

LYME ENERGY COMMITTEE
MINUTES
December 20, 2010

PRESENT: Matt Brown, Mike Morton, Gary Phetteplace, Carola Lea, Sue MacKenzie, Dan O'Hara, Becky Lovejoy

Guest: Mark Bolinger, Ross McIntyre

ABSENT: John Gartner, Charles Regan

Meeting called to order by Becky at

Minutes of the November meeting were approved as written.

1. Topic: Presentation on Wind Energy By Mark Bolinger.

Wind Power in Lyme?

Mark Bolinger MABolinger@lbl.gov 795-4937

Lyme Energy Committee December 20, 2010

1 Overview

1) Overview of Wind Resource in (Northwest) Lyme

• Resource requirements (turbine power curves) • Modeled wind speeds

2) **Small Wind: ≤100 kW** • Customer side of the meter (offset consumption) • Performance issues and competition from solar (PV)

3) **Large Wind: >100 kW**

• **Two Applications** – Customer side of the meter (offset consumption) – Utility side of the meter (power sale)

• Siting Issues in Lyme

4) **Pie in the Sky: Piggyback on Wind Projects Outside of Lyme**

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Small Wind Turbines

Skystream (2.4 kW) Northwind (100 kW)

Tower height from 10.2 m Tower heights are 30 or 37 meters

3 (33.5 ft) to 21.3 m (70 ft)

(98 or 121 feet)

Small Wind Turbines

Skystream (2.4 kW)

Cut-in: 3.5 m/s Max: 13 m/s Cut-out: 25 m/s

Need at least 4.5 m/s Best results >5.4 m/s

Northwind (100 kW)

Cut-in: 3.5 m/s Max power: 14.5 m/s Cut-out: 25.0 m/s

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Modeled Average Wind Speed: Northwest Lyme

Small Wind: Need at least 4.5 m/s (10 mph), best results >5.4 m/s (12 mph) **Large**

Wind: Need at least 7 m/s (Class III wind regime)

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Small Wind: ≤ 100 kW • Primarily used in off-

grid or grid-connected net-metering applications

- Only a few “established” manufacturers: Bergey, Southwest (maker of Skystream), Proven, Northern Power, maybe one or two others
- Many other “unproven” manufacturers out there – buyer beware
- Nationwide certification program just getting underway
- Several recent studies of small wind turbine performance (or lack thereof) have given small wind a bit of a black eye
- The culprits:
 - Average wind speed at site is less than anticipated – Turbulence (wind turbines hate turbulence) – Towers that are too short (enhances turbulence) – Extended inverter cut-outs from gusts miss the strongest winds – In some cases, just shoddy equipment

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Recent Example of the “Headwinds” Facing Small Wind

Recent review of small wind turbines in Saskatchewan is one of several studies in the past few years to demonstrate that small wind is underperforming relative to expectations (and relative to solar PV)

Source: Kelly Winder, Saskatchewan Research Council, 12/08/2010

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Small Wind Faces Stiff Competition From PV

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\$16 \$14 \$12 \$10

\$8 \$6 \$4 \$2 \$0

Installed Cost of Small Wind vs. PV

Data from NH Rebate Program

161 PV systems and 3 small wind systems (in red)

012345 System Size (kW)

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Installed Cost (\$/W)

Large Wind: > 100 kW

Two Applications: On-Site and Wholesale Supply

1) Onsite (self-supply)

- Interconnect on the ratepayer side of the electric meter
- Offset onsite power consumption
- Need a large enough load to absorb power and energy, because net metering in NH is limited to systems ≤ 100 kW
- Any large enough loads in Lyme? Skiway is seasonal...

2) Wholesale Supply

- Interconnect on the utility side of the electric meter • Sell power to the grid on a wholesale basis • Much more involved
- Need a good wind site to make the project economically feasible based on wholesale power prices

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Siting Issues in Lyme

The best winds will be on mountain tops and ridgelines 1) Skiway (Winslow Mountain ~2000 foot elevation)

Pros: Land already disturbed, significant load (though seasonal), other NE ski areas doing it, existing wind measurements, Dartmouth involvement(?)

Cons: AT nearby, peregrine falcons nearby, bear studies nearby, Dartmouth involvement(?)

2) Other high ground in Lyme?

