

# WIND TURBINES FOR HOME AND SMALL BUSINESS

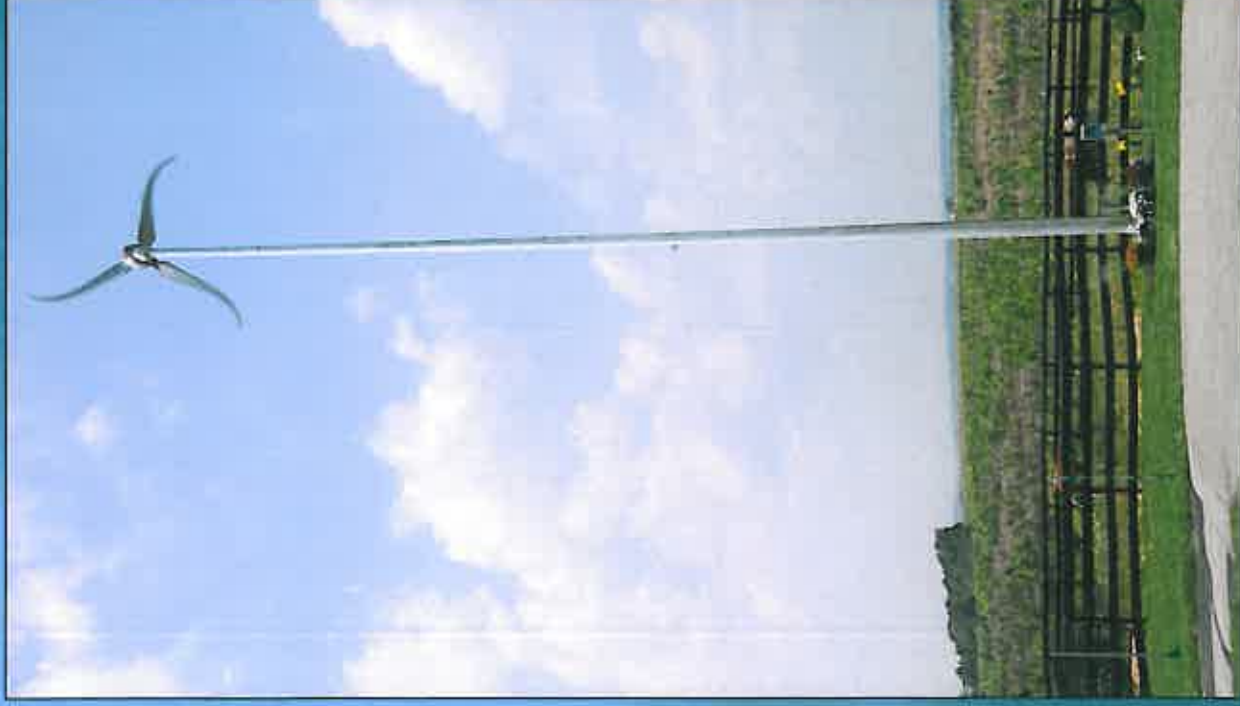
Presented by:  
Monarch Renewable Energy, LLC



