

***Kelly Kepner,
Economic
Development
Director of
Benton County***



A member of:






Outline:

- *Why pursue wind development?*
- *The Economic Impact/Benefits*
- *Obstacles/Best Practices*
- *Contact info*

Why Pursue Wind Development?

- 
- A green tractor is pulling a combine harvester through a field of harvested corn. The field is filled with golden-brown stalks of corn. In the background, there is a line of green trees under a clear blue sky.
- *For economic growth.....we struggle to compete with bigger cities! We are a very rural county rich in agriculture and agribusiness, but we do not have the “smoke stacks” that bring in the “big” numbers of opportunity.*

A 3D map of the state of Indiana is shown in a light blue color, set against a background of a darker blue map of the United States. A small, 3D inset map of a county is placed on the northern part of the Indiana map. The inset map is a grid of blue squares, with one square in the center being a lighter shade of blue, representing the county being discussed.

For most populated county in the State of Indiana, we rank 89th out of the 92 counties . 8,854 people = 406.30 sq. mile area(18x23 miles).

•With the county government operating in the red, relief was needed, but with the residents mind set....against any change, it was hard to find a way out!



•.....therefore, 2007 approval of wind development.

Broad outline of Wind Farms

- *2002 Talks started of interest in wind farms in Benton County.*
- *2005 Met towers built to gather wind data.*
- *June 2007 County completes ordinances and contracts are signed with company.*
- *August 2007 Start of construction.*
- *May 2008 Construction completed.*

HOME OF INDIANA'S FIRST WIND FARMS

Welcome to

Benton County

*A community with
Hometown Competitiveness*

www.bentoncounty.in.gov



*Fowler Ridge Wind Farm
a joint venture of*



BP Wind Energy



Three Developing Companies:

