



Advancing Wind Power in Illinois Conference 2011

Jonathan Nieuwsma

Illinois Wind Energy Association

Small Wind Zoning

Breakout Seminar

Thursday, July 21, 2011, 2:45 PM

Small Wind Zoning

IWWG Conference
July 21, 2011



Jonathan Nieuwsma
Chairman, Small Wind Committee
Illinois Wind Energy Association



Introduction

Jonathan Nieuwsma

Illinois Wind Energy Association
• Chairman, Small Wind Committee

Heston Wind and Renewable Energy LLC
• Business Development Director

CS2-Creative Solar Structures LLC
• Partner

Certified MREA Small Wind Site Assessor



Outline

- 1) For Zoning Officials
- 2) For Dealers/Installers



McGlynn Middle School
Medford, MA



Small Wind Zoning for Zoning Officials



Wind Turbine Physics

How much power is in wind?

$$\text{Power} = \frac{1}{2} \rho \times A \times v^3$$

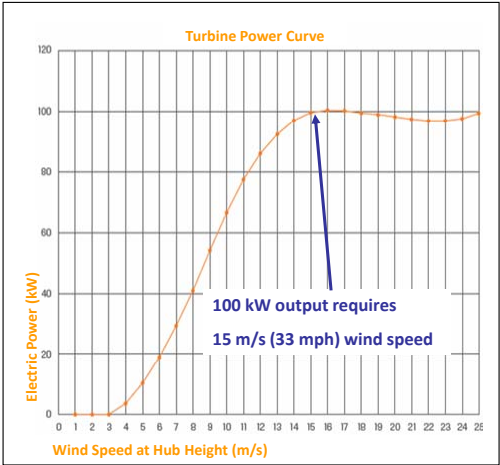
ρ = air density
 A = swept area
 v = wind speed

For standard HAWT:

$$A = \pi r^2, \text{ so}$$

$$\text{Power} = \frac{1}{2} \rho \times \pi r^2 \times v^3$$

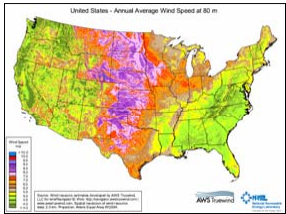
2x blade radius = 4x power
2x wind speed = 8x power



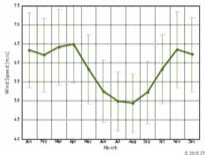
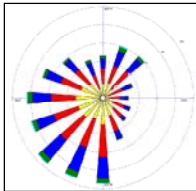
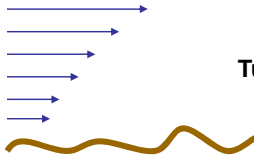
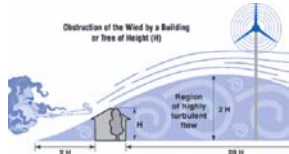
Power Curve for "100kW" Turbine



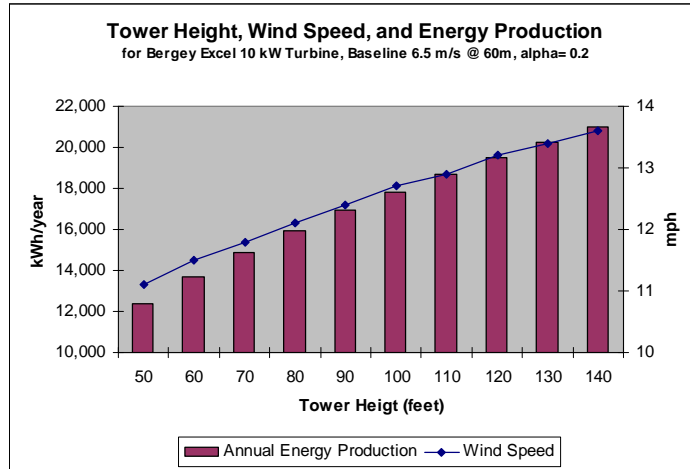
Wind Speed Varies With:



Turbine Location



More Tower, More Power



Small Wind ≠ Big Wind



is to



as



is to



Setback and Tower Height Restrictions

- 1.1x maximum setback per state law for “systems used exclusively by an end user”

For a square lot with turbine in exact center:

Lot Size (Acres)	Max. System Height (ft)
0.25	47
0.5	67
1	95
1.5	116
2	134
3	164
4	190
5	212

Setback requirements imply tower height restrictions; no need to do so separately.



