

Updated
for 2012

Economic Impact

Wind Energy Development in Illinois

June 2012



CENTER FOR
RENEWABLE ENERGY
Illinois State University

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This report is also available as a PDF on www.RenewableEnergy.ilstu.edu, under New Reports.

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Acknowledgements

Illinois Wind Working Group



The Illinois Wind Working Group (IWWG) is affiliated with the Department of Energy's Wind Powering America State Wind Working Groups. IWWG is administered by the Center for Renewable Energy at Illinois State University, including Dr. David Loomis (Economics), David Kennell (Technology), and Dr. J. Randy Winter (Agriculture).

Wind Powering America (WPA) is a regionally-based collaborative initiative to increase the nation's domestic energy supply by promoting the use of Wind Energy Technology, such as low wind speed technology, to increase rural economic development, protect the environment, and enhance the nation's energy security. WPA provides technical support and educational and outreach materials about utility-scale development and small wind electric systems to utilities, rural cooperatives, federal property managers, rural landowners, Native Americans, and the general public.

IWWG is an organization whose purposes are to communicate wind opportunities honestly and objectively, to interact with various stakeholders at the local, state, regional and national levels, and to promote economic development of wind energy in the state of Illinois. The organization is hosted by Illinois State University through a grant from the U.S. Department of Energy. The Illinois Wind Working Group is comprised of 200 key wind energy stakeholders from the state of Illinois.

IWWG is part of Illinois State University's Center for Renewable Energy and hosts an annual Advancing Wind Power in Illinois Conference that covers many aspects of wind energy; an annual Siting, Zoning and Taxing Wind Farms in Illinois Conference; and Landowner Forums throughout the state.

www.RenewableEnergy.ilstu.edu/wind/



Illinois State University established the Center for Renewable Energy, and it received Illinois Board of Higher Education approval in 2008. The Center was initially funded by a \$990,000 grant from the U.S. Department of Energy to research renewable energy, to establish a major in renewable energy at Illinois State and to administer the Illinois Wind Working Group (IWWG). The Center also received a grant from the Illinois Clean Energy Community Foundation to help complete its state-of-the-art renewable energy laboratory.

The Center has three major functional areas:

- Supporting the renewable energy major at Illinois State University
- Serving the Illinois renewable energy community by providing information to the public
- Encouraging applied research on renewable energy at Illinois State University and through collaborations with other universities

Founding Members:

Founding members include EDP Renewables, Iberdrola Renewables, State Farm Insurance, and Suzlon Wind Energy Corp.

Support of the Renewable Energy Major:

Many new workers will be needed in the renewable energy industry. To meet the growing demand for trained and educated workers, we have developed an interdisciplinary renewable energy major at Illinois State University. Graduates of the renewable energy program are well-positioned to compete for new and existing jobs.

The Center supports the renewable energy major through:

- Creation of an advisory board of outside experts
- Establishing a renewable energy internship program
- Bringing renewable energy experts to campus for seminars for faculty and students
- Funding scholarships to ensure high quality students in the major
- Providing ongoing financial support for the major

For more information about the Renewable Energy Undergraduate Major, please visit <http://tec.illinoisstate.edu/renewable-energy/>.



Center for Renewable Energy



Executive Summary



A number of factors have contributed to the rapid growth of wind power capacity in Illinois from 50 MW in 2003 to 3,334.91 MW in 2012, including federal and state policies, energy security, energy costs, environmental benefits, and economic development opportunities. One key policy driver in Illinois was the passage of the Illinois Power Agency Act in 2007 which included a Renewable Portfolio Standard of 25% by 2025, of which 75% of the renewable energy resources must come from wind.

As of April, 2012, Illinois ranked 4th in the United States in overall installed wind capacity and ranked 14th in potential capacity. Illinois installed the second most new generation capacity amongst all states during 2011. Illinois led the nation in 2011 with 404 new turbines installed (AWEA, 2012a). Illinois currently has 42 wind projects online, which account for 3,360.28 MW of wind generating capacity. This report will analyze the economic impacts from only the projects that exceed 50 MW of capacity. Illinois has 23 projects larger than 50 MW, which account for 3,334.91 MW or 99% of the state's wind energy generating capacity (see Table 1). Although project specific data were used in this report, proprietary information about the wind farms will not be released. It is important that stakeholders and decision makers are educated about the economic development impact wind energy has brought to the state and local communities so that informed decisions regarding future adoption of wind energy projects can be made. By analyzing the impacts of Illinois' wind energy, this report supplies interested parties with information concerning the economic development benefits of wind energy.

