

Challenges of Wind



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Turbine Types

- Horizontal
 - Propeller style
 - 2-4 blades
 - Generator located in nacelle
 - Spans all size profiles
- Vertical
 - Egg beater/DNA style
 - Generator at base
 - Typically small scale



Three Tenants of Wind

- Resource
 - 20m/s min average wind (44.7MPH)
- Location
 - Ridges vs. Fields
 - Micro climates
- Hub Height
 - Ground disturbance



Classes of Turbines

- Large Wind (Power plant scale)
 - 1.5-5MW
- Medium Wind (Neighborhood Scale)
 - 50kW-1.5MW
- Small Wind (Individual Scale)
 - <20kW



Commercial Wind Farms

- Size between 10MW-500MW
- Most efficient due to size, height
- Precise location of turbines based on wind studies yields output closest to projections
- Often have budget, time, socio/political to reduce external compromises



Neighborhood Wind

- Typical size between 50kW-1.5MW
- Not as common as other 2 classes
- Socio/political pressures dictate whether efficiency is similar to large or small wind
- Often output does not meet expectations



Wind for Ag and Residential

- Typical size between 800W-20kW
- Least efficient due to size, height
- Has largest complications due to external socio/political pressures
- Often output does not meet expectations



Misconceptions of Wind

- Migratory Birds
 - New designs vs. old
 - More birds killed by domestic cats than by wind turbines
- Noise
 - dB of turbine ~ dB of trees @given wind speed
- Decreased Property Value
 - No comprehensive study proves/disproves
 - Hail Mary of excuses by neighbors
- Safety
 - Mechanical equipment unsafe to be exposed
 - Towers present climbing attraction

The Real Challenges of Wind

- Appropriate location
 - Correct height
 - Socio/Political compromises
- Industry itself
 - Confusing or misrepresented performance data
 - Little third party verification of output data
- Customers
 - Measured vs. perceived wind resources
 - Willingness to accept marginal



Appropriate Implementation of Wind

- Allow wind on appropriate sites
 - Appropriate lot sizes
 - Freedom of location on lot (within reason)
 - Height to reach clear wind
- Minimize impact
 - dB levels at property line
 - Setback as function of height
 - Tower Safety

