POLICIES TO PROMOTE Small Wind Turbines

A MENU FOR STATE AND LOCAL GOVERNMENTS

Policies at a Glance

* = Low or No Cost
† = State-level policy

Public policy drives the performance, safety, and even feasibility of a small wind turbine installation. This guide identifies policy tools that state and local governments can use to bring the private and public benefits of small wind turbines to their communities.

Why help small wind?

1 **TO BE PREPARED.** Ten thousand small wind turbines are sold in the U.S. every year, and demand is rising sharply in all 50 states. Learn about the technology, the market, and small wind's unique policy needs in order to legislate proactively and effectively.

2 **FOR SMALL WIND'S PERSONAL BENEFITS.** Owners of small wind systems enjoy:

- Decades of free electricity after initial-cost recovery
- Increased property values
- Reliable electricity
- Relief from high and volatile prices of other forms of electricity
- Personal energy independence
- Ability to support clean energy and fight global warming in a tangible way

3 **FOR SMALL WIND'S PUBLIC BENEFITS.** Though the power generated by small wind systems is used only by a single residence or facility, the benefits of wind power extend to the entire community. Community benefits include:

Economy:

- Higher property values
- Diversified state energy supply portfolio
- Increased in-state electricity generation
- Increased market competition from more consumer choice
- Local jobs for turbine sales, installation, and maintenance

Security:

- Emergency back-up power to police stations, hospitals, etc.
- Increased local energy independence
- Enhanced reliability and power quality of the electricity grid
- Utility peak-power relief

Environment:

- 1 residential-scale turbine = displaced emissions of 1.5 cars
- No emissions, water use, or hazardous waste

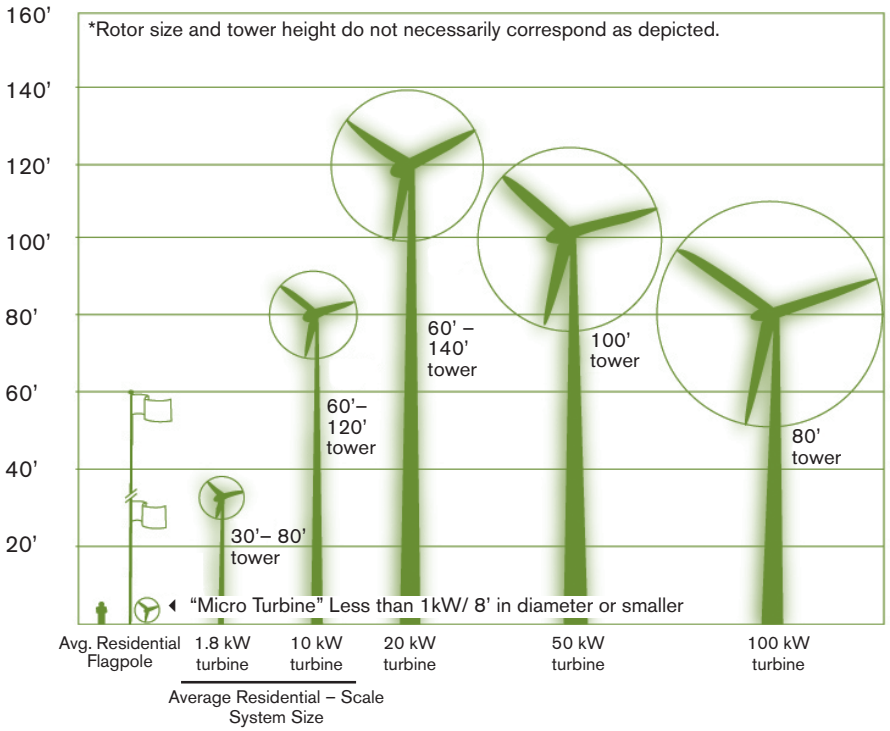
Community "PR": Visible indicator of community support for clean energy

What Are Small Wind Turbines?

A small wind turbine is a device that produces electricity from wind. Moving air causes its blades (or other airfoil design) to rotate, which generates clean energy that can be used to power a home, farm, school, or small business. Though most small wind turbines look like a miniaturized, "back yard" version of the large, utility-scale, three-bladed turbines, the industry encompasses over 200 different models and they can vary widely in appearance. A small wind turbine is technologically advanced but mechanically simple, with only two or three moving parts. Most feature three blades of 2-15 feet in length, a generator located at the hub, and a tail. The turbine is mounted on a steel tower 35-140 feet high, which is designed as a freestanding monopole (like a street light), a lattice tower (like a radio tower), or a guyed monopole (like a street light with support cables from mid-tower to the ground).

