



Wind energy systems have low operating expenses because they have no fuel cost. *Photo by Jenny Hager Photography, NREL 15990.*

1. Wind energy is cost competitive with other fuel sources.

The average levelized price of wind power purchase agreements signed in 2013 was approximately 2.5 cents per kilowatt-hour, a price that is not only cost competitive with new gas-fired power plants but also compares favorably to a range of fuel cost projections of gas-fired generation extending out through 2040.¹ Public and private research and development (R&D) can provide continued technological advancements and further reduce wind energy costs.²

2. Wind energy creates jobs.

Wind energy development creates thousands of long-term, high-paying jobs in fields such as wind turbine component manufacturing, construction and installation, maintenance and operations, legal and marketing services, transportation and logistical services, and more. In 2013, the wind sector invested \$2 billion in the U.S. economy to build projects and employed more than 50,000 workers.³ Historically, employment in the wind industry's manufacturing sector has varied depending on the status of federal incentives.⁴ In 2012, there were 25,500 jobs in the wind industry's manufacturing sector.⁵ This number decreased to 17,400 in 2013 as a result of policy uncertainty prior to the extension of the Production Tax Credit later that year.⁶

U.S. small wind turbine manufacturers are focusing on growing international markets. Exports from U.S.-based small wind turbine manufacturers increased 70%, from 8 megawatts in 2012 to 13.6 megawatts in 2013. U.S. small wind turbines were exported to more than 50 countries in 2013, including Italy, the United Kingdom, Germany, Greece, China, Japan, Korea, Mexico, and Nigeria.⁷

3. Wind energy is an indigenous, homegrown energy source that helps to diversify the national energy portfolio.

Adding wind power to the nation's energy mix diversifies our clean energy portfolio and helps reduce America's reliance on imported fossil fuels. With the expanded use of electric and plug-in hybrid vehicles, wind energy can also reduce our dependence on imported transportation fuels. Additionally, wind energy can help stabilize the cost of electricity and reduce our vulnerability to price spikes and supply disruptions.

4. Wind energy can provide income for farmers and ranchers, as well as economic benefits to communities.

Wind projects provide revenue to the communities in which they are located via lease payments to landowners, state and local tax revenues, and employment. Even a utility-scale wind turbine has a small footprint, enabling farmers and ranchers who lease their land to developers to continue growing crops and grazing livestock. As wind energy systems continue to expand, they provide significant economic benefits. A recent study found that, on average, wind power installations within the study area and occurring between 2000 and 2008 resulted in an increase in total county-level personal income of approximately \$11,000 per megawatt.⁸

5. Wind energy is an inexhaustible renewable energy source.

Wind energy is plentiful and readily available, and capturing its power does not deplete our natural resources. Improved technologies and taller turbines allow wind deployment in areas with lower wind speeds, such as in the southeastern United States. In addition, offshore wind has tremendous energy potential.

6. Wind turbines do not consume water.

Most electric power plants require water to operate, but producing electricity from the wind does not require water. Researchers estimate that wind power generation in 2013 reduced power-sector water consumption by 36.5 billion gallons.⁹

7. Wind energy is clean.

Electricity generated by wind turbines does not pollute the water we drink or the air we breathe, so wind energy means less smog, less acid rain, and fewer greenhouse gas emissions. Researchers estimate that wind energy in the United States in 2013 reduced direct power-sector carbon dioxide emissions by 115 million metric tons, equivalent to eliminating the emissions of 20 million cars during the year. An estimated 157,000 metric tons of sulfur dioxide emissions and 97,000 metric tons of nitrogen oxides were also avoided.¹⁰ Because it is a clean energy source, wind energy reduces health care and environmental costs associated with air pollution.

¹ Wisner, R.; Bolinger, M. (2014). *2013 Wind Technologies Market Report*. U.S. Department of Energy. <http://energy.gov/eere/wind/downloads/2013-wind-technologies-market-report>

² Wisner, R.; Bolinger, M. (2014). *2013 Wind Technologies Market Report*. U.S. Department of Energy. <http://energy.gov/eere/wind/downloads/2013-wind-technologies-market-report>

³ American Wind Energy Association. (2014). *U.S. Wind Energy Annual Market Report, Year Ending 2013*. www.awea.org/amr2013

⁴ Lantz, E.; Steinberg, D.; et al. (2014). *Implications of a PTC Extension on U.S. Wind Deployment*. National Renewable Energy Laboratory. www.nrel.gov/docs/fy14osti/61663.pdf

