MAINE PUBLIC UTILITIES COMMISSION

ANNUAL REPORT ON NEW RENEWABLE RESOURCE PORTFOLIO REQUIREMENT

Presented to the
Joint Standing Committee on
Energy, Utilities and Technology
March 31, 2011

STATE OF MAINE
PUBLIC UTILITIES COMMISSION

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March 31, 2011

Honorable Michael Thibodeau, Senate Chair
Honorable Stacey Fitts, House Chair
Energy, Utilities and Technology Committee
115 State House Station
Augusta, Maine 04333

Re: Annual Report on New Renewable Resource Portfolio Requirement

Dear Senator Thibodeau and Representative Fitts:

During its 2007 session, the Legislature enacted an "Act to Stimulate Demand for Renewable Energy (Act)--PL 2007, ch. 403. The Act added a mandate specifying percentages of electricity that supply Maine's consumers which come from "new" renewable resources. The Act contains an annual reporting requirement on the status of Class I renewable resource development and compliance with the portfolio requirement and also requires that the Commission submit annual reports on the status of the new renewable resource portfolio requirement by March 31, 2011.

Also, during the 2009 session, the Legislature enacted Resolves 2009, ch. 51, which requires the Commission to review a variety of issues involving the operation of the new renewable resource portfolio requirement and submit a report to the Committee.

The Commission hereby submits its report to the Energy, Utilities and Technology Committee pursuant to PL 2007, ch. 403 and Resolves 2009, ch. 51. If you have any questions regarding the report, please do not hesitate to contact us.

Sincerely,

Vendean V. Vafiades David Littell

Commissioners
Maine Public Utilities Commission

cc: Members, Joint Standing Committee on Energy, Utilities and Technology
Jean Guzzetti, Legislative Analyst
Jon Clark, Esq., OPLA Deputy Director

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I. INTRODUCTION

During its 2007 session, the Legislature enacted an Act to Stimulate Demand for Renewable Energy (Act).[1] The Act added a mandate that specified percentages of electricity that supply Maine's consumers come from "new" renewable resources. Generally, new renewable resources are renewable facilities that have an in-service date, resumed operation or were refurbished after September 1, 2005. The percentage requirement begins at one percent in 2008 and increases in annual one percent increments to ten percent in 2017 and remains at ten percent thereafter, unless the Commission suspends the requirement pursuant to the provisions of the Act.

The Act contains an annual reporting requirement on the status of Class I renewable resource development and compliance with the portfolio requirement. The reporting provision specifies:

> Annual Reports. No later than March 31, 2008 and annually thereafter, the Commission shall submit a report regarding the status of new renewable capacity resources in the State and New England, and compliance with the portfolio requirement required by this section to the joint standing committee of the Legislature having jurisdiction over utilities and energy matters. The report shall include, but is not limited to, a description of new renewable capacity resources available to meet the portfolio requirement required by this section, documentation of the loss of any existing renewable generation capacity in the State, the status of implementation of the new renewable resources portfolio requirement, including any suspensions pursuant to subsection D, and recommendations to stimulate investment in new renewable resources.

The Commission hereby submits it report to the Energy, Utilities and Technology Committee to describe the status of Maine's new renewable resource portfolio requirement. The Commission notes that this report is based on the most recently filed Competitive Electricity Provider annual compliance reports, which were filed in July 2010 for calendar year 2009. Therefore, this report generally presents information on implementation and compliance with the portfolio requirement for calendar year 2009.

II. BACKGROUND

A. New Renewable Resource Portfolio Requirement (Class I)

As stated above, the new renewable resource portfolio requirement, referred to as Class I,[2] requires that specified percentages of electricity that supply

[1] P.L. 2007, ch. 403 (codified at 35-A M.R.S.A. § 3210(3-A)).

[2] The "new" renewable resource requirement was designated as Class I in the Commission's implementing rules (Chapter 311) because the requirement is similar to portfolio requirements in other New England states that are referred to as "Class I." Maine's pre-existing "eligible" resource portfolio requirement is designated as Class II.

Maine's consumers come from "new" renewable resources.[3] The percentage requirement begins at one percent in 2008 and increases in annual one percent increments to ten percent in 2017 and remains at ten percent thereafter. The Act specifies the resource type, capacity limit and the vintage requirements for the new renewable resource requirement. As specified in the Act, a new renewable resource used to satisfy the Class I portfolio requirement must be of the following types:

- fuel cells;
- tidal power;
- solar arrays and installations;
- wind power installations;
- geothermal installations;
- hydroelectric generators that meet all state and federal fish passage requirement; or
- biomass generators, including generators fueled by landfill gas.

In addition, except for wind power installations, the generating resource must not have a nameplate capacity that exceeds 100 MW. Moreover, the resource must satisfy one of four vintage requirements. These are:

1) Renewable capacity with an in-service date after September 1, 2005;

2) Renewable capacity that has been added to an existing facility after September 1, 2005;

3) Renewable capacity that has not operated for two years or was not recognized as a capacity resource by the ISO-NE or the NMISA and has resumed operation or has been recognized by the ISO-NE or NMISA after September 1, 2005; and

4) Renewable capacity that has been refurbished after September 1, 2005 and is operating beyond its useful life or employing an alternate technology that significantly increases the efficiency of the generation process.

The Act also includes an "alternative compliance mechanism" (ACM) that allows suppliers to pay specified amounts into the Renewable Resource Fund[4] in lieu of compliance with the new renewable resource portfolio requirement, and states that the Commission shall set the alternative compliance payment rate in its implementing rules. In addition, the Act allows the Commission to suspend scheduled percentage increases in the portfolio requirement if it finds that investment in new renewable resources has not been sufficient for suppliers to satisfy the requirement, the requirement has burdened electricity customers without providing the benefits from new renewable resources or that there has been an over reliance on the ACM.

[3] Contracts or standard offer arrangements that that pre-date the effective date of the Act, 35-A M.R.S.A. § 3210(3-A)(D), and sales to qualified Pine Tree Development Zone businesses, 35-A M.R.S.A. § 3210-B(4), are exempt from the portfolio requirement.

[4] The Renewable Resource Fund was established to fund research, development and demonstration projects related to renewable energy technologies. 35-A M.R.S.A. § 10121.

B. Class I Implementing Rules

As required by the Act, the Commission modified its portfolio requirement rule (Chapter 311) to implement the "new" renewable resource requirement.[5] The implementing rules establish a certification process that requires generators to pre-certify facilities as a new renewable resource under the requirements of the rule and provide for a Commission determination of resource eligibility on a case-by-case basis.[6] The rule also specifies that the Commission may revoke a certification if there is a material change in circumstance that renders the generation facility ineligible as a new renewable resource. Under the rules, a generator does not have to be located in Maine to be eligible as long as its power is used to serve load in New England.

As required by the Act, the rules establish an ACM that allows suppliers to make a payment in lieu of compliance with the new renewable resource portfolio requirement.[7] The rule established a base alternative compliance payment rate of $57.12 per megawatt-hour that is adjusted annually based on the Consumer Price Index. The alternative compliance payment rate in 2009 was $60.92 per MWh.

Finally, the implementing rules allow suppliers to satisfy or "cure" a compliance deficiency in one calendar during the following calendar year. This cure provision only applies only if the supplier has satisfied at least two-thirds of its calendar year requirement. In addition, a supplier may "bank" any excess renewable credits in a calendar year for use in the next calendar year. However, a supplier may not use banked credits to satisfy more than one-third of the requirement in any year.

C. Maine's Eligible Resource Portfolio Requirement (Class II)

Maine's original restructuring legislation, which became effective in March 2000, included a 30% eligible resource portfolio requirement.[8] The eligible resource portfolio requirement, referred to as Class II, mandated that each retail competitive electricity supplier meet at least 30% of its retail load in Maine from "eligible resources." Eligible resources are defined in statute as either renewable resources or efficient resources. Renewable resources are defined in statute as fuel cells, tidal power, solar arrays, wind power, geothermal installations, hydroelectric generators, biomass generators, and municipal solid waste facilities. Renewable resources may not exceed a production capacity of 100 megawatts. "Efficient" resources are cogeneration facilities that were constructed prior to 1997, meet a statutory efficient standard and may be fueled by fossil fuels.

D. Renewable Energy Credits

Most of the compliance with Maine's portfolio requirements occurs through the purchase of renewable energy credits (RECs). The New England Power Pool

[5] *Order Adopting Rule and Statement of Factual and Policy Basis,* Docket No. 2007-391 (Oct. 22, 2007).
[6] Chapter 311, § 3(B)(4).
[7] Chapter 311, § 3(C).
[8] 35-A M.R.S.A. § 3210(3).

(NEPOOL) has established a REC creation and tracking mechanism referred to as the Generation Information System (GIS). This system allows for the trading of the renewable attribute separate from the energy commodity. This mechanism serves to significantly simplify compliance by suppliers and verification by regulatory commissions, and avoids double counting. Consistent with statutory direction,[9] the Commission requires suppliers in the ISO-NE to verify compliance with the portfolio requirement through the GIS. Because of its small size, northern Maine does not have REC system and therefore compliance is verified through contractual documentation and settlement data.

