

Wellfleet Forum – Wellfleet Wind Turbine Program – 3/1/10

Questions received by Dick Elkin for the forum meeting,
with Answers by Geof Karlson, Chair, Wellfleet Energy Committee

1. Has it been legally tested on a national level whether towns building industrial size energy equipment within the boundaries of a National Park is within the congressional guidelines regulating the National Park Service? It took an act of Congress, whose intent was clearly to protect the land within the CCNS against further development. How can a local community ignore a Congressional Act? If this turbine is built within the CCNS I am concerned about the precedent the Wellfleet turbine would set on a national level. I fear for our entire National Park system. Do the members of the WEC know for certain that what they are proposing is legal at a national level?

The proposed wind turbine facility is referred to by the Commonwealth of Massachusetts as *Community-Scale Wind*. The Town has been advised by Town Counsel that the proposed creation of a community-scale wind facility on *Town-owned land* within the Cape Cod National Seashore (CCNS) is within the guidelines and regulations of the CCNS and qualifies, in the opinion of Counsel, as a valid municipal use. Additionally, we note that the facility contributes to renewable energy initiatives established by the state and federal executives, including initiatives by the President and the Secretary of the Interior to promote renewable energy production.

2. How does the town propose to pay for this wind turbine?

The Town proposes to pay for the wind turbine construction through general obligation bonds. The current projected “pro forma” budget projects the project to be self-supporting by the end of the first year of production – this means that the revenue generated by the project would pay all principal and interest payments and other costs such as maintenance, insurance, and other expenses, and generate a net yearly revenue for the town.

How will that affect Wellfleet town taxes (now and into the future) and Massachusetts NSTAR customers (with the surcharge NSTAR will be allowed to attach to electric bills to pay for their participation in the net-metering program Wellfleet is counting on to make money from the turbine)?

The current financial projection shows that Wellfleet taxpayers will have to pay a maximum of about \$325,000 to fund the procurement and construction of the project, at which point the facility would be producing enough revenue to cover all expenses and return a net positive income to the town each year. Here is the projected “cumulative” revenue for the town. Negative amounts (in red) represent taxpayer funds paid out; positive amounts represent positive revenue accruing to the town. The following shows both yearly net revenue and cumulative net revenue (in 2010 dollars) for the project:

Wellfleet Wind Turbine – from Pro Forma Revenue Projections of 3/1/10		
Year	Net Revenue (2010 dollars)	Cumulative Net Revenue (2010 dollars)
1	-\$119,250	-\$119,250 (construction – interest only in this year)
2	-\$204,477	-\$323,727 (1/2 yr construction, 1/2 yr production)
3	\$214,542	-\$109,185 (full year of production, and so on)
4	\$168,055	\$58,869
5	\$179,788	\$238,657
6	\$201,806	\$440,463
7	\$212,633	\$653,096
8	\$233,316	\$886,411
9	\$243,292	\$1,129,703
10	\$262,712	\$1,392,415
11	\$271,889	\$1,664,304
12	\$293,962	\$1,958,266
13	\$311,260	\$2,269,525 (payback – year 11.5 of production)
14	\$327,915	\$2,597,440
15	\$343,946	\$2,941,386
16	\$359,373	\$3,300,758 (last year of payment on 15 year bond)
17	\$615,743	\$3,916,501
18	\$613,936	\$4,530,437
19	\$612,158	\$5,142,595
20	\$610,409	\$5,753,004
21	\$608,688	\$6,361,692
22	\$606,994	\$6,968,686 (total projected revenue, 2010 dollars, 20.5 years of production)

Above: Based on Vestas v90 turbine; 4,740,000 kWh/year production; \$5.3 million project cost, 15-year bond @ 4.5%, 2.2% inflation, constant electricity rates in 2010 dollars (13.95 cents/kwh), bond payments based on data supplied by Cape Cod 5.

With respect to the surcharge that will be charged customers to subsidize net-metered facilities: NSTAR, in a response dated 11/5/09 to a request from the Attorney General's office, estimated that the impact on customer's bills if its entire eligible net-metering capacity were supplied by wind facilities of the type proposed for Wellfleet, would be 1/10 of 1 percent per year (for example, for a customer using \$1,500 of electricity per year, the surcharge would be \$1.50 per year). This charge would apply to *all* customers in NSTAR's service area, and would be added to the customer's bill each January.

Does the WEC financial projection take into account downtime for maintenance and operating failures, such as what the Falmouth wind turbine is currently experiencing? Does the WEC financial projection take into account downtime for maintenance and operating failures, such as what the Falmouth wind turbine is currently experiencing? How much downtime are they projecting, and does this increase into the future as the equipment ages?

Wellfleet's projections are based on so-called "p90" estimated rates of annual production. This is a rate of production that has a 90% probability of being exceeded in any year. The "raw" rates are also adjusted by a factor of approximately 12% to account for downtime and other variability and unknowns. As of this date, the Falmouth turbine has not been "commissioned" – any delay in production is a construction issue, not a production issue. The adjustments to the expected production percentages are industry-standard and are expected to be sufficient to reflect production over time. The maintenance allocation is increased at a rate (2.7%) greater than the general rate of inflation (2.2%) to reflect additional maintenance expense in later years.

