

# Wind P&Z Considerations



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# Wind Potential?

- **Yes, there is excellent potential**
- **Large tracts of land**
- **Idaho can support wind farms**
  - **Large Commercial**
  - **Small Community**
  - **Individual Homeowner**
- **Reasonable, yet safe planning standards needed**



# Many Opportunities



Small ( $\leq 10$  kW)

- Homes
- Farms
- Remote Applications



Intermediate

(10-1000 kW)

- Community Power
- Ag Power
- Distributed Power



Large (1500 kW – 2500 MW)

- Large Wind Farms
- Distributed Power

# Examples of Wind Power Systems

## Large Grid Wind System



# On Grid Farm Wind System



***Refurbished  
Wind Turbine***



**Another Option for Farmers with Irrigation Loads**

**Many 65/80/100/200/300 kW units available**

# Off-Grid Wind Water- Pumping

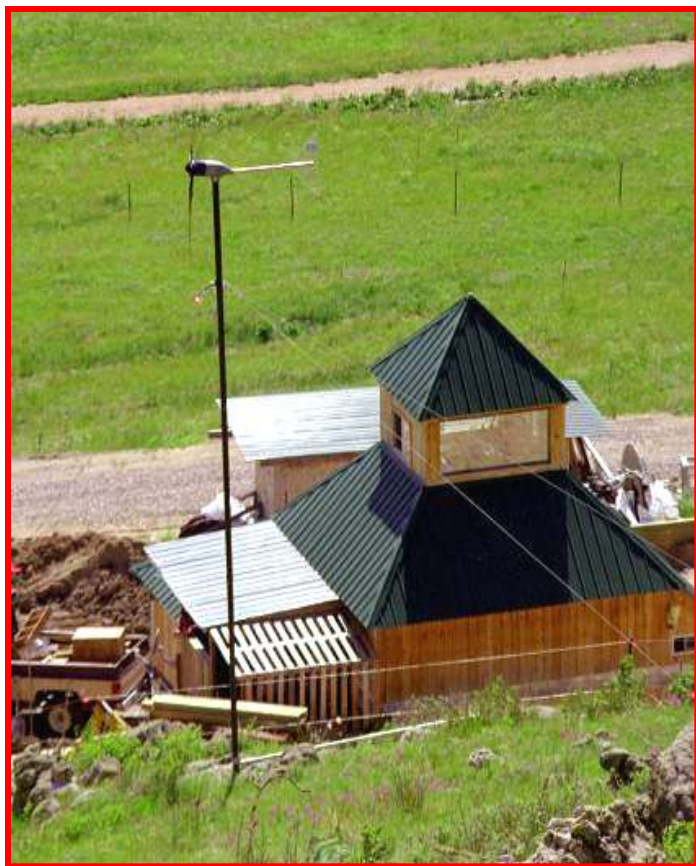


- Ranch applications
- Old Idea, new equipment
- Water-pumping for cattle
- Example – A Whisper 1000 wind turbine, 1 kW, 9 ft rotor, 30 ft tower

# Off-Grid Stock Tank Heating with Wind

- University of Wyoming
- Bergey Windpower 1500 wind turbine, 1500 W, 10 ft rotor





# Planning and Zoning Considerations

- **Two general categories of wind turbines ordinances**
  - **Small Wind (AKA Residential)**
    - **Up to 10 Kw**
  - **Large Wind**
    - **Can include single turbines and large farms**
    - **Can include both**
      - **intermediate ( 10-1000 Kw) and**
      - **large turbines (>1000 Kw)**

# Planning and Zoning Considerations

- Turbines have many advantages, both economical and environmental
- Make use of best practices (AWEA, WPA, Mfr, etc.)
- Clearly define and allow dual use of land without requiring new zoning to add turbines to residential, commercial or agriculture
- Restrictive ordinances inadvertently limit wind turbines
- Develop ordinances for public good and un-involved neighbors
- Pitfalls to avoid
  - Restrictive heights (today's technology can be easily surpassed in the near future)
  - Requiring excessive permitting analysis or costly processes (on small turbines)
  - Restrictive sound levels
  - Excessive setback limits
  - Who is buying the power (Not a P&Z Concern)

