Town of Falmouth
DPW / Wastewater Treatment Facility Site

Preliminary Wind Turbine Financial Analysis

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WITH SUPPORT FROM:

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1 SUMMARY

Preliminary financial analysis indicates that a single turbine wind project at the DPW site would likely require outside financial support in order to be cost-effective for the Town of Falmouth and/or a private wind developer. The total cost of a single turbine project is in the range of 2.75 million to 3.58 million. The project would have to earn revenues (levelized over 20 years) in the range of $90 to $110 per megawatt-hour[1] ("MWh") for a privately-financed project, and $85 to $105 per MWh for a municipally-financed project. Project revenue streams would be from three primary sources: (1) sale of power to the Town of Falmouth for use on-site, (2) sale of surplus power into wholesale power markets, and (3) sale of renewable energy certificates ("RECs"). Based upon the assumed value of power and RECs, the project could experience a cash-flow shortage (levelized over 20 years) of up to $45 per MWh for a privately-financed project, and up to $40 per MWh for a municipally-financed project.

Project investors are likely to require long-term contracts with creditworthy parties for sale of power and RECs. This is especially true for RECs because the REC market is relatively new and depends upon government mandates such as the Massachusetts Renewable Portfolio Standard ("RPS"). Unfortunately, there are few, if any, creditworthy parties entering into long-term REC contracts.

The Massachusetts Technology Collaborative ("MTC") is evaluating program approaches to support community wind projects. The most likely approach is for MTC to make an up-front purchase of RECs from such projects. This approach has the benefits of (a) reducing project requirements for capital from other sources, (b) preserving federal tax benefits, and (c) eliminating uncertainty relating to the value of

[1] One MWh equals 1,000 kilowatt-hours (kWh). A price of $45/MWh is equivalent to 4.5 cents/kWh.

RECs in the future. Although this analysis assumes a portion of MTC financing, the level of MTC financing commitment for any particular project requires approval of the MTC Board of Directors.

2 BACKGROUND

2.1 Project Costs and Revenue Streams

In order to be a successful investment, the project must have annual revenues sufficient to support project financing and operating costs. Financing costs may include principal and interest payments to debt providers, and distributions to equity investors. Operating costs may include monthly or annual payments for:

- financing;
- land lease;
- vendors for project management and oversight services;
- vendors for operations and maintenance services; and
- the funding of overhaul or decommissioning costs.

The project must have sufficient revenues (or offsets) from the following sources to meet cash-flow requirements and otherwise provide the required financial return on investments:

- sale of power to the site-owner for use on-site;
- sale of power to third parties;
- sale of renewable energy certificates ("RECs"); and
- federal wind energy production tax credits.

2.2 The Need for Revenue Certainty

The technical and financial performance of power generation projects can be predicted but not guaranteed. Project financiers are generally unwilling to invest in a project without certainty that the project's output can be sold at a price sufficient to repay debt and provide investor returns. The project financial structure will allocate power and REC sales cash-flow risk to specific parties:

1. Power sales – power plant owners typically minimize their exposure to falling power sales prices by entering into long-term power sales contracts with a creditworthy party (e.g. a utility).
2. REC sales– there are few, if any, creditworthy parties entering into long-term contracts to purchase RECs. As a short-term solution, MTC has entered into long-term REC purchase commitments with certain renewable project developers under its Massachusetts Green Power Partnership and has placed funds into escrow accounts to back up its purchase commitments. In this manner, MTC assumed the risk that REC prices will have a minimum value in the future. MTC anticipates that a similar model could be used to provide REC price certainty for Community Wind projects; however, the level and timing of any financial commitments are subject to approval by the MTC Board of Directors.

2.3 Ownership Options

Preliminary financial results are presented for the following potential project ownership and financing options. Please note the special considerations listed in Section 4.

	(1) Municipal	(2) Private	(3) Municipal / Private Partnership ("Flip")
Features	• Municipality owns and manages the project • Funded by municipality	• Private entity develops, owns project	• Private entity develops and owns for 10 years • Municipality becomes majority owner in year 11
Pro	• Lower cost of capital • Tangible community ownership	• Captures federal tax credit • Minimizes community management obligations	• Captures federal tax credit • Potentially higher overall return to community
Con	• No federal tax credit • Legal issues • Requires municipal management role which increases cost	• Higher cost of capital • Potentially, less community support	• Higher cost of capital • Legal issues • Deal complexity increases cost

3 FINANCIAL ANALYSIS METHODOLOGY AND RESULTS

3.1 Methodology

MTC has developed a spreadsheet-based Community Wind Financial Modeling Tool to help MTC and communities understand:

- the economic drivers of any wind energy project;
- the risk and return potential of Community Wind installations;
- the relative impact of inputs such as wind resource, power prices and financing structures; and
- whether to proceed with a project, and under which ownership and financing arrangement.

The model allows us to evaluate various financing scenarios and assumptions within the framework of a single spreadsheet. Model output presents required project investments and financial returns for each participant (e.g. community, private developer).

The model calculates a project owner's returns using one of two selected capital structures. The first assumes 100% equity financing, where the net present value is evaluated entirely against the investor's desired equity returns. The second assumes maximum sustainable debt. In this case, rather than defining the debt/equity split, the project takes on as much debt as it can pay off, subject to an input debt term and debt service coverage ratio. The net present value measures the project's ability to return the equity capital invested on top of the project debt.