III. IMPLEMENTATION AND COMPLIANCE

A. Certified Generators

As stated above, the implementing rules require generation facilities to be certified by the Commission as a Class I new renewable resource before such facilities can be used to satisfy Maine's new renewable resource portfolio requirement. To date, the Commission has certified approximately 50 facilities, with a total capacity of approximately 720 MW. However, not all of the facilities that have been certified are in-service and many of the facilities are also eligible for portfolio requirements in other New England states.[10]

B. Exempt Sales

Electricity suppliers are required to demonstrate compliance with the two percent new renewable resource portfolio requirement for calendar year 2009. However, any retail electricity sales made pursuant to a supply contract or a standard offer service arrangement executed on or before September 20, 2007 (the effective date of the Act) are exempt from portfolio requirement compliance until the end of the current term of the arrangement.[11] During 2009, approximately 3 million MWh or 25.5% of Maine's electricity sales were exempt from the new renewable resource portfolio requirement as a result of the pre-existing contract exemption.

Electricity sales to serve qualified Pine Tree Development Zone businesses established under Title 30-A are exempt from the portfolio requirements.[12] During 2009, approximately 62,000 MWh or 0.5% of Maine's electricity sales were exempt from the new renewable resource portfolio requirement as a result of the Pine Tree Zone exemption.

[9] The portfolio requirement statute states that the Commission shall allow competitive providers to satisfy the portfolio requirements through the use of RECs if it determines that a reliable system of electrical attribute trading exists. 35-A M.R.S.A. § 3210(8). The Commission has determined that the GIS is such a reliable system.

[10] A list of the certified facilities is attached to this Report as Attachment 1.

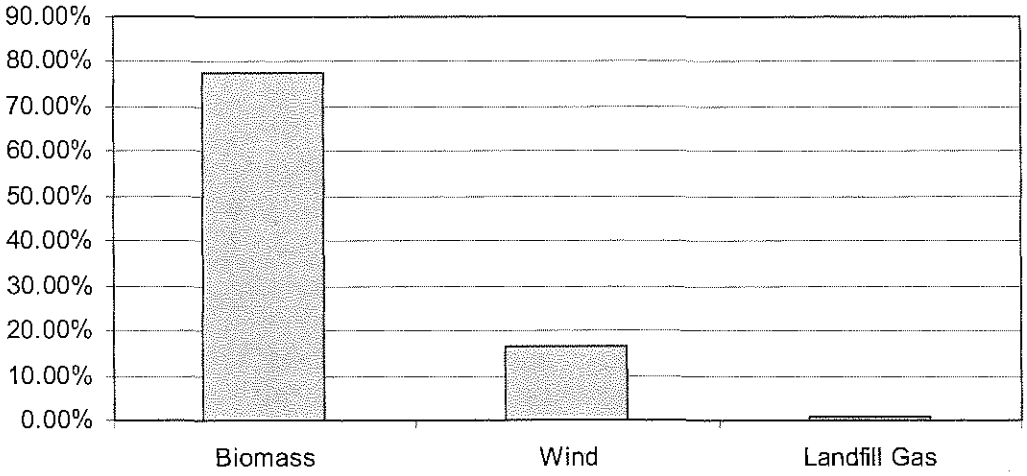
[11] 35-A M.R.S.A. § 3210(3-A)(D).

[12] 35-A M.R.S.A. § 3210-B(4).

C. New Renewable Portfolio Requirement (Class I); Resources and Cost Impacts

The following chart shows the mix of resources used to satisfy Maine's new renewable resource portfolio requirement during 2009.

Resources Used to Satisfy Class I Renewable Portfolio Requirements 2009



As the table below shows, the RECs from twelve facilities were used by suppliers to comply with the 2009 new renewable resource requirement. Nine of the facilities are biomass, two are wind facilities and one is a landfill gas facility. Nine of the twelve facilities are located in Maine and three are located in New York. Of the approximately 196,238 RECs purchased to meet the portfolio requirement in 2009, 87% came from facilities located in Maine.

Fuel Type and State	No. of Facilities	GIS Certificates	% of Total
Biomass - ME	8	157,717	80.37%
Biomass - NY	1	440	0.22%
Wind - ME	1	12,400	6.32%
Wind - NY	1	25,153	12.82%
Landfill Gas - NY	1	528	0.27%
Total – Overall	**12**	**196,238**	**100%**
Total - ME	**9**	**170,117**	**86.69%**

The cost to ratepayers of Maine's new renewable resource portfolio requirement is represented by the cost of compliance by suppliers, either through the purchase of RECs or payment under the ACM. For calendar year 2009, for which the 2% new renewable resource portfolio requirement applied, 96.1% of the requirement was satisfied through the purchase of RECs and 3% was satisfied through the ACM. The remaining 0.9% was satisfied using RECs banked from 2008 or will be satisfied during the 2010 cure period allowed by the rule.

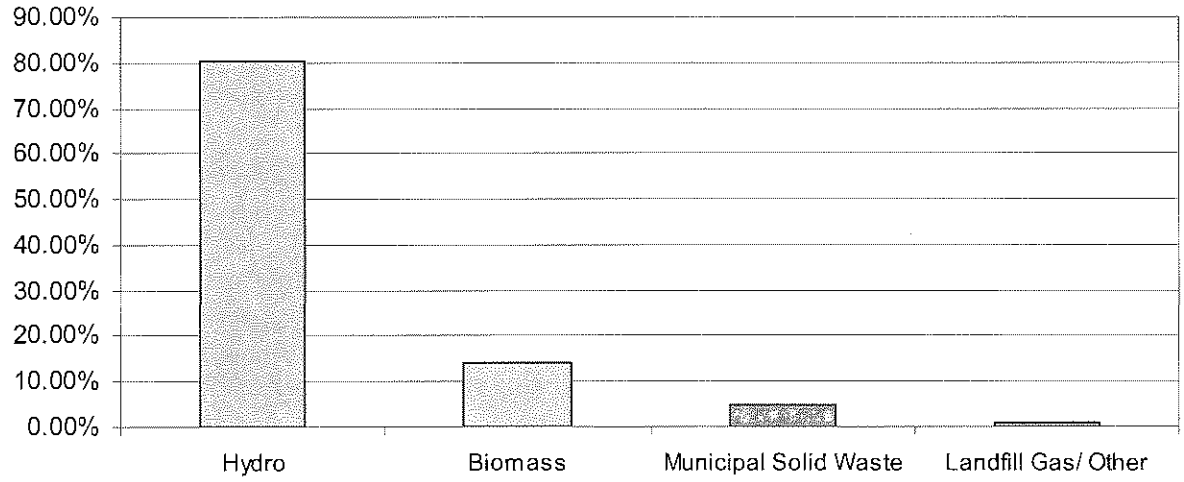
During 2009, the cost of RECs used for compliance ranged from approximately $6.50 per MWh to $44 per MWh, with an average cost of $26.28 per MWh and a total cost of $4,587,052. A minority of suppliers (4 out of 47)[13] choose to satisfy the portfolio requirement through the ACM at the rate of $60.92 per MWh for a total cost of $319,233. Thus, the total cost to ratepayers during 2009 was $4,906,285, which translates into a rate impact of .06 cents per kWh (or about a 35 cents monthly increase to a typical residential bill).

Based on this information, it appears that Maine's new renewable resource requirement is accomplishing its underlying purpose. It has created a substantial premium over market for eligible renewable generators (an average premium of 2.6 cents per kWh compared to an average wholesale rate during 2009 of approximately 4.0 cents per kWh, an approximately 65% increase over market prices). It has created this premium at a relatively small cost to ratepayers of .06 cent per kWh, and the fact that a relatively small percentage of the requirement has been satisfied through the ACM indicates that most of the ratepayer premium is going directly to eligible renewable generators.

D. Eligible Resources Portfolio Requirement (Class II); Resources and Cost Impacts

The following chart shows the mix of resources used to satisfy Maine's new renewable resource portfolio requirement during. 2009.

Resources Used to Satisfy Class II Renewable Portfolio Requirements 2009



During 2009, the costs of RECs used to satisfy the eligible resource portfolio requirement ranged from $0.00 per MWh (some RECs were provided for free as part of an energy transaction) to $0.35 per MWh, with an average cost of $0.24 per MWh and a total cost of $852,328. This translates into a rate impact of .01 cents per kWh (or about a 6 cents monthly increase to a typical residential bill).

[13] Out of the 47 suppliers, 24 supplied only to an affiliated customer.