For that matter, when would it be considered obsolete and what would the town's responsibility be toward its removal (and is that figured into the financial projections?)?

The wind turbine is expected to have a minimum of 20.5 year lifespan of production. It is expected that the scrap value of the metal in the turbine is sufficient to cover the cost of decommissioning (turbine removal). The current revenue projections do not include a decommissioning cost.

3. It appears that numerous people in other states and countries are calling for a minimum setback of 2km or 1 mile due to noise. It appears that even though noise studies are performed before the building of large wind turbines; that the current noise standards subject many people to sleepless nights and what they describe as "torture" of a pulsating noise. Most large turbines to date in this country are miles from anyone. What makes the supporters of this project confident that using the same sound models that they won't be subjecting their fellow citizens to "torture"?

There have been wind generating facilities constructed that through inadequate zoning or other design issues have resulted in sound levels that have created annoyance. There are at least three attributes of a wind facility that must be considered when comparing the experience at one facility with what might be experienced at another: (1) the number of turbines in the facility, (2) the distance to the closest residences, and (3) the topography – are there mountains and valleys?

For example, the experience of Vinalhaven Island, Maine has been used locally as an example of what will or could be the experience of the proposed Wellfleet project. However, the facilities are not comparable: Vinalhaven has three turbines, the Wellfleet proposal has a single turbine. According to a recent newspaper article (The "Waterfront", February-March, 2010) the requirements for the Vinalhaven project were:

Sound from the wind turbines is not to exceed 55 decibels between 7 a.m. and 7 p.m. and 45 decibels between 7 p.m. and 7 a.m. beyond the boundary of the wind-power property, according to the project's state Department of Environmental Protection permit.

According to the Maine CDC (<http://www.maine.gov/dhhs/boh/wind-turbines-neuro-acoustical.shtml>), Maine regulations for non-commercial/non-industrial areas have two categories of sound restriction: (i) for areas where ambient sounds are 45 dBA or less daytime or 35 dBA or less nighttime, the limits are 45 dBA daytime and 35 dBA or less nighttime, otherwise (ii) the limits are 60dBA daytime and 50 dBA nighttime. The limits set for Vinalhaven seem to be 5dBA *less* than the *least* restrictive, but 10 dBA *greater* than the *most* restrictive. This zoning is apparently unsuited to the actual rural nature of Vinalhaven, according to Mr. Peter Guldborg, the Town's acoustic consultant, who will be available at an informational meeting in Wellfleet scheduled for April 10, 2010 to explain in more depth the sound issues at Vinalhaven and other problematic developments.

For any acoustic impact to be discernable, residences generally must be *downwind* of the turbine. Since the predominant wind is from the west, northwest, or southwest in Wellfleet, sound will seldom be an issue for residences to the *west* of the turbine. In fact, the times when wind direction is from the east are generally during storms, when there will be high ambient sound and the additional turbine sound will be indistinguishable.

The acoustic study describes the circumstances under which sound could be heard during the most likely time – i.e., at "cut-in" wind speed:

The Project will be audible at certain times in the residential areas next to the project area. The "swishing" sound characteristic of a wind turbine will be audible outdoors when these three conditions all occur: 1) the residential area is downwind of the wind turbine, 2) ambient sound levels are low (usually late at night with calm surface winds), and 3) wind speeds at the hub height of the turbine are high enough for wind turbine operation. Project sounds will not be audible inside any residence.

The resulting ambient and combined sound levels and increase, from the study, are given below:

**DEP NOISE POLICY COMPLIANCE AT NEARBY RESIDENCES AND THE BEACH
FOR THE VESTAS V82
CUT-IN WIND SPEED CONDITION (dBA)**

Residential Location	Ambient L ₉₀ Level	Maximum Project Sound	Combined Sound Level	Net Increase
Ocean View Dr. Residence North of Beach	29.6	24.8	30.8	1.2
White Crest Beach	29.6	28.0	31.9	2.3
Sea View Road Residence	29.6	28.1	31.9	2.3
Ocean View Dr. Residence South of Beach	29.6	29.7	32.7	3.1
Priscilla Road Residence	29.6	30.0	32.8	3.2
Ocean Road Residence	29.6	27.9	31.8	2.2
Woodlot Road Residence	23.0	26.5	28.1	5.1
Pineneedle Road Residence	23.0	25.0	27.1	4.1

The Town is in the process of obtaining an acoustic analysis for the Vestas V90 turbine, which is the replacement model for the V82, which is being phased out. It is expected that the V90 acoustic impact is similar to that of the V82.

4. I understand that Mr. Sexton and Mr. Karlson will be taking a "fact-finding trip" to Vinalhaven, ME. Will they be meeting with the Wylies and the Lindgrens, area residents who had been in favor of the wind turbines before they were commissioned who since then have unfortunately discovered that their lives have been negatively impacted by the machines . . . or will they be avoid speaking with any people who don't share their enthusiasm for wind turbines?