Some models eliminate the traditional propeller-shaped blade design and instead feature a cylinder-like component that revolves similarly to a barbershop pole or corkscrew. Systems of this configuration are known as "vertical axis" turbines because the plane of the turbine's rotation is perpendicular, or vertical, to the ground.

The technology has advanced considerably in the recent years, making small wind turbines quieter, more reliable, and better able to blend in with surrounding aesthetics. A forthcoming (2009) program to certify small wind turbines to a safety, performance, sound, and reliability standard will further promote high performance and increase consumer confidence.[2]



[2] The Small Wind Certification Council (SWCC) is an independent, third-party program that will, upon its introduction in 2009, certify small wind turbines tested to a performance, safety, and reliability standard. Proposed and enacted incentives for small-turbine consumers at state and federal levels have already begun to account for this impending program by making future certification a requisite for eligibility. Other states, such as California and New York, have incorporated their own criteria for eligibility into their incentive programs in order to grant incentives only to products that meet certain performance and safety conditions.

How Are They Used?

Unlike large turbines that power entire cities, small wind systems are used to produce power primarily on-site for a single user. Tens of thousands of homes, farms, small businesses, schools, and other institutions throughout the country use small wind turbines to lower or eliminate their electricity bills and help the environment.

Uses are diverse and quite similar to those of solar photovoltaic panels. The two technologies are in fact natural complements (winds resources are strongest in the winter and spring while solar resources are strongest in the summer) and are often used together in hybrid systems. Some small wind systems connect to the electricity grid, while others charge batteries for backup power for remote, stand-alone applications like cabins or even sailboats. Connecting to the electric grid allows a turbine owner to use electricity from the local utility when the wind does not blow, but also allows any surplus electricity – energy produced in excess of consumption, such as when winds are strong and usage is low – to be sent back into the grid and used by a neighbor.

Common Applications
On- or Off-Grid…

- Single-Family Homes
- Businesses
- Farms
- Institutions
- Schools
- Government Buildings
- Industrial Sites
- Military
- Communications Systems

Recommended Policies for State and Local Governments

1 OFFER CONSUMERS REBATES OR OTHER UP-FRONT INCENTIVES:

Helping people afford small wind systems

Why they're important: The single largest factor in a consumer's decision whether or not to buy a turbine

Demand is strong for small wind systems, but they are currently too expensive for many people to afford. A system large enough to power a whole home, for example, can cost up to $70,000 installed. States that offer consumer incentives effectively funnel the market into their communities and enjoy the public and private benefits that small wind offers.

Example state incentive programs:

- Oregon www.energytrust.org/RR/wind/small/incentives.html
- Arizona www.revenue.state.az.us/Forms/2006/310%20instructions.pdf
- Massachusetts www.masstech.org/RenewableEnergy/small_renewables.htm
- New Jersey www.njcleanenergy.com/renewable-energy/programs/core-rebate-program/incentives/core-rebate-program
- New York www.powernaturally.com/Programs/Wind/incentives.asp?i=8
- California www.consumerenergycenter.org/erprebate/index.html
- American Wind Energy Association model incentive program www.awea.org/pubs/factsheets/buydwn_fs.PDF

2 STREAMLINE THE PERMITTING PROCESS:

Making an installation safe, easy, and affordable

Why it's important: The time, expense, and restrictions of a local zoning ordinance too often pose tremendous challenges to consumers. Education may be the single most important factor in streamlining the permitting process for the benefit of consumers and governments alike.

Although not intended to discourage installations, zoning restrictions can cripple the market by increasing the costs and time required to obtain necessary construction permits. By designating small wind energy systems as an allowed use (such as a permitted, conditional, or accessory use), counties, cities, and even entire states can effectively streamline the permitting process to ensure safe, effective, and practical installations.

See the American Wind Energy Association's comprehensive small-wind permitting guidebook:

- "In the Public Interest: How and Why to Permit for Small Wind Systems." AWEA 2008. www.awea.org/smallwind/pdf/InThePublicInterest.pdf

3 ENACT DISTRIBUTED GENERATION FEED-IN TARIFFS (BUY-BACK RATES):

Setting a price at which utilities compensate small-turbine owners (and other producers of on-site renewable energy) for any excess electricity they generate

Benefits:

- Reward a turbine's performance
- Provide opportunities for farmers, small businesses, and schools to profit from wind turbines and other renewable energy sources.
- Ease grid congestion

A distributed generation or "feed-in" tariff ensures that locally owned, small-scale renewable energy systems become significant contributors to the local power supply. A feed-in tariff is similar to a Renewable Electricity Standard (see policy 7) except that instead of establishing a set quantity of renewable electricity a utility must generate, it establishes a set price at which a utility purchases excess electricity from a renewable generator, such as a small wind system. This way, natural market forces can adjust the amount of energy produced (supply) and demand accordingly. Unlike up-front rebates and tax credits, this policy is based on output (cents/kWh) rather than turbine size (kW), and therefore rewards performance.

