

## DWEA Briefing Paper: Unique Benefits of Distributed Wind



Distributed wind systems—typically smaller wind projects sited near where their electricity is used—provide a number of unique economic, environmental, and social benefits to individuals, businesses, utility companies, and communities.

### **Decentralized Power Generation**

The fundamental character of these systems is their decentralized nature. Generating electrical power near where it is consumed can:

- Reduce the burden on the electrical transmission and distribution grid,
- Improve power quality around the grid, and
- Improve the reliability of the grid.

Encouraging distributed power generation of all types allows electric utilities to delay or even forego expensive transmission and distribution upgrades by reducing the need for imported power. The use of distributed wind can lessen a

utility's need for feeder upgrades and reduce transmission congestion.<sup>i</sup> Distributed wind turbines installed in strategic locations can provide reactive power support with substantial benefits to weak feeders that experience voltage-regulation problems.<sup>ii</sup> Distributed resources can provide stability to the grid by meeting the peak demands of local distribution feeder lines or major customers.<sup>iii</sup>

While many of these benefits manifest in long-term cost savings, improved power quality and reliability also improve the quality of life for customers served in such areas.

### **Energy Independence**

Although the term “energy independence” sometimes refers to off-grid stand-alone systems that can allow individuals to live in remote locations, it also refers to the role that distributed, grid-connected wind systems play in decreasing the use of both domestic and imported fossil fuel resources.

Distributed wind and other types of distributed generation provide direct benefits by increasing competition in the electricity sector. On-site power generation allows farmers, schools, and other energy users to benefit from reduced utility bills, more-predictable energy costs, and hedges against rising retail electricity costs. Electricity produced by a distributed wind system offsets the initial installation costs over time, including the costs of continuing maintenance. Distributed wind systems can also increase energy security and promote self-reliance.

Independence fosters awareness; hosting or owning and operating a distributed wind system

encourages awareness of electricity consumption.

While some of the benefits of energy independence show as economic awareness, conservation and competition provide additional social and environmental benefits.

### **Economic Benefits**

Most of our electricity supply comes from sources outside our local areas. As a result, when we import power, we export dollars and jobs. Wind power presents an opportunity to create jobs locally.

Perhaps the most significant economic benefit of distributed wind is domestic jobs linked to the manufacturing, installing, maintaining, and selling of wind turbines used in distributed applications. Installation materials, services, and labor account for about 30% of total installed costs for small wind turbines.<sup>iv</sup> The overall domestic distributed wind investment in 2012 was \$410 million; \$101 million of that was from the small wind turbine market sector, resulting in an estimated \$30 million impact from local jobs related to small wind turbines alone. With the introduction of leasing and financing to the small wind market, local investments of up to \$1 billion are projected over the next 10 years.

Benefits to wind turbine owners and operators include reduced utility bills, tax incentives and renewable energy credits. Local communities benefit when project materials, equipment and services are purchased through local suppliers and when community members become more engaged in energy markets. Also, electric utilities benefit from improved distribution system reliability, decreased distribution and maintenance costs, more stable energy pricing, decreased fuel required to run plants, pollution emission mitigation and increased ability to meet Renewable Portfolio Standard requirements.

Additionally, U.S. manufacturers dominate the domestic small wind turbine market, claiming

93% of 2013 sales on a unit basis and 88% of sales capacity.<sup>v</sup> U.S. small wind turbine manufacturers source most of their turbine components from U.S. vendors, maintaining domestic content levels of 80 to 85% for turbine and tower hardware.<sup>vi</sup>

### **Environmental Stewardship**

Distributed wind systems generate energy from wind and, unlike most conventional power plants, they do not pollute. More distributed wind systems means fewer pollutants in our streams, rivers and atmosphere, and fewer negative impacts on our health. Adverse effects of pollution from generating electricity impacts at-risk communities and wildlife habitat the most. Distributed wind projects can help preserve open spaces with a small footprint.

*For more information see:*

[distributedwind.org/zoning-resource-center/](http://distributedwind.org/zoning-resource-center/)

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### **References**

<sup>i</sup> Forsyth T. and I. Baring-Gould, 2007. Distributed Wind Market Applications. National Renewable Energy Laboratory, Golden, CO. NREL/TP-500-39851.

<sup>ii</sup> Ibid.

<sup>iii</sup> National Renewable Energy Laboratory, 2012. Learning About Renewable Energy: Distributed Energy Basics. Available at [www.nrel.gov/learning/eds\\_distributed\\_energy.html](http://www.nrel.gov/learning/eds_distributed_energy.html) (last updated 12/3/2012).

<sup>iv</sup> American Wind Energy Association, 2011. U.S. Small Wind Turbine Market Report, Year Ending 2010. AWEA, Washington, D.C.

<sup>v</sup> American Wind Energy Association, 2014. U.S. Wind Energy Annual Market Report, Year Ending 2013. AWEA, Washington, D.C.

<sup>vi</sup> Orrell A., H. Rhoads-Weaver, M. Gagne, K. Sahl, B. Pro, R. Baranowski, L. Flowers, and J. Jenkins, 2013. 2012 Market Report on Wind Technologies in Distributed Applications. PNNL-22537. Pacific Northwest National Laboratory, Richland, Washington.