Tower Type Restrictions

Free Standing



Lattice



Monopole

Guyed Support



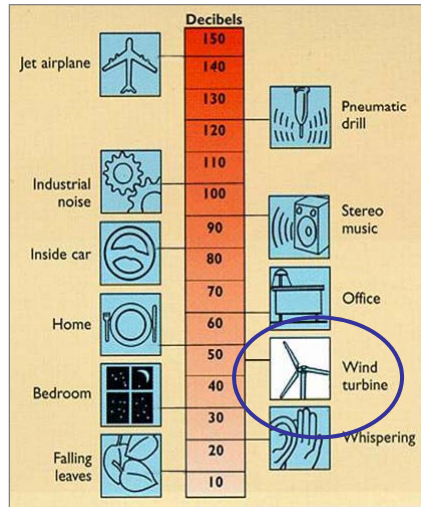
Lattice



Monopole



Typical Question: Sound



How much sound does a wind turbine make?

**35 - 45 decibels
at 350 meters
(1,148 ft)**

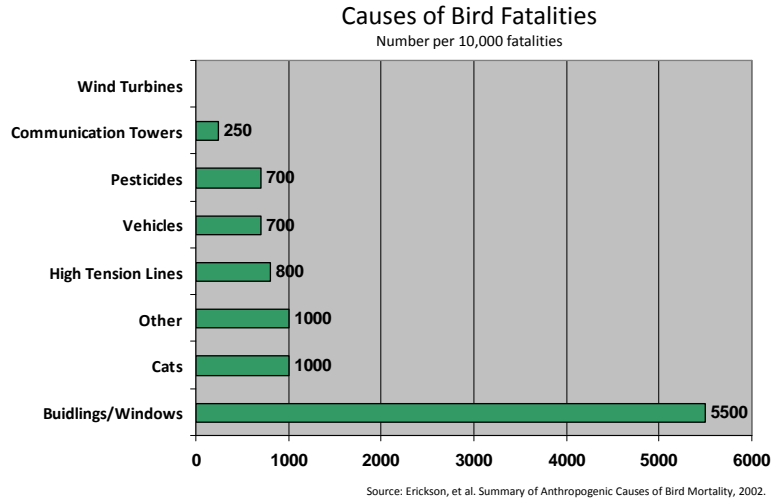
- Usually masked by ambient sounds
- Varies by turbine type.
- Modern equipment is much quieter.
- Exponentially quieter with distance
- White noise: less tonal than flagpole clasp

Typical Question: Shadow Flicker

- Not an issue for smaller turbines due to higher RPMs.
- Predictable and easily avoidable.
- Only occurs during certain hours and certain days.
- Setback requirements usually preempt any issues.
- Formal studies not required for small turbines.



Typical Question: Birds



Typical Question: Birds

Avian Impact Studies

Audubon Society, Presque Isle Chapter 2005-2007

- “No notable findings”
- One dead seagull, no apparent physical injuries

Pennsylvania DCNR/Gannon University 2006-2008

- 3,000 species in the area
- Including 130 threatened, endangered, or rare
- One dead grackle, cause of death undetermined

Photo credit: Lisa DiFrancisco, North Coast Energy Systems



Typical Question: Birds



*“On balance, **Audubon strongly supports wind power** as a clean alternative energy source that reduces the threat of global warming. Each individual wind project, however, has a unique set of circumstances and should be evaluated on its own merits.”*

- Audubon Society



Source: Congressional testimony of Mike Daulton, Director of Conservation Policy, National Audubon Society, before the Committee on Natural Resources Subcommittee on Fisheries, Wildlife and Oceans, May 2007.

Typical Question: Property Value

- Studies of *utility* scale wind show no impact on property values (LBNL Report, Sept. 2009)
- No formal studies for small wind.
- Anecdotal evidence that neighboring values *increase*.
- Sign of progressive community.