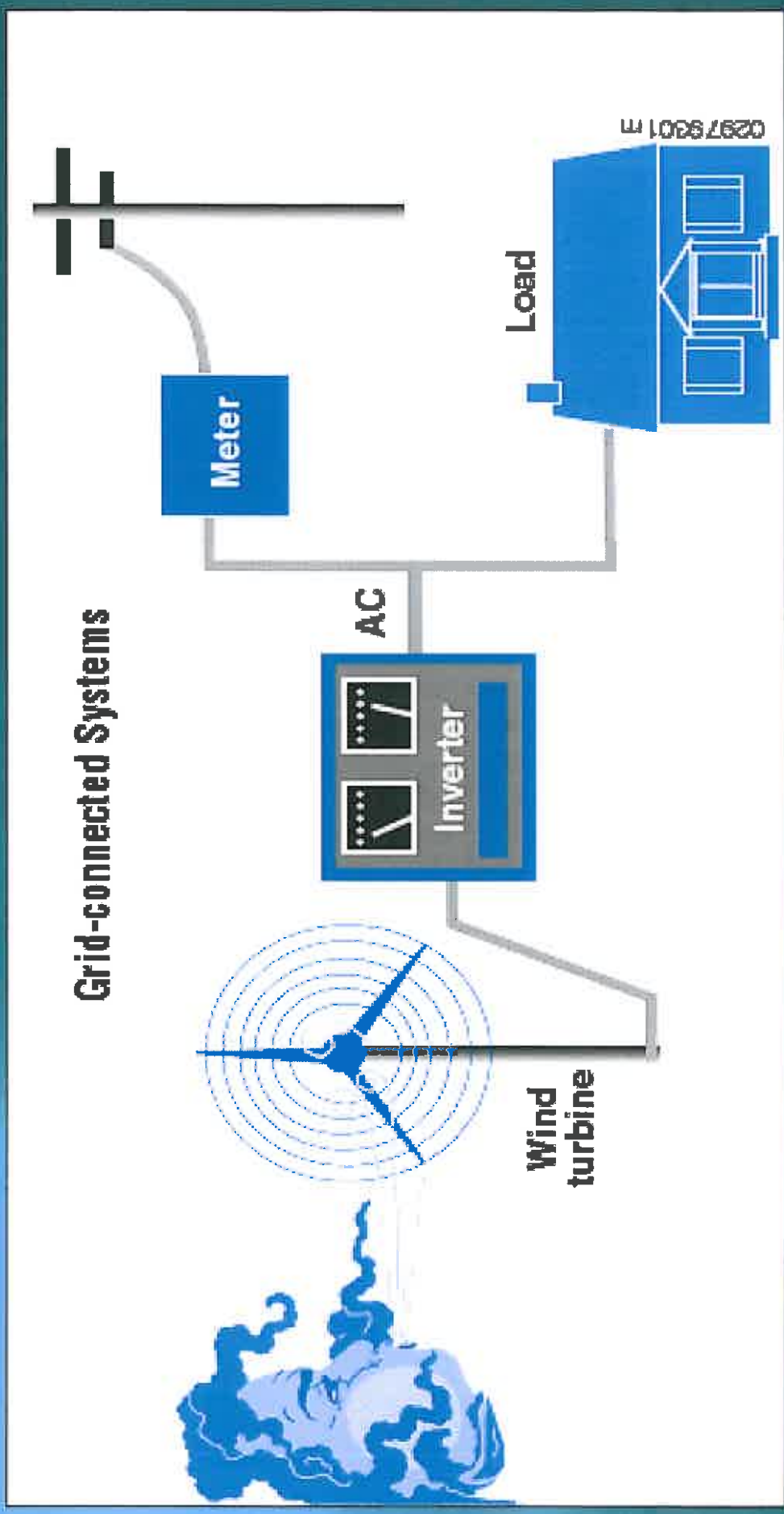
**monarch**  
RENEWABLE ENERGY, LLC  
recreateyourenergy.com

## About Monarch

- Elgin-based, full service design and construction firm has launched Monarch Renewable Energy, LLC
- Specialize in sales & installation of wind turbines for residential, rural and small business clients
- Certified in proper site selection and installation of wind turbine systems; direct dealer of (2.4 kW) Skystream 3.7 and (10 kW) Bergey BWC Excel wind turbine systems
- Demonstration turbine site in Campton Hills - welcome to visit by appointment, call 847-531-WIND



