



Opportunity in the Wind

Wind energy. It is abundant, it is endless, it is a gift to anyone that is willing to harness it. Its negative impact on our health and the health of the environment is minimal compared to fossil fuels and nuclear power. We can hardly contain our enthusiasm for wind energy—not only is it environmentally responsible, it offers fresh opportunities for shot peening industries.

David Neidig plans to capitalize on wind energy in two ways: As a consumer and a supplier. Neidig is Vice President of Indiana Tool/Indiana Gear. The company is a metal parts manufacturing facility in Northern Indiana. A large portion of the business is dedicated to manufacturing gears and gear drives for aerospace, wind turbines and the mining industry.

Neidig is exploring the viability of using wind turbines to reduce utility costs at Indiana Tool/Indiana Gear. "We estimate that the energy cost savings will pay for the turbine(s) in seven years," says Neidig. Neidig has applied to the Federal Aviation Administration for on-site wind measurement testing. Much of the land mass in the United States gets enough wind to power small wind turbines, but Neidig can't afford to rely on guesses or wind maps. He needs power to run a 100,000 sq. ft. plant for 75 employees and over 100 electrically-powered machines. To safeguard against power interruptions, Neidig will continue to maintain the present utility line connection. Federal law requires that all utilities permit customer-owned generators to interconnect with their systems and compensate them for energy production.¹

Now for the supply side. Indiana Tool/Indiana Gear manufactures and shot peens wind turbine gearing in its in-house shot peening facilities.

While Neidig is a wind energy advocate, he is realistic about the economies of manufacturing and shot peening wind turbine components. To keep wind energy costs competitive with electricity provided by fossil fuels, suppliers must significantly cut their margins to get the business.

Wind energy industry suppliers, like Neidig, are feeling the effects of the lack of government action. U.S. wind energy growth was reaching gale levels in 2003, but tapered to a slight breeze when the U.S. Congress failed to pass an extension of the federal wind energy Production Tax Credit (PTC), which expired December 21, 2003. The House and Senate approved the bill on September 23, 2004, and President Bush signed it into law on October 4. The PTC was reinstated through 2005 and provides a 1.8¢ kWh tax credit (adjusted annually for inflation) for electricity generated by wind turbines.

Another boost will come from the broader implementation of the Renewables Portfolio Standard (RPS). The RPS, which would require that a minimum amount of electricity be generated from renewable sources, is a market-friendly tool that has successfully stimulated least-cost renewable energy development in Texas and several other states. (The eligible renewable energy sources include wind, solar, biomass and geothermal.)

RPS is a national standard that would provide a much-needed long-term market signal and stimulate large-scale deployment of renewable energy at competitive costs over time.²

With the PTC passed and more RPS programs in place throughout the U.S., the wind turbine market will be a stronger niche for those in the gear industry, like Indiana Tool/Indiana Gear, that can work with gears that are growing bigger and bigger to accommodate the larger megawatt turbines.

There are more shot peening opportunities in the turbine because its shafts, gears, transmission housings and other components are prone to stress cracks similar to a plane engine.

World Leaders in Wind Capacity

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Country	Capacity (MW)
Germany	14,609
United States	6,374
Spain	6,202
Denmark	3,110
India	2,110
Netherlands	912
Italy	904
Japan	686
United Kingdom	649
China	568

Source: Wind Energy Statistics from American Wind Energy Association

¹ Permitting Small Wind Turbines, A Handbook
² www.awea.org

The blades, shaft and base are painted and benefit from blast cleaning. Blast cleaning extends the paint life, reduces rust and relieves the surface of tensile stresses. The better the surface on the blade, the less resistance and drag.

Following this article is a paper by Peter Riccardella, Senior Associate with Structural Integrity Associates. As "experts in the prevention and control of structural failures," Structural Integrity Associates conducted a failure investigation of large wind turbine transmission housings for a major U.S. manufacturer. This case study is an excellent example of the opportunities to support this growing industry.

