



One in a series of “toolbox” items to accompany the Regional Plan for the Berkshires

November 2003

## PERMITTING WIND ENERGY FACILITIES

*This toolbox item discusses the issues that should be considered in the permitting of inland small-to-moderately-sized commercial wind energy facilities (1-30 MW).*

### Introduction

The Berkshires, along with the coastal region of Massachusetts, has been identified as an area to harness wind power. The Berkshires, again like the coast, is an area rich in scenic and natural resources, of which its residents can be fiercely protective.

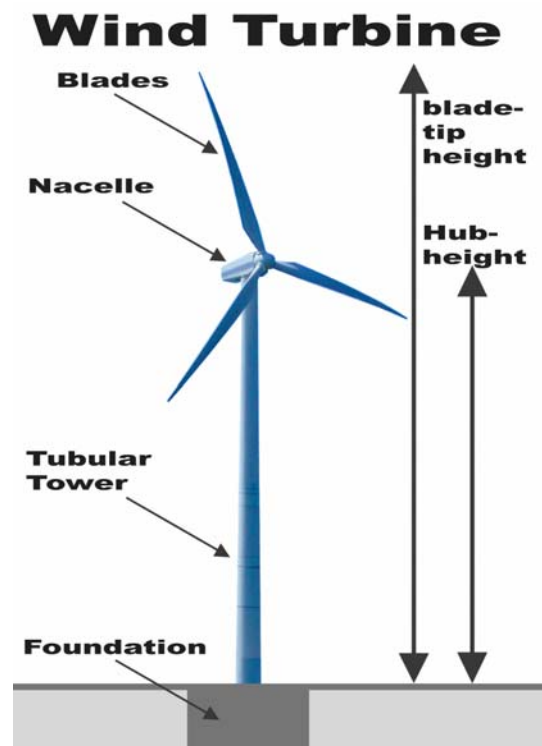
Some Berkshire communities are being approached by wind energy developers and some are considering pursuing wind power proactively. Local officials should plan ahead and determine residents’ level of interest in fostering wind energy production within their communities. If town residents are amenable to the development of wind energy, then they should consider adopting a bylaw that would allow wind while being protective of community resources.

### Wind Energy Technology in the Northeast

Modern wind turbines are no longer the quaint wind paddles that we envision on family farms. They are tall, sleek and powerful, often three times more powerful than their predecessors 5 years ago. Each turbine will produce 660 kW to 1.5 MW, enough to supply electricity to 200-700 homes.

Although large wind energy facilities with dozens or hundreds of wind turbines are common in the western and more open expanses of America, wind professionals expect that the typical commercial inland facility in the Northeast will range between 10-20 turbines. This is consistent with existing commercial wind developments in Vermont and New York State, and the proposed developments in Western Massachusetts.

Most likely the turbines that we will see in Western Massachusetts will have hub heights of 160-260 feet, with an additional blade height of at least 75-160 feet. At these heights, the turbines will be much taller than surrounding trees, which grow to approximately 70 feet tall. The Federal Aviation Administration requires lighting on all structures taller than 200 feet, so lighting will be required.



**Basic diagram of a wind turbine.**

Graphic courtesy of Sally Wright, Renewable Energy Research Laboratory, UMass, Amherst.

## Berkshire Planning Tools

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### Step One: Determine Community Interest

Public opinion on commercial wind energy facilities is varied and often contradictory. As part of the “bigger picture,” they represent a green energy source, because they emit no air pollution and reduce impacts caused by oil and coal extraction and refinement. As part of the “local picture,” they represent a potentially negative land use that could impact the scenic and natural resources of the region. As such, wind power presents a paradox.

Local officials should determine residents’ level of interest in fostering wind energy production within their community. This can be done by conducting resident surveys and by holding public meetings on the subject. During this time, it would be prudent to identify sites that are unacceptable or “off limits” to wind development.

If local residents view wind energy facilities as a beneficial land use, then the local planning board should develop policies and regulations to permit them. These policies and regulations will provide leaders with a clear sense of what local residents will accept.