30 foot rule?



Typical Question: Safety

- Turbines and towers are engineered structures.
 - Like lamp posts, cell towers, utility poles...
 - Setback distances are appropriate.
- Attractive Nuisance (tower climbing)
 - Depends on tower style.
 - Access required for maintenance.
- Braking redundancies prevent over speed.
- Foundations are professionally engineered.



Typical Question: Ice



Bolton Valley Ski Area
Bolton, VT

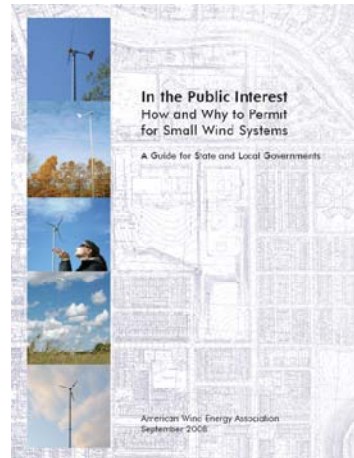


Typical Question: Lightning



Small Wind Zoning Resources

- AWEA: resource guide, model ordinance
www.awea.org
- DWEA: fact sheets, bird/bat study, more
www.distributedwind.org
- IIRA/Illinois Wind: model ordinance, county-by-county zoning guide
www.illinoiswind.org
- IWEA Small Wind Committee: education, advocacy
www.windforillinois.org



Small Wind Zoning for Dealers/Installers



Case Study: Lake County Illinois

Zoning Ordinance Timeline

	Jan 2010 Draft Initial Draft	June 2010 Draft ZBA	November 2010 Draft PBZ Committee	March 2011 Final Approved by Board
Scope:	Bldg, Small, Large	Bldg, Small, Large	Bldg, Small, Large	Bldg, Small
Setback:	1.1x	2X <125', 500' >125'	1.5x	1.5x
Definition:	175'	175'	175'	200'
Tower Type:	No restrictions	Monopole only	Monopole only	Monopole only
Permit Type:	Not addressed	Conditional	Permitted	Permitted
Sound:	45/55 dB(A)	40/50 dB(A)	45/55 dB(A)	45/55 dB(A)
Shadow:	<1 hr/day within 500'	0 on bldg, <50 hpy bld ar.	<1 hr/day on res. bldg.	<1 hr/day on res. bldg.
Wildlife:	Not addressed	>125' rqmnts apply	>75' rqmts <i>may</i> apply	>75' rqmts <i>may</i> apply



Lessons Learned, Part 1

Get Involved Early

- *As early in the process as possible, ideally before policy is even written.*
- *Participate in working groups, zoning commissions, etc.*

Work Collaboratively

- *Cooperative effort by competitors is more effective than working alone.*
- *Strength in numbers.*
- *Less perceived self-interest.*

Build Relationships

- *Establish good working relationship with planning staff.*
- *Polite interactions with elected officials and staff.*



Lessons Learned, Part 2

Education is Key

- *Local officials must know enough to make informed decisions.*
- *They're usually willing and happy to learn. IWEA can help.*
- *Organize a field trip for hands-on (or eyes/ears-on) experience.*
- *Don't forget neighbors.*
- *Educate the customer!*

Set a Good Precedent

- *One bad project can poison the well.*
- *But if done properly, the first project in a community can set the stage.*
- *Set realistic customer expectations.*

Differentiate from Wind Farms

- *Small turbines should not be treated like utility scale.*
- *Lower permitting fees, less restrictive requirements.*



Lessons Learned, Part 3

Be Prepared

- *Have documentation to support your arguments.*
- *Model ordinances, fact sheets, academic studies.*
- *Third-party site assessment report can help.*

Organize at the State Level

- *State level action is more effective than working at the local level.*
- *102 counties in Illinois, hundreds of local zoning jurisdictions.*
- *Example: 1.1x max setback*
- *Example: no tower height restrictions (did not pass)*
- *Example: net metering expansion (pending)*
- *Example: RPS carve out for small wind (pending)*



Thank you!

Contact:
Jonathan Nieuwsma
jonathan@windforillinois.org
312.546.4899

