

CommonWealth

Resource Management Corporation

MEMORANDUM

TO: Nantucket Energy Study Committee:
Madaket Wind Turbine Economics Subcommittee
FROM: George H. Aronson, CRMC
RE: Renewable Energy Credits
DATE: 1 February 2012

This memo defines and describes the creation, sale and pricing of renewable energy credits (RECs) in the context of the economics of the Madaket Wind Turbine project. Additional information on RECs can be found on-line at <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/rps-and-aps-program-summaries.html>, at <http://www.mass.gov/eea/docs/doer/rps/rps-aps-2010-annual-compliance-rpt-jan11-2012.pdf> and at many other web-sites.

REC Creation

RECs are a product of a regulatory program of the Commonwealth of Massachusetts¹ to encourage development of new facilities to generate electricity for renewables sources. In particular, since 2003, all of the privately-owned entities that sell electricity to retail customers in Massachusetts (known as Load-Selling Entities, or LSEs²) are required to purchase a certain percentage of the electricity they sell from renewable sources. LSEs can satisfy this obligation by buying a sufficient number of RECs. Implementation of this requirement involves the following steps:

1. Facilities that generate electricity from eligible renewable sources³ become eligible for the program by registering with the Massachusetts Executive Office of Energy and Environmental Affairs (Mass EEA).
2. Once registered, the eligible facilities report their actual metered output each month to a New-England-wide registry, which documents the creation and ownership of the RECs. One REC can be created for each MWh of net generation.
3. Once created, the RECs can be sold to LSEs as follows:

¹ The program is known as the Renewable Energy Portfolio Standard, or RPS program.

² The LSEs include the four Massachusetts investor-owned utilities – National Grid, NStar, Western Massachusetts Electric Company and Unitil – as well as more than 30 competitive suppliers that sell electricity at retail in Massachusetts, such as Constellation, Dominion, TransCanada, Nextera and Con Ed Solutions.

³ Eligible renewable sources include wind, solar, small hydropower sources, tidal/wave power, landfill gas, geothermal energy and certain biomass fuels.

- Direct sale during one of the four annual trading periods, which occur starting on January 15, April 15, July 15 and October 15 of every year for RECs associated with generation from months in the calendar quarter prior to the quarter that concluded prior to the trading period.⁴
- Forward transfers, in which the RECs are sold after they are created, but in advance of the trading period. Under this approach, RECs created in January can be sold as soon as February 1.

The Madaket Wind Turbine would clearly be an eligible resource to create what are known as Massachusetts Class I RECs. The turbine would file to become eligible during construction to ensure that all RECs are eligible to be reported and sold immediately upon start of operation.

REC sales and prices

REC prices are determined by the balance between the demand for RECs (to satisfy the regulatory obligation of the LSEs) and the supply of RECs being generated, registered and sold, as well as the cost to the LSEs of failing to meet their regulatory obligations.

The demand for RECs depends on the following factors:

- The actual percentage of retail sales that defines the LSE obligation to buy. In 2012, LSEs are required to purchase RECs in the amount of 7 percent of their electricity sales. That obligation will increase by 1 percent each year until 2020, at which point LSEs will be obligated to purchase RECs in the amount of 15 percent of their electricity sales.
- Retail electricity sales. When more electricity is sold, the demand for RECs increases. When less electricity is sold, the demand for RECs decreases. Electricity sales, and the demand for RECs, increased sharply during the economic boom from 2003 through 2006. In 2007 through 2010, when the economy experienced a downturn, the demand for RECs decreased accordingly. Recently, electricity sales have begun to increase again, which has resulted in increases in the demand for RECs.
- Brokering and inventory activities. The regulations governing REC obligations incorporate provisions for REC banking and storage from year to year. When brokers are buying, or when LSEs are buying extra RECs as inventory for future years, demand increases. When brokers are selling, or when LSEs are making withdrawals from inventory, demand decreases.

The supply of RECs depends on the number of eligible generators, and the amount of output that such generators register and sell in any given time period. Note that the Mass EEA has some ability to regulate the supply of RECs by revising the eligibility criteria, particularly those related to (a) what constitutes an eligible biomass fuel; and (b) conditions under which out-of-state facilities are eligible to participate in the

⁴ For example, RECs associated with electricity generated in January, February or March can be traded and sold in the trading period that starts July 15.

Massachusetts market. The Mass EEA has used its authority to restrict the REC supply from such sources, which has had the effect of reducing REC supplies and increasing REC market prices.