#### ***Why Consider Wind Energy?***

##### 1. Environmental benefits.

*Fossil-fueled electric power plants emit more air pollution than any other industrial activity in the U.S. Per year these power plants emit:*

- *34% of the carbon dioxide generated by the U.S.; CO<sub>2</sub> is a major green house gas component and the U.S. is the largest emitter of CO<sub>2</sub> in the world*
- *70% of the sulfur dioxide, a major component of acid rain*
- *34% of nitrogen oxides, a major factor in smog and coastal eutrophication*
- *More than 33% of the mercury emissions, toxic at low levels; emissions can travel from 30-600 miles downwind of the source.*

##### 2. Financial benefits.

*Commercial wind energy facilities provide revenue to local communities. Municipalities can collect taxes on the assessed value of the property as an industrial site, as well as on value of the equipment and structures. Property owners can collect a fee for leasing the land on which the facility rests.*

### Step Two: Creating a Bylaw that Addresses the Major Issues

Wind turbines are not invisible, nor are they a typical development that local communities are used to permitting. If a community wants to allow commercial wind development, it should consider developing a bylaw that allows wind, while being protective of community character and public safety. Commercial wind projects should be categorized as a special permit use, with site plan review. This allows the municipality to place appropriate conditions on the project. Listed are the major issues that a windmill bylaw should address.

#### **Purpose or Preamble**

A wind energy facility bylaw should begin with a statement of purpose. This purpose should be derived from communications with local residents through surveys, public meetings or other outreach activities.

#### **Aesthetics**

Commercial wind farm developers look for sites with a relatively forceful and steady rate of wind, and in Western Massachusetts that is along our ridgelines. As noted earlier, modern wind turbines are over 200 feet tall and will stand far above the existing treeline. They will also require lighting. As such, they will be prominent features against the skyline.

However, the aesthetic impacts can be minimized to some extent by careful placement and spacing of the turbines, and by selecting mute and non-reflective colors for the tower and blades. *Criteria to consider:*

- Require post-development photographic simulations of the project, as seen from several prominent locations
- Require the flying of balloons to allow residents to understand the extent of the proposed project
- Require non-reflective color to minimize contrast
- Require that lighting be as minimal as allowed by FAA regulation.

It should be noted that limiting the height of the turbines to less than 200’ to avoid FAA lighting requirements is ***effectively prohibiting commercial wind development***, as all utility-scale turbines on the market today are taller than 200’.

# Berkshire Planning Tools

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## Environmental Protection

Some of our ridgelines are ecologically sensitive, harboring old growth forests and rare plants and animals. Some, like Mt. Greylock and Mt. Everett, support rare species found nowhere else in the state. Other ridgelines are covered with commonly found northern hardwood species. Some of our ridgelines are important flight pathways for migrating birds while others are not. *Criteria to consider:*

- Require environmental studies that evaluate impacts to:
  - Resident and migratory avian populations
  - Rare/endangered species
  - Rare ecological communities
  - Water resources
- Require post-construction revegetation plans, including measures to control erosion and incoming invasive species
- Require stormwater management and maintenance, on the facility and the access road
- Require avian mortality rate monitoring and reporting

Avian mortality rates are difficult to predict, despite the best efforts of professional biologists. An acceptable rate of avian mortality should be established, beyond which mitigation to reduce mortality would be required.

## Public Safety

The primary safety considerations associated with wind are the tower failure, the movement of the blades and the presence of high-voltage electric equipment that is potentially accessible to the public. Like all tall structures, there is the risk of the tower collapsing. There is also a risk of “blade throw,” which is when the lamination or pieces of the blade splinter away and fly off a short distance. It can also include the shearing away of built up snow and ice.

The turbines themselves can become “attractive nuisances” to those who would like to climb them. These people could be subject to injury from electrical equipment, moving parts, guy wires, or of course from falling off the towers.

*Criteria to consider:*

- Establish setbacks from:
  - Adjacent properties
  - Adjacent dwellings (usually a minimum of 1.5 times the total height of the turbine)
  - Public roads and recreation areas
- Require anti-climbing devices
- Require that the operator of the facility maintain the road for emergency vehicle access

## Abutters’ Rights

Unlike most industrial uses, wind energy facilities will most likely be located in rural areas. As such, they may generate noise in an otherwise quiet or natural setting. Modern turbines are amazingly quiet, but it is prudent to set maximum noise limits, which can be set at the property line, the nearest dwelling or from a specific distance from the facility.