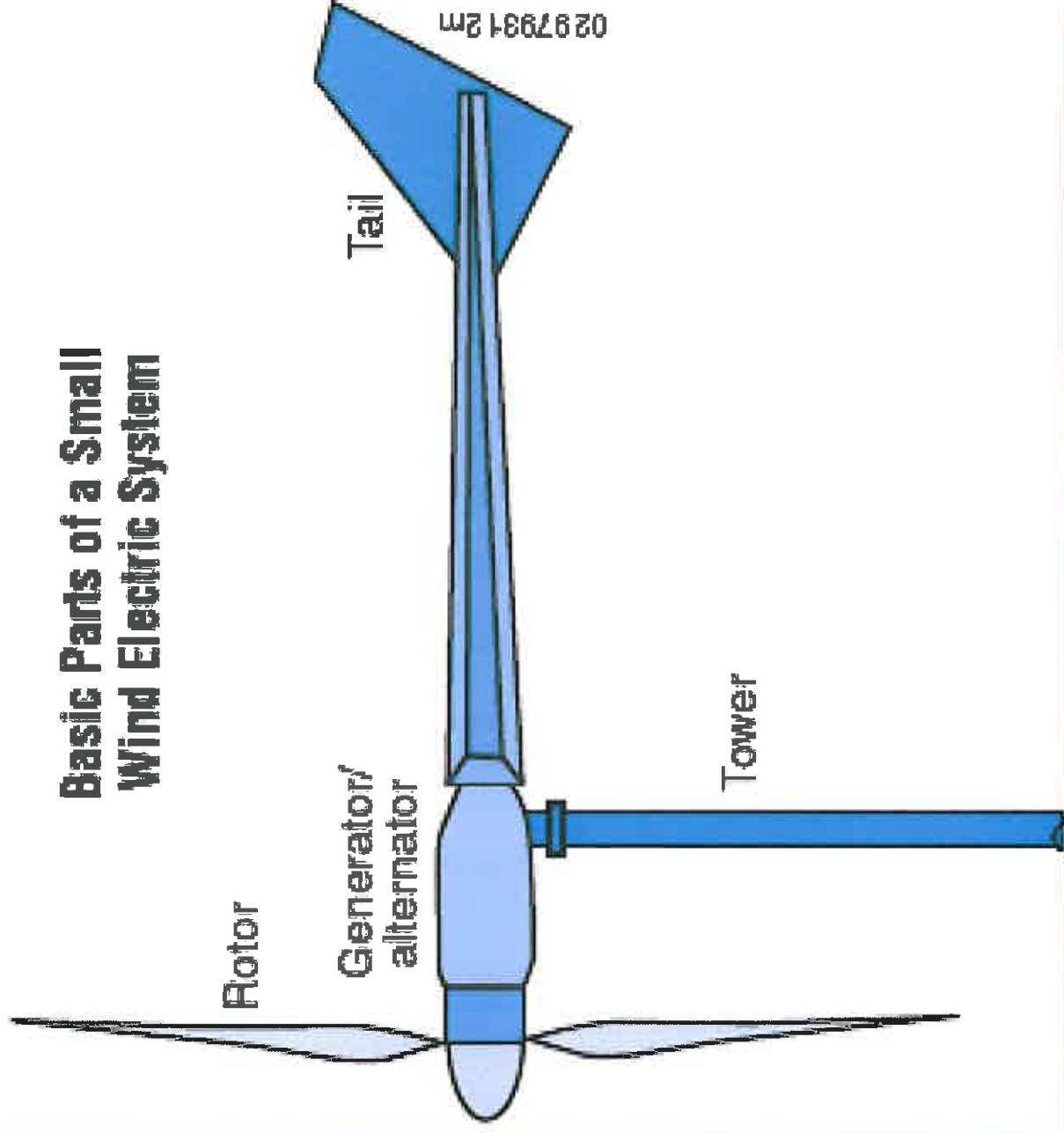
# Utility Connected System Diagram



### Key Features:

- ✓ Utility-connected
- ✓ Auto shutoff at high wind speeds and during grid power outage
- ✓ 20-30 year design life
- ✓ Safety tested at 120-140 mph wind speeds
- ✓ Cut in wind speed 7.5 or 8 mph
- ✓ Internal speed control at 30+ mph
- ✓ Sound levels of 40-65 dB per U.S. Dept of Energy's NREL (National Renewable Energy Laboratory)
- ✓ Fully engineered, manufactured components

