

Biomass Power Generation and REC Markets
Governor's Panel on Optimizing Wood Harvesting
Nathan Hebel – Dec 11, 2008

Introduction

The intent of this document is to give a brief overview of what a Renewable Energy Certificate (“REC”) is and how the REC market works in practice. We will also discuss the eligibility requirements for New England state Renewable Portfolio Standards (“RPS”) and the role biomass power plays in this market.

What is a REC?

Put most simply, RECs are the environmental attributes of power generation from a specific generator. By convention, 1 REC is created side-by-side for every 1 MWh of power generated. The two products (RECs and power) are marketed separately and are typically sold independent of each other.¹ The separation of these products allows for buyers and sellers to meet for only the products that they are interested in. For example, an energy marketer can satisfy their power needs from a fossil fuel generator and then buy RECs from a biomass power plant in order to have a full green power product to the end user.

RECs derive value only to the extent that there is a demand for renewable power. There are two main sources of demand for RECs: the voluntary market and the compliance market. In the voluntary market, customers who are interested in having all or a portion of their power usage from renewable resources access the market to find RECs from generators who meet their specific renewable criteria. These RECs are often aggregated together by intermediaries for more efficient exchange. Compliance RECs are ones which are eligible to satisfy state Renewable Portfolio Standards (“RPS”). Voluntary RECs are an important and growing part of the renewables market, but for the purposes of this panel we will focus our attention on compliance RECs.

What is an RPS?

Due to electricity deregulation in many states, the opportunity to provide power to end-use customers no longer sits with the local utility. Instead, that obligation is met by third parties called Load Serving Entities (“LSE”) who compete in an open market. When LSEs provide power to the customer, they must also meet other obligations. These obligations are typically driven by the needs and goals of the state and the power grid in which the customer is located. One of these obligations is often a state RPS.

An RPS is a requirement where a minimum % of power delivered to the end user must be renewable. These % generally rise over time. The method of meeting this % target is by

¹ Note that capacity and ancillary services are 2 additional products from a power generating facility that are also marketed and sold separately. Similar to any other enterprise, power generation uses various separate product lines in order to diversify revenue streams.

procuring RECs which are eligible for that state RPS. 5 out of 6 New England states (including Maine) have an RPS.²

As each state determines their own RPS according their energy goals, the rules are different for each state. Some areas of differential treatment are: magnitude of % requirements now and in the future, eligibility standards for renewable fuel types³, alternative compliance payment (“ACP”) levels when RECs are not procured⁴, power deliverability requirements, behind-the-meter eligibility, number of REC classes required, and market-stability measures such as banking provisions.

Eligibility

RPS programs at the class I level are intended to promote improved and new renewable power sources. As such, RECs are not subsidies, windfalls, or handouts for existing generators. All New England state RPSs have either stringent technical standards, capacity addition standards, or both. As such, participation by biomass resources (new or existing) requires substantial investment before the first REC is printed. The business case for investing to meet eligibility standards includes material risk due to uncertainties in the market, the regulations, and the final technical achievement from an efficiency and emission profile perspective.

Below in *figure i* is a summary table of New England state RPS and some rules specific to biomass power production.⁵

	ME	CT	MA	NH	RI
% req. 2009	2%	6%	4%	0.5%	2%
% req. 2020	10%	20%	15%	11%	14%
Biomass tech standard	New: no Existing: refurbishment to significantly increase efficiency	NOx emission limit	NOx and PM emission limits	NOx and PM emission limits	no
Biomass “new” standard	yes, with tech standard for existing and incremental existing	no	yes, incremental existing allowed	yes, incremental existing allowed	yes, incremental existing allowed
Biomass fuel standard	none	cultivated and harvested in a sustainable manner	eligible biomass as listed by regulations	eligible biomass as listed by regulations	eligible biomass as listed by regulations
Behind-the-meter allowed?	pending	yes, all ISO-NE	yes, all ISO-NE	NH only	RI only

fig. i

² Vermont currently has renewable portfolio goal, which is not legally binding at this time.

³ Commonly eligible fuel types at the class I level are wind, solar, geothermal, biomass, tidal, and landfill gas. Also sometimes included are small run-of-river hydro and fuel cell technology.

⁴ ACPs work to help create a monetary value for the product as well as to serve as an ensured maximum price the LSE will have to pay to meet the obligation. ACPs are typically in the \$55-\$60 range at the moment.

⁵ Note that the values given here are for Class I or “new” status RECs for each state in cases where more than one class exists. Additional Class II or Class III RECs in some states are intended to provide small incentives for existing facilities to maintain operations at the *status quo* and are not the subject of this summary. Other more comprehensive reviews are available at the links provided in the References section of this document.