E. Portfolio Requirement Percentage Suspension

The Act allows the Commission to suspend scheduled percentage increases in the Class I portfolio requirement if it finds that investment in new renewable resources has not been sufficient for suppliers to satisfy the requirement, the requirement has burdened electricity customers without providing the benefits from new renewable resources or that there has been an over reliance on the ACM. As specified in section III(C) above, most of the compliance with the Class I portfolio requirement occurred through the purchase of RECs with very little reliance on the ACM. In addition, the REC prices during 2009 (an average cost of $26.28 per MWh) were substantially less than the alternative compliance payment ($60.92 per MWh). This indicates that renewable resource development has been sufficient for suppliers to satisfy the Class I portfolio requirement without an over reliance on the ACM. Accordingly, the Commission did not act to suspend percentage increases in the portfolio requirement in 2009.

F. Status of Renewable Resource Development

Maine's portfolio requirement operates in conjunction with the portfolio requirements in the other New England states to promote the development of renewable resources in Maine and New England.[14] The New England Independent System Operator (ISO-NE) annually publishes a "Regional System Plan," that includes an assessment of the development of renewable resources that are necessary to satisfy the portfolio requirements of the New England states.[15] In the most recent plan, issued October 2010, the ISO concluded that the renewable resources in the ISO interconnection queue[16] represent a large potential physical supply for RPS compliance in New England.[17] Recognizing that not all of the projects in the queue will be successfully completed, the ISO indicates that projects in the queue would likely meet incremental RPS demand over the next five years. The ISO also recognized that renewable resources other than those in the queue (such as on-site and behind the meter renewable resources, renewable projects not yet in the queue, eligible renewable fuels in existing generators, and imported energy from renewable project in adjacent regions) will be available to meet some of the RPS future demand in New England.

The primary indicator of whether new renewable resource development has been sufficient to meet Maine's portfolio requirement is the degree to which compliance is satisfied through the ACM. In the event that a significant degree of compliance occurs through ACM over a number of years, this would indicate that the portfolio requirements in Maine and the other New England states are not satisfying

[14] Generally, newly developed renewable resources located within or adjacent to New England can be used to satisfy the various New England state's portfolio requirements.

[15] A copy of the renewable resource assessment section of the ISO-NE's Regional System Plan is attached to this Report as Attachment 2.

[16] The ISO interconnection queue represents proposed generation projects that have initiated the review process for interconnection to the regional grid.

[17] As of April 1, 2010, there were a total of 3,515 MW of renewable resources in the ISO queue (wind projects, both onshore and offshore,--87%; biomass projects--11%, remaining projects comprised of landfill gas, hydroelectric, and fuel cell projects—2%).

their goals of fostering new renewable resource development in the region.[18] There has been very little reliance on the ACM by suppliers in 2009 and 2008.

At this time, the Commission makes no recommendations regarding mechanisms to stimulate investment in renewable resources beyond those that already exist on the State and federal levels.

IV. CONCLUSION

Maine's new renewable resource portfolio requirement became effective January 2008. Since that time, the portfolio requirement appears to be working as intended. The mechanism has created a significant premium over market prices to help promote renewable project development, while having a relatively small impact on electricity prices. Accordingly, in the Commission's view, there is no fundamental structural problem with the new renewable resource portfolio requirement and, therefore, the Commission does not recommend any corrective statutory changes.

The Commission will continue to monitor the operation of the new renewable resource portfolio requirement and the development of new renewable resources in the region, and will act to notify the Legislature of any significant issues with the implementation and operation of Maine's portfolio requirement.

[18] As required by the Act, the implementing rules specify that the Commission shall temporarily suspend the scheduled percentage increases in the new renewable resource requirement if reliance on the ACM in the aggregate is more than 50% of the statewide obligation in three consecutive years. Chapter 311, § 3(D)(1).

Generation Facilities Certified by the Commission as Class I New Renewable Resource

Docket Number	Applicant	Order
Docket No. 2007-619	Greenville Steam Co. (19 MW; Greenville, ME; biomass)	Order (word 44 kb)
Docket No. 2008-049	PPL EnergyPlus (4.8 MW; Orono, ME; hydroelectric project)	Order (word 46 kb)
Docket No. 2008-078	Town of Kittery (50 kW; Kittery, ME; wind facility)	Order (word 42 kb)
Docket No. 2008-105	Loring Bioenergy (55 MW; Limestone, ME; biofuel/natural gas/diesel facility)	Order (word - 52 kb)
Docket No. 2008-173	Lincoln Pulp and Paper (13.5 MW; Lincoln, ME; wood and process waste)	Order (word 67 kb)
Docket No. 2008-213	Evergreen Wind Power (42 MW; Mars Hill, ME; wind facility)	Order (word 36 kb)
Docket No. 2008-330	Seneca Energy II, LLC (6.4 MW; Seneca Falls, NY; landfill gas)	Order (word 40 kb)
Docket No. 2008-332	Modern Innovative Energy, LLC (6.4 MW; Youngstown, NY; landfill gas)	Corrected Order (word 43 kb)
Docket No. 2008-333	Innovative Energy Syst., Inc.; DANC Landfill (4.8 MW; Rodman, NY; landfill gas)	Corrected Order (word 39 kb)
Docket No. 2008-334	Innovative Energy Syst., Inc.; Colonie Landfill (4.8 MW; Cohoes, NY; landfill gas)	Corrected Order (word 43 kb)
Docket No. 2008-336	Indeck Energy-Alexandria, LLC (16 MW; Alexandria, NH; biomass)	Order (word 38 kb)
Docket No. 2008-395	Pine Tree Landfill (3 MW; Hampden, ME; landfill gas)	Order (word 42 kb)
Docket No. 2008-414	Hyland Innovative Energy Systems (4.8 MW; Angelica, NY; landfill gas)	Order (word 42 kb)
Docket No. 2008-432	University System of New Hampshire (4.0 MW; Durham, NH; landfill gas)	Order (word 37 kb)
Docket No. 2008-466	Evergreen Wind Power V, LLC (57 MW; Washington County, ME; wind)	Order (word 37 kb)
Docket No. 2008-467	Wm Renewable Energy, LLC; High Acres 2 (6.4 MW; Fairport, NY; landfill gas)	Order (word 39kb)
Docket No. 2008-468	Madison Power Industries (3.0 MW; Madison, ME; hydro)	Order (word 43 kb)
Docket No. 2008-469	Wm Renewable Energy, LLC; Mill Seat Facility (6.4 MW; Bergen, NY; landfill gas)	Order (word 39 kb)
Docket No. 2008-472	Wm Renewable Energy, LLC; Chaffee Facility (4.8 MW; Chaffee, NY; landfill gas)	Order (word 38 kb)
Docket No. 2008-478	Lempster Wind, LLC (Iberdrola Renewables); Lempster Wind (24 MW; Lempster, NH; wind)	Order (word 38 kb)
Docket No.	Fortistar Methane Group; MM Albany Energy, LLC (2.8 MW;	Dismiss (mdi)

2008-501	Albany, NY; landfill gas)	
Docket No. 2008-516	Innovative Energy Systems; Clinton Landfill (4.8 MW; Morrisonville, NY; landfill gas)	Order (word 42 kb)
Docket No. 2009-066	Wm Renewable Energy, LLC; Fitchburg Landfill (4.8 MW; Westminster, MA; landfill gas)	Order (word 40 kb)
Docket No. 2009-074	Innovative Energy Systems, Inc; Chautaugua Landfill Gas Facility (6.4 MW; Jamestown, NY; landfill gas)	Order (word 41 kb)
Docket No. 2009-077	Innovative Energy Systems, Inc; Fulton Landfill Gas Facility (1.6 MW; Johnstown, NY; landfill gas)	Order (word 41 kb)
Docket No. 2009-093	Wm Renewable Energy, LLC; Crossroads Landfill (3.2 MW; Norridgewock, ME; landfill gas)	Order (word 40 kb)
Docket No. 2009-094	Wm Renewable Energy, LLC; Madison County Landfill (1.6 MW; Canastota, NY; landfill gas)	Order (word 40 kb)
Docket No. 2009-120	Sheldon Energy, LLC; High Sheldon Wind Energy Center (112.5 MW; Sheldon, NY; wind)	Order (word 40 kb)
Docket No. 2009-184	University of New Hampshire; UNH Power Plant (7.9 MW; Durham, NH; landfill gas)	Order (word 49 kb)
Docket No. 2009-197	Richey Properties, LLC; (600 kW; Newburyport, MA; wind)	Order (word 46 kb)
Docket No. 2009-208	Red Shield Acquisition, LLC; Old Town Fuel & Fiber (14.5 MW; Old Town, ME; biomass)	Order (pdf 124 kb)
Docket No. 2009-223	Canandaigua Power Partners; Dutch Hill Wind Farm (37.5 MW; Cohocton, NY; wind)	Order (word 38 kb)
Docket No. 2009-224	Canandaigua Power Partners; Cohocton Wind Farm (87.5 MW; Cohocton, NY; wind)	Order (word 38 kb)
Docket No. 2009-278	FPL Energy Maine Hydro LLC, Gulf Island Project (614 kW; Lewiston/Auburn, ME; hydro)	Denied (Order word - 50 kb)
Docket No. 2009-279	Beaver Ridge Wind, LLC (4.5 MW; Freedom, ME; wind facility)	Order (word 38 kb)
Docket No. 2009-288	PPL Renewable Energy, LLC; PPL Colebrook LFGTE (800 kW; Colebrook, NH; landfill gas)	Order (word 38 kb)
Docket No. 2009-303	Seaman Energy, LLC; Gardner Landfill (1MW; Gardner, MA; landfill gas)	Corrected Order (word 38 kb)
Docket No. 2009-370	Fox Island Wind, LLC (4.5 MW; Vinalhaven, ME; wind)	Order (word 39 kb)
Docket No. 2009-386	MM Lowell Energy, LLC; Westford Street Landfill (0.5 MW; Lowell, MA; landfill gas)	Order (word 40 kb)
Docket No. 2009-389	CommonWealth New Bedford Energy, LLC; Greater New Bedford Landfill Gas Utilization Facility (3.3 MW; New Bedford, MA; landfill gas)	Order (word 42 kb)
Docket No. 2009-395	Sappi Fine Paper North America (50 MW; Westbrook, ME; biomass)	Order (word 55 kb)
Docket No. 2010-042	Stetson Wind II, LLC (25.5 MW; T8R3, ME; wind)	Order (word 42 kb)
Docket No. 2010-060	Avery Hydro LLC, (479 kW; Laconia, NH; hydro)	Order (word 38 kb)