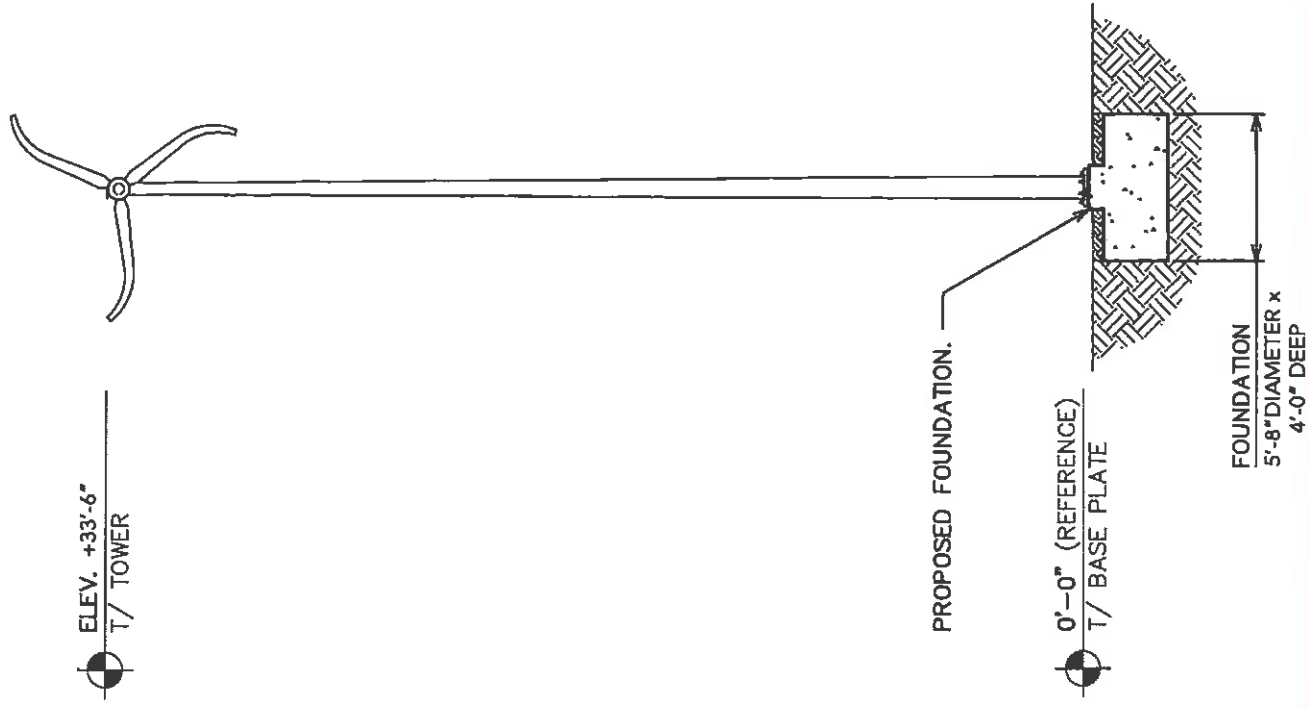
## Basic Parts of a Small Wind Electric System





## Turbine Tower Specifications

- Structurally safe, coated steel
- Installed properly in concrete foundation and site specific factors, all according to manufacturer specification
- Installed according to recommended/required setback distances, usually 110% of tower + blade height
- Excellent safety record: far less likely to fall than tall trees
- 3 basic types: guyed lattice, self-supporting lattice, monopole
- Height range 30-140+ feet tall





## Top 10 Reasons Consumers Invest in Small Wind:

1. Control over energy needs and source
2. Electric bill reduction
3. Tangible Support for Green Energy
4. Global Warming/ Environmental Pollution Concerns
5. Reduced impact of utility rates/increases
6. Increase property value
7. Invest in residential appliance that pays them back
8. Take advantage of federal and state incentive programs
9. Capture clean, 100% renewable energy
10. Reduce or offset peak power demands