1. Orion Energy—Benton County Wind Farm

***87 GE 1.5 turbines = 130.5 megawatts**

2. BP Alternative Energy—Fowler Ridge Wind Farm

***355 Turbines = 599.8 megawatts**

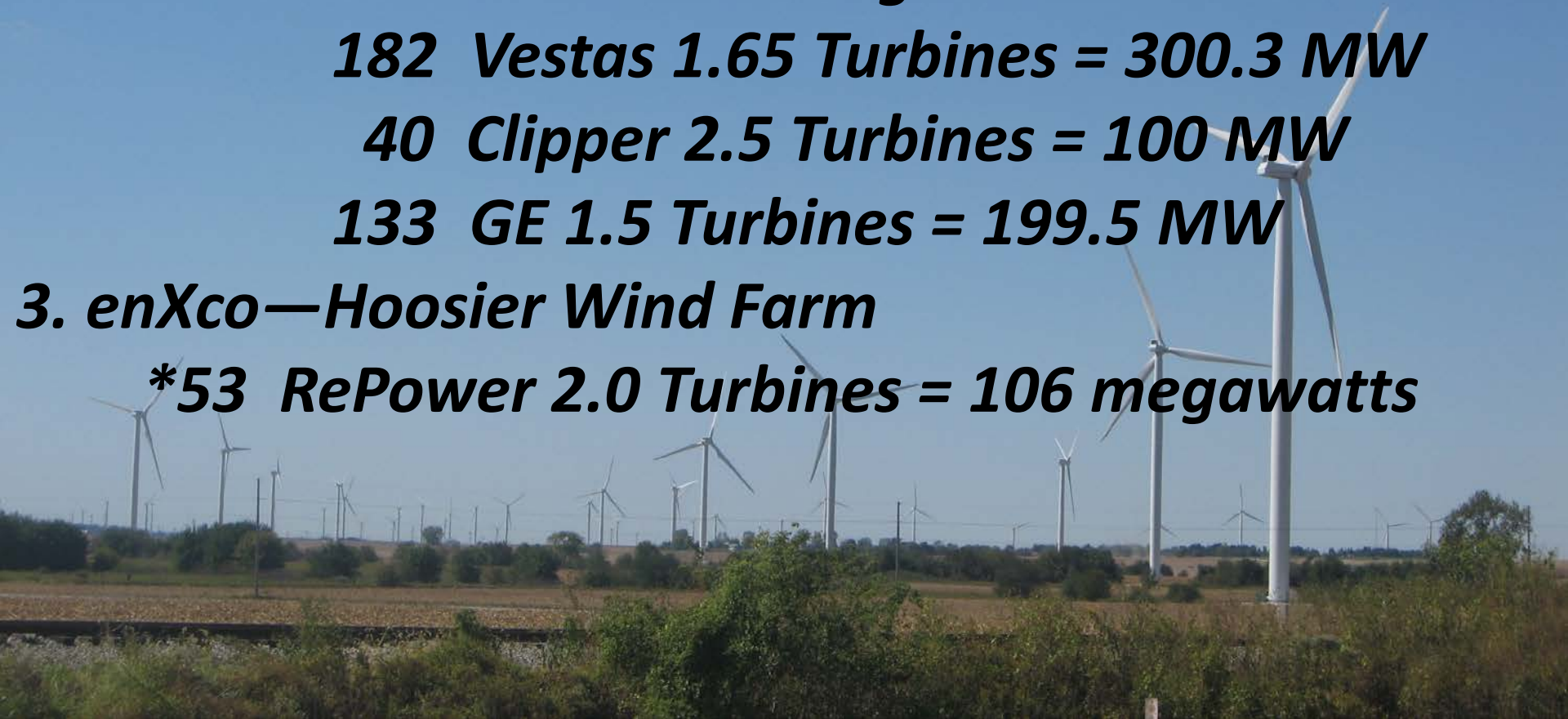
182 Vestas 1.65 Turbines = 300.3 MW

40 Clipper 2.5 Turbines = 100 MW

133 GE 1.5 Turbines = 199.5 MW

3. enXco—Hoosier Wind Farm

***53 RePower 2.0 Turbines = 106 megawatts**



Currently totaling:

495 turbines = 836.3 megawatts

By January 2015, Pattern Energy will have:

65 Siemens 2.3 turbines = 149.5 MW

in operation for a grand total of:

560 turbines = 985.8 MW



**The economic impact/benefits to
Benton County from the wind farms.**



Multiple usage of the land! Over 370 land owners are receiving lease payments. With only 280 acres claimed to develop the wind farms.



Benton County Government is now *debt free!*

**After receiving first year payment of taxes
from the wind developers, the county
has been able to pay off all debt.**



County roads.....major improvements.



A photograph of a two-story brick elementary school building. The name "PRAIRIE CROSSING ELEMENTARY" is written in white capital letters on the upper part of the brick facade. The building features a central entrance with a gabled roof and large windows. To the right, a white wind turbine is visible against a cloudy sky. The foreground shows a paved parking lot and some young trees.

PRAIRIE CROSSING ELEMENTARY

With the money received from wind farm taxes, the county made a huge impact financially in helping our schools by contributing \$2 million.

The county was able to purchase new emergency extraction equipment for each community's fire department.



**The county now has a remodeled
Community Center which holds the
Purdue University Cooperative Extension
Office and Tourism Center.**



Home of Indiana's First Wind Farms

Benton County Wind Farm Tours

765-884-2080

www.bentoncounty.in.gov



The county commissioners created a government operated Economic Development Department staffing a full-time director...that would be me..... and part-time administrative assistant.



www.benton4biz.com





During 2008, when small towns within the U.S. were feeling the recession, Benton County was blessed with 760 wind farm workers spending their money within our communities which caused a delayed affect of the recession by 2 years.

Houses were being rented by the companies for their workers. Rent that was usually \$800 was going as high as \$1400 a month.



Lower cost of living.....County residents benefit from lower property taxes due to the larger tax base we now have from the wind farms \$1.5 Billion investment. Towns and non-for-profit organizations received donations for community projects!



Work Force.....creation of 97 new jobs in the county. Average pay of \$40,000 with good benefits and paid vacation days.



Education/Youth Retention.....In 2010, a team of individuals from the school corporation and wind companies worked with Ivy Tech in creating a 2 year certification for individuals who wanted to maintain jobs working for the wind farm companies located in Benton County.