Docket No. 2010-104	Summit Hydropower, Inc. ,Wyre Wynd (2.8 MW; Jewett City, CT; hydro)	Order (word 38kb)
Docket No. 2010-127	Red Shield Acquisition, LLC; Old Town Fuel & Fiber (2 MW; Old Town, ME; biomass)	Order (word 36 kb)
Docket No. 2010-189	Covanta Maine, LLC; Covanta West Enfield (27.5 MW; West Enfield, ME; biomass)	Denied (Order word - 51kb)
Docket No. 2010-210	Covanta Maine, LLC; Covanta Jonesboro (27.5 MW; Jonesboro, ME; biomass)	Denied (Order word - 50 kb)
Docket No. 2010-224	Talmage Solar Engineering, Inc.; George Roberts Step Guys Precast Concrete Company Photovoltaic Array (111 kW; Alfred, ME; solar)	Order (word 37 kb)
Docket No. 2010-254	Thundermist Hydro LLC, (1.2 MW; Woonsocket, RI; hydro)	Order (word 39 kb)

Attachment 2

REGIONAL SYSTEM PLAN

2010

10TH ANNIVERSARY ISSUE

2010 Regional System Plan

October 28, 2010

EE resources that participate in the FCM are treated like traditional supply resources when the ISO calculates the ICR (see Section 4.1). However, ISO's load forecasting methodology does not incorporate projected energy savings from EE resources that do not participate in the FCM. The ISO's energy forecast includes new federal appliance standards that will take effect in 2013 and the effect of historical energy-efficiency programs as they have lowered energy consumption over time.

New England's state-sponsored EE programs will likely have an overall long-term impact on energy usage in the region. Because of the diversity in size, scope, and focus of the state-sponsored EE programs, calculating the cumulative impact of these programs is challenging. Other challenges include double-accounting concerns, monitoring and verification, "fatigue" by those repeatedly reducing energy use and choosing not to continue to reduce use, and the diversion of EE funding. The ISO will continue to work with stakeholders to gain a better understanding of these programs and their impact on the power system.

8.5 Renewable Portfolio Standards, Projected Requirements, and Potential Supply from the ISO Queue

Five New England states have Renewable Portfolio Standards (RPSs), and Vermont has a goal for increasing energy usage from renewable resources. These Renewable Portfolio Standards represent state policy targets to be achieved by retail competitive suppliers and have been summarized in previous RSP reports.[237] The retail electricity suppliers can meet the targets in a variety of ways, as discussed in this section.

Table 8-14 summarizes the technologies designated in Renewable Portfolio Standards in New England. Table 8-15 shows the annual percentages of electric energy consumption by affected LSEs for meeting the states' RPS classes through 2020. This section highlights the RPS changes that occurred over the past year.

[237] *Retail competitive suppliers* are load-serving entities (LSEs), such as electric utility distribution companies that sell basic electrical energy service to end-use customers, except for municipally owned utilities.

Table 8-14
Summary of Technologies Designated in Renewable Portfolio Standards in New England

Technology	CT Classes			MA Classes[a]			ME Classes		RI	NH Classes			
	I	II	III	I	IIa	IIb	I	II		I	II	III	IV
Solar thermal	✓			✓	✓		✓		✓	✓	✓		
Photovoltaic	✓			✓	✓		✓		✓	✓	✓		
Ocean thermal	✓			✓	✓				✓	✓			
Wave	✓			✓	✓				✓	✓			
Tidal	✓			✓	✓		✓		✓	✓			
Marine or hydrokinetic				✓	✓								
Hydro	<5 MW	<5 MW		<25 MW	<5 MW		✓[b]	✓	<30 MW	incremental			<5 MW
Wind	✓			✓	✓		✓		✓	✓			
Biomass, biofuels	Sustainable, advanced conversion low NO_X emissions[c]	✓		Low-emission, advanced technology[c]	✓		✓	✓[d]	✓ Includes cofiring with fossil fuels	Low NO_X, and PM emissions		<25 MW, Low NO_X, and PM emissions	
Landfill gas	✓			✓	✓		✓		✓	✓[e]		✓[e]	
Anaerobic digester				✓	✓				✓	✓		✓	
Fuel cells[f]	✓			w/ renewable fuels	✓		✓		w/ renewable resources				
Geothermal				✓	✓		✓		✓	✓			
Municipal solid waste		✓				✓		✓w/ recycling					
Cogeneration, combined heat and power			Customer sites, minimum 50% fuel efficiency	✓				✓[d]					
Energy efficiency			✓										

(a) The Massachusetts *Green Communities Act* divides the state's RPS into Class I and Class II resources, each of which allows primarily the same renewable technologies. Resources that began operating after December 31, 1997, are Class 1 renewables, and those that were in operation before that date are Class II renewables.

(b) These resources can be pumped hydro units, and they must meet all federal and state fish-passage requirements.

(c) These terms are explained in the state's RPS legislation and regulations.

(d) These can be high-efficiency units built through December 31, 1997.

(e) This category also includes biologically derived methane gas from sources such as biodiesel, yard waste, food waste, animal waste, sewage sludge, and septage.

(f) Fuel cells are a relatively new "renewable" energy technology. These units emit negligible amounts of SO_2, NO_X, and particulates such that Connecticut does not require fuel cell installations to obtain air permits. For Massachusetts, an RPS fuel cell using an "eligible biomass fuel" includes landfill or anaerobic digester methane gas, hydrogen derived from such fuels, or hydrogen derived using the electrical output of a qualified renewable generation unit. As shown in the table, RPS fuel cells in Rhode Island must use eligible renewable resources.

Table 8-15
Annual Percentages of Electric Energy Use by Affected Load-Serving Entities for Meeting the States' RPS Classes, 2010 to 2020

Year	CT Classes[a]			MA Classes[b]			ME Classes[c]		RI Classes[d]		NH RPS Classes[e]			
	I	II	III	I	IIa	IIb	I	II	Existing	New	I	Ii	III	IV
2010	7.0	3.0	4.0	5.0	3.6	3.5	3.0	30	2.0	2.5	1.0	0.04	5.5	1.0
2011	8.0			6.0			4.0			3.5	2.0	0.08	6.5	
2012	9.0			7.0			5.0			4.5	3.0	0.15	6.5	
2013	10.0			8.0			6.0			5.5	4.0	0.2	6.5	
2014	11.0			9.0			7.0			6.5	5.0	0.3	6.5	
2015	12.5			10.0			8.0			8.0	6.0	0.3	6.5	
2016	14.0			11.0			9.0			9.5	7.0	0.3	6.5	
2017	15.5			12.0			10.0			11.0	8.0	0.3	6.5	
2018	17.0			13.0			10.0			12.5	9.0	0.3	6.5	
2019	19.5			14.0			10.0			14.0	10.0	0.3	6.5	
2020	20.0			15.0			10.0			14.0	11.0	0.3	6.5	
Use Generator Information System Renewable Energy Certificates?	Yes			Yes			Yes		Yes		Yes			
Purchase of RECs from outside ISO New England allowed?	Yes, from adjacent areas, with confirmation of delivery of energy from the renewable energy source and reciprocal RPSs for NY, NJ, PA, MD, and DE.			Yes, from adjacent areas, with confirmation of delivery of energy			Yes, from adjacent areas		Yes, from adjacent areas		Yes, from adjacent areas, with confirmation of delivery of energy from the renewable energy source			

(a) All Connecticut Class I technologies except LFG and fuel cells can be used to meet Class II requirements. For Class III, combined heat and power (CHP) facilities can be used to offset generation on the grid with the more efficient on-site use of fuel.