See the discussion, above, concerning Vinalhaven. Clearly, the zoning requirements and the design of the three-turbine GE facility at Vinalhaven were not based on a realistic appraisal of the ambient sound regime in that area. The sound levels generated created by the three-turbine facility in Vinalhaven are significantly greater than those in Wellfleet and clearly there are residences much closer to the turbines there than would be the case for the closest residences to the turbine in Wellfleet. The acoustic impact of the three-turbine facility in Vinalhaven is in no way comparable to that of the Wellfleet proposal and should not be used as indication of the effect of the Wellfleet proposal. For more information, and discussion, please attend the April 10, 2010 information meeting in Wellfleet.

5. Mr. Karlson, I realize that at this time you are only considering one turbine, yet all studies and contracts for connections with NStar are for three turbines.

The statement in the question above that "...all studies and contracts for connections with NStar are for three turbines" is incorrect. The Black & Veatch feasibility study of August, 2008 examined both a single-turbine facility and a three-turbine facility, because the physical size of the Town-owned parcel would support at maximum up to three turbines. The Energy Committee, after considering all factors, Forum Questions & Answers, 3/1/10

including financial, environmental, regulatory, visual, acoustic, and shadow flicker, recommended to the Board of Selectmen that the investigation phase be continued for a *single-turbine* facility. The funding article approved at the October, 2009 Special Town Meeting is specifically for a *single-turbine* facility. The Interconnection Application submitted to NSTAR on 12/1/09, which includes the detailed electrical characteristics of the unit, is for a *single-turbine* facility. The engineering consultancy contract awarded to Weston & Sampson Corporation is for a *single-turbine* facility. The surveying work undertaken by Slade Associates under the subcontract to Weston & Sampson has been for a *single-turbine* facility. The currently pending *avian and wildlife study request for proposals* is for a *single-turbine site* and associated access.

One or three turbines, either choice sounds like industrial development for commercial purposes of a land that has been set aside by an act of the U.S. Congress for conservation and preservation for future generations. Commercial and industrial are defined by the nature of the activity, not who does that activity.

It is my sense that it is the consensus of the Energy Committee that this proposal contributes to the long-term viability of the Outer Cape and embodies the type of change that is necessary for the preservation and flourishing of human civilization into the future. The type and scale of this project, referred to as a municipal *Community-Scale Wind Facility* in Massachusetts, contributes to State and Federal initiatives to move the nation towards a sustainable future and conforms to renewable energy initiatives recently sanctioned by executive orders from the President and the Secretary of the Interior. The Wellfleet town counsel has advised the Town that, in counsel's opinion, the proposal represents a valid municipal use, and I believe it is the feeling of the Energy Committee that the scale of this project is appropriate for the Town to pursue as a valid municipal use.

If one turbine is built, what is to prevent human greed from trying for three turbines?

The Town Meeting format and requirement for two-thirds votes to pursue projects like this serve as a validation point for the reasonableness of taking on such additional projects in the future. I believe the chances of attempting to build more than one turbine on the White Crest/Wellfleet-by-the-Sea parcel in the future would be slim – it is certainly not something I would support, because I believe the scale, and setbacks possible for a single turbine, are appropriate for the Town of Wellfleet. No one can predict the course that those that those who follow us will pursue – but I do have faith in the ultimate maturity and prudence of the Wellfleet voting public.

6. Why is the Wellfleet Energy Committee pursuing industrial size wind turbines within the national park when there are numerous other forms of renewable energy -- geothermal, solar thermal and photovoltaic -- that are benign?

A single turbine that is between 1 and 2 megawatts is referred to as *Community-Scale Wind* in Massachusetts. The Town of Wellfleet, of which the Wellfleet Energy Committee (WEC) is a volunteer advisory board, has and will continue to pursue all feasible forms of renewable energy. For example,

recently the Town was awarded \$145,000 of ARRA "stimulus" for the installation of photovoltaic panels on the Fire Station. Last year, WEC personnel assisted in the Library photovoltaic project and in the preliminary analysis of photovoltaics for the Senior Center. We expect further projects will be examined into the future, including options for energy conservation and efficiency improvements in town buildings through possible conversions to geothermal heating systems and solar thermal hot water, especially where grants are available.

The wind turbine project is especially appropriate for Wellfleet to undertake for a variety of reasons: (1) Wellfleet has one of the best land-based wind resources in Massachusetts, (2) recent regulatory changes have facilitated and encouraged municipal development of this type of facility, and (3) the project is projected to generate significant revenue for the Town that could be used, in part, to fund continuing energy efficiency projects within the Town during a period of difficult fiscal constraint.

As recently as the February 22nd episode of CBS's "60 Minutes" there was a report on the "Bloom Energy Box" which is being hailed as "the future of American energy." It's "footprint" is about the size of a parking space that would be placed outside of buildings and can produce enough energy for 100 homes.

The WEC is interested in investigating all feasible forms of renewable energy production on behalf of the Town.

Instead the Energy Committee seems hell bent on pursuing a 400-foot (or now 425-foot) wind turbine despite the fact that there are numerous instances of these machines negatively impacting residents living within a mile of their site, not to mention their affect on wildlife, including the killing of birds flying into their blades.