Market Mechanics

Generators who are eligible for a specific state and class level (if applicable) are then assigned RECs according to their MWh production in a given calendar quarter. Trading of this product is done on an over-the-counter basis as buyers and sellers meet on price and volume for specific vintage years. There is no standardized exchange where the products are quoted and traded, although brokerage houses do help facilitate some transactions. REC markets in New England are still quite young and are experiencing typical growing pains. The market is generally illiquid as transactions are infrequent, small in size, limited in term length⁶, and often confidential. Price volatility can be very high as small shifts in supply or demand can have large price impacts as trading periods for vintage years come to a close.

REC product creation, exchange, and retirement are typically handled electronically through the NEPOOL Generator Information System (“GIS”). This system ensures that only parties with eligibility are generating the appropriate RECs and that each REC is only sold once. For generation in the NMISA area, verification of compliance with the portfolio requirement must be through market settlement data and other documentation that reveal the resources used to serve customers.

Geographical Considerations/Behind-the-Meter

Despite the differences in some eligibility standards, one common trait among New England state RPSs is that power can be delivered anywhere in ISO-NE in order to be eligible for REC generation.⁷ The premise to this is that power delivered into the ISO is to the benefit of the region as a whole and is not tied to any one state.

There is some divergence of treatment with respect to generators located within ISO-NE, but that are serving load behind-the-meter (“BTM”). In this case, Rhode Island and New Hampshire have determined that only BTM generators within their state will be eligible for the RPS. Connecticut and Massachusetts have determined that any ISO-NE area BTM generation is eligible as long as a competent third party reads and verifies the generation meter. Maine regulations are unclear on this point, and an open docket is serving as a test case to the matter.⁸

In Connecticut, the relevant document is the application of Pratt and Whitney for eligibility of a Cape Cod Community College Fuel cell in Docket 04-05-13. The Connecticut Department of Public Utility Control said in part:

⁶ Most transactions are “spot,” meaning delivery is for the current calendar year, and virtually all trades are for 3 years or less.

⁷ The one exception to this is the Maine RPS, where delivery into NMISA is also considered eligible.

⁸ Please see MPUC Docket No. 2008-173 – REQUEST FOR CERTIFICATION FOR RPS ELIGIBILITY (LINCOLN PAPER AND TISSUE, LLC.)

Recognizing the value and benefits of small electric generators, the Department hereby reverses its position in the MWRA Decision and allows all behind-the-meter and off-grid renewable resources located within the jurisdiction of ISO-NE and within the jurisdiction of New York, Pennsylvania, New Jersey, Maryland, and Delaware⁹ to qualify for Connecticut RPS. The Department will conduct on-site audits of behind-the-meter and off-grid RPS generators located in Connecticut on a quarterly basis. However, based on the reasons set forth previously, the Department will require those behind-the-meter or off-grid generators located outside of Connecticut to be similarly audited by at least one entity with competent jurisdiction.¹⁰

In Massachusetts, the recently signed Green Communities Act now follows the lead of Connecticut with similar conditions:

A renewable energy generating source may be located behind the customer meter within the ISO-NE, as defined in section 1 of chapter 164, control area if the output is verified by an independent verification system participating in the New England Power Pool Generation Information System, in this section called NEPOOL GIS, accounting system and approved by the department.¹¹

It is clear that pulp and paper operators in Maine who self-supply a portion of their power needs BTM already have the opportunity to participate in the New England REC markets on a level playing field with grid-connected generators in at least 2 states (which represent at least 75% of total REC demand in New England on a going-forward basis).

Biomass Fuel Standards

Aside from the previously mentioned technology and capacity addition standards imposed on biomass producers looking to enter the REC market, there are also fuel standards in place. In the case of Connecticut, biomass must be harvested in a sustainable manner. The law then goes on to provide a lengthy description their definition of “sustainable biomass.” Massachusetts, Rhode Island, and New Hampshire all maintain lists of fuels considered eligible for their programs. Maine does not make reference to specific biomass fuels or criteria with respect to the Maine new RPS; however, forestry activity in Maine is still bound by sustainability rules.¹²

Impact on Biomass Use

⁹ Note that subsequent regulations amended the potential jurisdictions to be only the geographical area of ISO-NE.

¹⁰ CT DPUC Docket No. 04-05-13 Final Decision

¹¹ Massachusetts Chapter 169 of the Acts of 2008, Section 32.

¹² MRS Title 12 Section 8869, MRS Title 12 Section 8876-A, Maine Forest Service Chapter 23 Rule, and Maine Forest Service Chapter 20 Rule

To the extent that REC markets attract investment in new biomass facilities or new facility uprates, then one could imagine that New England state RPS would have an impact on biomass use in the state where the facility is installed. To date, only one new facility has been added since the inception of the RPS programs. The PSNH Schiller station in Portsmouth, NH has retrofitted one of their boilers to take wood instead of coal, and has gained eligibility in the Massachusetts RPS.