(b) Class I has a minimum of 2% behind-the-meter resources. Class IIa is a minimum percentage for existing pre-1997 vintage LFG, hydro less than 5 MW, and biomass plants. Class IIb is a minimum percentage for pre-1997 vintage waste-to-energy plants.

(c) The 30% requirement refers to electric energy delivered to affected LSEs.

(d) Existing resources can make up no more than 2.0% of the RPS percentage.

(e) Class I increases an additional 1% per year from 2015 through 2025. Classes II to IV remain at the same percentages from 2015 through 2025.

Massachusetts has made two major changes to its RPS since RSP09. One is that it has added a solar "carve-out" as part of the Class I RPS requirements. For 2010, the solar carve-out is set at 30 MW (DC current). Each year, the requirement for the carve-out is calculated based on the previous year's minimum requirement, increased by 30%. Once a maximum of 400 MW (DC) of solar is installed in the state, the carve-out requirement ends. The state also set a solar carve-out Alternative Compliance Payment (ACP) of $600 (see Section 8.5.2.3). As a minimum support for solar REC (S-RECs), the DOER has proposed an auction process to guarantee developers a minimum of $300/MWh and a long-term market for S-RECs. The second Massachusetts change is that new biomass has been suspended as a renewable resource option to meet the RPS. The development of new regulations is pending and will be based on a DOER study of what types of biomass are considered a sustainable resource.[238]

Vermont's Sustainably Priced Energy Enterprise Development (SPEED) program has a trigger window, from 2005 to 2012; if new load growth within the state is not met with new renewable generation, an RPS goal will be triggered. On the basis of the ISO's 2010 load forecast, Vermont's net load for energy is expected to be about 50 MW above 2005 levels in 2012. Vermont also has a legislative goal of meeting 20% of its energy needs with renewable resources by 2017. Vermont considers large hydro as renewable resources and allows hydro imports from New York and Canada. The ISO will monitor whether any additional legislative action may be taken at the conclusion of the trigger window and revise its projections as appropriate.

As shown in Table 8-15, Connecticut has three classes of renewable resources; New Hampshire has four classes; and Massachusetts, Maine, and Rhode Island have two classes each. The Maine Public Utilities Commission established regulations in 2007 that created a Class I and Class II for renewable sources of energy.[239] Class II became the previous 30% RPS for existing resources.[240] Under the Class I RPS, competitive suppliers in Maine must demonstrate that new renewable resources provide a percentage of their energy supply portfolio. This started at 1% in 2008 and increases 1% annually through 2017. Alternatively, in lieu of having sufficient resources, affected suppliers may use the ACP (see Section 8.5.2.3).

The main drivers for the growth of renewable resources in New England are the classes for new renewables: Rhode Island's RPS; Massachusetts's, Connecticut's, and Maine's Class I; and New Hampshire's Classes I and II. The Massachusetts DOER issued a rulemaking in 2010 that determined that the maximum size of on-site solar generation comprising Class I solar carve-out resources would be 2 MW.[241]

The classes for existing renewables include Connecticut's, Massachusetts's, and Maine's Class II, and New Hampshire's Classes III and IV. These existing classes are intended to retain the use of existing

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[238] MA DOER, *Biomass Sustainability and Carbon Policy Study* (June 2010); http://www.mass.gov/?pageID=eoeeaterminal&L=4&L0=Home&L1=Energy%2c+Utilities+%26+Clean+Technologies&L2=Renewable+Energy&L3=Biomass&sid=Eoeea&b=terminalcontent&f=doer_arra_bscps&csid=Eoeea and *Clarification of Suspension of Biomass Energy from Qualification in the Renewable Energy Portfolio Standard Program* (December 22, 2009); http://www.mass.gov/Eoeea/docs/doer/renewables/biomass/biomass-suspend-clarify-2009dec22.pdf. Ian Bowles (Secretary, Massachusetts Executive Office of Energy and Environmental Affairs) in letter on biomass sustainability and carbon regulations to the MA DOER, July 7, 2010; http://www.mass.gov/Eoeea/docs/eea/biomass/070710_biomass_sustainablity_carbon_regs_letter.pdf.

[239] Maine Public Utilities Commission Revised Rules 65.407 Chapter 311 Portfolio Requirement (Effective November 6, 2007).

[240] Maine's RPS allows FERC-qualifying facilities (i.e., efficient cogeneration plants) to count toward meeting its goal of having renewable resources provide 30% of its electricity use. Maine's many paper mills typically meet this goal.

[241] *Renewable Energy Portfolio Standard—Class I 225* [CMR 14.05 (1)(4)(a)]; http://www.mass.gov/Eoeea/docs/doer/renewables/solar/225CMR1400Jan8-2010.pdf.

renewable resources for meeting the RPS, although the projected increase in electricity use for these states will increase the amount of electric energy that resources in these classes will need to provide. Some combination of increased energy efficiency and the use of CHP facilities that have a total fuel efficiency greater than 50% can be used to satisfy Connecticut's Class III. The percentages for this class are shown in Table 8-15.

With its *Green Communities Act*, Massachusetts established a Class II RPS. In the state's RPS regulations, the Massachusetts DOER developed two Class II requirements: a minimum of 3.6% for the technologies shown in Table 8-14 and a minimum of 3.5% for municipal solid waste plants, both applying to plants in operation before December 31, 1997.

The Massachusetts *Green Communities Act* also established an Alternative Portfolio Standard (APS) similar to the RPS. The APS sets electric energy consumption targets for competitive retail electricity supplies, which must use alternative technologies to meet the minimum APS percentage of their electric energy consumption. The technologies include CHP, flywheel storage, gasification with carbon sequestration, paper-derived fuel, and efficient steam technology.[242] The Massachusetts DOER determined the APS percentages, starting in 2009, to be 1.0% and growing in increments of 0.5% per year to 2014, reaching 3.5%. The percentages would then increase at 0.25% increments per year, reaching 5% by 2020. Table 8-14 and Table 8-15 do not include the APS targets because this category of technologies does not strictly encompass renewable resources. In any case, the ISO estimates the APS target would reflect about 300 MW by 2020 (operating at an 80% capacity factor).

8.5.1 Related Renewable Resource and Energy-Efficiency Developments

Another portion of the Massachusetts *Green Communities Act* is for the Secretary of Energy and Environmental Affairs to prepare a five-year plan for meeting the following renewable and energy-efficiency goals, some of which were discussed in Section 8.4.2:

- Meet at least 25% of the state's electricity load by 2020 with demand resources that include energy efficiency, load management, demand response, and behind-the-meter generation.
- Have competitive LSEs meet at least 20% of their electricity load by 2020 through the use of new, renewable, and alternative energy generation. This goal encompasses the RPS target of 15%, plus the APS target of 5% by 2020.
- By 2020, reduce the amount of fossil fuels used in buildings by 10% from 2007 levels through increased efficiency.
- Plan to reduce total electric and nonelectric energy consumption in the state by at least 10% by 2017 through the development and implementation of a green communities program that encourages the use of renewable energy, demand reduction, conservation, and energy efficiency, as well as the progressive adoption of Massachusetts's new *Stretch Energy Code*.[243] This building

[242] The electric energy consumption target for CHP technology is based on the megawatt-hours of fuel energy savings a CHP facility can experience compared with the amount of fuel separate energy facilities would use (e.g., an electric purchase from the ISO grid and a boiler each requiring its own fuel). To meet the target, the CHP would need to be more fuel efficient providing electricity and heat than the separate electric energy purchase from the ISO grid and boiler providing the same energy applications as the CHP facility. Flywheels are large rotating masses that can store electric energy, which can be called on to provide power for relatively brief periods.

[243] *Stretch Energy Code*, 780 CMR Appendix 120 AA (Commonwealth of Massachusetts, 2009); http://www.mass.gov/Eeops/docs/dps/inf/appendix_120_aa_jul09_09_final.pdf.

energy conservation code is intended to reduce at least 20% of the average overall annual combined energy consumption per square foot by all new and existing buildings in the municipalities that have adopted the code.

8.5.2 Projected RPS and Renewable Resources in the ISO Queue

This section presents a New England-wide projection of the states' RPS electric energy targets for renewable resources and energy-efficiency goals. It then shows the outlook for meeting these electric energy targets with just the renewable resources in the April 1, 2010, ISO Generator Interconnection Queue. Although the retail electricity providers have a combination of means for meeting their RPS targets (see Section 8.5.2.3), the renewable resources in the ISO queue represent a large potential physical supply for RPS compliance in New England. Analysis of the amounts of these resources provides information on the potential need for additional renewable development.