# Planning and Zoning Considerations

- **Small Wind Considerations**
  - **Establish simple permitting guidelines for no contest approval (Examples - private property, up to 50 foot, up to 10 Kw, net metered, etc)**
  - **Setback**
    - **Fall distance (turbine height to tip of blade) to property lines**
    - **Fall distance to owner's structures**
      - **Can be waived in writing during permitting process**
      - **Can be waived by neighbors in writing**
    - **Consideration given to neighboring residences for Flicker and sound**
      - **Flicker – Perform a study or three fall distances**
      - **Sound – Manufacturer certified sound levels at property line – Example -**
        - **60-65 dB (A weighted) and**
        - **50-55 dB (C weighted)**



# Planning and Zoning Considerations

- **Large Wind Considerations**
  - **Setback**
    - **1.1-1.5 x Fall distance (turbine height to tip of blade) to property lines**
    - **Fall distance to owner's structures**
      - **Can be waived in writing during permitting process**
    - **¼ mile minimum distance to non participating landowners residences**
      - **Can be waived by neighbors in writing**
  - **Consideration given for avian, flicker, and sound issues**
    - **Flicker – Perform a study (or three times fall distances)**
    - **Sound – Manufacturer certified sound levels at property line and nearby residences**
      - **Avoid the wind turbine syndrome pitfall**
    - **Avian – Pre and post construction surveys and best practices**

# Planning and Zoning Considerations

- **Establish common definitions**
- **Support case by case assessments**
- **Sound certification**
- **Make use of visualization**
- **Property values are not typically impacted**
- **Invoke IBC, NEC, and other applicable codes**
- **Develop a positive yet fair and open P&Z environment**
- **Avoid extremist views for and against turbines**

# Planning and Zoning Considerations

- Information available for research - examples

[http://www.windpoweringamerica.gov/pdfs/policy/2008/ordinances\\_overview.pdf](http://www.windpoweringamerica.gov/pdfs/policy/2008/ordinances_overview.pdf)

<http://www.windpoweringamerica.gov/policy/ordinances.asp>

<http://www.awea.org/smallwind/toolbox/IMPROVE/zoning.asp>

<http://www.awea.org/SMALLWIND/TOOLBOX2/zoning.html>

<http://www.awea.org/smallwind/documents/modelzo.html>

[http://www.windpoweringamerica.gov/pdfs/policy/2010/wind\\_energy\\_or\\_dinances.pdf](http://www.windpoweringamerica.gov/pdfs/policy/2010/wind_energy_or_dinances.pdf)

<http://www.windpoweringamerica.gov/siting/ordinances.asp#links>

Which, for example leads to a sample Idaho Ordinance

[http://www.co.jefferson.id.us/use\\_images/planning\\_zoning/WindmillOrd.pdf](http://www.co.jefferson.id.us/use_images/planning_zoning/WindmillOrd.pdf)

**Wind Turbine Sound Study**

[http://www.canwea.ca/pdf/talkwind/Wind\\_Turbine\\_Sound\\_and\\_Health\\_Effects.pdf](http://www.canwea.ca/pdf/talkwind/Wind_Turbine_Sound_and_Health_Effects.pdf)

**Impact on Real Estate Costs (Or Lack of Impact!)**

<http://eetd.lbl.gov/ea/ems/reports/lbni-2829e.pdf>

# AWEA Example

AWEA Model Small Wind Zoning Ordinance

Permitted Use Regulation for Small Wind Turbines

**Section 1 Purpose:** It is the purpose of this regulation to promote the safe, effective and efficient use of small wind energy systems installed to reduce the on-site consumption of utility supplied electricity.

**Section 2 Findings:** The [city or county] finds that wind energy is an abundant, renewable, and nonpolluting energy resource and that its conversion to electricity will reduce our dependence on nonrenewable energy resources and decrease the air and water pollution that results from the use of conventional energy sources. Distributed small wind energy systems will also enhance the reliability and power quality of the power grid, reduce peak power demands, and help diversify the State's energy supply portfolio. Small wind systems also make the electricity supply market more competitive by promoting customer choice.