The wind turbine project is a project of the voters of Wellfleet – twice in 2009, voters at Town Meeting approved by over 2/3 vote articles relating to community-scale wind turbines – first the municipal wind turbine zoning bylaw in April, 2009, and then the funding article in October, 2009. Those articles had the unanimous support of the Board of Selectmen. The WEC is continuing with its support of this community-sanctioned project in accord with the "charge" of the Committee, and strictly as an advisory body to the Town Administration and Board of Selectmen.

In terms of the negative impact of wind turbines on nearby residents, refer to the discussion of Vinalhaven above, and of "flicker shadow" impact later in this document. The voters have found this project worthy of future work. In terms of potential impact on avian species, an extensive avian and wildlife study is scheduled to begin in April, 2010. It is now understood that deaths of birds from impacts with turbines of the type proposed are minimal (certainly less than the effects of household cats and impacts with windows). The Town looks forward to the results of the upcoming environmental, avian, and wildlife assessment.

Worst yet is the Energy Committee's total disregard for how such a project would divide the community of Wellfleet. George Zebrowski

Wellfleet attracts strong individuals with strong opinions who often express their opinions with strength and passion. The WEC does not see this as undesirable – certainly a project of this scope must be completely and closely examined in all its aspects, and openly and thoroughly debated, and the current discussion, in that light, is salutary. The Committee believes, however, that the discussion can be especially furthered by (1) adhering to *generally accepted accounting principles* when discussing financial aspects, and (2) refraining from comparing this proposal to facilities with dissimilar, incomparable characteristics in terms of maximum and expected sound levels, numbers of turbines, closeness to residences, special topological features, etc. The Committee remembers issues from the past, such as the placement of cell phone towers and even the opinions of some concerning the new water tower, that have engendered forceful dialog. The WEC has confidence in maturity of the voters and in their commitment to the democratic process that must be the basis for the community's decision-making.

7a. The proposed site lies deep within a national park -- the Cape Cod National Seashore - whose stated core mission is “the preservation of the natural landscape in its original condition for all future generations.”

The proposed site is about 1/2 mile from the boundary of the CCNS – where a major utility easement carries high-voltage power lines to and from the Gross Hill Substation. The area is bisected by numerous dirt roads, and riding and walking paths.

7b. Every major conservation organization – Mass Audubon, the Sierra Club, the Nature Conservancy, the NRDC and the National Park Service – state unequivocally that installation of wind turbines within or abutting such conservation areas and sensitive habitats – including national parks - should be prohibited.

The organizations cited are valuable national organizations that have performed and continue to perform valuable action to promote a sustainable future for the planet and the living species that inhabit it. However, broad-brush policy positions do not necessarily take into account the special status of the CCNS as a national park that was set down in the midst of a number of existing municipalities. That historical fact, and the historical multi-use character of Wellfleet-by-the-Sea, create special circumstances and considerations concerning the development of land not in the ownership of the Seashore, but residing within its boundaries. For example, there are numerous private residences in the area, some of which are even used for commercial (rental) purposes, and which occupy the viewscapes of the Lecount Hollow and Whitecrest Beach areas. Mr. George Price, Superintendent of the CCNS, has himself pointed out the special relationship of the Seashore with the Towns and the necessity of examining each municipal development proposal on its own merits. Mr. Price has also noted the importance of green / renewable energy initiatives in relation to policy and planning for private, municipal, and federal land use within the Seashore.

Additionally, Mr. Dick Elkin has communicated the following: “Both Mass Audubon and the Nature Conservancy have responded to me disagreeing with Eric Bibler’s characterization of their position. “ Mass Audubon has issued a statement that reads, in part, “It is premature for Mass Audubon to take a position on this project until the wildlife and avian assessment is completed.”

7c. The proposed site is considered to be valuable “unfragmented habitat” in an area that has been officially designated by Mass Audubon as an Important Bird Area because of its location on a major bird migration route that is protected by international treaties.

In fact, the area is traversed by numerous dirt paths, tracks, and driving roads, leading 1/2 mile to the west to the NSTAR power lines, from whence ATVs and dirt bikes often proceed into the CCNS. Within 1/2 mile to the east are found paved parking lots and roads and numerous private residences along with accompanying human impacts such as traffic, noise, ground water septic contamination, and night lights.

Possible impacts on migratory species, if any, are planned to be examined in considerable detail during the coming migration season. It is hoped that mitigation measures, if recommended, will be well within the scope of the project.

7d. The area surrounding the wind turbine site, on both Town owned land and within the Seashore, is honeycombed with wooded trails that are currently used by recreational hikers, mountain bikers, horseback riders and other park users who value the peaceful stillness of the natural setting.

These facts were noted above in commenting on the “unfragmented habitat” question. The proposed use, in fact less than 3% of the total area of the Town-owned parcel, does not threaten the use of the vast majority of the parcel for recreation or species habitat. And, as you note, *the parcel is abutted by literally thousands of acres of Seashore land* that provides vast areas of habitat and recreational opportunity.

7e. The proposed 400 foot wind turbine – 100 feet taller than the Statue of Liberty -- lies within a half mile of Ocean View Drive, which has been officially designated by the Town of Wellfleet as a “Scenic Drive,” where it will dominate and dramatically alter the scenic landscape in an area where the tallest trees are only 20 to 30 feet high.

