

For December 13, 2010 Planning Board Meeting -DRAFT-

To: Planning Board
Mark Boyer, Chair

From: Jennifer Paquet
Town Planner

Re: Zoning for Wind Energy Systems/ Wind Turbines

At a past meeting, the Board expressed some concerns about utility scale wind turbines. You wanted to know what I had researched in order to put together the proposed draft ordinance, and you have asked that I compare other Town's regulations, and try to find regulations from a town similar to our rural, inland community (as opposed to a shoreline community). Since then, I have also attended a wind energy presentation hosted by a local organization, Apeiron Institute for Environmental Living, and the Foster-Glocester school district. From the table below, you can see that there is not much consistency.

Since the proposed ordinance was drafted, prompted by your concerns, I've done additional research: We all know the benefits of wind power (no emissions, renewable, local resource, etc.). But what about the negative affects of the turbines? I've found YouTube videos of what the negative effects are like (noise, shadow flicker phenomenon, structure collapses, amount of land disturbance to access the remote sites during construction, and affect on local roads to get the extremely large components transported to the site, etc.) We also need to be concerned with affects on migratory birds, predatory birds, and bats, and affects on human health due to noise and low frequency, etc.

In the drafted ordinance, for the utility-scale turbines, I originally envisioned an actual field of turbines on land owned by the utility. Since then, I've come to realize that utility scale turbines have been being developed more like cell towers, as individual structures on leased sites on other people's property. They are not intended to serve as on-site supplemental power.

[This seems to be a more haphazard, rather than a unified, approach to energy development in the State. It brings up other questions on if this is how the PUC and the utility providers expect wind energy to be developed. Would it be better to locate wind farms out in the middle of more remote areas to feed electricity to the grid, rather than locate turbines for utility generation in areas where people live—this is an industrial use. There is no reason why utility scale turbines need to be scattered all over the place like cell towers—there are no coverage gaps. This is entirely different than having turbines as an accessory use to actually use it on site for your own power.]

Clearly, we need to do more research on how this will affect the Town and the residents and what safeguards are needed.

Please read through the RIDEM Siting Standards to get an understanding of the issues involved. Please also take a look at the New Jersey DEP recent requirements on wind turbines.

On November 23, 2010 I spoke with Lisa Primiano at RIDEM. She noted that when they did the research on the original siting standards, they noticed that there was a lot of inconsistency with zoning dimensions, especially setback distances—they varied a lot from place to place. She advised that I speak with Tom Getz.

On November 29, 2010 I spoke with Tom Getz at RIDEM who is working on the revisions to the State's Siting Standards. The main factor he is looking at is noise, the timing on the noise, and setbacks, and he noted that it is complicated. He noted that in rural areas, people are used to quieter sounds (around 35 decibels) than many of the ordinances are designed for (50 decibels). He also noted that people are used to certain sound levels at different times of the day, particularly noise at night is lower. He also noted that with taller turbines, the noise can be louder than expected because of the lack of ambient sounds. In other words, the wind is blowing up high, so it turns the blade, but there is no wind down where the people are, yet the blades are turning—so the sound of the blades is not masked by the sound of the wind. So the RIDEM are basically looking at increasing setbacks, but to have it based on sound levels. He noted he was not looking at low frequency vibrations, but he's found a lot of conflicting information on it. He stressed that you need to know what to ask for and to be specific in a sound study, being careful to set the parameters such as the timing of when the background noise study is conducted- do you time it to the loudest time of the year?

I asked Mr. Getz about bird migration studies, and the State has studied the coast, because that is where they are searching for sites—in Narragansett on State owned land. He noted that the migration patterns are actually up between RI and CT, not right on the coast. (Since we form the State border, this is a factor for West Greenwich, especially considering the area known as the 'Borderlands' as termed by The Nature Conservancy) He also noted that birds flying in from the sea to the land tend to fly in low, not up high where the blades would be. This information does not consider habitat areas or nesting areas. We have a different situation in West Greenwich with birds and bats, which would need to be studied and/or researched. I know of some very sensitive areas in Town, but I don't know ranges. The State of New Jersey has done more extensive work on requirements for studies of wildlife. Please see some of the attached materials.

Two things are clear, the technology on turbines is changing (apparently rapidly over the past 5 years) and more and more studies are being done on things like birds, bats, and human health effects from turbines. A lot of the turbines from over 5 years ago rotated at a much higher speed, which affects sound levels and structural stability. Apparently, the blades rotate much slower nowadays. We'd need to know more about the modern turbines.