According to this economic analysis (see Figure 1), the 23 largest wind farms in Illinois:

- Created approximately 19,047 full-time equivalent jobs¹ during construction periods with a total payroll of over \$1.1 billion
- Supports approximately 814 permanent jobs in rural Illinois areas with a total annual payroll of nearly \$48 million
- Supports local economies by generating \$28.5 million in annual property taxes²
- Generates \$13 million annually in extra income for Illinois landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of \$5.98 billion over the life of the projects³

¹ Job calculations are based on a full time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2,080 hours worked in a year. A part time or temporary job would constitute only a fraction of a job according to the JEDI model. For example, the JEDI model results show 1,473 new jobs during construction; though the construction of the wind farms may have actually involved hiring closer to 3,000 workers. Thus, due to the short-term nature of construction projects, the JEDI model significantly understates the number of people actually hired to work on the project. It is important to keep this fact in mind when looking at the numbers or when reporting the numbers.

² Property tax revenue is listed for the first year (where there are property tax abatements during the first few years of the wind farm project or Payments in Lieu of Taxes (PILOT), an average figure over the first ten years is utilized). This figure will change over time due to several factors: (1) whether the county increases/decreases the local property tax rate; (2) depreciation over the life of the project; and (3) if the state law regarding wind farm valuation changes in the future.

³ The project life of the wind farm is assumed to be approximately 25 years in this calculation, although many landowner contracts may extend as long as 30 years.

Table 1.—Illinois Wind Farm Projects Larger than 50 MW

Wind Farm	Location (County)	Capacity (MW)
Streator Cayuga Ridge South Wind Farm	Livingston	300.00
Big Sky Wind Farm	Bureau and Lee	239.40
Lee-DeKalb Wind Energy Center	DeKalb and Lee	217.50
California Ridge	Champaign and Vermilion	214.00
Bishop Hill I	Henry	209.40
Top Crop Wind Farm Phase II	Grundy	198.00
Twin Groves Wind Farm Phase I	McLean	198.00
Twin Groves Wind Farm Phase II	McLean	198.00
Pioneer Trail	Iroquois and Ford	150.00
Settlers Trail	Iroquois	150.00
White Oak Wind Farm	McLean	150.00
Camp Grove Wind Farm	Marshall and Stark	150.00
Grand Ridge Energy Center Phase II, III, and IV	LaSalle	111.00
Shady Oaks	Lee	109.50
EcoGrove Wind Farm Phase I	Stephenson	100.50
Rail Splitter Wind Farm	Logan and Tazewell	100.50
Top Crop Wind Farm Phase I	LaSalle	102.00
Grand Ridge Wind Farm Phase I	LaSalle	99.00
Bishop Hill II	Henry	80.00
GSG Wind Farm	Lee and LaSalle	80.00
Providence Heights Wind Farm	Bureau	72.00
Crescent Ridge Wind Farm	Bureau	54.45
Mendota Hills Wind Farm	Lee	51.66