8.5.2.1 Projected Targets for RPSs and Related Energy-Efficiency Policies

To provide a New England-wide outlook for the five states with RPSs and other related state policies, the ISO projected the electric energy targets for all the RPS classes and related state policies. It also projected the potential growth of the RPS targets for "new renewable" classes. The RPS projections were based on the ISO's 10-year 2010 forecast for the electric energy demand for competitive retail suppliers and excluded relevant municipal utilities in states where these entities are exempt from meeting the RPSs.[244] To obtain the RPSs' projected targets for 2020, the energy forecast was extrapolated from 2019, assuming energy growth rates would be similar to those of the last year of the ISO's forecast (from 2018 to 2019). Massachusetts's *Green Communities Act* energy-efficiency goal of reducing the state's overall use of electric energy 25% by 2020 was modeled as energy-efficiency percentages of statewide electric energy use. The percentages were projected to incrementally increase annually until the state achieves the 25% goal in 2020 (i.e., electric energy usage for competitive retail suppliers would be reduced by over 14,000 GWh).[245] The Massachusetts RPS percentages were then applied to the reduced level of electric energy consumption to obtain the RPS energy requirements. For these analyses, the various state RPS classes and other policies have been grouped into four categories:

- **Existing**—RPS classes using existing renewable resources. This includes the Class II category for Maine, Connecticut, and Massachusetts; Rhode Island's "existing" category; and New Hampshire's Classes III and IV. Massachusetts's new Class II has two components: one covering the technologies shown in Table 8-14 and in operation before December 31, 1997, and another class for just waste energy plants from the same time period. Table 8-15 shows the percentage targets for each component. All these classes have some growth in the use of renewable resources because of the ISO's estimated growth in the total demand for electric energy for each state over the next 10 years. New Hampshire's Classes III and IV also include, for several near-term years, some increase in the percentage targets shown in Table 8-15.
- **New**—RPS classes focusing on using new renewable resources. This category includes increases in new renewable resources and includes Class I for Maine, Connecticut, and Massachusetts; Rhode Island's RPS class for new growth; and New Hampshire's Classes I and II.
- **Vermont goals for using new renewable resources**—This category includes Vermont's goal of renewable resources meeting 20% of the state's electric energy demand by 2017, as well as the

[244] The ISO projections did not account for customers still on "standard offer" contracts for the next several years because these offers are not subject to the RPS until the contracts expire.

[245] The calculation is based on the exemption of municipal loads through 2020.

SPEED program. Since an implementation plan for 20% by 2017 has not been formally established, an increase in renewable penetration of 2.5% has been assumed for forecasting this target.

- **Energy efficiency**—New energy-efficiency RPS classes and policy goals. This includes Connecticut's Class III targets, which also can be met by CHP and Massachusetts's goal of meeting 25% of energy demand with new energy-efficiency measures by 2020. Although the new Massachusetts APS category includes CHP, the APS has not been projected in this analysis for reasons explained previously.

For each of these four RPS categories and for 2010, 2013, 2017, and 2020, Table 8-16 shows the RPS and policy goals based on the ISO's 2010 10-year forecast for annual electric energy use by state (net of noncompetitive suppliers' energy) and the corresponding RPS percentage requirements shown in Table 8-15. For each year, the table shows the total electric energy goal for each of these four categories of renewables. It also shows the totals of these categories as a percentage of the projected total electric energy demand in New England.[246] For the figures presented in this section and data shown in Table 8-15, it has been assumed that Vermont's SPEED program will be renewed beyond 2012.

Table 8-16
Estimated New England RPS and Related Targets for Renewables and Energy Efficiency (GWh and %)

Line #	Use/Requirement Category	2010	2013	2017	2020
1	2010 ISO electric energy use forecast	131,305	134,650	139,810	143,868
2	Existing—RPS targets for existing renewables[(a)]	8,980	9,132	9,167	9,157
3	New—RPS targets for new renewables[(b)]	5,231	8,584	13,662	17,136
4	Vermont goals[(c)]	160	695	1,516	1,662
5	Energy efficiency—targets for new energy efficiency and CHP[(d)]	3,316	6,617	11,369	15,770
6	Total RPS targets for renewables and energy efficiency	17,687	25,027	35,715	43,724
7	Total RPS targets for renewables and energy efficiency as a percentage of New England's projected electric energy use[(e)]	13.5%	18.6%	25.5%	30.4%

(a) This category includes CT Class II, new MA Class II, ME Class II, RI Existing, and NH Classes III and IV. This RPS category grows through time as a result of the growth in electricity demand. NH's classes also include some growth in the use of renewable resources to meet the RPS percentage of electric energy use.

(b) This category includes CT Class I, ME Class I, MA Class I, RI's "new" category, and NH Classes I and II.

(c) It has been assumed that Vermont's SPEED program will be renewed beyond 2012. Thus, this category includes VT's goal for renewable resources to meet 20% of the demand for electric energy by 2017 and assumed will meet 20% for 2020. Incremental increases up to 2017 were assumed for meeting this renewable goal.

(d) This incorporates only CT Class III (energy efficiency and CHP) and MA's goal of 25% energy efficiency by 2020 from its *Green Communities Act*.

(e) The numbers may not add to the totals shown because of rounding.

[246] The ISO's Renewable Portfolio Standard projection calculator provides regional goals and electric energy production by renewable resource type. Users can insert their own input assumptions in these spreadsheets, which are available at http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/eag/usr_sprdshts/index.html.

Figure 8-4 shows the projected cumulative targets for renewable resources and energy efficiency in New England based on RPSs and related policies similar to Table 8-16.

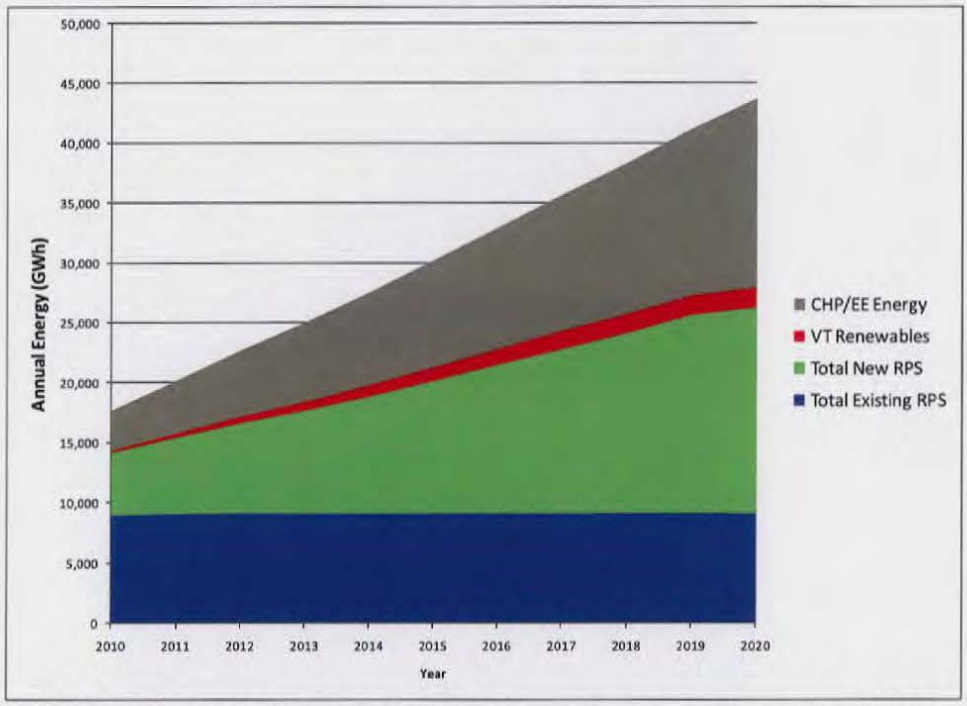

Figure 8-4: Projected cumulative targets for renewables and energy efficiency based on RPSs and related policies, 2010 to 2020.

Table 8-17 shows that to meet the RPS-related targets for 2017, these four categories of renewables (i.e., existing, new, Vermont's, and energy-efficiency resources) need to supply about 25.5% of the total amount of electricity projected to be needed in New England and, similarly, about 30.4% for 2020. Table 8-17 shows the percentages for each of these categories of resources. Energy efficiency is only calculated for states with specific numerical targets.

Table 8-17
New England RPS and Related Targets for Renewables and Energy Efficiency, by Category (%)

Category	2017	2020
Existing	6.6	6.4
New	9.8	11.9
Vermont goals	1.1	1.2
Energy efficiency/CHP	8.1	11.0
Total[a]	25.5	30.4

(a) The numbers may not add to the totals because of rounding.

New renewable resources are the focus of the ISO's assessment because these resources represent the growth required in renewable resources. Table 8-18 shows the RPS targets for incremental new renewable resources (as shown in Table 8-16, line 3). Table 8-18, lines 1 to 5, show the breakdown by state class of the RPSs for new renewable resources, and line 6 shows the 2009 total New England RPS. Assuming the 2009 targets for RPS classes for new renewables are met by existing renewable resources and then subtracting the 2009 "new" RPS (line 7) from the total (line 6), the new incremental RPS would range from 868 GWh of electricity annually for 2010 to 12,773 GWh for 2020 (line 8).