## Wind Power May Be Viable if:

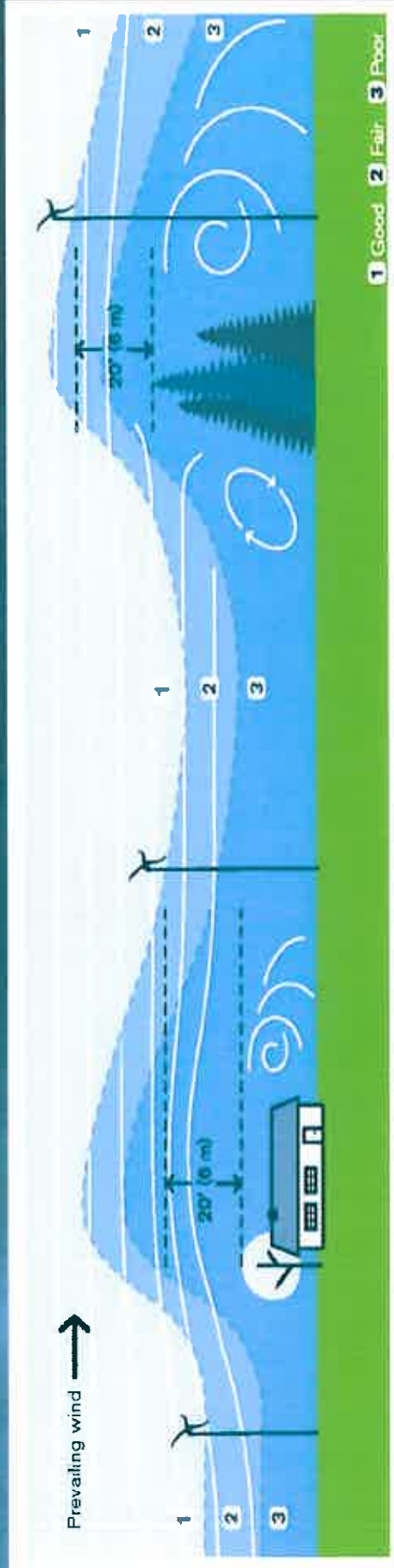
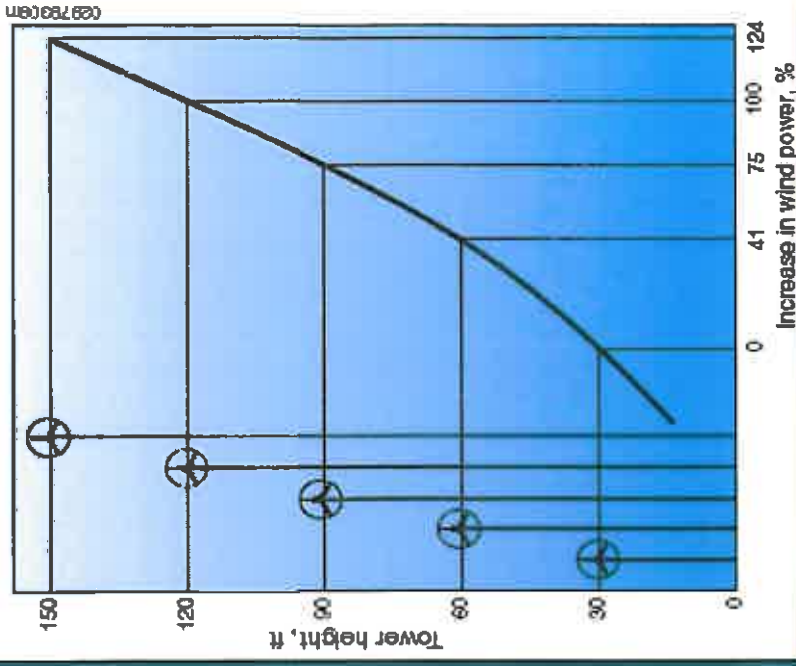
- Property has good wind resource potential
- Home/business is located on 1 or more acres of land in an open or rural area
- Local zoning codes and covenants permit wind turbines
- Average electric bill is \$100 per month or higher
- Consumer has a good tolerance for long term investments



# Turbine Site Selection

- 20/250 or 30/300 rule: to avoid turbulence issues, ensure bottom of rotor blades are min. 20-30 ft. above trees, structures or any obstacle within 250-300 ft
- Observe setback recommendations or guidelines, typically 110% of turbine height at tallest point (tower + blade length)
- Wind speeds increase with height, so customers may choose a taller tower for a faster return on investment; tower height and energy generation potential are impacted when local height restrictions apply
- Current Illinois DCEO rebate program requires minimum of 100-foot tower height and use of 30/300 rule. (IL Dept of Commerce and Economic Opportunity)
- Site selection is part of a highly customized, thorough site analysis performed by a trained professional turbine siting specialist
- There is a limit to how far a turbine can be placed from the home's utility connection point
- Significant cost drivers for the end user: tower height, electrical cable, potential zoning / permitting fees & permit-related expenses

Wind Speeds Increase with Height



# Potential Installation Challenges

- ❑ Potential permitting obstacles
  - Ordinances with height, capacity or placement limitations
  - Additional required testing, studies or architectural and structural drawings
  - Extended delays, excessive fees and other related costs
  - Important to voice your support for allowing properly sited small wind turbines on residential lots 1 acre or greater
- ❑ Other challenges are minimal, with installer expertise
  - Ensure turbine is within 600 feet of electrical connections
  - Place turbine 30 feet above obstacles within 300 foot radius
  - No FAA issue below 200 feet unless near public airport
  - Carefully choose capacity – net metering, but can't sell excess