Feed-in tariffs are also designed to provide small systems with fair access to distribution lines by standardizing interconnection agreements (see policy 6). Tariffs simplify negotiations and reduce transaction costs for both owners of small wind turbines (and other technologies) and power companies, provide equitable treatment for producers, and ensure the safe, reliable operation of the interconnected systems.

As of June 2008, Michigan, Illinois, California, Minnesota, and Rhode Island have begun to consider feed-in tariff legislation.

- Xcel Energy's small wind energy tariff and standard power purchase contract and interconnection agreement: www.puc.state.mn.us/docs/orders/01-0069.pdf or www.newrules.org/dgtariff/

4 INITIATE PUBLIC EDUCATION AND OUTREACH PROGRAMS:

Letting people know that small wind is an option

Why it's important: Accurate, widespread information about small wind systems is critical to the industry's success

Recommended practices:

- Include small wind into publicly funded renewable energy marketing efforts
- Educate local businesses about the cost savings and "hazard mitigation" potential of on-site, clean power generation
- Publicize information on incentive programs and other pertinent policies
- Learn how to streamline zoning rules so owners can install their turbines (see policy 2)

Resources – American Wind Energy Association

- www.awea.org/smallwind
- www.awea.org/smallwind/faq.html
- www.awea.org/smallwind/toolbox2/index.html

5 INSTALL SMALL WIND TURBINES ON GOVERNMENT PROPERTY:

Public facilities supporting the public benefits of renewable energy

Benefits: Demonstrate support for clean energy, enjoy fixed energy costs for decades, and experience zoning regulations firsthand

Under the 2005 Energy Policy Act (Sec. 203), the federal government is required to purchase or use renewable energy to power a portion of their operations. By using a small wind system to offset power consumption, public buildings enjoy renewable energy's economic and environmental benefits, set a highly visible example for others to follow, and create a substantial market for the technology.

An added benefit is that by siting, purchasing, and installing a small wind turbine, public officials experience their local permitting process firsthand. Experiencing the paperwork, restrictions, and time required to obtain a building permit in person can quite effectively shed light on many onerous zoning and permitting regulations, and ultimately lead to their improvement (see policy 2).

Examples:

- NASA facility in Houston, TX
- Sangre De Cristo Electric Association Buena Vista, CO
- Grand Valley State University, Allendale, MI
- Coconino Community College, Flagstaff, AZ

6 IMPLEMENT ANNUALIZED NET METERING: Consumers receiving fair credit from a utility for any electricity produced but not consumed

Why it's important: Administratively easier for both utilities and consumers, and improves the economics of a small wind system

Net metering is a policy implemented by some states and electric utilities that ensures that any extra electricity produced by an on-site generator, such as a small wind turbine, can be sent back into the utility system for fair credit. For example, if a home's (utility-connected) small wind turbine produces more electricity than the home can use, the excess electricity is sent back into the distribution system to be used by someone else. Under a net metering policy, this excess generation will cause the small-turbine owner's home electric meter to spin backwards to indicate essentially "negative" electricity usage and effectively bank excess generation. Net metering (net energy billing) allows such a customer to be credited at the end of the billing period, preferably over a year's time (i.e., "annualized"), for any net consumption or production of electricity. Since a single meter is used to measure in- and out-flow, the customer automatically receives compensation from the utility for any excess electricity produced at the full retail electricity rate.

When a net metering policy is "annualized," a user's net electricity consumption or production is calculated as an average over the span of one full year, rather than a shorter period. This reduces administrative costs for utilities and allows the turbine owner to account for the seasonal variations of electricity usage and production. Overall, net metering is a far more accurate and efficient method of accounting.

Resources:

- Freeing the Grid handbook by Network for New Energy Choices www.newenergychoices.org/uploads/netMetering.pdf
- American Wind Energy Association www.awea.org/smallwind/toolbox2/utilities.html

7 STANDARDIZE GRID INTERCONNECTION RULES: Making the process of connecting a turbine to the electric grid more transparent, predictable, and streamlined

Benefits: Avoids continually reinventing a process, reduces transaction costs, and ensures equitable treatment among technologies

The bulk of the small-turbine market is comprised of systems that can be connected to the electricity grid, which eliminates the need for batteries or other electricity storage devices. By connecting to the grid, a turbine that produces more electricity than its owner needs will send the excess into the grid to be used by a neighbor. And when winds are calm but electricity usage is high, the user can use electricity from the grid as usual.