The State of xxxxxx has enacted a number of laws and programs to encourage the use of small-scale renewable energy systems including rebates, net metering, property tax exemptions, and solar easements. [as appropriate]

However, many existing zoning ordinances contain restrictions, which while not intended to discourage the installation of small wind turbines, that can substantially increase the time and costs required to obtain necessary construction permits.

Therefore, we find that it is necessary to standardize and streamline the proper issuance of building permits for small wind energy systems so that this clean, renewable energy resource can be utilized in a cost-effective and timely manner.

## Section 3 Definitions:

**Small Wind Energy System:** A wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more than 100 kW and which is intended to primarily reduce on-site consumption of utility power.

**Tower Height:** The height above grade of the fixed portion of the tower, excluding the wind turbine itself.

# AWEA Example

## *AWEA Model Small Wind Zoning Ordinance Continued*

### **Section 4 Permitted Use:**

Small wind energy systems shall be a permitted use in all zoning classifications where structures of any sort are allowed; subject to certain requirements as set forth below:

- 4.1 Tower Height:** For property sizes between  $\frac{1}{2}$  acre and one acre the tower height shall be limited to 80 ft. For property sizes of one acre or more, there is no limitation on tower height, except as imposed by FAA regulations.
- 4.2 Set-back:** No part of the wind system structure, including guy wire anchors, may extend closer than ten (10) feet to the property boundaries of the installation site.
- 4.3 Noise:** Small wind energy systems shall not exceed 60 dBA, as measured at the closest neighboring inhabited dwelling. The level, however, may be exceeded during short-term events such as utility outages and/or severe wind storms.
- 4.4 Wind Turbines:** Small wind turbines must have been approved under the Emerging Technologies program of the California Energy Commission or any other small wind certification program recognized by the American Wind Energy Association.
- 4.5 Compliance with Uniform Building Code:** Building permit applications for small wind energy systems shall be accompanied by standard drawings of the wind turbine structure, including the tower, base, and footings. An engineering analysis of the tower showing compliance with the Uniform Building Code and certified by a licensed professional engineer shall also be submitted. This analysis is frequently supplied by the manufacturer. Wet stamps shall not be required.
- 4.6 Compliance with FAA Regulations:** Small wind energy systems must comply with applicable FAA regulations, including any necessary approvals for installations close to airports.
- 4.7 Compliance with National Electric Code:** Building permit applications for small wind energy systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code. This information is frequently supplied by the manufacturer.
- 4.8 Utility Notification:** No small wind energy system shall be installed until evidence has been given that the utility company has been informed of the customer's intent to install an interconnected customer-owned generator.

Off-grid systems shall be exempt from this requirement.

# Example Ordinance - Summary (pg 1 of 2)

([http://www.windpoweringamerica.gov/pdfs/policy/2008/ordinances\\_overview.pdf](http://www.windpoweringamerica.gov/pdfs/policy/2008/ordinances_overview.pdf))

## Wisconsin *Buffalo County, Wisconsin*

|   |  |
|---|--|
| Zoning Areas where turbines are allowed | Agricultural   |
| Setbacks                                | <ol style="list-style-type: none"> <li>1) Blufflines: Each wind turbine shall be set back from all blufflines.</li> <li>2) Habitable structures: Each wind turbine shall be set back from a habitable structure a distance of 50 feet, plus the height of the turbine from ground level to the tip of the blade at maximum height.</li> <li>3) Property lines: Each wind turbine shall be set back from the nearest public road right-of-way a distance of 50 feet, plus the height of the wind turbine from ground level to the tip of the blade at maximum height.</li> <li>4) Communication and electrical power lines: Each wind turbine shall be set back from the nearest above-ground electric power line or telephone line a distance of 50 feet, plus the height of the tower as determined from the existing line unless appropriate easements are obtained from the power or telephone company whose lines would be affected and recorded at Buffalo County Register of Deeds.</li> </ol> |
| Spacing and Density                     | No Spacing or density requirements.  |
| Height                                  | No Height standards.   |
| Clearance                               | No clearance standards.  |
| Access                                  | <ol style="list-style-type: none"> <li>1) Wind turbine towers shall not be climbable up to 15 feet above ground level.</li> <li>2) All access doors to wind turbine towers and electrical equipment shall be lockable.</li> </ol>  |
| Electric Wires                          | <ol style="list-style-type: none"> <li>1) All wiring between wind turbines and the WECS substation shall be underground.</li> <li>2) Electrical controls and control wiring and power lines shall be wireless or not above ground except where wind farm collector wiring is brought together for connection to the transmission or distribution network, adjacent to that network.</li> </ol>   |
| Lighting                                | WECS shall not be artificially lit, except to the extent required by the Federal Aviation Administration or other applicable authority.  |
| Equipment                               | No Equipment Standards   |
| Appearance, Color, and Finish           | <ol style="list-style-type: none"> <li>1) Wind turbines shall be painted a non-reflective, non-obtrusive color.</li> <li>2) At WECS sites, the design of the buildings and related structures shall, to the extent reasonably possible, use materials, colors, textures, screening, and landscaping that will blend the WECS into the natural setting and the existing environment.</li> </ol>   |
| Signs                                   | <ol style="list-style-type: none"> <li>1) Wind turbines shall not be used to display any advertising except for reasonable identification for the manufacturer or operator of the WECS.</li> <li>2) Appropriate warning signs shall be placed on wind turbine towers, electrical equipment, and WECS entrances.</li> </ol>   |