# Available Incentives

## Federal Income Tax Credit

- 30% of total cost
- Cap lifted Feb. '09

## IL DCEO Rebate Program

- Applications for 2011 program are currently being accepted
- Install within 120 days of application date
- Preauthorized rebates of 30/50% ; capped based on rated energy capacity
- 60 foot tower height, 1 acre minimum, 30/300 rule
- Professionally installed – must submit labor hours in cost info

- Latest information available at [www.dsireusa.org](http://www.dsireusa.org)

- Updated frequently on our web site [recreateyourenergy.com](http://recreateyourenergy.com)

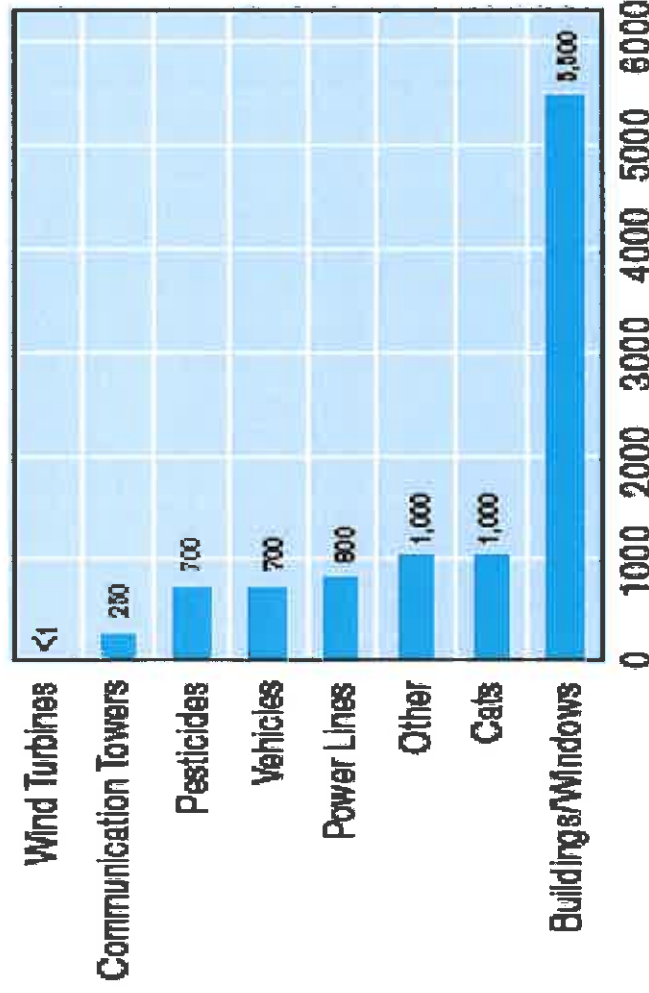
- Additional programs often include:

- USDA Farm Bill Grants
- Recovery and Reinvestment Act Funds –state/local level
- Utility rebate programs
- ICE Grants – Illinois Clean Energy Community Foundation

# Frequently Asked Questions: Birds

- Rarely occur
- Less likely with smaller turbine size
- Less likely at small wind turbine heights
- Less likely over a widely dispersed area vs. large array