Implementing established, standardized rules for connecting a turbine to the grid is as simple as adhering to the nationally recognized Underwriters Laboratories (UL) Standard 1741 and the Institute of Electrical and Electronic Engineers (IEEE) Standard 1547.

Other resources:

- "Freeing the Grid" handbook
- www.newenergychoices.org/uploads/FreeingTheGrid2007_report.pdf
- Interconnection Guidebook by the Interstate Renewable Energy Council
- www.irecusa.org/fileadmin/user_upload/ConnectDocs/IC_Guide.pdf
- UL Standard 1741 http://ulstandardsinfonet.ul.com/scopes/1741.html
- IEEE 1547 http://grouper.ieee.org/groups/scc21/1547/1547_index.html
- American Wind Energy Association www.awea.org/smallwind/toolbox2/utilities.html

8 ENACT STATE RENEWABLE ELECTRICITY STANDARDS: Requiring power companies to derive a certain amount of their generation from renewable energy

Why it's important: Creates a market for all renewables, makes government incentives more effective

Under a Renewable Electricity Standard (RES, also called Renewable Portfolio Standard), utilities must derive a certain percentage of their electricity generation from renewable resources, like wind. This creates a guaranteed demand for renewable power and can open new opportunities for small-scale wind as well. Commercial projects will be the first to supply the requirement, but as utilities gain more experience with renewable energy systems, they will likely look to small wind as a way to diversify their sources.

Some Renewable Electricity Standards direct utilities to focus on specific technologies. The Iowa State legislature, for example, considered an RES in 2003 that would have specifically required a certain percentage of their renewable generation to come from locally owned, small-scale projects. Resource-specific "carve-outs" like this, however, are not preferred, since the market should determine which technologies are the most suitable to fulfill a standard. But should an RES require such a "carve-out," small wind should be treated equally with other distributed energy technologies.

A renewable electricity standard protects consumers from rate increases, enhances our domestic energy supply, and improves national security. It also locks in a supply of affordable electricity and stable prices despite unpredictable fluctuations in energy markets, and diversifies our mix of resources to help minimize overreliance on a few energy sources. Renewable energy installations -- especially small-scale generators -- also create power closer to where it is needed, reducing the stress on electric transmission lines.

Renewable electricity standards do not force power companies to invest in additional generation that they do not need. If new power acquisitions are not feasible for a power company, it can instead purchase tradable renewable energy credits (sometimes called "green tags"). Renewable electricity standards typically obligate power companies to acquire credits equal to some percentage of their retail power sales, ensuring their support for new renewable energy development without requiring unnecessary capital investments.

Resource:

- American Wind Energy Association www.awea.org/legislative/#RPS

9 OFFER PROPERTY OR SALES TAX REDUCTIONS/EXEMPTIONS:

Reducing the payback period of a turbine investment

Benefits: Makes small wind systems more economical and treats them equally with other, similar technologies

A small wind turbine adds tangible value to a property, just like any other home or business improvement. By reducing or waiving property taxes for the addition of a small wind system, as over 19 states currently do, an installation can be considerably more viable for a consumer.

While a rebate or investment (up-front) tax credit is by far the most effective incentive for small wind systems, eliminating or reducing the sales or property taxes on a system is an important part of making the technology more affordable.

Model property tax reduction

- American Wind Energy Association www.awea.org/smallwind/toolbox/IMPROVE/incentives_3e.asp.

Examples of property tax reductions:

- Database of State Incentives for Renewables and Efficiency http://dsireusa.org

Sales Tax Reductions:

Fossil fuel supplies to power plants are generally exempt from sales taxes, whereas wind turbines are often not. State legislatures have the authority, independent of electric industry structure and regulation, to implement, enact, and enforce these policies.

Model of a sales tax reduction:

- American Wind Energy Association www.awea.org/smallwind/toolbox/IMPROVE/incentives_3d.asp.

Examples of sales tax reductions:

- Iowa www.legis.state.ia.us/IACODE/2001/422/45.html.
- Minnesota www.commerce.state.mn.us/pages/Energy/ModTech/taxincentives.htm.
- Current, comprehensive list: Database of State Incentives for Renewables and Efficiency http://dsireusa.org

10 OFFER CONSUMERS LOW-COST LOANS: Providing low-cost financing for renewable energy equipment

Benefits: Though rebates and tax incentives are preferred, state-administered "green" loans give consumers the chance to afford a small wind turbine

Private bank loans for on-site renewable technologies like small wind are likely to be even more costly and restrictive than for large-scale systems. However, state governments can provide low-cost capital to renewable energy projects to support their development. This can be done directly through a state agency or by making arrangements with private lending institutions, local authorities, or electric utilities.