The turbine “hub” is about 263 feet tall, somewhat shorter than the Pilgrim Monument. The designation of a road as “scenic drive” actually relates only to the changes that are allowed on the road itself – it makes no implication about the nature of development that might be appropriate 1/2 mile distant. Here is the actual substantive language from Chapter 40, Section 15C of the General Laws of Massachusetts:

“After a road has been designated as a scenic road any repair, maintenance, reconstruction, or paving work done with respect thereto shall not involve or include the cutting or removal of trees, or the tearing down or destruction of stone walls, or portions thereof, except with the prior written consent of the planning board, . . .”

With the availability of the photosimulations, it becomes apparent that even from the closest and clearest view of the proposed turbine – from the back (western edge) of White Crest Beach parking lot (2560’ from the turbine) – the turbine would not “dominate” or “loom over” the landscape. Here is that simulation:



From a point north on Ocean View Drive, looking south, 3700' feet (almost 3/4 mile) from the turbine:



From many points, including South Wellfleet General Store, Route 6 at Cove Road, and other points to the west, the turbine will be completely obscured and will be less visible than the new water tower. From a point parallel to the closest residence to the turbine to the west (on Priscilla Road) the turbine itself is obscured almost entirely by pine trees, as shown by the “wire figure” here:



The turbine would not be visible from the Atlantic beaches. For example, the photo below from Lecount Hollow beach looking west shows the position of the turbine as a wireframe against the dune:



7f. According to the wind turbine manufacturer’s brochure, the proposed model will emit noise of over 100 decibels at its 262 foot hub height under normal operation – comparable to the sound from a jet --, which will be easily perceived by nearby residents – virtually all of the time, 24 hours a day – under normal operating conditions; furthermore, numerous studies have shown that such chronic noise has an extremely adverse impact upon wildlife.

See the discussion of sound in the answer to question 3, above. What is most important is the attenuation of sound over the distance from the turbine nacelle to the closest residence, almost 1/2 mile away. By the time the sound reaches the closest residences, it has attenuated to an extremely low level and its contribution to the decibel level at those residences is minor.

In terms of the impact of the turbine sound on wildlife, it is hoped that the use of this small part of the large Town-owned parcel for an environmentally beneficial goal can be viewed in light of the 97% of the parcel that remains untouched and of the hundreds of acres of adjoining untouched habitat. It is our hope that any acoustic impact on local wildlife can be mitigated by the availability of extensive adjoining habitat.

7g. The wind turbine will create a dramatic strobe effect – or “flicker effect” – over a vast area during the best light of the day, in morning and evening, when the sun is low in the sky.

A *shadow flicker* analysis of the proposed facility was completed by the UMASS Wind Energy Center on 4/2/09. The following paragraph appears on page 3 of the report:

This report considers flicker at distances of up to about 1500 meters from the proposed wind site. However, at distances greater than approximately one kilometer (0.6 miles) [1000 meters], light is sufficiently dispersed by particles in the air that the blades no longer produce distinct shadows. Consequently the rotor of a wind turbine will not cause shadow flicker, and beyond this distance shadow flicker is normally negligible.

Based on the above, then, if residences are about 1000 meters or farther away, flicker is not an issue even if a residence is in the calculated path of the shadow. UMASS performed calculations for 18 locations around the original three turbine sites. Of these 18 locations, only three were less than 1000 meters from turbine site #2. One of those three is west of the turbine site and is shown as 980 meters from the site. Pine trees to the east of this area would likely shield the location from direct sunlight (additional photo simulations are planned for this area to determine if the turbine will be visible).

Discounting the residences west of the turbine (near 1000 meters away and shielded by pine trees), leaves one area subject to shadow flicker of about 28 residences along Ocean View Drive extending from the White Crest Beach parking lot south about 0.45 mile. These are residences in the areas of sample locations #3 and #4. It is likely that flicker shadow impact for residences within range will be mitigated by existing trees located to the west of many residences. Here is what the report says about flicker from Turbine #2:

While Turbine 2 is would likely impact a greater number of houses than Turbine 1, the annual expected values of flicker duration do not exceed four hours at any site (the maximum value of 3 hours and 54 minutes corresponds to receptor 4). Most of the houses that would be affected by this turbine are located in Wellfleet by the Sea. Few of these would likely experience more than two hours of flicker per year.

Additionally, the seasonal graph of flicker for Turbine #2 shows that there is only a period of approximately two weeks in the beginning of September where there is significant flicker from this turbine during the “high use” calendar period for this area. Based on the above information, it is apparent that shadow flicker is minimal and is likely already mitigated by trees for many of the residences potentially affected. The major part of the impact is concentrated during parts of the year when most of the residences are likely to be unoccupied.

7h. The current proposal from the WEC contains no provision whatsoever for costs associated with abandonment and removal if the adverse effects prove to be more extreme than currently projected.