Obstacles/Best Practices

Obstacles

- Residents not wanting project.
- Roads torn up during construction.
- Broken Drainage Tiles.
- Land owners contracts.
- Union/hiring outside of county.

Best Practices

- Educate!!!! Hold forums.
- Hire of County Highway Dept.
- Update ordinance of what depth all drainage tiles should be.
- All land owners agree to same contract.
- Have developers purchase and hire within the county as much as possible.

BENTON COUNTY ECONOMIC DEVELOPMENT

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Kelly Kepner

Director

706 E 5th Street
Suite 11

Fowler, IN 47944

Phone: 765-884-2080

Fax: 765-884-2087

Cell: 765-376-3113

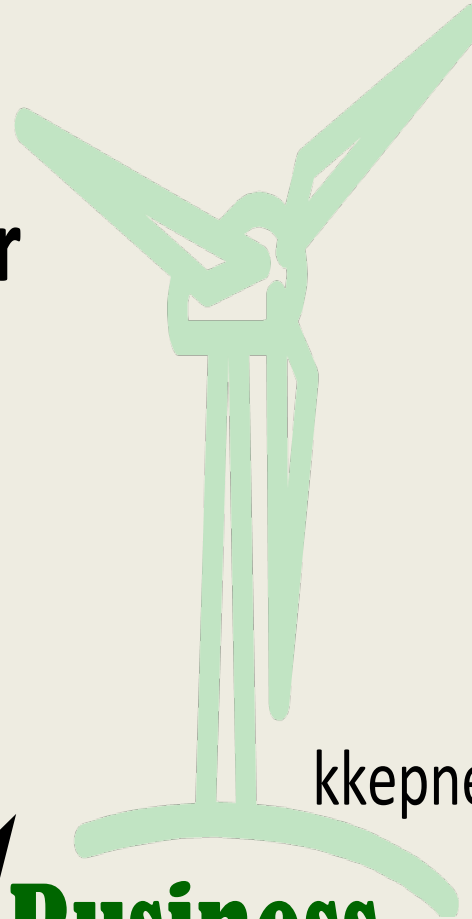
kkepner@bentoncounty.in.gov

www.benton4biz.com

www.bentoncounty.in.gov

www.indianastechnologycorridor.com

Benton  **Business**



Rural Resources

Benton County

260,038 acres

Population
8,854

Benton County 
495 Turbines/836 MW

White County

323,351 acres

Population
24,643

White County 
303 Turbines/501 MW

Combined

798 Turbines/1,337 MW

Over \$2.6 Billion invested

Best Practices in Small Wind Permitting for Counties

Mike Bergey
Bergey Windpower
Distributed Wind Energy Assoc.
March 21, 2014



Bergey Windpower Co.

The World Leader in Small Wind

- ❖ 37 year old family-owned manufacturer of small high-reliability wind turbines
- ❖ Products: 1, 6, and 10 kW
- ❖ Bergey 10 kW is leading 5 – 15 kW turbine in the world
- ❖ Over 9,000 installations, in all 50 States and over 100 countries
- ❖ Turbines have only 4 moving parts, require no scheduled maintenance, and have demonstrated 20+ years with 100% availability and zero O&M costs – unique in wind industry
- ❖ Longest warranties in industry
- ❖ Financial strength and stability





Russ Waldrop's Bergey Excel Current Conditions

Username:

Password:

Remember Me

Login

Current Conditions

Production Data

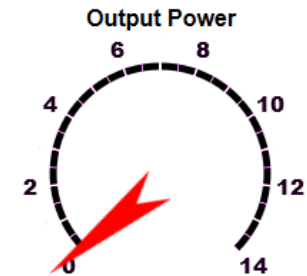
Diagnostics

PS2 Tap Fault List

Email Notifications

Wind Turbine

Data Date:	2014-03-21 07:50:35 PDT
Current Date:	2014-03-21 07:50:38 PDT
Status:	WAITING FOR WIND
Power:	0 watts
Energy:	15 kWh so far today (average of 2 kWh an hour)
	569 kWh in the last 7 days (average of 81 kWh a day) (2014-03-14)
	2,162 kWh in the last 30 days (average of 72 kWh a day) (2014-02-19)
	9,074 kWh since installation
AC:	246 VAC @ 60 Hz
DC:	0 VDC @ 0 amps



