

GOOD PLANNING FOR DISTRIBUTED WIND



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Why Planning & Zoning Matters

- Directly affects...
 - Up-front system cost to the end-user
 - ROI
 - Productivity
 - Service & maintenance costs
 - Project feasibility
 - Project time-lines

Why Planning & Zoning Matters

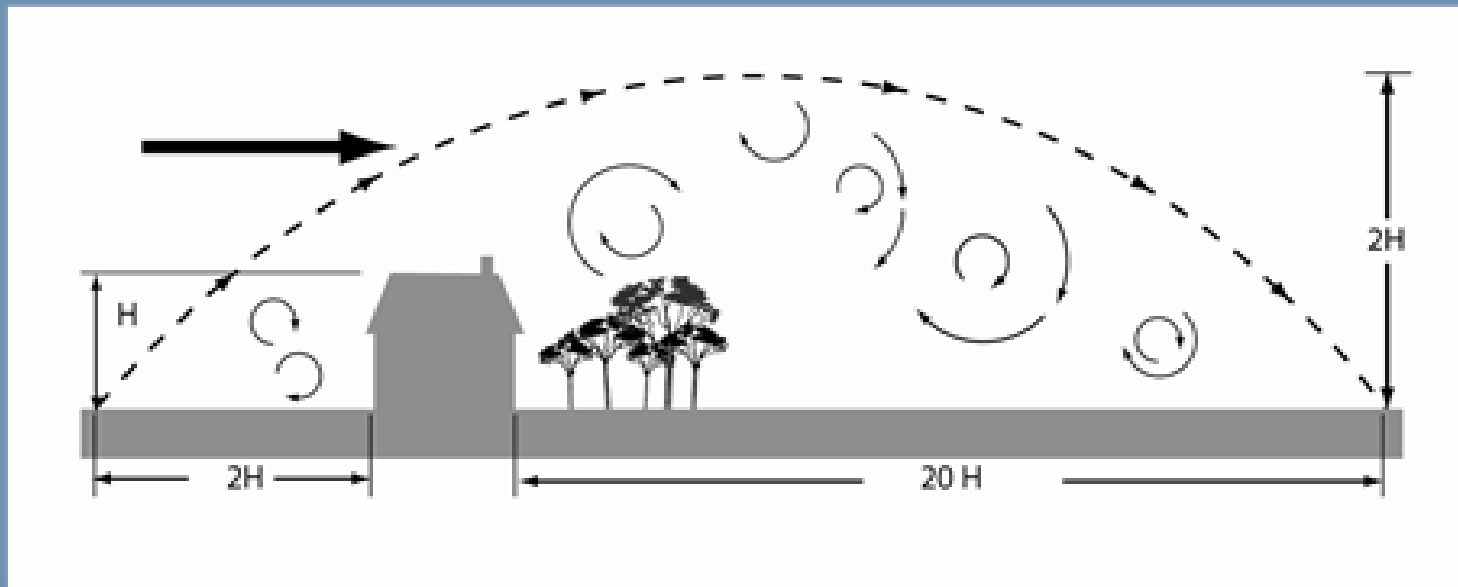
- Indirectly affects...
 - Ability of utilities and States to meet Renewable Energy Portfolio Standards
 - Ability of towns to meet their sustainability goals
 - Local, State & National energy issues
 - Economic development & job creation
 - Business & community development

Effective Planning & Zoning

- The “Big Six”
 - System Height
 - Setbacks
 - Sound
 - Engineering
 - Aesthetics
 - Environmental Impact

System Height & Turbulence

Importance of “Micro-Siting”



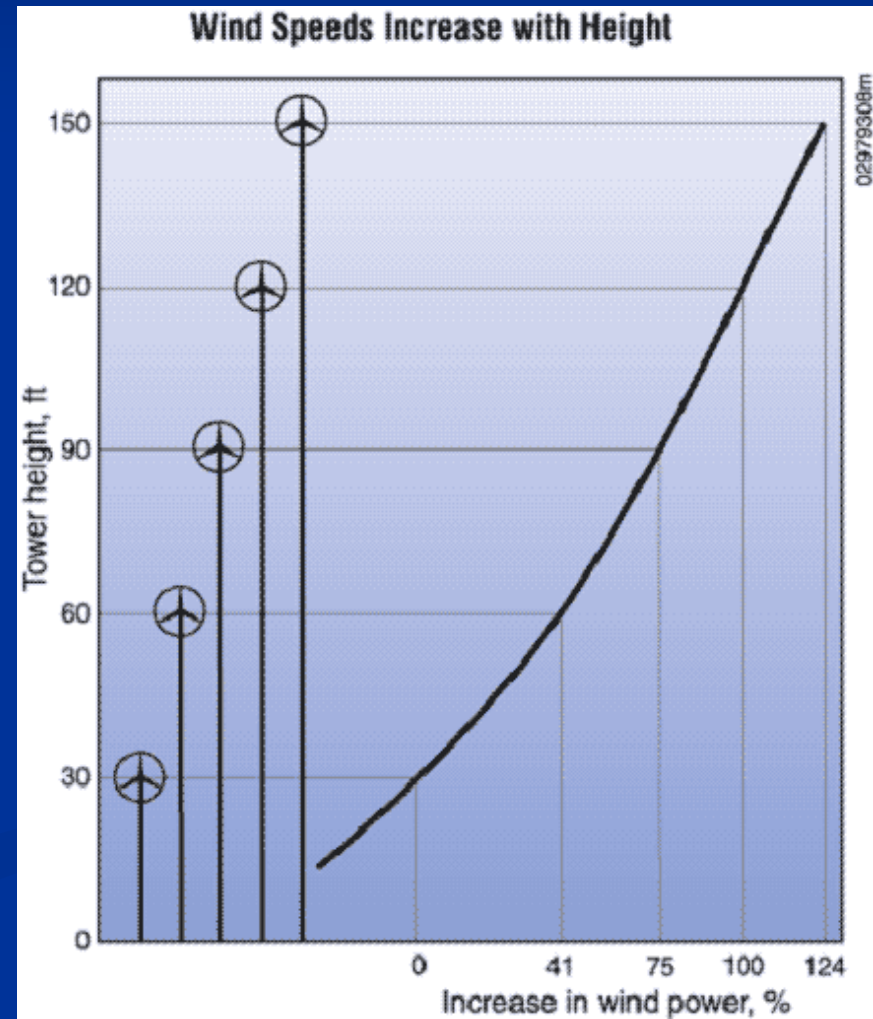
Site turbine a minimum of 30 feet higher than obstructions within 500 feet