Table 8-18
Projected New England RPSs for "New" Renewables Beyond 2009 (GWh)[a]

Line #	State	2010	2013	2017	2020
1	Connecticut Class I	308	1,276	3,138	4,730
2	Massachusetts Class I	453	1,823	3,473	4,466
3	Rhode Island "new"	40	296	789	1,080
4	New Hampshire Classes I and II[b]	63	445	989	1,423
5	Maine Class I	4	381	911	1,075
6	Total "new" RPS targets (from Table 8-16, line 3)[c]	5,231	8,584	13,662	17,136
7	2009 "new" RPS	4,363	4,363	4,363	4,363
8	Incremental "new" RPS beyond 2009[d]	868	4,221	9,229	12,773

(a) The projection is based on the ISO's 2010 state electric energy use forecast deducting 5% for noncompetitive LSEs in CT, and similarly, 14% for MA and 0.6% for RI. Modest growth requirements in the "existing" and "other" categories are not included here.

(b) New Hampshire's Classes I and II will go into effect in 2009 and 2010, respectively. However, NH's Class I requirement starts at 0.5% in 2009.

(c) The numbers may not add to the totals shown because of rounding.

(d) This assumes existing renewable projects in New England met the 2007 requirements for "new" renewable resources.

Figure 8-5 shows the annual cumulative RPS targets for new renewable resources included in Table 8-18 by state (lines 1 through 6) for each year of the forecast period. By 2020, the RPSs for Connecticut and Massachusetts will make up 72% of the total RPSs for new renewable resources for the New England states.

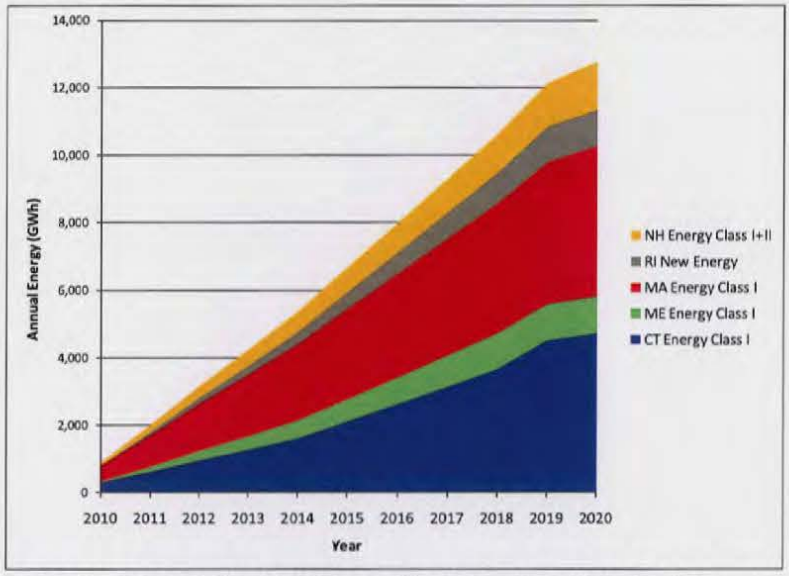

Figure 8-5: Cumulative RPS targets for new renewable resource classes beyond 2009, by state (GWh).

8.5.2.2 Incremental RPS Targets for New Renewables Compared with Renewable Projects in the ISO Queue

Figure 8-6 shows the renewable resource projects in the ISO queue as of April 1, 2010. They total 3,515 MW, with wind projects comprising 87% of the total megawatts, and biomass projects, 11%. The remaining 2% of the projects comprises landfill gas, hydroelectric, and fuel cell projects.

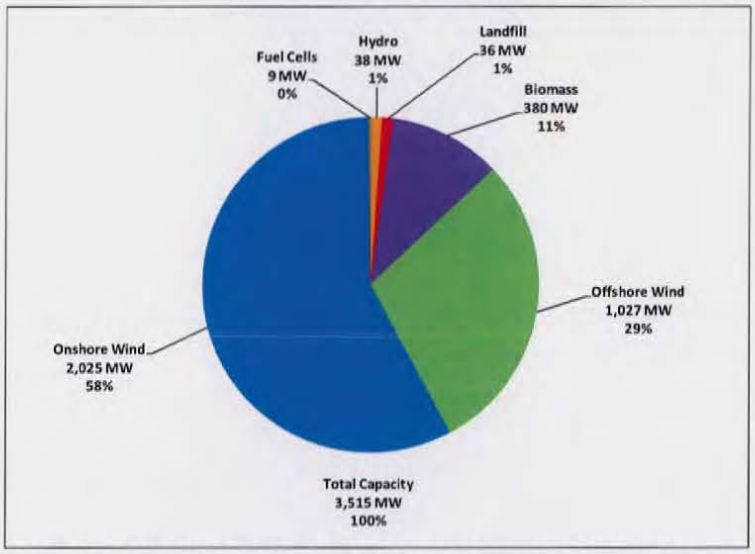

Figure 8-6: Proposed New England renewable resources in the ISO Generator Interconnection Queue as of April 1, 2010 (MW and %).

Note: Totals include all queue wind projects in New England. The total amount of renewable resources is 3,515 MW.

To provide an estimate of the regional outlook for meeting the new incremental growth in the RPS Class I targets by 2020 with just resources in the ISO queue, Table 8-19 develops an estimate of total electric energy production from a total of 52 renewable energy projects in the queue (as of April 1, 2010). These projects are assumed to become qualified to meet the total of the states' new RPS targets (line 8 of Table 8-18). The table shows estimates of the electricity that the proposed renewable projects in the queue might provide annually. These estimates are based on an assumed capacity factor for each type of renewable resource. The estimates also assume all the projects would be built as proposed and the New England states would certify them as RPS projects so that they can count as RECs toward compliance with the RPS.[247] Figure 8-7 also shows the projected energy from these resources similar to Table 8-19.

Table 8-19
Estimated Energy from New England Renewable Energy Projects in the ISO Queue as of April 1, 2010

Type (#) of Projects	Nameplate Capacity (MW)[(a)]	Assumed Capacity Factor (%)[(b)]	Estimated Annual Electricity Production (GWh)
Hydro (6)	38	25	83
Landfill gas (2)	36	90	284
Biomass (11)	380	90	2,996
Wind onshore (29)[(c)]	2,025	32	5,676
Wind offshore (3)	1,027	37	3,329
Fuel cells (1)	9	95	75
Total (52)	**3,515**	**40[(d)]**	**12,443**

(a) *Nameplate capacity* is a facility's megawatt capability designated and usually guaranteed by the manufacturer or developer.

(b) Capacity factors are based on the ISO's *2007 Scenario Analysis*. The wind capacity factors were adjusted to account for a generic assumption that wind turbines have a 90% availability. See http://www.iso-ne.com/committees/comm_wkgrps/othr/sas/mtrls/elec_report/scenario_analysis_final.pdf.

(c) This includes wind projects in New England (including affected non-FERC queue projects) and ignores duplicate listings for projects with more than one potential interconnection point.

(d) An equivalent capacity factor = [{total energy production (GWh) x 1,000)/{total capacity (MW) x 8,760 hours}].

[247] The ISO recognizes that each state must certify the resources to meet the RPS requirements. These state-certified RPS projects include generators connected to the grid, behind the meter, and in adjacent balancing areas (where allowed).

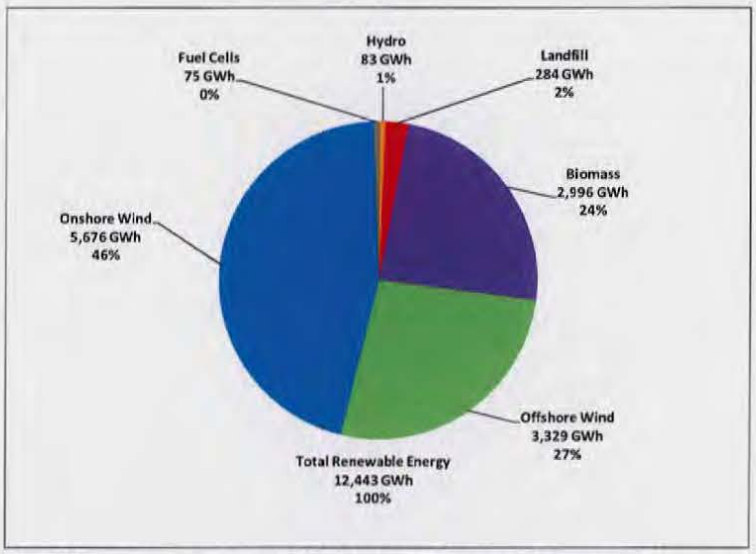

Figure 8-7: Estimated energy from proposed New England renewable resources in the ISO's Generator Interconnection Queue (including affected non-FERC queue projects) as of April 1, 2010 (GWh and %).