The Vestas V90 turbine, as an example, has capability for special configurations that can be programmed depending on the time of day, wind speed, season of the year, and even direction of the wind. These capabilities can be used to mitigate, if necessary, possible impacts, as follows:

i) **Acoustic impacts.** As described above, acoustic impact is even a theoretical issue during times of low wind speed, usually occurring in the evening. Also, the impact is only heard when you are *downwind* of the turbine. If necessary, during the summer months and the evening hours and when the wind is coming from the west or northwest, the “cut-in” wind speed could be set at a higher level so that the turbine does not operate at very low wind speed during those times.

ii) **Flicker impacts.** As described above, flicker impacts that would occur during periods when residences in the area are heavily occupied are limited to two weeks early in September. If horticultural mitigation is not already in place or is not able to be installed, the turbine could be idled (“parked”) for the few minutes in which the flicker shadow was a potential.

iii) **Bat and bird migration mortality.** It is expected that the environmental assessment will identify any migratory issues and mitigation measures. One mitigation measure that has been demonstrated to be successful for migrating bats is to raise the “cut-in” wind speed during periods when bat migration activity is the greatest. These are generally periods (1) at the dark of the moon in the evening when (2) there is low wind speed for (3) late September through early October. If, indeed, the avian study shows that migrating bats are prevalent in the area, the turbine could be configured for a higher wind speed cut-in during bat migration periods.

Since the repayment of the borrowing for the turbine is from the revenue produced by it, the decommissioning of the turbine prior to the payback of the loan would result in a loss to the town. Currently, the payback period for the V90 is projected at about 11.5 years of production. After that time, the turbine could be decommissioned probably without expense as the value of the turbine for scrap is generally considered sufficient to cover the cost of decommissioning, or the income from a few more months of production after payback would be sufficient to cover the costs of decommissioning.

7i. If the location of the wind turbine is “inappropriate” according to the all of these criteria put forth by so many thoughtful and responsible conservation organizations; if the wind turbine itself is so grossly out of scale and out of character with the surrounding landscape; if the noise and the flicker effect will create a predictable, and maybe even intolerable nuisance for nearby residents and for those who love the unspoiled beauty of the woods; if the wind turbine will drive off wildlife and kill birds and bats; and if the Town makes no commitment – and no financial provision – to dismantle the giant industrial tower if the whole project turns out to be a terrible mistake, as the zoning bylaw requires; why does the proposal not fail every single provision of stipulated in the Wind Turbine Bylaws?

See answers to individual assertions, above. A single community-scale wind turbine appears to be a skillful synthesis of multiple worthy priorities and concerns among a diversity of Wellfleet voters and appears to be appropriate in scale, environmental benefit, financial prudence and ecological benefit.

8a. Is the land value zero? After the WEC constructs a wind turbine “using less than 2% of the land” will the rest of it be salable?

Since it is Town-owned land, although an assessed value may have been assigned, the property does not generate tax revenue. Certainly, if the Town has any plans (or is even able) to sell the property, the Energy Committee would not proceed with investigation of the establishment of a wind turbine generator. The Energy Committee expects that the Town Administration and/or the Board of Selectmen would advise the Committee of any such plans at the earliest possible time.

8b. Land Value / Initial Permitting and Studies – Not Included in Costs? Your “Pro Forma Budget” neglects to assign any value to the land which the Town will contribute to the wind turbine project. As I’m sure that you can appreciate, once the proposed wind turbine, or turbines, are erected, the land will no longer be available for other use. It is illogical, therefore, not to consider the land value as part of the overall project cost.

The use of less than 3% of the parcel for a wind turbine would not preclude other use of rest of the property – for example, the remainder could be used as it has been used for forty years and longer – as natural habitat. In the last forty years, the Town has had zero revenue from the land, and (presumably) zero expenses, giving a net cash flow and income of zero for the entire parcel, regardless of its current assessed valuation. If a wind turbine is installed, both expenses and revenue would increase. The difference would not be zero, but rather revenue would exceed expenses by a projected \$6,968,000 in 2010 dollars over the 20.5 year productive life of the facility. That approximate \$7 million thus earned could be used for a variety of useful projects for the town, including but not limited to additional energy conservation measures and funding of additional renewable energy production facilities as may be appropriate for municipal energy needs, or for reduction of what would otherwise be tax increases.

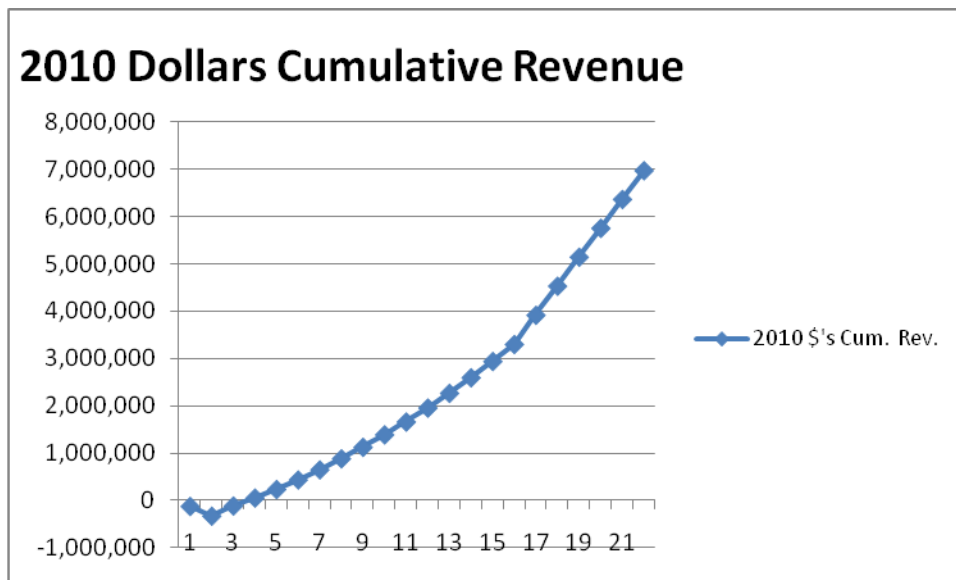
8c. According to the report supplied to me by Ms. Nancy Vail, Wellfleet Tax Assessor, the current assessed value of the land that you identify for use on this project is \$2,568,600 (see attached). In your Pro Forma, you project the cost of the project (excluding land) to be \$5.3 million – a 10% increase over the projected cost last three months ago at the Special Town Meeting. When the land value is added into this figure, the total projected cost of the project is, in fact, \$7.9 million.