“Trees will grow but the tower never will!” Mick Sagrillo

Why System Height Matters

Translation of Height to Increases in Wind Speed

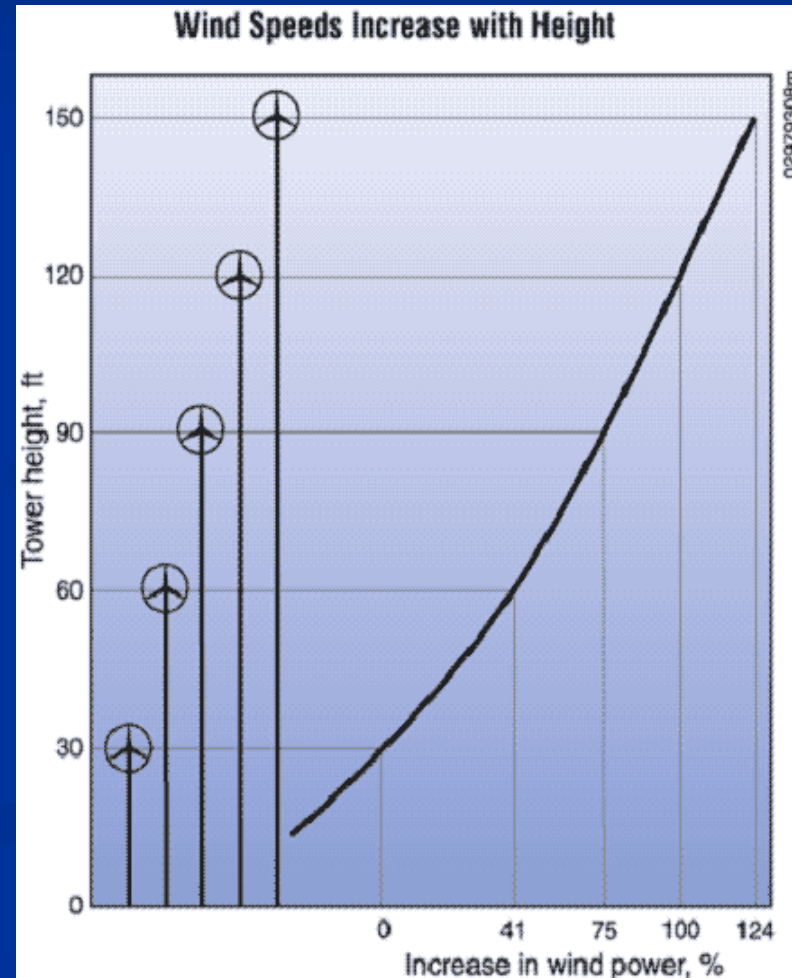
- ♦ Small increases in wind speed result in large increases in power ($P \sim V^3$)
- ♦ Tall towers often needed for clearance above obstacles (*turbulence*)
- ♦ May require a variance or a special use permit, but worth the effort!
- ♦ Chart assumes no obstacles; curve is steeper with obstacles



Why System Height Matters

Translation of System Height to kWh

- ◆ Using a popular 10kW turbine, consider the kWh results for different heights at the same site:
 - ◆ At 60': 9 mph = 7116 kWh
 - ◆ At 80': 9.5 mph = 8347 kWh
 - ◆ At 100': 10 mph = 9677 kWh
 - ◆ At 120': 11.25 mph = 13,443 kWh
 - ◆ At 150': 12.5 mph = 17,700 kWh



Benefits of Good Tower Height

- Better resource
- Better productivity
- Better system function
- Reduced sound
- Reduced maintenance
- Reduces number of variance requests
- Happy system owner, happy neighbors, happy township

Setbacks

- Setbacks critical in creating conditions for responsible installations
- Benefits of good setbacks:
 - Fewer variance requests
 - Facilitates responsible tower height
 - Does not arbitrarily exclude would-be wind turbine owners w/good on-site wind resource
 - Encourages use of renewable energy in your township

Sound

- Wind turbines make *sound*; should not make *noise*
- Most under 65dB – compare to window A/C
- Exceptions during storms & power outages
- Ambient sound increases often correlate with increases in wind turbine sound

Note: Tall towers facilitate less sound at ground level in multiple ways; ergo, reasonable height allowances can actually help meet the sound goals of your ordinance.