Direct loan programs come in many forms, including economic development

bonds, government and utility loans, community development programs, and green bonds. These programs can be used to support renewables by providing lower-cost and less restrictive debt than is available in the private markets. For smaller-scale systems, these programs also may reduce the transaction costs of arranging a private loan.

Model of a revolving loan fund:

- www.awea.org/smallwind/toolbox/IMPROVE/incentives_3c.asp.

11 SUPPORT UTILITY GREEN PRICING PROGRAMS: Utility customers supporting renewable energy by agreeing to pay a slight premium on their energy bills

Benefits: Offers people more ways to support small wind

Green pricing allows customers, through their choosing, to help their utilities invest more in renewable energy. Under this program, participating customers pay a small premium on their electric bills to offset the utility's incremental cost of additional renewable energy. More than 750 utilities in over 28 states, including investor-owned, municipal, and cooperative utilities, offer a green pricing option.

Utilities typically apply customers' green power premiums only to purchases from commercial renewable energy facilities, neglecting to provide incentives for small wind turbines or other on-site generators. Some utilities, however, choose to make small-scale renewables a priority by pooling green power premiums into a fund that is used to lower the installation costs of new small-scale renewables. Under this method, a utility may provide the small-system owner with up-front rebates for purchasing equipment, or pay the owner a premium for electricity they generate.

Resources & Examples:

- Chelan County, Wash., Public Utility District's Sustainable Natural Alternative Power program (SNAP) www.chelanpud.org/snap.html
- Orcas Power & Light Cooperative (OPALCO) Green Power Program www.opalco.com/
- National Renewable Energy Laboratory www.nrel.gov/docs/fy01osti/29831.pdf
- U.S. Department of Energy www.eere.energy.gov/greenpower/markets/pricing.shtml?page=0

12 SUPPORT TURBINE TESTING AND CERTIFICATION: Helping the industry help itself

Benefits: Strengthen industry credibility and help consumers choose

Beginning in 2009, small wind turbines can become certified to a safety, performance, reliability, and sound standard by the Small Wind Certification Council (SWCC). This program is designed to help consumers make more educated purchases while strengthening the industry. However, the testing and certification process can take upwards of a year or more, and hundreds of turbines will compete for a very limited number of testing sites. Therefore, helping to

expand the number of testing sites around the U.S. will lessen the bottleneck and hasten the maturation of the industry.

Supporting the administrative costs of the SWCC would also help this program serve consumers, industry, and the governments that provide incentives for them.

Resources:

- Interstate Renewable Energy Council www.irecusa.org/index.php?id=107.

13 ENSURE POLICY TREATMENT IS EQUITABLE ACROSS ALL SMALL RENEWABLE TECHNOLOGIES: Letting the market decide

Benefits: Promote consumer choice and fair market competition

The small wind industry is indeed small and can be politically overshadowed by its market counterparts, particularly solar photovoltaics (PV). Remember that these two technologies share a nearly identical market and often benefit under the same policies, whether they be incentives, utility interconnection rules, net metering, Renewable Electricity Standard "carve-outs," or even zoning regulations. Treating them equally under public policy promotes market competition and encourages better products.

Resource:

- American Wind Energy Association www.awea.org/smallwind/toolbox2/drawer_2_promotion.html

14 LOAN WIND-MEASURING EQUIPMENT TO POTENTIAL CONSUMERS: Helping consumers get the most out of their investment

Benefits: Help a turbine generate the most clean energy possible from a site

Some states, organizations, and institutions loan wind measurement equipment (anemometers) at low or no cost to potential turbine owners. Though wind measurement is not usually required for small turbine installations, it can help to optimize a turbine's performance.

Resources:

- U.S. Department of Energy www.eere.energy.gov/windandhydro/
- windpoweringamerica/na_anemometer_loan.asp
- Oregon http://me.oregonstate.edu/alp/
- New Jersey www.rowan.edu/colleges/engineering/clinics/cleanenergy/anemometer_homepage.htm
- Virginia sbalp.cisat.jmu.edu/
- North Carolina www.wind.appstate.edu/swiwind/alp.php
- Utah http://geology.utah.gov/SEP/wind/anemometerdata/index.htm

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