If the value of the land is actually \$2.6 million, then the Town has been foregoing tax income of approximately \$15,600 per year (at \$6 per \$1000 valuation tax rate) for forty years – or about \$624,000. The Committee’s current pro forma based on the V90 shows cumulative net revenue of some \$653,000 by the end of the sixth year of production – thereby recouping the many years of lost tax revenue. The fact that 95% of the property would remain available for recreation and natural habitat adds to the reasonableness of this synthesis of financial common sense, habitat preservation, and action towards a sustainable energy economy. The use of this property for a wind turbine facility is clearly more advantageous over the life of the project than (i) selling the property (assuming it could be sold) and then (ii) taxing the sold property. The estimated value of selling and taxing (in 2010 dollars) is \$2.6 million plus \$15,600 per year for 22 years, or a total of about \$3,000,000. This is only about 42% of the projected revenue (\$7 million) of the proposed wind turbine. This financial accounting does not include

the added benefits of the reduction of green house gases and pollutants represented by the energy so produced.

8d. It is unclear whether your “Pro Forma Budget” includes the \$290,000 expense for permitting and further studies which was authorized on 26 October 2009 and which you are currently spending. If this figure must be added to the prior estimates, the total cost of your project for the installation of one wind turbine rises to \$8.2 million.

The current estimated cost of \$5.3 million includes the \$290,000 allocated from October, 2009. Estimated net revenue is \$6,968,686 in 2010 dollars for 20.5 years of production, giving average yearly revenue of \$339,936. The graph below shows the cumulative revenue by year, starting with the first year of construction.



9. Why is it that the Energy Committee does not discuss matters of the utmost importance at their meetings? Instead important decisions are made outside of the meetings such as the recent matter of declaring that V-82 windmill is obsolete and a newer, bigger V-90 is required which was not even mentioned at a Energy Committee meeting less than 2 weeks ago? This is only the latest example of the lack of transparency and I am questioning why this is an ongoing problem even when Massachusetts Public Record Law requests are made, very little if any information is provided ?

Mr. Sexton of the Energy Committee had been acting as liaison on behalf of the Committee with Vestas and had had a telephone meeting scheduled with the Vestas representative for 2/17/10, which was rescheduled by the Vestas representative to Friday, 2/19/10. Sexton was to be out of town on that date so Karlson made the phone call. The Vestas representative provided information that confirmed that the v90 model, the follow-on to the v82, would provide superior price performance to the v82, and provided other proprietary engineering information. The representative confirmed that the maximum

tip height of the v90 is 125 meters (410.15 feet). Karlson communicated to the Town Administration that the replacement turbine available from Vestas conformed to the 125 meter form factor. The Town Administration (Mr. Peterson) advised Karlson that a variance for new construction is not routinely awarded, and that a zoning bylaw amendment enabling 125 meter wind turbines was advisable. Given the typical 90 day waiting period for Attorney General approval of zoning bylaw changes, it became apparent that it was important that a zoning bylaw amendment be put forth, if found reasonable by the Board of Selectmen, for the Spring town meeting, rather than the Fall, in order to maintain the original schedule based on the exigencies of the net metering regime. Hence, in order to present the option of a zoning bylaw change at the 2/23/10 Selectmen's meeting to accommodate the 125 meter height, it was necessary for Mr. Peterson to place such an amendment on the agenda for the Selectmen.

The events described above occurred between meetings of the Energy Committee, and hence were not able to be discussed by the Committee prior to the decisions taken by the Town Administration. The Energy Committee is expected to take up these matters as soon as the article is referred to them by the Selectmen.

10. The studies that have been done to date are based on a certain size turbine. Will these studies be performed again, if the size of the turbine is increased?

Yes. Note that according to Massachusetts Chapter 30B procurement regulations, a specific model cannot be specified except under special circumstances. However, minimum and maximum performance criteria, etc., can be specified.