If you are interested in learning more about wind turbine gearboxes, a good place to start is the American Gear Manufacturing Association (AGMA) Standard for the Design and Specification of Gearboxes for Wind Turbines (ANSI/AGMA/AWEA 6006-A03). Newly released, it provides information for specifying, selecting, designing, manufacturing, procuring, operating and manufacturing reliable speed increasing gearboxes for wind turbine generator system service. The price is \$198.00 and it can be ordered from www.agma.org.

The U.S. is poised for rapid growth in wind energy development, but it is number two to Europe's progressive wind energy generating capacity. See the chart on page four for the top wind energy markets. Within Europe, installations remain concentrated in the "big three" (Germany, Spain and Denmark). The German wind energy industry currently employs 45,400 people. In a typical wind year, Germany's wind farms generate enough to meet about 6% of the country's electricity needs, according to the German Wind Energy Association. Wind provides between 4% and 5% of Spain's power. Denmark, a country about the size of Maine, generates some 20% of its power from wind. It is the nation that gets the highest percentage of its electricity from wind. India added 408 megawatts (MW) in 2003, and now produces over 2,000 MW of wind power.

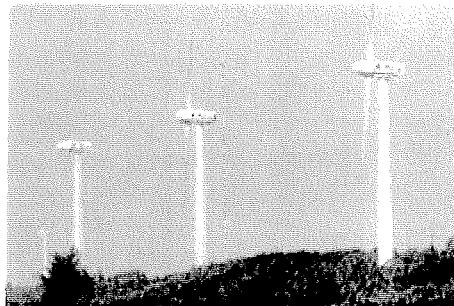


Picturesque (and functional) windmills still dot the European landscape. The Dutch were the first real innovators of the windmill. They used windmills primarily to remove water from the land. For five centuries, windmills were the primary source of power in Holland.

The present use of wind energy doesn't begin to tap the possibilities of this power source that will provide economic growth, jobs, new technology and a secure energy supply. Many wind energy advocates are striving for 20% renewable energy usage (wind, solar, biomass and geothermal) by the year 2020. Policy reforms and a level playing field in the energy sector will make that possible.

We're confident that Neidig will experience his windfall long before then. In a symmetry of environmental responsibility and sound business practices, Indiana Tool/Indiana Gear will be manufacturing and shot peening wind turbine gearing—on machines powered by wind turbines.

Today's wind turbines are graceful, almost surreal. Many see wind turbines as the symbol of hope for a better, less polluted future.



Wind Energy Resources

AWEA (American Wind Energy Association) is a national trade association that represents wind power plant developers, wind turbine manufacturers, utilities, consultants, insurers, financiers, researchers, and others involved in the wind industry – one of the world's fastest growing energy industries. In addition, AWEA represents hundreds of wind energy advocates from around the world. Learn more about AWEA at www.awea.org.

EWEA (European Wind Energy Association) is the voice of the wind industry in Europe and worldwide. EWEA calls itself "the most powerful wind energy network." EWEA members include manufacturers covering 98% of the world wind power market, component suppliers, research institutes, national wind and renewables associations, developers, electricity providers, finance and insurance companies and consultants. Visit its web site at ewea.org for more information.

Indiana Tool/Indiana Gear

Indiana Tool/Indiana Gear is part of the ITAMCO company. For more information on ITAMCO, visit www.itamco.com. Email David Neidig at dkneidig@itamco.com.

A few of the large wind turbine manufacturers are:

- DeWind GmbH (Germany)
- Enercon GmbH (Germany)
- GE Wind Energy, LLC (U.S.)
- Lagerway the Windmaster (The Netherlands)
- Nordex Energy GmbH (Germany)
- Ohio Alternative Power (U.S.)
- Vestas Wind Systems A/S (Denmark)
- WestTech Energy Systems, Inc. (Canada)
- Suzlon Wind Energy Corporation (India)
- Mitsubishi Heavy Industries, Ltd. (Japan)

For a complete list of large wind turbine manufacturers (50KW), visit www.energy.sourceguides.com/businesses/byP/wRP/lwindturbine/byB/mfg/byN/byName.shtml.

For a complete list of wind turbine manufacturers for residential, farm, and commercial/industrial applications, visit www.awea.org/faq/smsyslst.html