Considering many of the zoning dimensional standards we have seen from other towns varies so much, I recommend that we base our setbacks on noise generation, and in no case less than 1.5 times the height in distance from the property line. At one meeting I attended back in 2006 on wind power, it was recommended that the setbacks for noise be 600 to 700 feet. I do not know what size turbine was envisioned at the time, but I do not believe they exceeded 400 feet. On the extreme, I've seen others recommend that they should not be within 2 kilometers of people. It

would be prudent to wait and see what happens and what other issues arise in other Towns, considering so many of these are in the pipelines and can be experienced within the near future.

Town	Definitions	Height limit and Ground Clearance	Minimum setback from property line or structure	Minimum Lot Size for turbine/WES	Noise limit	Special Considerations	Zoning Districts Permitted	Demolition/Bond	Insurance
North Kingstown	Small- max height 150 feet Large- height between 151 and 400 feet	Small- 150 ft Large- 400 ft	All- same as principle structure, measured back from farthest horizontal extension of blade		All -50 decibels at property line;	All- Minimize visual impact; maintenance agreement required	Large prohibited in Historic District; SUP in most other except villages and dense residential	All- demo permit within 180 days of abandonment (abandoned after no use for 2 years)	All- Proof required
NK- Zoning Ordinance revised October 2010 (changed authority from ZB to PB for review and approval of all wind energy systems)	Building Mounted- mounted on a building Small-height max 50 feet Medium- height b/t 50 and up to 160 feet Large-height greater than 160 feet	Small – 50 feet Medium- b/t 50 to max 160 ft Large- no max height	All- not less than the height of nacelle, but in no case not less than the required setback for a principle structure in that zoning district		(not in Zoning, standards in subdiv regs, see below)	Requires 6 lines of site with pre- and post-development views from populated areas and public ways	Changed all SUP's into Permitted uses, and put all standards into the Land Development and Subdivision Regulations; all size systems allowed by Right in all zoning districts except the historic district	(not in Zoning, requirements in subdiv regs, see below)	Medium and Large-proof required
NK Land Development and Subdivision		Small- tip of rotor can not be closer than 25 feet from the			All- not to exceed 50 dB(A) measured at	'Potential adverse impacts to wildlife and habitats must be		All- bond for removal required;	Small-PB may require

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Regulations provisions for Wind Energy Systems added October 26, 2010		ground; Medium and Large- 'the minimum rotor height for the tip of the rotor blade shall be no less than 50 feet from the ground.'			property line;	identified by the applicant and shall be minimized through appropriate facility siting and design.'; Planning Board can waive development standards.			
Charlestown, RI (requires Site Plan Review by PB and SUP by ZB)	Large- rated capacity exceeding 100kW Small- rated capacity no more than 100kW	Ground clearance, minimum 30 feet from blade tip; no height limit give	1.1 times the blade tip height from the property line	Small- 1 acre Large- 5 acre minimum lot	50 dB(A) measured from the property line (if ambient exceeds 50, then dB plus 5 dB)	Requires impact statement and 6 lines of site for visualization	SUP for all; Small (<100kW)- any district; Large (<100kW)-all but high density residential, open space, or village,	Bond for removal required	Proof required for large systems
Middletown, RI (requires SUP and Development Plan Review)	Large- rated capacity exceeding 100kW Small- rated capacity no	Small- not greater than 15 feet above limit for structure in that district Large-	Small- distance of highest height of tower plus 10 feet Large- 1.5 times the highest height of the tower from	5 acres for Large system	Shall conform to Town Noise Ordinance	Requires automatic braking, governing, or feathering system to prevent	Large- prohibited in Residential	ZB may require financial surety for removal	Proof required

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	more than 100kW	regulated by lot dimensions and setback requirements	<p>nearest occupied building or property line;</p> <p>Equipment, guy wires and other components setback at least 10 feet from property lines and structures on the property</p>			<p>uncontrolled rotation, overspeeding, and excessive pressure on the tower structure and rotor parts;</p> <p>**Term of SUP expires in 25 years- need to apply for new SUP or remove structure;</p> <p>Requires Impact Statement and 6 lines of site</p>			
Middletown (as amended October 2010)						Added definition for “ <u>P</u> rominent <u>P</u> ublic <u>V</u> antage <u>P</u> oint” and added a requirement that turbines shall not be located in			

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						areas that will result in the turbine dominating the view of scenic, natural, or historic resources from one or more PPVP, and this needs to be a Finding of Fact that the ZB must make on the SUP			
<p>Bristol, RI (specifies turbines as an accessory use) Requires Development Plan Review and SUP</p>	<p>Commercial-rated capacity not less than 25 kW per hour of electricity</p> <p>Residential-rated capacity of not more than 25 kW and which supplies electrical power solely for onsite</p>	150 meters (450 feet) including blade length	<p>1 times the tower height (including blades);</p> <p>No part of system, including guy wire anchors may extend closer than minimum zoning setback requirements for primary structures.</p>	Required minimum of 5 acres	At no time shall noise levels exceed the Noise Control Ordinance of the town.		<p>SUP in large lot residential zoning, industrial, and open space districts;</p> <p>Prohibited in commercial, high density residential, mixed use, downtown, and waterfront districts;</p> <p>Prohibited in Historic District or within 200 feet of</p>	Required to get demo permit within 180 days of abandonment, but no bond required	No proof required in ordinance