A comparison of the queue projects in Table 8-19 with the total resources in the "new" RPS category beyond 2009 (as shown in Table 8-18, line 8), indicates that the New England renewable energy resources proposed in the queue would not meet the New England RPS demand by 2020 even if all the projects in the queue were completed successfully. However, additional projects not yet within the ISO queue could help meet the regional RPS demand, and the higher RPS requirements going forward could provide an incentive to develop additional renewable projects that may then appear in the queue.[248] Table 8-20 shows the amount and percentage of projects (in total projects and megawatts) that have gone commercial, are active, or have withdrawn from the queue since the queue started in June 1996. Since wind is the dominant type of renewable technology in the queue, the table also shows the total number and megawatts of wind projects that have gone commercial or are active or have been withdrawn from the queue. A total of 51% of the projects withdrew from the queue, which represent 68% of the total megawatts withdrawn. Similarly, the number of wind projects that withdrew is 40%, representing a decrease in total megawatts of 70%.

[248] New renewable energy projects generally do not enter the queue until they are within two to five years of their intended commercial operation date.

Table 8-20
Summary of All Projects and Wind Projects in ISO Queue as of April 1, 2010

Project Category	All Projects				Wind Projects			
	No.	%	MW	%	No.	%	MW	%
Commercial	64	21	12,871	19	4	7	174	2
Active	84	28	8,809	13	32	52	3,052[(b)]	29
Withdrawn	152	51	45,467	68	25	41	7,446	70
Total[(a)]	**300**	**100**	**67,147**	**100**	**61**	**100**	**10,672**	**100**

(a) Percentages may not sum to 100 because of rounding.

(b) This includes wind projects in New England (including affected non-FERC queue projects) and ignores duplicate listings for projects with more than one potential interconnection point.

Figure 8-8 shows the annual new cumulative RPS targets for renewables from 2010 to 2020 compared with the annual potential electric energy production by renewable projects in the queue on the basis of the projected commercial operation date for these projects and assuming the capacity factors shown in Table 8-19.[249] Given the uncertainty of the success of renewable projects, most of which are wind, and using guidance from the PAC, Figure 8-8 shows three scenarios of estimated cumulative electric energy from the renewable resource projects in the queue: 20%, 40%, and 60% of assumed commercial operation. These reflect different assumed attrition levels of renewable projects of 80%, 60%, and 40%. These assumed levels cover a wider range of attrition of wind projects than historically occurred, as shown in Table 8-20. If only 20% of the electric energy from the queue projects became commercially available, other projects would be needed to meet the total RPS targets for new renewables. Starting in 2011, the RPS targets for renewables would start to increase significantly from what the 20% level could provide. Similarly, at a 40% level, the queue projects alone would meet the RPS through 2013. At a 60% level, the queue projects alone would meet RPS targets through 2015.

[249] The ISO's Renewable Portfolio Standard projection calculator provides regional goals and electric energy production by renewable resource type. Users can insert their own input assumptions in these spreadsheets, which are available at http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/eag/usr_sprdshts/index.html.

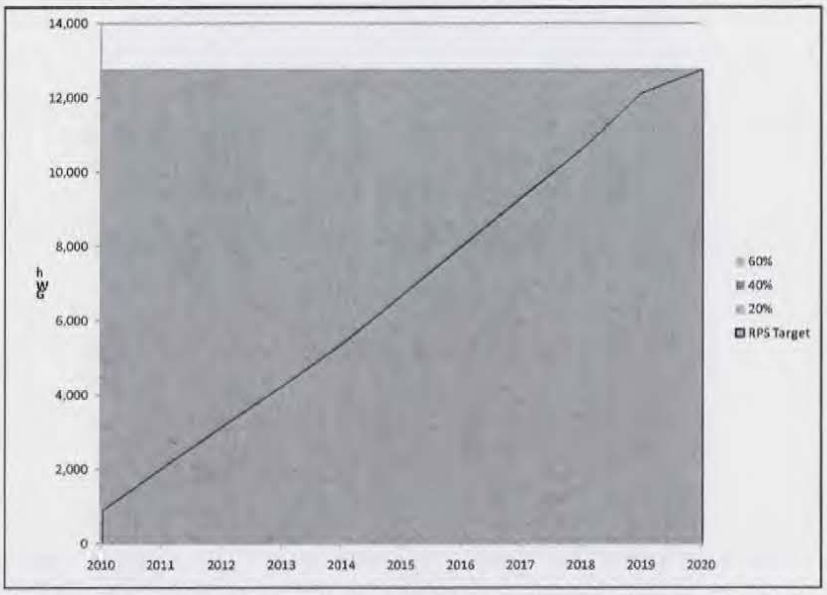

Figure 8-8: Various levels of estimated cumulative electric energy from new renewable projects in the ISO queue, as of April 1, 2010 (including affected non-FERC queue projects) compared with RPS demand by year.

Notes: Various percentages of electric energy availability from queue projects have been assumed and are not projections of the projects' expected energy production. RPSs also can be met with behind-the-meter projects, imports, new projects not in the queue, and Alternative Compliance Payments.

8.5.2.3 Other Ways of Meeting New England's Renewable Portfolio Standards

The ISO recognizes that renewable resources other than those projects in the ISO queue will be used to meet some of the RPS demand in New England.[250] These additional renewable projects include small, on-site and behind-the-meter renewable resources not in the queue; renewable projects in New England not yet in the queue or under development; eligible renewable fuels in existing generators; and imported energy from renewable projects in adjacent balancing authority areas. In 2008, the Massachusetts RPS compliance resources from imports into New England amounted to 40%.[251] The Alternative Compliance Payment is a default that affected LSEs also could use for meeting RPS targets.[252] The ACP acts as an administrative cap on the cost of renewable sources of electric energy, and ACP funds are used to promote the development of new renewable resources and energy efficiency in the region.

To meet their RPS targets, Massachusetts and Connecticut have been certifying some existing renewable generators to qualify for the "new" RPS category and, in some cases, requiring technology upgrades. Retail competitive suppliers will likely continue to use these generators for partial compliance with RPS classes for new renewable resources.

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[250] Robert Grace, "Renewable Energy Resources in New England . . . Will They Be There When We Need Them," presentation at the Northeast Energy and Commerce Association 15th Annual New England Energy Conference, Newport, RI (May 12, 2008).

[251] MA DOER, *Annual RPS Compliance Report for 2008* (July 29, 2009); http://www.mass.gov/Eoeca/docs/doer/rps/rps-2008annual-rpt.pdf.

[252] The ISO's Renewable Portfolio Standard projection calculator provides regional goals and electric energy production by renewable resource type. Users can insert their own input assumptions in these spreadsheets, which are available at http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/cag/usr_sprdshts/index.html.

8.6 Summary

Providing electricity at a reasonable cost while meeting environmental goals for air and water quality can create competing requirements for reliably meeting New England's demand for electricity. The region's stakeholders, including the ISO, NEPOOL participants, and state environmental agencies, should collaborate on any needed planning to meet these environmental initiatives. The key issues for the region's major power plants will be complying with the requirements to meet the ozone standard, potential climate change legislation, RGGI revisions, and EPA's cooling water intake permit requirements.

The New England generation emissions analysis, covering average and marginal emission rates, shows a continuing decline in the region's SO_2, NO_X, and CO_2 emissions. Even the total emissions for SO_2 and NO_X have continued to decrease with time. This is the result of generating units using cleaner fuels, particularly natural gas, and adding emission controls to generating plants over the last 10 years.

The ISO also conducted a new analysis of NO_X emissions on 20 historic peak-load days. The analysis determined that the increase in emissions for the last 500 MW of fossil fuel generation serving the peak loads ranged from 2 to 11 lbs/MWh over the 20 days. The ISO will issue a report covering this analysis of system peak-load NO_X emissions.

A summary of the New England states' energy-efficiency programs and goals shows a policy focus of achieving all cost-effective energy efficiency as the region's energy resource of first priority. Increased funding for achieving this goal is coming from increased state energy-efficiency budgets, FCM revenues, and the majority of RGGI auction revenues. Measurement and verification of energy reductions will become more important to assess the extent that targeted reductions from the state programs are achieved. Analysis using this input and other information has the potential to improve the long-term accuracy of the ISO load forecast.

The total RPS and related energy-efficiency targets will increase to approximately 25.5% of New England's total projected energy use by 2017 and reach 30.4% by 2020. State energy-efficiency programs make up about a third of this by 2017; the remainder is attributable to Renewable Portfolio Standards and related policies.

The ISO recognizes the uncertainty of success for projects in the current queue. On the basis of assumptions used in the three scenarios presented, these projects would likely meet the incremental growth in the RPS classes for new renewables sometime between 2011 and 2015. For the 10-year planning horizon, the potential supply is greater than what is in the ISO queue (as of April 1, 2010).[253] Most renewable projects have a short lead time of a few years, and many new projects are likely not yet in the queue. Also contributing to the greater supply are the development of small renewable projects "behind the meter" and the purchase of RECs from projects in neighboring balancing authority areas, which could help meet any shortfalls. Alternatively, affected LSEs can make Alternative Compliance Payments to the states' clean energy funds, which help finance new renewable projects.

[253] New England has the potential for developing over 215 GW of wind generation (see Section 9.3). New England also has cooperated regionally to promote the development of renewables and import them from the neighboring Canadian provinces (see Section 12.2.2).