⁵ American Wind Energy Association. (2013). *U.S. Wind Energy Annual Market Report, Year Ending 2012*. www.awea.org/Resources/Content.aspx?ItemNumber=5346

⁶ American Wind Energy Association. (2014). *U.S. Wind Energy Annual Market Report, Year Ending 2013*. www.awea.org/amr2013

⁷ U.S. Department of Energy. (2014). *2013 Distributed Wind Market Report*. <http://energy.gov/sites/prod/files/2014/09/f18/2013%20Distributed%20Wind%20Market%20Report.pdf>

⁸ U.S. Department of Energy. (2012). *The Impact of Wind Development on County-Level Income and Employment: A Review of Methods and an Empirical Analysis*. www.nrel.gov/docs/fy12osti/54226.pdf

⁹ American Wind Energy Association. (2014). *U.S. Wind Energy Annual Market Report, Year Ending 2013*. www.awea.org/amr2013

¹⁰ American Wind Energy Association. (2014). *U.S. Wind Energy Annual Market Report, Year Ending 2013*. www.awea.org/amr2013

¹¹ Utility Variable-Generation Integration Group. (2006). *Utility Wind Integration State of the Art*. www.uwig.org/UWIGWindIntegration052006.pdf

¹² Wisner, R.; Bolinger, M. (2014). *2013 Wind Technologies Market Report*. U.S. Department of Energy. <http://energy.gov/eere/wind/downloads/2013-wind-technologies-market-report>

¹³ American Wind Energy Association. (2014). *U.S. Wind Industry Third Quarter 2014 Market Report*. www.awea.org/Resources/Content.aspx?ItemNumber=6865

¹⁴ Gallup. (2013). *Americans Want More Emphasis on Solar, Wind, Natural Gas*. www.gallup.com/poll/161519/americans-emphasis-solar-wind-natural-gas.aspx. Survey methodology and demographic overview are available at www.gallup.com/file/poll/161525/Energy_sources_130327.pdf

¹⁵ FM3, Public Opinion Strategies. (2014). *Voter Attitudes toward Energy Issues in the Midwest (includes information on survey methodology and demographic overview)*. www.mepartnership.org/wp-content/uploads/2014/08/Re-AMP-2014MidwesternEnergyIssues-MediaRelease-Final.pdf

8. Wind energy systems have low operating costs.

Wind energy systems have low operating expenses because there are no associated fuel costs. When large amounts of wind energy are added to the grid, additional generation may be required to accommodate wind energy's variability, but leading experts in the field concluded that system operating cost increases from wind variability and uncertainty amounted to only about 10% or less of the wholesale value of the wind energy and that there are ways to reduce these costs.¹¹ The absence of fuel cost also protects consumers from fluctuating coal and natural gas costs.

9. Wind energy can be used in a variety of applications.

Wind turbines can be used in a variety of applications. Utility-scale wind farms can provide electricity to an entire community while smaller turbines, often described as being used in "distributed applications," can be installed at or near a site where the electricity will be used. Community wind projects include turbines for schools, tribes, municipal utilities, and rural electric cooperatives. Small wind turbines, alone or as part of a hybrid system, can power homes, businesses, farms, ranches, and schools. Wind energy can be perfect for remote applications such as water pumping, ice making, and telecommunications sites, and can displace diesel fuel in remote communities.

10. Wind energy is deployed in all U.S. regions and is widely supported.

Since 2007, wind power has represented 33% of all U.S. capacity additions, and an even larger fraction of new generation capacity in the Interior (54%) and Great Lakes (48%) regions. Growth in wind power capacity over the 2007–2013 period averaged 7.1 gigawatts per year. If wind power additions continue over the next decade at the same pace as in 2007–2013, then roughly 40% of the nation's projected increase in electricity generation would be met with wind electricity.¹² As of the end of September 2014, developers reported more than 13,600 megawatts of wind energy under construction.¹³

Because of all the benefits listed above and more, many opinion surveys show that the majority of people are in favor of wind energy. In 2013, a Gallup poll showed that more than 70% of Americans believed the United States should place more emphasis on wind energy development.¹⁴ Additionally, a 2014 bipartisan poll showed 87% of Midwesterners throughout Illinois, Iowa, Michigan, Minnesota, Ohio, and Wisconsin support increasing the use of wind energy.¹⁵

Despite wind energy's numerous benefits, wind development is not appropriate everywhere. Individuals and communities should make informed decisions on local wind development. For more information, visit wind.energy.gov/windexchange. ■