Output Power (kW) from the last 60 hours

Distributed Wind: Behind the meter, or off-grid, and sized for the customer's needs



Residential



Schools



Commercial



Military



Farms



Public

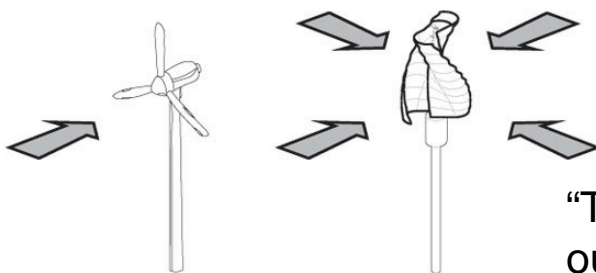


Foreign Assistance

DWEA is the Voice of the Distributed Wind Industry



Industry Hucksters Not Allowed to Join DWEA

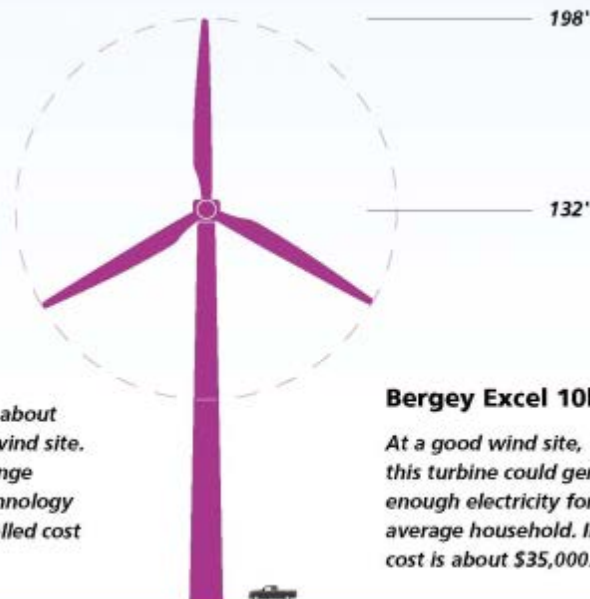
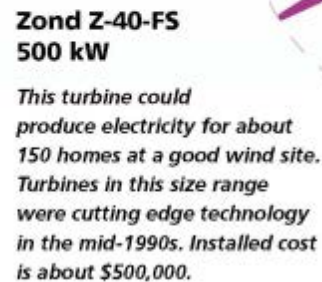
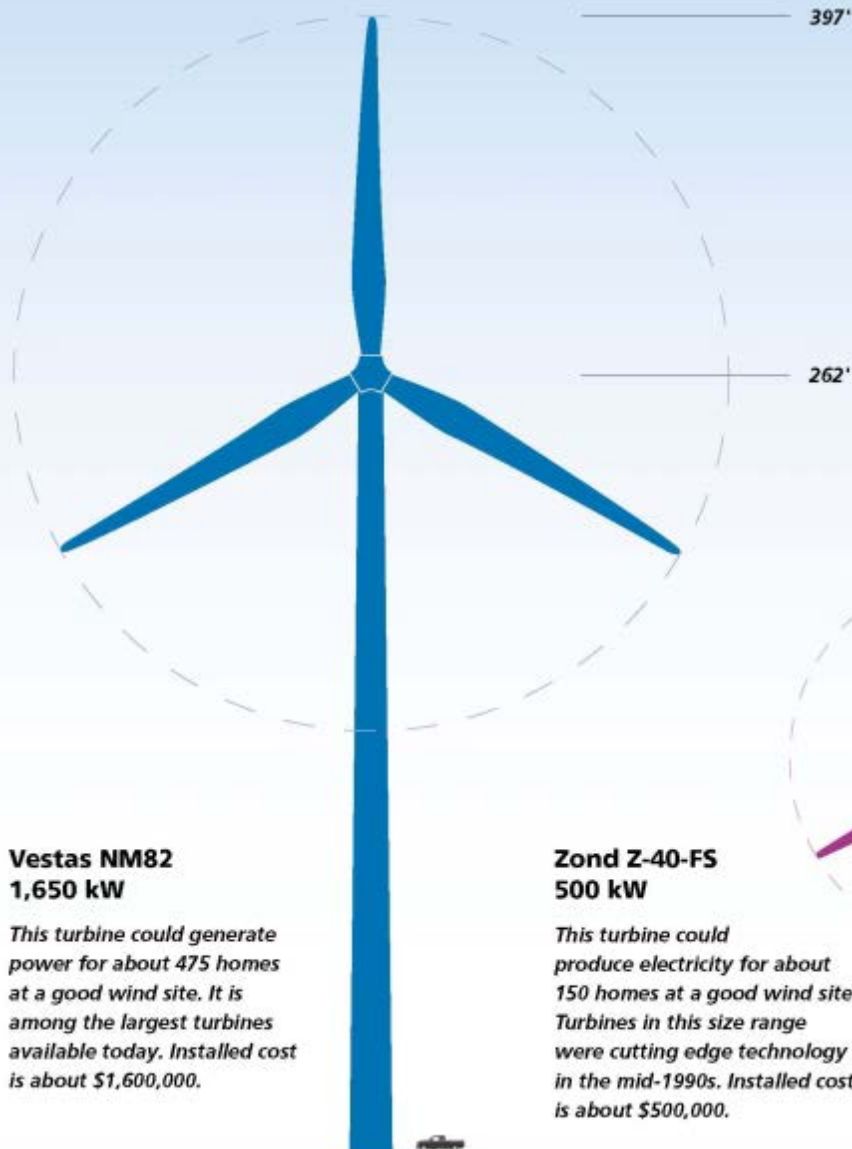