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	use						historic district or structure		
Westerly, RI (requires SUP and Site Plan)	Tower height-height to non-moving part (does not include rotor blade tip extension)	85 feet (towers over 85 feet exclusively for municipal use)	360 degree fall zone with radius equal to tower height which shall be provided entirely within the lot and no residential structure within radius ; no part of structure, including guy wire anchors, within setback for primary structure	7 acre minimum, only one turbine per property	Shall not exceed Town Noise Control Ordinance	Utility Notification required: need written evidence that the utility company has been informed of intent to install interconnected generator.	SUP in all zoning districts (min lot 7 acres)	Demo required within 180 days of abandonment (no use for 90 days)	No proof required by ordinance
Massachusetts Model Ordinance Special Use Permit with Site Plan review	Utility Scale- primary use to sell electricity to market On-site Facility- wind project that will consume more than 50% of the electricity	400 feet, but makes provisions if the applicant demonstrates higher than 400 is needed	1.5 times the height of tower including blade tip height from any residential or commercial structure; and 100 feet from nearest property line and road		Shall conform to Dept. Environmental Protections Div. of Air Quality Noise Regulations; violation if	SUP expires in 25 years, unless extended or renewed; otherwise need to remove structure	Proposes all if meets requirements	Financial surety required for removal	required

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	generated on the site				increases broadband level by more than 10 dB(A) above ambient, or produces a 'pure tone' condition (3 decibels over center frequency) measured both at property line and at nearest inhabited residence.; Requires analysis by qualified engineer to demonstrate compliance				
New Jersey model for Small	Small- 100 kW or less	Leaves up to locality	Equal to town's building setback; no portion may					Removal for abandonment required,	

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systems (as a permitted use subject to site plan review and zoning permit procedure)	(Model only pertains to small systems)		extend over the setback, nor into public road or any overhead utility lines					but not a financial guarantee	
NJ Dept. Env. Protection Standards for large systems (includes list of possible State permits and Federal Permits, like Environmental Protection Act						The State of NJ has adopted a map of areas in the State where large wind turbines are prohibited based on a siting report by the NJ DEP, and they have some other interesting requirements, see attached.			
American Wind Energy Association Model for small	Small- rated capacity not more than 100 kW and intended to primarily	No limit as long as can meet the required setback distance	Equal to tower height including extended tip of blade from property lines		Normal operating conditions as measured at the property line shall not	Utility Notification – evidence that utility company has been informed of	Allowed as Accessory Use in all Zonign Districts where structures are allowed; subject to performance	Removal for abandonment required, but no financial guarantee	None beyond homeowners coverage required

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systems	reduce on-site consumption of power.				exceed the definition of nuisance noise. (but this is not defined anywhere!!)	intent to install connected generator	standards	required	

Here is a list of the documents I have reviewed:

“In the Public Interest: How & Why to Permit for Small Wind Systems, a Guide for State and Local Governments” by the American Wind Energy Association, September 2008

Wind Energy Fact Sheet: “Wind Energy—How Does It Work?” by the American Wind Energy Association

“Terrestrial Wind Turbine Siting Report,” by RIDEM, January 2009

Ordinances from Rhode Island communities:

- Charlestown
- Middletown
- North Kingstown (including their recent amendments since my first memo to you)
- Bristol
- Westerly

Ordinances from other states:

- State of Massachusetts Model Ordinance Allowing Wind Facilities by Special Permit
- Draft New Jersey Small Wind Energy System Ordinance
- AWEA(American Wind Energy Association) Model Zoning Ordinance: Permitted Use Regulations for Small Wind Turbines / Small Wind Zoning Ordinance
- Nevada, IA

Wind Turbines in RI

Location	Height	Cost	Power Generation	Notes
Portsmouth Abbey	240 feet total (164 feet to rotor hub, 77 foot long blades (154 diameter))	\$1.1 million		750 feet away from nearest neighbor; supplies 39.35% of school’s electricity
Portsmouth Town	336 feet total (213 feet to rotor hub, 123 foot blades (246 foot diameter blades))	\$2.9 million		
New England Tech Automotive	156 feet total (121 feet to rotor hub, 69 foot diameter blades)	\$500 K	100 Kilowatts electricity at 34 mph wind	Blades are black to help with melting ice; supplies 30% of building’s electricity
Middletown **				