WIND TURBINES FOR HOME AND SMALL BUSINESS

Presented by:
Monarch Renewable Energy, LLC
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 BW C Excel wind turbine systems

Demonstration turbine site in Campton Hills - welcome to visit by appointment, call 847-531-WIND
Key Features:

- Utility-connected
- Auto shut-off at high wind speeds and during grid power outage
- 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
- Fully engineered, manufactured components
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
Wind Power May Be Viable if:

- Property has good wind resource potential.
- Income/business is located on flat, open or rural area.
- Local zoning codes and covenants permit wind turbines.
- Average electricity bill is $100 per month or higher.
- Consumer has a strong tolerance for long-term investments.

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
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 25(1-300) ft.
- Observe setback recommendations or guidelines, typically 100% 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; lower height and energy generation potential are impacted when local height restrictions apply.
- Current Illinois DCEO rebate program requires minimum 60 ft. tower height and use of 30/300 rule (IL Dept of Commerce and Economic Opportunities)
- 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
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 website [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**

- Wind Turbines: <\( \frac{1}{1000} \) (0.001)
- Communication Towers: 250
- Pesticides: 700
- Vehicles: 700
- Power Lines: 800
- Other: 1,000
- Cats: 1,000
- Buildings/Windows: 3,500

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

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
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 lighting 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