# Example Ordinance – Summary (pg 2 of 2)

|                         |   |
|-------------------------|---|
| Permits Required        | Conditional Use Permit, Wind Energy Conversion System Zoning Permit   |
| Restoration Requirement | No restoration requirements, but a plan for abandonment must accompany the application for a conditional use permit.  |
| Signal Interference     | The applicant shall take reasonable steps to minimize interference with electromagnetic communications, such as radio, telephone, or television signals caused by WECS.   |
| Noise                   | <p>1) Audible noise due to WECS operations shall not exceed 50 dBA for any period of time, when measured at any inhabited structure.</p> <p>2) In the event the audible noise due to WECS operations contains a steady pure tone, such as a whine, screech, or hum, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by 5 dBA. A pure tone is defined to exist if 1/3 octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels of the two contiguous 1/3 octave bands by 5 dBA for center frequencies of 500 Hz and above, by 8 dBA for center frequencies between 160 Hz and 400 Hz, or by 15 dBA for center frequencies less than or equal to 125 Hz.</p> <p>3) In the event the ambient noise level (exclusive of the development in question) exceeds the applicable standard given above, the applicable standard shall be adjusted so as to equal the ambient noise level. The ambient noise level shall be expressed in terms of the highest whole number sound pressure level in dBA, which is succeeded for more than 5 minutes per hour. Ambient noise levels shall be measured at the exterior of potentially affected existing residences, schools, hospitals, churches, and public libraries. Ambient noise level measurement techniques shall employ all practical means of reducing the effect of wind-generated noise at the microphone. Ambient noise level measurements may be performed when wind velocities at the proposed project site are sufficient to allow wind turbine operation, provided that the wind velocity does not exceed 30 mph at the ambient noise measurement location.</p> <p>4) Any noise falling between 2 decibels shall be the lower of the two.</p> <p>5) In the event the noise levels resulting from the WECS exceed the criteria listed above, a waiver to said levels may be granted by the Board of Adjustment provided that the following has been accomplished:</p> <p style="padding-left: 40px;">A-Written consent from the affected property owners has been obtained stating that they are aware of the WECS and the noise limitations imposed by this ordinance and that consent is granted to allow noise levels to exceed the maximum limits otherwise allowed.</p> <p style="padding-left: 40px;">B-If the applicant wishes the waiver to apply to succeeding owners of the property, a permanent noise impact easement is recorded in the Buffalo County Register of Deeds that describes the benefited and burdened properties and that advises all subsequent owners of the burdened properties that noise levels in excess of those permitted by this ordinance may exist on or at the burdened property.</p> |
| Shadow Flicker          | No shadow flicker standards, but a “document including an accompanying aerial photo if necessary, showing the shadow flicker projection” must accompany the application for a conditional use permit.   |
|                         | <a href="http://www.buffalocounty.com/County%20Board/Ordinances/Full%20Wind%20Energy%20Facility%20Ordinance.pdf">http://www.buffalocounty.com/County%20Board/Ordinances/Full%20Wind%20Energy%20Facility%20Ordinance.pdf</a>   |



# Questions

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