11. The noise study appears to have been performed during a short period of a day or two using a single wind direction. Noise studies for other wind turbine installation are done over many seasons with varying wind, atmospheric and environmental conditions (foliage, frozen ground, etc). The met tower showed a prevailing wind from the SW whereas the noise study was using only a NE wind which conveniently introduced a substantial amount of surf noise to mask the normal low ambient noise. Why wouldn't these factors give a misleading result? We know of so many cases where noise is a substantial issue, why was the wind study so limited? ~~Was it just to get a good result with little care for the people who will be impacted?~~

It is the Energy Committee's understanding that Mr. Guldberg of Tech Environmental performed the test according to the requirements established with their contract with the Mass Technology Collaborative, with whom the contract was made, and according to generally accepted acoustic engineering practice. Mr. Guldberg of Tech Environmental will be attending the informational meeting scheduled for April 10, 2010 and will be able to provide more information at that point. It would appear the benign results of the acoustic study are primarily the result of the long distance (almost 1/2 mile) between the proposed turbine site and the closest residences.

12. " Geoff Karlson, Wellfleet Energy Committee, will give an introduction to the project, covering location, visual simulations, noise/flicker studies, ownership model, anticipated costs/savings/payback, schedule, and possible later expansion to three turbines." My understanding from attending many WEC meetings is that only ONE turbine is under discussion. Please explain the apparent inconsistency.

The description of the Wellfleet Forum program was developed without consultation with the Energy Committee. The Energy Committee is not currently considering any option that includes more than one turbine at the White Crest / Wellfleet-by-the-Sea property and has no plans to do so in the future. My personal opinion is that a single turbine, sited according to the proposal at Turbine Site #2, is an appropriate community-scale wind facility for that area.

13. Does Mr. Karlson have any concern for the fracturing of the Wellfleet community, as expressed in Gooz Draz's resignation letter from the WEC? Please comment.

I understand and respect Mr. Draz's opinions. However, I am hopeful that the discussion concerning the wind turbine proposal can continue in a spirit of mature debate and that all of the parties will embrace the democratic decision-making processes in place. A spirited and detailed discussion of all aspects of the proposal is valuable and should be encouraged.

14. Does Mr. Karlson recognize that the WEC's proposal to erect a turbine with its acoustic and flicker, will create both a Private and Public Nuisance? And that the Town of Wellfleet will (should the turbine be erected) very likely be subject to property owner lawsuits for this nuisance?

It is my personal opinion that acoustic and shadow flicker will be of minimal significance and impact, if any.

15. Will the owners of property directly affected by the "nuisance" this installation will surely create be compensated by the Town of Wellfleet?

Based on the engineering studies I have seen relating to this specific facility, it is my personal opinion that there will be no nuisance – that acoustic and shadow flicker impacts will be of minimal significance.

16. If some residents homes are deemed uninhabitable by the courts or an independent party will the Town buy these properties at the fair market price prior to the installation?

It would appear the answer to this question would require the expertise of an attorney .

17. If owners of homes that presently rent them and are unable to rent them after the construction of the towers begins will the town compensate the owners for the lost rental income?

This would be a question that would need to be addressed by the Selectmen. There might be difficulty in identifying the exact cause of a change in economic circumstance – which could arise because of a number of causes, some or all of which might not be related to the construction of a turbine. Again, an issue such as this would probably require the involvement of an experienced attorney.

18. The National Seashore Park in Wellfleet is a summer destination for many families and visitors who are beachgoers, hikers, hang gliders, fishing enthusiasts, bike riders, surfers, and others who find inspiration in its natural beauty. Some are looking for peace and quiet solitude. Has the Town of Wellfleet considered the impact in that a 400 ft Wind Turbine would have on the local tourist industry?

Any answer would be conjectural, however we have found there to be a widespread belief that the presence of a wind turbine would be a net positive for the tourist industry, because, in the opinion of many, (1) it would not create a nuisance in terms of acoustic impact or shadow flicker, (2) it would not be visible from any of the Atlantic beaches, (3) many consider a modern community-scale wind turbine to be esthetically pleasing, and (4) it would represent a laudable step taken by a forward-looking community to address the serious and pressing energy and climatic issues facing the nation and the world. Many believe such a turbine would engender appreciation among the many summer visitors and enhance the reputation of Wellfleet as a desirable vacation destination.

19. The GE Company has a document that warns their windmill users and operators that there is a risk from ice throw from windmills:

"General Electric Energy recommends a setback distance from any hiking trails of approximately 180 meters (600 feet) to avoid any potential ice throw danger."

Will the Town do anything to warn hikers/bikers/hunters, etc. that enter this 26 acres of land to this danger? Will a fence be required now that a road will lead folks right to the windmill?

It would be prudent to post signs at the gate on the road and near the wind turbine. The Energy Committee would discourage use of the trails within 600 feet of the facility during icy weather. The exact extent of fencing is to be determined.

20. Should the turbine be erected, will there be a property assurance clause included in local legislation? This would insure that no resident has to sell his house at less than a pre-turbine price. The town would pick up any difference. What's to lose for the WEC or the town, since the WEC claims that property values will not be impacted by the turbine?

This would be an item to bring up with your Selectmen. It would seem difficult, especially given the recent volatility in the housing market, to determine the exact cause of a price decline (or rise). Again, for questions such as this, the assistance of legal counsel would be helpful.