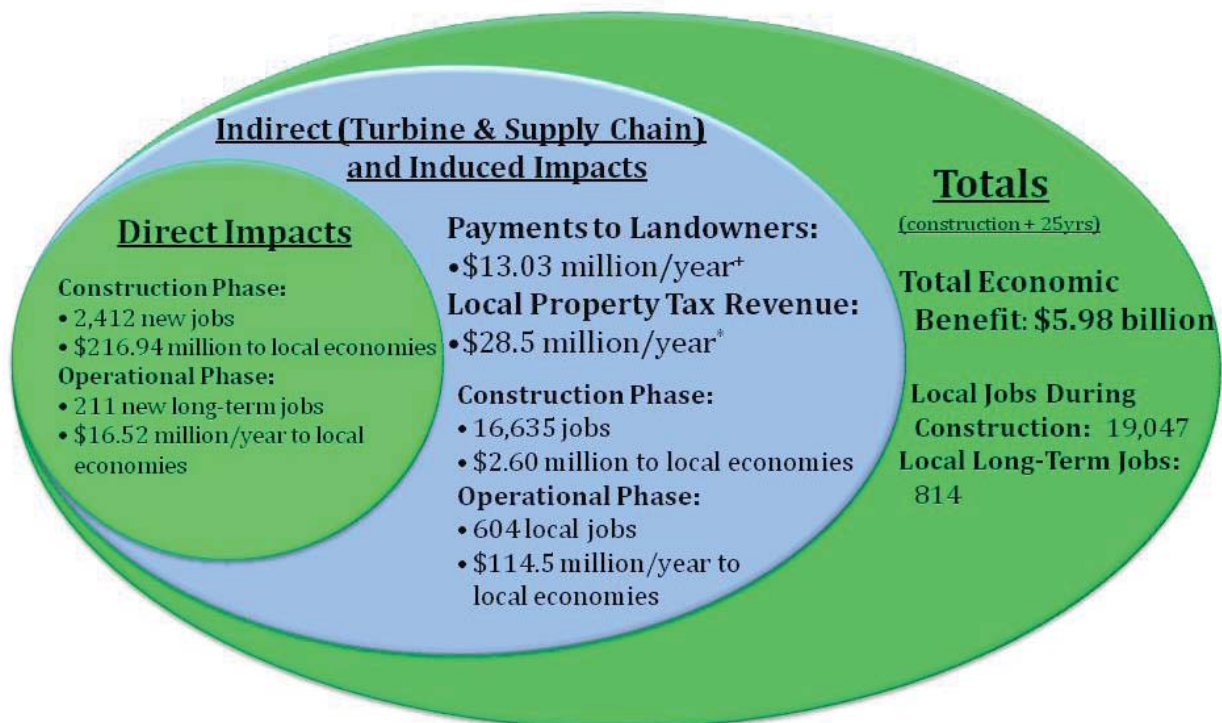


Figure 1.—Economic Impacts from Illinois' 23 Largest Wind Farms (3,334.91 MW)

Notes: All dollar values have been converted to 2008 dollars. JEDI versions 1.09.03b, 1.09.03e and 1.10.03 were utilized in the calculations.

+ The landowner payments are appropriately adjusted for inflation throughout the life of the project such that the amount received each year will most likely increase.

* Property tax revenue is listed for the first year. This figure will change over time because of several factors: (1) whether the county increases/decreases the local property tax rate; (2) depreciation over the life of the project; and (3) if the state law changes in the future.

^ All jobs reported are full-time equivalent (e.g., one person works half-time for one year, it is counted as 0.5 jobs; four people working full-time for three months = 1 job). Job calculations are based on a full time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2080 hours worked in a year. A part time or temporary job may be considered one job by other measures, but would constitute only a fraction of a job according to the JEDI model. For example, if an engineer worked only 3 months on a wind farm project (assuming no overtime), that would be considered one-quarter of a job by the JEDI model.

I. Introduction



According to the American Wind Energy Association (AWEA), the wind energy industry had a challenging but strong year in 2011 in which it increased cumulative capacity by 17%, bringing 6,816 MW of new generating capacity online. The additions in 2011 brought the total installed capacity in the United States to nearly 50,000 MW and “electricity from installed wind power capacity in the U.S. will supply the equivalent of over 12.2 million American homes” (AWEA, 2012b). The 2011 capacity growth was a 31% increase from 2010, but significantly less than record year 2009 when 10,000 MW of generating capacity was installed. AWEA attributed the 50% drop in new installations following 2009 to several factors, but pointed to inconsistent policy on the federal level as the primary driver. The 2011 capacity growth looks to be continuing with over 8,300 MW under construction entering 2012 (AWEA, 2011a, AWEA 2012b).

Alongside growth in capacity, the share of domestically manufactured wind turbine components has grown tremendously from less than 30% in 2005 to about 60% in 2011 (AWEA, 2011a). Consequently, the wind energy manufacturing sector increased employment to roughly 30,000 jobs. Operations & maintenance related employment remained stagnant. However, the construction and service sector related positions that support installation increased due to the increase in new wind energy installments. Project development positions increased from being a negligible sector in 2010 to being larger than both construction and operations & maintenance sectors. Total direct and indirect employment related to wind energy remained at 75,000 from 2010 to 2011 (AWEA, 2012b).