Some residents may fear that the facility may interfere with television and cellular phone reception. *Criteria to consider:*

- Establish maximum noise levels at a given distance:
  - A limit of 40-60 dBA, measured at the property line or closest neighboring inhabited dwelling, is often cited
  - An alternative could be to require that the facility not exceed 10 dBA above background noise at the property line or nearest residence
- Require that the facility not interfere with electromagnetic signals and cellular reception

### *Typical Sound Levels (in decibels, or dBA)*

1-10	Threshold of hearing
~30	Quiet room, soft whisper
~50	Suburban residence (daytime), business office
65-80	City center traffic
~90	Ambulance siren (100’ away), boiler room
110-120	Rock concert in front of speakers
~120	Threshold of pain

## Berkshire Planning Tools

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### Compliance Enforcement

Compliance enforcement is often overlooked in the creation of a bylaw. Determining that a facility is not in compliance of a permit is the easy part; determining what to do to ensure that the problem is corrected is more difficult.

- Determine unacceptable conditions and establish steps to mitigate problems
- Clearly state the consequences of non-compliance
- Identify who enforces permit conditions
- Establish conflict resolution procedures

### Consultant Review

Reviewing the permit application for a commercial wind energy facility is not a routine activity for local permitting boards. Therefore, it is important that communities interested in allowing these facilities should include a consultant review clause in their bylaw. This clause requires the developer to fund the hiring of an independent wind energy expert to review the proposed project on behalf of the municipality.

### Performance Security

Municipalities often require that developers of large or complex projects provide financial performance guarantees. Wind energy facilities are complex development projects. They have extremely high start up costs (wind power on this scale costs in the range of ~\$1.5 million per MW), they are vulnerable to energy market fluctuations, and most likely they will be located in remote and steeply sloped areas. In addition, it is unlikely that the owner of the facility will reside in the community and be readily accessible if a problem should occur.

The municipality should require a financial surety to insure that it is not left with a financial liability in the event it has to correct erosion or non-compliance problems, dismantle a damaged turbine, or decommission an abandoned facility.

The types of financial surety that could be used for wind projects is varied and includes cash, letter of credit, negotiable securities, and bonds. The primary interest of the municipality is to have surety in a form that is easily collected. For more information on the different types of financial surety that are available to municipalities, refer to the June 2003 toolbox item, "Financial Performance Guarantees."

#### ***Does your Community have attractive sites for commercial wind production?***

- *A strong wind source of at least 11-13 miles/hour on an annual average (in Western Mass. this will generally occur along ridgelines over 1,500' in elevation or in large expanses of open land, like farms)*
- *Close proximity to existing high voltage electric transmission lines (it costs thousands of dollars per mile to install these lines, not including clearing of the land)*
- *Close proximity to existing roads or utility rights of way (also high costs to construct and maintain)*

### Resources

BRPC, 2003. *Financial Performance Guarantees*, One in a series of "toolbox" items to accompany the Regional Plan for the Berkshires, Pittsfield, MA.

James Manwell, 2003. *Planning for Wind Power*, a public presentation from Sept. 18, 2003. Renewable Energy Research Laboratory, UMass, Amherst, MA.

Siting Subcommittee of the National Wind Coordinating Committee, 1998. *Permitting of Wind Energy Facilities, a Handbook*, NWCC, Washington DC.

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*This publication is one in a series of "toolbox" items to support the Regional Plan for the Berkshires. If you would like to receive additional copies of this or other toolbox items, please contact the Berkshire Regional Planning Commission, 1 Fenn St., Suite 201, Pittsfield, MA 01201 or call (413) 442-1521.*

*Copies of the toolbox items are also available on the web at [www.berkshireplanning.org](http://www.berkshireplanning.org)*

*Photo simulation of wind farm on front cover courtesy of enXco.*

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