LSEs that fail to purchase sufficient RECs to meet their regulatory obligations are required to make payments in the amount of what is known as the Alternative Compliance Price, or ACP. In 2012, the ACP is \$64.02 per MWh. The ACP, which escalates annually with the Consumer Price Index, acts as a price cap on REC purchases, because no rational LSE would pay more to purchase a REC than it would pay as a penalty for failure to purchase the REC.

REC market price experience

At the start of the REC program, the demand for RECs exceeded the supply, and prices tended to reflect modest discounts off the then-current value of the ACP. From 2003 through 2006, RECs often sold at prices that exceeded \$50 per MWh.

From 2007 through 2009, the supply of RECs exceeded the demand, in part due to reduced electricity retail sales from the economic downturn and new eligible facilities entering commercial operation. REC prices fell, bottoming out at about \$15 per MWh in 2010. LSEs took advantage of the low prices to buy and bank extra RECs in inventory.

In 2011, the demand for RECs again began to exceed the supply, inventories were emptied, and prices began to rebound. Price increases were blunted by LSEs use of RECs banked in inventory from prior years to meet their regulatory obligations.

In 2012, REC prices are rising again, in part due to the continuing increase in the regulatory obligation, the recovery of electricity retail sales and certain limitations on eligibility standards. Recent broker reports indicate market prices in early 2012 in the high \$30s and low \$40s per MWh.

REC price forecasts for the Madaket Wind Turbine

The Madaket Wind Turbine would generate in the range of 3200 to 3800 RECs per year, which could be sold to any LSE. As a practical matter, such RECs would likely be sold at a discount from the prices in broker reports for two reasons. First, the Town would sell RECs on a “unit contingent basis,” because the number of RECs being sold would vary from month to month with variations in the turbine output. Prices for RECS sold on a unit-contingent basis tend to be discounted from prices for RECs sold on the basis of a guaranteed quantity. Second, if the Town prefers to receive its revenue in advance of a trading period, it would need to sell the RECs through a forward transfer. Forward transfers also typically involve a discount off trading period prices.

In recent years, LSEs have offered to purchase RECs under fixed-price contracts having terms of up to one year, but have been reluctant to commit to purchase at fixed prices for longer terms without steep discounts. Thus, it is not reasonable to expect that the Town

could procure a contract to sell its RECs at a reasonable price for a 10-year term or longer – or even for a three-year term. Indeed, some facilities that are eligible to generate RECs have been financed without such fixed-price contracts on the expectation that the demand for RECs will continue to be strong at least through 2020 and beyond.

By way of disclosure, CRMC has sold and been involved in sales of RECs from certain small facilities since 2005. Prices for RECs sold through forward transfers on a unit-contingent basis, including small odd lots of RECs, have ranged from a high of \$54 per MWh in 2006 down to \$15 per MWh in 2011. Recent prices for odd lots of RECs sold on a unit-contingent basis through forward transfers have been on the order of \$30 per MWh.

For the purposes of the Madaket Wind Turbine, CRMC recommends that the pro forma base its projections of revenues on a flat value of \$30 per MWh for at least the first ten years of the life of the project without escalation. The value of \$30 per MWh represents a price that can be achieved and exceeded in today's market for RECs from a unit-contingent source in the quantities that the turbine is projected to produce, and for which one-year purchase contracts can be obtained. The value of \$30 per MWh is somewhat below the long-term average market price for such RECs since the market opened in 2003.

CRMC notes that the demand for RECs is projected to increase significantly as a result of both (a) the rebound in electricity sales from the low levels experienced during the economic downturn and (b) the increasing share of sales that constitutes the regulatory obligation of the LSEs to purchase RECs, rising from seven percent in 2012 to 15 percent in 2020. For that reason, it is quite plausible that, in certain years, the Town might realize the benefits of REC prices that exceed \$30 per MWh.

As a sensitivity case, the Town might reasonably evaluate the impact of a decline in the REC price to \$15 per MWh, which is what occurred in the aftermath of the economic downturn in 2010 and 2011 (CRMC sold RECs at prices that exceeded \$30 per MWh in 2008 and 2009 despite the economic difficulties in those years). The historical record does not support a case that would have REC prices stay at \$15 per MWh over a period of more than two years.

Some have suggested that the Town should not consider revenues from REC sales, because the market for RECs is a regulatory creation that might be abrogated by a change in law. CRMC disagrees. The REC program has proven to be a popular and stable program that uses a market-based mechanism to provide renewable electric generation facilities with additional revenues to support their viability. The state Department of Public Utilities has approved mechanisms for regulation and recovery of costs of the REC program to the investor-owned utilities. The legislature has already acted once to expand the program (in 2008), and bills have been filed to expand the program further. These factors support the view that the program is likely to be maintained, and in fact might be expanded, rather than be cut back or overturned.