

Small Wind: Home and Ranch Applications

Why the need for alternative energy?

- Based on known oil reserves and the worldwide consumption rate, most estimates suggest this reserve has only 50 more years of production left in it
- 89% of US total energy comes from fossil fuels
- Fossil fuel combustion represents a global environmental problem
- U.S. winds could generate more electricity in 15 years than all of Saudi Arabia's oil, without being depleted
- The choices are:
 - Invest in discovery of new oil reserves (e.g. off-shore, shale oil)
 - Invest in clean coal technology (20% of the world's supply of coal is in the US)
 - Invest in alternative energies

Comparing Renewable Energies PV large cost, Hydro huge cost, Wind is moderate.

Wind in Texas

1888, San Angelo. Aeromotor markets their windmills to pump water to irrigate crops and feed cattle. This new system opens up the South Plains of Texas and makes living in West Texas possible. Oil, cattle, cotton industries shape the new economy of Texas.

Texas is still #1

In 2006, Texas overtook California and continues to lead the nation in total installed wind capacity, shaping our state's future economy and strengthening our importance in the global marketplace.

Presently

With advanced engineering and aerodynamic designs, today's wind turbines are more powerful than their predecessors.

Power usage

What are wind energy applications? irrigation, elec fences, residence, outbuildings, etc...

What is "small wind"

Industrial systems vs. Small wind systems

What TYPE of wind system?

Grid-Tie vs. Off-Grid

Check list:

- Make sure you are allowed to install a wind turbine
- Make sure you have sufficient wind speed
- Find out what your electrical usage is
- Find funding/grant sources for your area

Zoning Approval

NIMBY, H.O.A, City, County, Minimum acreage, Height restrictions, 110% rule

Finding wind speed: resources

Anemometer, Local airport, Local media, Internet, Trees & flags

Power Output (W) and Energy (kWh)

be aware of the way the turbine is marketed

Monthly Electricity Usage

•Electric usage is listed in kWh. •This data is on every monthly statement.

Finding the right wind solution

- Convert turbine's output power (W) into kW $(W) \times (.001) = kW$
- Convert kW into kWh
- How many hours in a year? $(365.25) \times (24) = 8,766 \text{ hrs/year}$
- How many hours in a month? $8,766 / 12 = 730.5 \text{ hrs/month}$
- $(730.5) \times (kW) = kWh/ \text{ month}$

YOUR wind turbine

- Wind speed?
- Monthly electrical usage?
- Typical sizes needed
 - 2kW – 1/2 of your energy
 - 5kW – almost all energy
 - 10kW – all, plus surplus
 - 20kW – small biz, ranch
 - 30kW – med. biz, ranch
 - < 100kW – larger ranch, village

Cost Benefit Analysis Excess electricity production

- Store in batteries
- Off-grid or grid-interactive systems
- Transfer excess to utility company
- Grid-tie or grid-interactive systems
- Net metering
- Similar to 'roll-over' minutes on wireless phone plans
- At the discretion of the utility company
- Texas is one of the last states NOT mandating net metering
- Only through Austin Energy or Green Mountain Energy
- kWh buyback
- Not at the same rate charged TO you

Two basic types of towers

Monopoles and Lattice Towers

Siting your wind turbine Funding your small wind project

- 30% Federal tax credits
- American Recovery and Re-Investment Act (Stimulus Bill 2009)
- < 100kW project
- IRS Form 5695 for individuals
- IRS Form 3468 for businesses
- Non-profit businesses can apply for 25% grant money
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- Non-profit businesses can apply for 25% grant money
- 25% REAP grants
- Rural Energy for America Program
- <50,000 population (based on latest census)
- SECO – State Energy Conservation Office grants
- www.seco.cpa.state.tx.us
- DSIRE •Database of State Incentives for Renewables & Efficiency
- www.dsireusa.org

Your final checklist

1. Find out if there are any restrictions against installing wind turbines in your area
2. Find out your area's wind speed
3. Find out your monthly electric usage
4. Find a good site for your wind turbine
5. Find a wind turbine that will produce what you need
6. Find any funding, tax breaks or grants to help with your project
7. Find an installer and set your project in motion
8. Relax and let Mother Nature do the rest