Why Engineering Matters

- Safety
- Incentives
 - Positive zoning required prior to approval for incentive
 - Townships that require engineering in order to get *zoning* permit can cost \$500 - \$15,000...*Before resident even knows if he/she is allowed to use technology, and before knowing if incentive will be approved*
- Cost (Installation and ROI)
- Project Time-line

Excessive engineering requirements = high cost = no positive zoning = no incentive = no project

What Engineering Costs

- Engineering is appropriate for the building permit, not for the zoning permit
- Basic engineering costs \$500 – \$5,000
- Excessive engineering requirements (wet stamps, structural, electrical, soil, in-state engineer, etc.) can add \$1,500 - \$15K
- Adds 5-20% to cost of standard 10kW installation

Challenges of Aesthetics

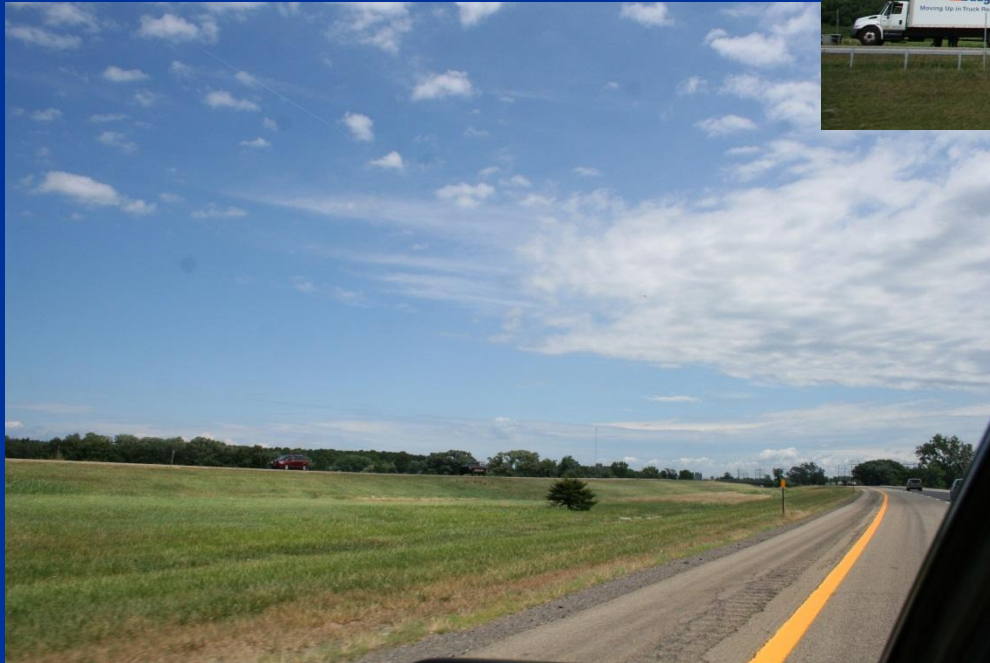
- Subjective
- Difficult to regulate; legislating taste
- Aesthetics and Property Rights
- Aesthetics and Energy Needs
- NIMBY's

Aesthetics

- Assumptions of ugly – your language matters
- Blending
- Tower type requirements in an ordinance
- Flicker/strobe
- What we already accept – change is difficult, but possible
- Image and standards of the township
- NIMBY's
- Surely taller = more visible...right?

Aesthetics

What a wind turbine
actually looks like



Environmental Impact

■ What about the birds?

- It has been demonstrated via formal and informal studies that small wind has no significant negative impact on the environment, including avian, bat and other wildlife.

See www.distributedwind.org for studies and other helpful resources

MODEL ORDINANCE

See www.distributedwind.org for new model ordinance and other helpful resources

RESOURCES

- *Distributed Wind Energy Association*
www.distributedwind.org
- *American Wind Energy Association –*
www.awea.org
- *Renew Wisconsin --* renewwisconsin.org
- *Environmental Protection Agency --*
www.epa.gov/
- *Natural Resource Cons. Serv.*
www.nrcs.usda.gov/
- *Farm Bureau --*
www.pfb.com/counties/greene/index.html

RESOURCES

- *DSIRE – Database of State Incentives –*
www.dsireusa.org
- *Dept of Environmental Protection --*
www.dep.state.pa.us
- *US Dept of Energy --* www.energy.gov/
- *US Dept of Agriculture --* www.usda.gov
- *Energy Star*
http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_audits

Contact Info

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