To the extent that REC markets attract investment in existing and currently operating facilities in order to increase efficiency and reduce emissions, then the efficiency gains would have the effect of *reducing* biomass use.

Conclusion

Renewable Portfolio Standards in New England create opportunities for both new and improved renewable power generation from many sources, including biomass. Biomass power producers, both grid-connected and behind-the-meter, have the business opportunity to participate in these markets but must also assume the investment costs and risks involved. Those who do participate are providing a product that has been demanded by 95% of the electricity load in New England.

APPENDIX A

References

State regulations:

Maine: http://www.state.me.us/mpuc/doing_business/rules/Chap-311_000.doc

Connecticut: <http://www.ct.gov/dpuc/cwp/view.asp?a=3354&q=415186>

Massachusetts: existing regs <http://www.mass.gov/Eoeea/docs/doer/rps/225cmr.pdf>

Massachusetts: new law <http://www.mass.gov/legis/laws/seslaw08/sl080169.htm>

Rhode Island: <http://www2.sec.state.ri.us/dar/regdocs/released/pdf/PUC/4694.pdf>

New Hampshire: <http://www.puc.state.nh.us/Regulatory/Rules/Puc2500.pdf>

Summary Information:

<http://www.dsireusa.org/>

<http://www.eia.doe.gov/fuelrenewable.html>

APPENDIX B

Summary of REC Demand

Table 8-3
Required RPS Percentages of Annual Electric Energy Use that Renewable Resources Must Provide for Load-Serving Entities

Year	CT Classes ^(a)			MA Class ^(b)	ME Classes ^(c)		RI Classes ^(d)		NH RPS Classes ^(e)				
	I	II	III	I	I	II	Existing	New	I	II	III	IV	
2008	5.0	3% in all years	2.0	3.5	1.0	30% in all years	2.0	1.5	0.0	0.0	3.5	0.5	
2009	6.0		3.0	4.0	2.0		2.0	2.0	2.0	0.5	0.0	4.5	1.0
2010	7.0		4.0	5.0	3.0		2.0	2.0	2.5	1.0	0.04	5.5	1.0
2011	8.0		4.0	6.0	4.0		4.0	2.0	3.5	2.0	0.08	6.5	1.0
2012	9.0		4.0	7.0	5.0		5.0	2.0	4.5	3.0	0.15	6.5	1.0
2013	10.0		4.0	8.0	6.0		6.0	2.0	5.5	4.0	0.2	6.5	1.0
2014	11.0		4.0	9.0	7.0		7.0	2.0	6.5	5.0	0.3	6.5	1.0
2015	12.5		4.0	10.0	8.0		8.0	2.0	8.0	6.0	0.3	6.5	1.0
2016	14.0		4.0	11.0	9.0		9.0	2.0	9.5	7.0	0.3	6.5	1.0
2017	15.5		4.0	12.0	10.0		10.0	2.0	11.0	8.0	0.3	6.5	1.0
2018	17.0		4.0	13.0	10.0		10.0	2.0	12.5	9.0	0.3	6.5	1.0
2019	19.5		4.0	14.0	10.0		10.0	2.0	14.0	10.0	0.3	6.5	1.0
2020	20.0		4.0	15.0	10.0		10.0	2.0	14.0	11.0	0.3	6.5	1.0
Use Generator Information System renewable energy certificates?	Yes			Yes	Yes		Yes		Yes				
Purchase of Renewable Energy Certificates (RECs) from outside ISO New England allowed? ^(f)	Yes, from adjacent areas, with confirmation of delivery of energy from the renewable energy source			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 landfill gas and fuel cells can be used to meet Class II requirements. For Class III, CHP facilities can be used to offset generation on the grid with the more efficient on-site use of fuel.
 (b) The MA Department of Energy Resources (MA DOER) has yet to determine the specific percentage requirements for Class II resources, which would add to the MA's RPS Class I requirements shown on the table. Also, the provision for DOER to review the annual 1% growth in RPS requirements has been rescinded in the 2008 energy bill (S. 2768; <http://www.env-ne.org/public/resources/pdf/S2540-08.pdf>).
 (c) The 30% requirement refers to electric energy delivered to LSEs.
 (d) Existing resources can make up no more than 2.0% of the total.
 (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.
 (f) A Renewable Energy Certificate represents the environmental attributes of 1 MWh of electricity from a certified renewable generation source for a specific state's RPS. Providers of renewable energy are credited with RECs, which usually are sold or traded separately from the electric energy commodity.

Source: ISO-NE 2008 Regional System Plan