“Tall towers are unnecessary with our technology”

Small is small, Large is large



THE SCALE OF WIND POWER



Typical Small Wind Customers

- Rural homeowner with 2 – 50 acres of land
- Farmers / ranchers
- High electric rates
- Good wind resources
- State incentives




Typical “Mainstream” Small Wind Turbine Product

- **10 kW, 7m (23 ft) rotor diameter**
- **80 – 140 ft tower**
- **Unattended operation**
- **Rated for 130 mph**
- **Certified to AWEA 9.1**
- **UL listed**
- **NEC compliant**



Small Wind Certification

- ❖ US small wind industry developed the standard, AWEA 9.1-2009
- ❖ Adopted in also in UK and Japan
- ❖ DOE supporting implementation, testing and certification
- ❖ States are requiring
- ❖ IRS will require in 2015

Small Wind Certification Council Certified Small Wind Turbine		
Manufacturer/Model		
Bergey Windpower Company Excel 10 (240 VAC, 1-phase, 60 Hz)		
Rated Annual Energy Estimated annual energy production assuming an annual average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution, sea-level air density and 100% availability. Actual production will vary depending on site conditions.		13,800 kWh/year
Rated Sound Level The sound level that will not be exceeded 95% of the time, assuming an annual average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution, sea-level air density, 100% availability and an observer location 60 m (~ 200 ft) from the rotor center.		42.9 dB(A)
Rated Power The wind turbine power output at 11 m/s (24.6 mph) at standard sea-level conditions.		8.9 kW
Certified to be in Conformance with: AWEA Standard 9.1 – 2009		
For a summary report and SWCC Certificate visit: www.smallwindcertification.org		

The Small Wind Opportunity

- **Strong Consumer Interest:** “I live on a hill and the wind blows all the time”
- **Huge Under-Developed Potential:** 15 million homes, 4 million farms and businesses, thousands of public facilities, military, foreign assistance, etc.
- **A 30% Federal Tax Credit:** Established in 2009
- **“Zero-down” lease financing now available**
- **Made in the USA:** In 2012, 91% of the small wind turbines installed in the U.S. were made in the U.S.