**Causes of Bird Fatalities**

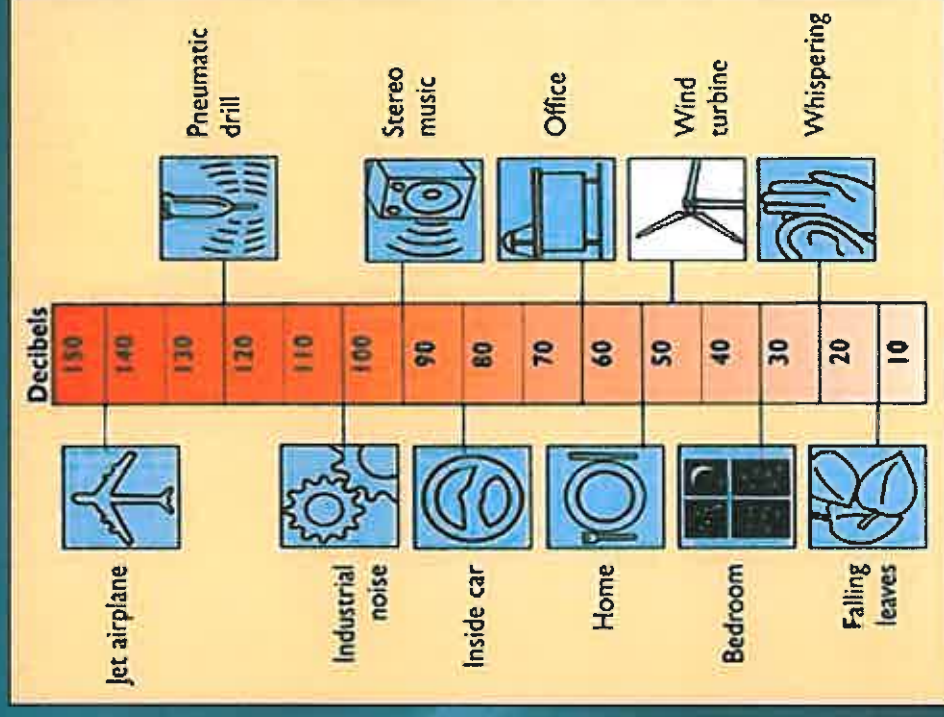


**Number per 10,000 fatalities in the U.S.**

Source: Erickson, et al, 2002. "Summary of Anthropogenic Causes of Bird Mortality" Proceedings of the 2002 International Partners in Flight Conference, Monterey, California

# Frequently Asked Questions: Sound

- ▣ Small amount of operating sound
- ▣ Blends with common outdoor sounds
- ▣ 40-65 decibel range falls below typical household and neighborhood background noise
- ▣ Often inaudible at normal distance between lot sizes of 1 acre or larger





# Frequently Asked Questions: Visual Impact



- ❑ Proper placement in open areas means turbines are likely to be visible to their owners and neighbors
- ❑ Current designs are intended to minimize visual area and preserve the horizon
- ❑ Appearance varies by size, model and tower type
- ❑ Tower types are similar to those commonly accepted as light poles and radio towers

# Frequently Asked Questions

## ▣ Icing

- Ice can accumulate on blades and slow the turbine's rotation
- When ice melts, it slides directly down to the ground and is not thrown from the turbine blades

## ▣ Lightning Strike

- Turbine structure is electrically grounded
- No additional susceptibility to lightning strike
- Surge protection and lightning arrestor technology

## ▣ FAA Regulations

- Not as applicable to small wind systems
- FAA does not require notification or special lighting of structures below 200 feet tall except under rare situations
- Specifically, if property is within 20,000 feet of a public use airport with a runway over 3,200 feet long

*Download our consumer guide: [www.recreateyourenergy.com](http://www.recreateyourenergy.com)*



# Frequently Asked Questions: System Payback

- ▣ Achieved more quickly under today's available tax credits, rebates and other possible incentive programs
- ▣ Small wind systems are long term investments, with dollars diverted from electricity payments to turbine purchase and installation expense
- ▣ Payback happens over a period of years, depending on total electrical use, utility rate increases, turbine type, tower height and actual wind performance
- ▣ Most consumers who choose wind power will do so for additional factors beyond savings / payback potential
- ▣ More specific estimates are given after completion of thorough site survey and custom consultation



# Cost-Payback Model

## 2.4 kW Example:

- ▣ Fully Installed Cost \$25K
- ▣ After Incentives \$10K
- ▣ Zone 3 energy estimate: 3730-4800 kWh / yr.
- ▣ Assuming 5% rate increases over time, payback is 12-16 yrs.
- ▣ 5-year limited warranty
- ▣ Product design life is 20 years or more

## 10 kW Example:

- ▣ Fully Installed Cost \$65,000
- ▣ After Incentives \$26,000
- ▣ Zone 3 energy estimate: 13,860-19,500 kWh / yr.
- ▣ Assuming 5% rate increases over time, payback would be 9-12 years.
- ▣ 10-year limited warranty
- ▣ Product design life is 30 years or more

*Typically 2/3 of the cost for a small wind turbine is in the tower, foundation & electrical wiring. At the end of the product life span, turbines can be replaced with new technology or re-manufactured at a fraction of the original cost.*

# Increasing the Use of Home/Small Business Wind Turbines

- Actively educate consumers on the viability and advantages of small wind systems – dispel myths
- Repeatedly communicate within your sphere of influence regarding the benefits and availability of wind power
- Support the consumer's right to own an independent source of renewable energy without excessive obstacles
- Stay attuned to federal & state incentive programs and their compatibility with local zoning / permitting practices
- Show your support for the 'early adopters' generating visibility and interest in small wind