3.2 Assumptions

We have used the following conservative assumptions in the financial analysis:

Project Technical and Cost Aspects

1.	Average wind speed at 80m above ground level	6.83 meters per second
2.	Project capacity factor	25.9%
3.	Percent of power used on-site (wastewater plant and DPW garage)	18 to 20%
4.	Total project cost range	$1,800 to 2,200 / kW

Value of Power and RECs

5.	Value of power used on-site (i.e. retail rate paid by Falmouth)	$125 / MWh (+2.5% / yr)
6.	Price of power sold for on-site use (private developer model)	$125 / MWh (+0.0% / yr)
7.	Value of power sold off-site to third party	$50 to $70 / MWh
8.	Short-term value of RECs	$40 - $50
9.	Long-term value of RECs	$15 - $25

Financing – private

10.	Private financed equity percentage	100%
11.	Required return for financier	8%
12.	Finance term	20 years
13.	Federal wind production tax credit and accelerated depreciation	Fully utilized

Financing – municipal

14.	Finance term	10 years
15.	Bond interest rate	4.5%
16.	Sources of capital	
	a. Town debt as a percentage of total capital cost	1/3
	b. Town cash contribution as a percentage of total capital cost	1/3
	c. MTC REC payment as a percentage of total capital cost	1/3

Decommissioning

17. Reserve account established in year 11 of operation

3.3 Preliminary Financial Results

To serve as a basis for comparison with current power rates, we have calculated the project revenue requirements levelized over 20 years assuming a privately-owned and financed project. The results for a single turbine project at the Falmouth site are presented in **Table 1**. Inserting the combined power and REC cash-flow assumptions, we estimate the shortfall in project cash flows.

Table 1. 20-Year Levelized Revenue Requirements in $ per MWh.

	Municipal Financing	Private Financing
Revenue Requirements (Single Turbine Project)	$85 - $105	$90 - $110
Combined power and REC cash-flow	$65 - $95	$65 - $95
Shortfall	Up to $40	Up to $45

With the assumption that MTC contributes to the project in the form of an up-front payment for RECs, the financial performance of the project is presented in **Table 2** below. Results are presented for three ownership and financing methods (see Section 2.3). Financial assumptions are described in Section 3.2.

Table 2. Preliminary Financial Analysis for Three Ownership Options

		(1)	(2)	(3)
		Municipal Ownership	**Private Ownership**	**Partnership (Flip)**
(a)	**# of turbines**	1		
(b)	**Total Project Cost**	($2.750 million to $3.575 million)		
(c)	**Assumed MTC Financial Support [1]**	≈$600K to $1,250K		
	PROJECT ECONOMICS			
(d)	Annual Power Sales Revenue	$225,000 including sales to WWTF		
(e)	Annual Expenses	($100,000) includes payment to town		
(f)	Annual Operating Cash Flow (before pmt of debt, equity,& tax)	$125,000		
	TOWN ECONOMICS			
(g)	Initial Capital Investment	($2.75 M-$3.58 M)	$0	≈($300,000)
(h)	Average Annual Cash Flow - Town[2]	$25K / $150K	$21,000	$21K / $150K
(i)	10 Year NPV – Town[3]	($375,000)	$155,000	$35,000
(j)	20 Year NPV – Town[3]	$150,000	$245,000	$450,000
	PRIVATE INVESTOR ECONOMICS			
(k)	Private Investor IRR	n/a	~ 8%	~ 8%

1. Based on current market conditions; will be refined when project costs are known.
2. Years 1-10 / 11-20, except when cash low goes to decommissioning reserve fund.
3. Assumes 5.5% discount rate. In Municipal-owned model, assumes 10-year, 4.5% debt, and municipal cash contribution of ≈$1 million.

4 SPECIAL CONSIDERATIONS

4.1 Wind Turbine Costs and Availability

Growth of the wind power industry over the past several years, combined with recent extension of the federal wind production tax credit, has created unprecedented demand for wind turbines. This demand is causing wind turbine prices to rise and extending the timeframe for delivery of turbines. Relatively small projects in regions without a high level of wind development activity face significant challenges in this climate. With this in mind we note that project financial results may be enhanced by incorporating timing flexibility into the process. For example, turbine prices may be higher when earlier delivery is required.

4.2 Other Cautionary Notes

- MTC Financial Role – MTC is willing to financially support the construction of community wind projects. However, the amount of support provided to each project must be approved by the MTC Board of Directors.

- Financial concerns
  - The use of tax exempt municipal bonding may not be allowed for a project that sells wholesale power.
  - The federal wind production tax credit will expire on December 31, 2007 unless extended by Congress.
  - The transaction costs for a municipal project (legal costs, personnel, establishment of entity) is unknown.
  - The new federal CREBS process is unknown at this time.

- Legal concerns
  - Municipalities are likely to require special legislative authority to own wholesale power projects. This is according to a legal opinion commissioned by MTC.
  - Municipal bonding capacity on energy facilities is limited to 10 years. Special legislative approval is also needed to extend this capacity to 20 years.