SWT Permitting is a Real Problem

- ❖ **In most cities and counties it is illegal to go higher than 35 ft**
 - ❖ **Turbine need to be at least 30 ft above obstacles within 500 ft (e.g., 70 ft trees means 100 ft+ tower)**
- ❖ **It sometimes takes more man-hours to permit than to manufacture, transport and install it**
- ❖ **In some cases a rural residential wind turbine is harder to permit than a new subdivision**

Aubrey Davis, Nags Head, NC

- ❖ **Outer Banks Brewing Station**
- ❖ **10 kW, 80 ft tower on 3 acres**
- ❖ **Permitting:**
 - ❖ **55 months**
 - ❖ **\$2,000**
 - ❖ **Worked to elect supportive city council after original rejection and 3-year ban on reapplying**



Charles Braswell, Riverside Co., CA

- ❖ Real estate developer
- ❖ 10 kW, 80 ft tower on 9 acres, ~ \$55K project
- ❖ Permitting:
 - ❖ 30 months
 - ❖ \$13,600 in fees
 - ❖ One public hearing
 - ❖ > 20 trips to County offices (2 – 4 hours ea.)
 - ❖ ~ 15 separate checks written



CB: “Permitting my subdivisions was much, much easier”

Why is it so?

- ❖ The ubiquitous 35 ft height restriction was for fire safety 120 years ago. It is out dated and is an immediate barrier
- ❖ Some planners dislike towers due to visual impacts
- ❖ Emotion and bad information enter the dialogue and are given disproportionate credibility



The logo for NACo Green Government features the acronym 'NACo' in white on a green rounded rectangle. Below it, the text 'An initiative of the National Association of Counties' is written in a smaller font. To the right is a green square icon containing a white house silhouette with a green leaf below it. The words 'GREEN' and 'GOVERNMENT' are stacked in large, bold, black capital letters to the right of the icon.

NACo GREEN
GOVERNMENT

An initiative of the
National Association
of Counties

- ❖ **DWEA has been a NACo Green Government partner**
- ❖ **Jointly produced a one-hour informational webinar in January 2012**
- ❖ **Jointly produced a zoning reference guide in December 2012**

Introduction to Generating Wind Power for Your Local Communities

January 12, 2012

*NACo is pleased to present this webinar in cooperation with
The Distributed Wind Energy Association (DWEA).*



Slides available at:

http://www.naco.org/programs/csd/Documents/Green%20Government/NACo%20Wind_ALL.pdf

NACo / DWEA Zoning Guide

Available at:

<http://www.naco.org/newsroom/pubs/Documents/Infrastructure%20and%20Sustainability/NACo%20County%20Strategies%20for%20Successfully%20Managing%20and%20Promoting%20Wind%20Power%20in%20America's%20Counties.pdf>

or

<http://distributedwind.org/zoning-resource-center/>

County Strategies for Successfully Managing and Promoting Wind Power

Implementing Wind Ordinances in America's Counties



What Makes for Bad Ordinances?

- ❖ Tower height restrictions below 80 ft.
- ❖ Forbidding lattice towers
- ❖ Noise restrictions below 50 dBA (less than background!)
- ❖ Set-backs referenced to property line rather than neighboring occupied structure
- ❖ Set-backs greater than total height
- ❖ Requires public hearing
- ❖ Favoring roof-mounted installations
- ❖ Very high fees (> ~ \$500)

What Makes a Good Ordinance?

Small Wind Turbine's a permitted use under reasonable constraints and fees

- ❖ Minimum property size of 1 or 2 acres
- ❖ Effective tower heights allowed (100 – 160 ft), relating to set-backs
- ❖ Set-back no worse than total height from neighboring occupied structure
- ❖ Noise limits relative to background and anticipating high wind events
- ❖ PE mechanical-stamped structural analysis to TIA/EIA -222-g (i.e., wet-stamp not required)
- ❖ Wiring conforms to NEC Section 694
- ❖ Over-the-counter permit with fees \leq \$500

Options for Consumer Protection

- ❖ **Require turbine certification to AWEA 9.1-2009 (limited to ~ 50 kW turbines) ... see <http://www.smallwindcertification.org/>**
- ❖ **Set minimum tower height of 60 ft.**
- ❖ **Forbid roof-top turbines**



