings for 2003 that is required by the RPS regulations at 225 CMR 14.10(2), which provides as follows:

> Annual Renewable Energy Resource Report. The Division will produce an annual report that summarizes information submitted to the Division by Retail Electric Suppliers in the Annual Compliance Filing submitted to the Division pursuant to 225 CMR 14.09 (1) (a) and (h).

The summary information for the report required at §14.10 (2), namely the "total retail electrical energy sales" (pursuant to §14.09 (1) (a)) and the total "Renewable Generation Attributes" (pursuant to §14.09 (1) (h)), in megawatt-hours (MWh), is provided in the following table:

2003 Annual Renewable Energy Resource Report

Total Retail Electrical Energy Sales in Massachusetts in 2003	49,834,324 MWh
Total Renewable Generation Attributes in 2003	1,071,063 MWh

It is important to note that the total Renewable Generation Attributes reported in the Filings is much higher than the total quantity of *New* Renewable Generation Attributes, which are used for RPS Annual Compliance, and much lower than the actual total quantity of energy from Renewable Generation Units (see below), most of which do *not* qualify for RPS: hydropower plants, municipal solid waste (MSW) energy and trash-to energy plants, and pre-1998 renewable energy plants. Most of that RPS-*in*eligible output is aggregated with non-renewable sources into the so-called "residual mix" category in the GIS and is not reportable in the Filings, which use documentation from the GIS.

To provide more useful information, DOER has derived from a GIS public report complete data on how many GIS certificates were created for 2003 electricity from Renewable Generation Units for the entire New England power grid. The total of those certificates is listed on the first row of the following table.[45] Using the same data source that was used to forecast the Massachusetts shares of projected New England retail load in the text of this report (see footnote 14), DOER then calculated the share of that renewable output that would have been delivered to Massachusetts retail customers if it were distributed equally in the grid (although, because of power flows, bottlenecks, and other physical factors, it cannot be). In addition, DOER calculated the share of that output that would have been delivered to retail customers in the territories of the regulated utilities of Massachusetts, which are the ones to whose retail sales this report pertains. DOER thinks that these two numbers are the ones that the language of the RPS statute actually meant DOER to report annually.

[45] The data were aggregated from the four quarterly data tables in the public report titled, "GIS Certificates Statistics" (specifically the tab titled "[Number of Certificates] By Fuel"), which is accessible at https://www.nepoolgis.com/mymodule/mypage.asp.

GIS Renewable Energy Certificates in 2003

	Percentage	Quantity in MWh
Total Renewables on New England grid		13,543,664
Massachusetts share	45.7%	6,184,427
MA regulated utility territories' share	39.3%	5,318,607

APPENDIX FOUR

RPS IN CONNECTICUT AND RHODE ISLAND

The provisions of RPS in Connecticut (CT) and Rhode Island (RI) will increasingly impact the market for RECs available for Massachusetts RPS compliance after 2003. This appendix provides a very brief overview of those aspects of RPS in those states by which they differ in ways most relevant to this report – first, their definitions of which types of renewable sources are eligible, and second, shown in a table, their annual minimum compliance obligations.[46]

CT RPS, as most recently amended by the legislature in 2003, provides for two categories of eligible renewable sources, termed Class I and Class II. MA RPS will be affected only by the more stringent eligibility of Class I. The following are the salient differences:

- CT has no vintage restriction except for hydropower, while MA requires that facilities have begun commercial operation after 1997 to qualify (except under the Vintage Waiver provisions). Thus, older plants may qualify for CT but not MA.
- CT includes run-of-river hydropower plants under 5 MW capacity if built after July 1, 2003, while MA excludes all hydropower.
- CT includes fuel cells regardless of fuel source, while MA requires them to use an eligible new renewable fuel (as that is defined in the regulations).
- CT requires that biomass plants have NO_x emission rates lower than 0.75 pounds per million BTUs and use biomass fuel cultivated and harvested in a sustainable manner, but no technology criterion. MA requires that biomass plants use "low-emission, advanced biomass power conversion technologies," as these are determined by DOER and the MA Department of Environmental Protection, and no sustainability criterion.

The eligibility standards of Rhode Island's more recently enacted RPS (formally termed a Renewable Energy Standard) differ significantly from those of Massachusetts as follows:

- RI does not exclude pre-1998 plants but restricts their RPS-eligible output to two percent.
- RI includes small hydropower plants, less than 30 MW.
- RI requires of biomass plants only that they maintain compliance with current air permits.

MINIMUM COMPLIANCE OBLIGATIONS OF THE THREE STATES

	2004	2005	2006	2007	2008	2009
Massachusetts	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
Connecticut Class I	1.0%	1.5%	2.0%	3.5%	5.0%	6.0%
Rhode Island				3.0%	3.5%	4.0%

[46] Good accessible summaries are at the Database of State Incentives for Renewable Energy: http://www.dsireusa.org/library/includes/type.cfm?Type=RPS&Back=regtab&CurrentPageID=7&Search=TableType . The most recent CT RPS statutes are at http://www.cga.ct.gov/2003/act/Pa/2003PA-00135-R00SB-00733-PA.htm and http://www.cga.ct.gov/2003/act/Pa/2003PA-00221-R00HB-06428-PA.htm. The RI RPS statute is at http://www.rilin.state.ri.us/Statutes/TITLE39/39-26/INDEX.HTM, and a notice of a Negotiated Rulemaking Proceeding for its implementation is at http://www.ripuc.org/eventsactions/docket/3659-notice.pdf.