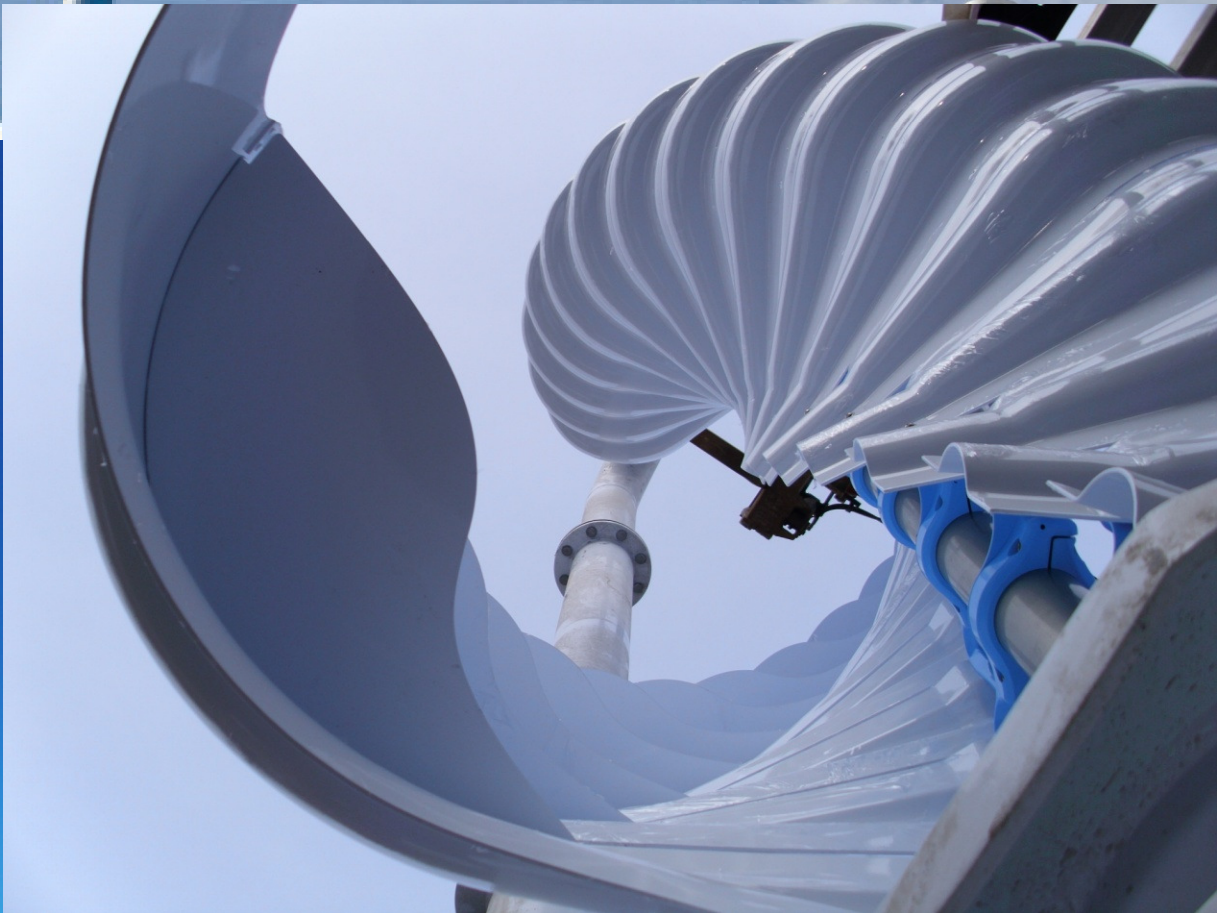
Special Concerns

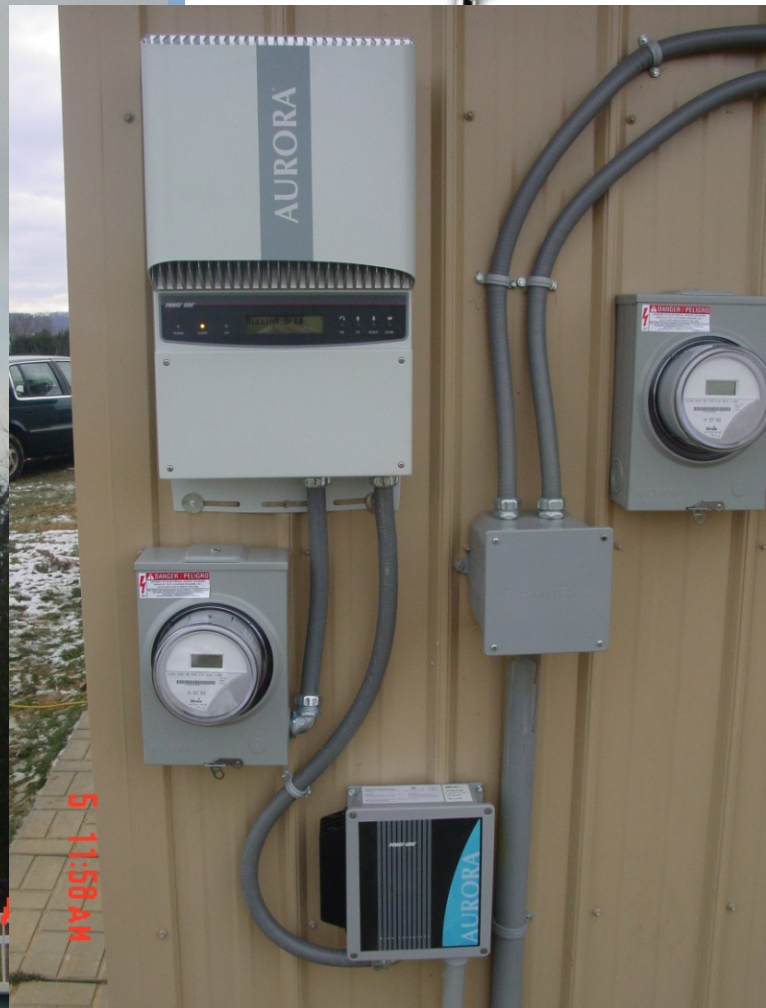
- Electrical and mechanical equipment
 - Difference for large wind vs. Small
 - When to perimeter fence, when not to
- Liability insurance
- FAA (Title 14 subpart B section 77.15)
 - 200' above Ground level
 - Inline of landing way
 - Other restrictions if within 20,000' or airport

Prior to Writing Ordinance

- Review others
 - Mount Joy twp
 - West Hempfield twp
- Visit sites
 - Review mechanical equipment
 - Note structure, electrical and point of interconnection
- Review EDC guidelines for interconnection
 - Application process
 - Inspection requirements







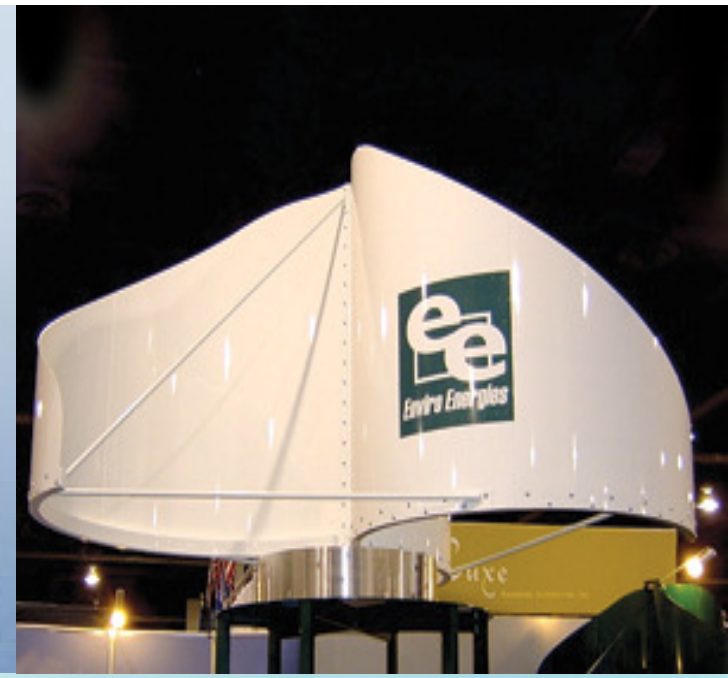


Large Wind





Upcoming Wind



**The Home
Energy
Solution**

by EarthTronics

Bringing
Saving
home



WIND FLOW

mogon

Future Wind



Wind Turbine Output	400W (@28 mph)
Energy Output	40kWh/month (@12 mph)
Wind Turbine Type	Vertical Axis (VAWT)
Output Voltage (AC)	120V
Max Current (AC)	3.2A
Mounting	Wall or Roof Mounted
Installation	1-2 Hours
Dimensions	48" x 36" (1.2m x 0.9m)
Module Weight	30 lbs (13.5 kg)
MSRP	\$399-\$699

A photograph of an offshore wind farm with several white wind turbines on blue water under a clear sky. The text is overlaid on the image.

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