Examples of Good County Ordinances:

- ❖ **San Bernardino County, California**
- ❖ **Solano County, California**



Resources on Small Wind Permitting Issues

DWEA Model Ordinance and Reference Guide

DWEA Briefing Papers

- Tower Height
- Setbacks
- Property Values
- Birds and Bats
- Sound / Acoustics
- Aesthetics
- Safety
- Ice Shedding

Available at:
<http://www.distributedwind.org/fact-sheets>



our Wind our Power our Future

DWEA Briefing Paper: Tower Height

The Biggest Barrier

Tower height limitations are the single biggest regulatory barrier to the use of small wind systems in the United States. Small turbines need to be on towers 60 – 180 ft tall to be effective, depending on the height of nearby trees and other obstructions, but antiquated zoning ordinances typically limit the tower to unworkably low heights, such as 35 ft. Putting a small wind turbine on a short tower is like putting a solar system in the shade.

It's the Physics

The wind close to the ground and around trees and buildings is choppy (turbulent) and weak because surfaces and obstacles interfere with smooth wind flow. You experience these effects when you duck behind a building to get out of the wind or experience turbulence on an airline flight. Wind blockage and turbulence radically reduce performance and they significantly increase the wear and tear on the wind turbine structure. And contrary to the claims of some wind industry hucksters, there are no wind turbine technologies that can overcome the harmful effects of turbulence and the poor energy production from short towers. Hype changes, but physics does not. As industry experts put it "Short towers shortchange customers".

Tall Towers are a Must

After 35 years of experience and tens of thousands of installations, the industry guidance on minimum tower height, to the lowest extension of the rotor, is 60 ft., assuming no obstacles, or at least 30 ft above any obstacles within 500 ft. So if the mature height of trees in the area is 75 ft and the turbine rotor diameter is 20 ft then the minimum recommended tower height is 75 ft + 30 ft + 10 ft = 115 ft. As an example, a 5 kW residential wind turbine on a 35 ft tower in an open area might produce 1,200 kWh annually in a moderate wind regime, but the same turbine on a 115 ft tower would generate 9,000 kWh per year. In other words, it would take eight turbines at 35 ft to equal the output of one more properly sited at 115 ft. This because the power in the wind increases exponentially with wind speed, so small differences in wind speed produce big changes in turbine output.

Why Not Tall Towers?

The common 35 ft height restrictions seen in many zoning ordinances were introduced over a century ago as a fire safety measure because that was how high the manual fire pumps of the day could pump water. Unfortunately for potential small wind customers these height limits were not adjusted as fire engine technology improved. Applying the 35 ft restriction to small wind is highly discriminatory for a number of reasons. First, almost all zoning jurisdictions have utility structures (power poles) that exceed 100 ft. Second, the FAA has no restrictions on towers below 200 ft unless you are near an airport. Third, towers designed to the latest edition of the International Building Code (IBC) are stronger than nearby homes and buildings and there has never been an injury related to the failure of an operating small wind turbine. Finally, there will never be a tall man-made structure that does not generate some aesthetics criticism, as was the case with the Eiffel Tower, the Brooklyn Bridge, and the Statue of Liberty. However, the minority NIMBY (Not In My Back Yard) complaints should be kept in perspective and balanced against the overwhelming societal good of wind energy. **DWEA recommends that for property sizes of one acre or more there be no height restrictions on certified wind turbines installed on towers meeting the IBC design code.**

www.distributedwind.org

Recommendations

- ❖ **Let your residents use small wind by adopting a permitted use ordinance**
- ❖ **Start with the NACo/DWEA Zoning Guide and the DWEA model ordinance (www.distributedwind.org)**



Contact Information

Mike Bergey
President
Bergey Windpower Co.
2200 Industrial Blvd.
Norman, OK 73069
(405) 364-4212
mbergey@bergey.com
www.bergey.com

Jennifer Jenkins
Executive Director
Distributed Wind Energy Association
(928) 255-0214
jjenkins@distributedwind.org
www.distributedwind.org

