

<http://www.eren.doe.gov/wind/web.html>

Are there good wind resources in the United States?

Wind energy is very abundant in many parts of the United States. Wind resources are characterized by wind-power density classes, ranging from class 1 (the lowest) to class 7 (the highest). Good wind resources (class 3 and above) which have an average annual wind speed of at least 13 miles per hour, are found along the east coast, the Appalachian Mountain chain, the Great Plains, the Pacific Northwest, and some other locations. North Dakota, alone, has enough energy from class 4 and higher winds to supply 36% of the electricity of the lower 48 states. Of course, it would be impractical to move electricity everywhere from North Dakota. Wind speed is a critical feature of wind resources, because the energy in wind is proportional to the cube of the wind speed. In other words, a stronger wind means a lot more power.

What are the advantages of wind-generated electricity?

Numerous public opinion surveys have consistently shown that the public prefers wind and other renewable energy forms over conventional sources of generation. Wind energy is a free, renewable resource, so no matter how much is used today, there will still be the same supply in the future. Wind energy is also a source of clean, non-polluting, electricity. Unlike conventional power plants, wind plants emit no air pollutants or greenhouse gases. In 1990, California's wind power plants offset the emission of more than 2.5 billion pounds of carbon dioxide, and 15 million pounds of other pollutants that would have otherwise been produced. It would take a forest of 90 million to 175 million trees to provide the same air quality.

What are the economic obstacles to greater wind power usage? Even though the cost of wind power has decreased dramatically in the past 10 years, the technology requires a higher initial investment than fossil-fueled generators. Roughly 80% of the cost is the machinery, with the balance being the site preparation and installation. If wind generating systems are compared with fossil-fueled systems on a "life-cycle" cost basis (counting fuel and operating expenses for the life of the generator), however, wind costs are much more competitive with other generating technologies because there is no fuel to purchase and minimal operating expenses.

Are there environmental problems facing wind power?

Although wind power plants have relatively little impact on the environment compared to other conventional power plants, there is some concern over the noise produced by the rotor blades, aesthetic (visual) impacts, and sometimes birds have been killed by flying into the rotors. Most of these problems have been resolved or greatly reduced through technological development or by properly siting wind plants. Avian mortality remains an issue to be better understood and resolved.

Are there other drawbacks to the use of wind energy?

The major challenge to using wind as a source of power is that it is intermittent and it does not always blow when electricity is needed. Wind cannot be stored (unless batteries are used); and not all winds can be harnessed to meet the timing of electricity demands. Further, good wind sites are often located in remote locations far from areas of electric power demand (such as cities). Finally, wind resource development may compete with other uses for the land and those alternative uses may be more highly valued than

electricity generation. However, wind turbines can be located on land that is also used for grazing or even farming.

Is wind energy good for the economy? Wind energy avoids the external or societal costs associated with conventional resources, namely, the trade deficit from importing foreign oil and other fuels, the health and environmental costs of pollution, and the cost of depleted resources. Wind energy is a domestic, reliable resource that provides more jobs per dollar invested than any other energy technology--more than five times that from coal or nuclear power. In 1994, wind turbine and component manufacturers contributed directly to the economies of 44 states, creating thousands of jobs for Americans.

Is the cost of wind power competitive with conventional power plants? New, utility-scale, wind projects are being built all around the United States today with energy costs ranging from 3.9 cents per kilowatt-hour (at very windy sites in Texas) to 5 cents or more (in the Pacific Northwest). These costs are competitive with the direct operating costs of many conventional forms of electricity generation now--and prices are expected to drop even further over the next 10 years. Since wind is an intermittent electricity generator and does not provide power on an "as needed" basis, it has to compare favorably with the costs saved on fuel from fossil generators.

Can homeowners sell excess electricity to the utility? Under the Public Utilities Regulatory Policy Act of 1978 (PURPA), any qualifying individual can install a wind generator and the local electric utility must pay for any excess power produced. PURPA was specifically intended to create a market for clean, renewable, electric-generating technologies by guaranteeing a buyer for the excess power. Prior to PURPA, selling power to the utility was an option but was the discretion of the utility. With PURPA, small power producers meeting specific criteria are guaranteed purchase and interconnection. Many states now permit "net metering," in which the utility must buy wind power generated by homeowners at the same retail rate the utility charges. This essentially allows the customer's meter to turn backward while wind energy is supplied to the grid by the customer's turbine.