•••••

Land most likely “pristine” (or at least not developed like the Skiway) Proximity to AT could still be an issue (turbines visible from far away) Lack of nearby transmission?

“Ridgeline conservation districts” – see next slide

Bottom Line: Utility-scale wind in Lyme likely a non-starter

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Excerpt from Lyme Zoning Ordinance Section 3.27.6: “The primary objective of the Ridgeline and Hillside Conservation District is to protect the Town's scenic and rural character by providing that development be carried out so as to be visually unobtrusive to the greatest extent reasonably practicable while permitting the landowner to exercise his property rights. The Ridgeline and Hillside Conservation District shall not include land in the Skiway District used in conjunction with Skiing Facilities.”

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A “Pie in the Sky” Alternative(?)

Try to “piggyback” on other utility-scale wind development in NH

- See if the developer is willing to split off a portion of the project for “community” ownership

- Developer may see this as a way to gain public acceptance

Community portion could be financed via a “private placement” or an “intrastate offering”

- Private placement involves limited offering to mostly “accredited” investors • Intrastate offering opens it up to anyone in the state (see next 2 slides)

But what’s the Lyme connection?

- Maybe a project developed by Wagner? Is that strong enough? • Other?

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South Dakota Wind Partners, LLC

First Intrastate Offering Combining Debt and Equity

Project Overview:

- 10.5 MW (7 x 1.5 MW GE turbines) project, piggybacking on Basin Electric Power Cooperative’s adjacent 151.5 MW “PrairieWinds SD1” project

- Basin will construct and operate both projects (all 162 MW) and will also buy the power from SDWP’s 10.5 MW

- SDWP will pay Basin 6.48% (=10.5/162) of total construction and operating costs (but power sale will be from 7 specific turbines)

- SDWP’s 6.48% portion of overall project is expected to cost ~\$23.5 million

- SDWP initially formed by 4 organizations to enable their members (and other SD residents) to directly invest in wind power

– East River Electric Power Cooperative initiated and championed the project – Joined by SD Corn Utilization Council, SD Farmers Union, SD Farm Bureau

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South Dakota Wind Partners, LLC

First Intrastate Offering Combining Debt and Equity

- **3 share classes offer varying combinations of equity and 6.5-year note:** – Class A: \$750 equity, \$14,250 note paying 7% (~\$7 million raised in 2 weeks) – Class B: \$1,500 equity, \$13,500 note paying 6.75% (~\$4.5 million in 4 weeks) – Class C: \$14,250 equity, \$750 note paying 5.5% (~\$5.3 million in 8 weeks)
- At 6.5 years, mutual buyout option (either party can trigger) at formula-based price – likely to be exercised
- Intrastate offering raised ~\$16.8 million in 8 weeks (Aug-Sep 2010)
- Through a series of 27 public meetings, >600 investors (mostly individuals) from across the state invested an average of ~\$27k each
- ~\$11 million in debt and ~\$5.8 million in equity – Remainder (~\$6.7 million) will come from Section 1603 cash grant
- Cash grant critical to success (reduces capital needs, as well as need for tax appetite)

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Wind Power in Lyme? Takeaways **Small Wind (≤ 100 kW)**

- Unless you are absolutely certain that you have a good wind resource, you're probably better off with PV
- Proposed small wind ordinance may further hurt small wind economics by limiting tower height

Large Wind (≥ 100 kW) • Skiway most obvious choice (consider net-metered

Northwind 100 arctic

model), but siting/permitting issues are likely a deal-killer

- Ridgeline conservation districts likely to prohibit development in other potentially viable parts of town

Alternatives?

- Could potentially try to piggyback on larger project elsewhere in state...but what's the connection to Lyme?
- Complex (and costly) undertaking – would need to be a larger effort involving others beyond Lyme

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Discussion- Ross- ? Possibility to buy into Cape Wind Project.

Mark- May be a real long

Carola: ? Mark making a presentation to the Planning Board- Planning a wind tower height ordinance.

Mike: Will Anemometer measure turbulence? No.

2. Topic- Report Re: Peregrine

Discussion- Sue heard from Charles that a representative from Peregrine had made a site visit to the Fire station and The Academy Building.

Meeting adjourned at 08:30

Next Meeting Monday, January 17, 2010 7:30-8:30 Town Office Building.

Respectfully submitted,

Susan J. MacKenzie

Secretary