Wind industry...today The wind energy industry has grown steadily over the last 10 years and American companies are now competing aggressively in energy markets across the nation and around the world. The industry, in partnership with the U.S. Department of

Energy, continues to expand and develop a full range of highly reliable, efficient wind turbines. These new-generation turbines, when installed, perform at 98 percent reliability in the field, representing remarkable progress since the technology was first introduced in the early 1980s.

Wind power...tomorrow Wind power has an expansive future according to experts. Wind energy has been the fastest growing source of electricity generation in the world in the 1990s. However, the majority of this growth has been in Europe, where government policies and high conventional energy costs favor the use of wind energy. The U.S. Department of Energy recently announced the Wind Powering America initiative with goals to power at least 5% of the nation's electricity with wind by 2020, increase the number of states with more than 20 megawatts of wind to 16 by 2005 and 24 by 2010, and increase federal use of wind energy to 5% by 2010.

Additional information on wind power  
 The American Wind Energy Association  
 Energy Efficiency and Renewable Energy Network (EREN)  
 National Renewable Energy Laboratory's  
 ???National Wind Technology Center  
 National Wind Coordinating Committee  
 Your State Energy Agency

<http://www.awea.org/news/wpa15.html>

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MEDIA ADVISORY  
 FOR MEDIA COVERING DROUGHT, SMOG OR HEAT WAVE

HARVESTING THE WIND FOR ENERGY CAN  
 REDUCE AIR POLLUTION,  
 PROVIDE INCOME FOR DROUGHT-STRICKEN FARMERS.

Coal plants provide more than half of America's electricity. At the same time, they are the nation's largest stationary source of air pollutants such as sulfur dioxide and nitrogen oxide, which cause smog and acid rain. Power plants release one third of the nation's carbon dioxide emissions, whose build-up worldwide, scientists believe, is causing global warming, hotter summers and more violent weather

patterns. To meet peak demand during heat waves, our utilities fire up older, dirtier coal plants that add even more to air pollution. By developing a fraction of its wind energy potential, the U.S. could reverse this trend toward greater pollution and help clean up the electric generation industry

In the United States, from June 1998 to July 1999, the wind industry installed a total of 1,073 MW in new wind turbines and generating equipment. That new American wind power will prevent 2.2 million tons of carbon dioxide, 11,000 tons of sulfur dioxide, and 7,000 tons of nitrogen oxide from being released annually into the air. These amounts would have been emitted if instead the average U.S. utility fuel mix had been used to produce an equivalent amount of electricity. These pollutants and gases are major factors in the formation of acid rain, smog, and global warming.

Wind power is affordable, and growing fast. The cost of electricity from new wind farms is now competitive with fossil fuels in many regions of the U.S. And because wind power is pollution-free, it makes it less costly for the entire nation to meet clean air standards and maintain a healthy environment.

Wind power is the fastest growing energy technology in the world, expanding at an average rate of 22.6% per year since the beginning of the decade and 27.4% in 1998. This decline in costs and surge in growth means that it is realistic and affordable for the U.S. and the world economy to supply a more significant share of electricity from wind power plants.

Development of wind power in windy states -- many of them in the agricultural Great Plains -- boosts farmers' income and provides a buffer against the impacts of drought. Farmers in Iowa and Minnesota, where more than half of the new wind projects have been built over the past year, supplement their income by leasing land for the installation of wind turbines while continuing to farm around the towers. There's also more income for the local communities in the form of an expanded tax base. "The Midwest could be the Saudi Arabia of wind energy" says one wind project manager in Ventura, Iowa. (Attachment D)

America's wind energy potential is enormous. Wind from the Dakotas could provide 255,000 MW of capacity and 2.2 trillion kWh of electricity (equal to approximately two-thirds of current total U.S. electricity consumption). Texas has the potential to power one third of the nation. California, with the largest wind generating capacity installed to date, ranks only 17th among the nation's top twenty states for wind energy potential. Many states have excellent wind resources that can begin to be tapped today.

Wind energy cannot be used to fully power an electric system as winds are variable and the electricity they produce is intermittent. However, experience shows that wind can reliably power up to 20% of a regional electric system and perhaps more, if the wind resource is well tapped across a variety of sites. Local winds currently provide more than 20% of the electricity in the industrial state of Navarra in northern Spain. Denmark is the country with the highest penetration of wind power in its energy mix at the national level, currently at 8%.

The U.S. Department of Energy has recently announced a goal of producing 5% of America's electricity from wind by 2020. That goal can be achieved and exceeded if the industry's current rapid growth rate is maintained and if measures to encourage the production and purchase of wind power are implemented.