As of April, 2012, Illinois ranked 4th in the United States in existing wind-powered generating capacity and ranked 14th in the United States in potential capacity (AWEA, 2012a). Illinois currently has 42 wind projects online, which accounts for 3,360.28 MW of wind generating capacity. A number of these projects, however, are very small and only consist of one turbine. This economic analysis will consider the impact of only the wind farms that are larger than 50 MW of capacity. Illinois has 23 of these projects, accounting for 3,334.91 MW of generating capacity. It is very important that stakeholders and decision makers are educated about the economic development impact wind energy has brought to the state and local communities so that informed decisions regarding future adoption of wind energy projects can be made. By analyzing the impacts of Illinois’ 23 largest wind farms, this report supplies interested parties with information concerning the economic development benefits of wind energy. It can also be used as a resource by communities to identify the economic development opportunities a wind project may create.

II. Wind Energy Growth Factors

Federal and State Policies

A number of factors have caused the rapid growth of wind power capacity in the United States in recent years including federal and state policies, concerns regarding energy security and energy costs, environmental benefits, and economic development opportunities. Federal and state policies are major drivers of wind power development (Bird et al., 2005). For example, the American Recovery and Reinvestment Act of 2009 (ARRA, 2009) provides more than \$40 billion for clean energy initiatives, and new and modified tax incentives for clean energy are estimated to contribute an additional \$20 billion. In particular, federal renewable energy production tax credits (PTC) along with state renewable electricity standards (RES) have been the biggest drivers.

The federal renewable energy production tax credit is an inflation-adjusted per-kWh credit that is applied to the output of a qualifying facility during the first ten years of operation (Bird et al., 2005). As Figure 2 illustrates, wind energy installations have peaked in years that the PTC was set to expire as wind farm developers rushed to complete construction of the wind farm projects in time to take advantage of the tax credit (Bird et al., 2005). The credit expired at the end of 1999, 2001, and 2003, and the results were huge reductions in new wind power installations in 2000, 2002, and 2004 (AWEA, 2009b). ARRA extended the PTC for wind energy through 2012 (ARRA, 2009).

The PTC is due to expire at the end of 2012. Numerous bills have been proposed to extend the PTC but as of the writing of this report, no extension has passed. Many are concerned that if the PTC is not extended soon, 2013 will be a very slow year for new wind capacity additions (Figure 2).

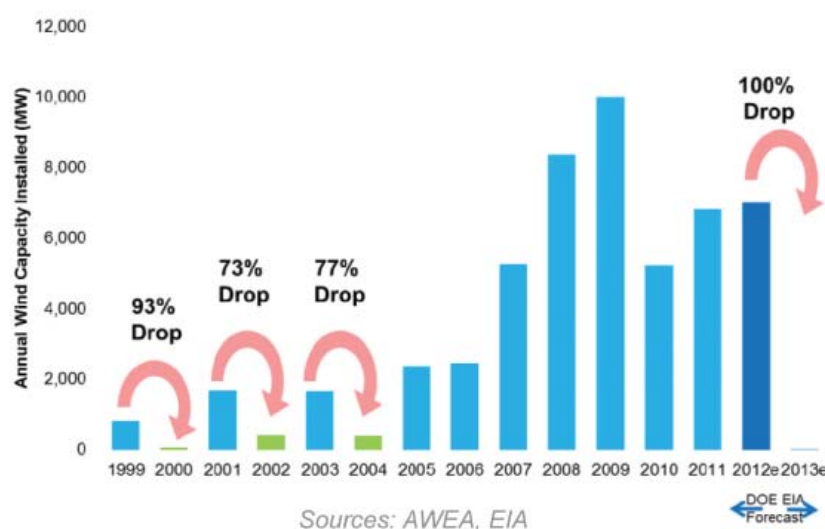


Figure 2.—Impact of PTC Expiration on Annual Installation of Wind Capacity. Source: AWEA



Energy Security and Energy Costs

A state renewable electricity standard (RES), which is often referred to as a renewable portfolio standard (RPS), mandates that a percent of the state's overall electricity generation (percent of installed capacity (MW) or percent of energy sales (MWh)) must come from renewable energy.⁴ The percent of energy sales or installed capacity that are required to come from renewable resources usually increases incrementally from a base year to an ultimate target. Each utility in the state is required to invest in renewable energy systems or purchase an equivalent amount of renewable energy credits in order to meet their percentage requirements. When a state adopts a renewable electricity standard, this increases the demand for renewable energy in the state. The certainty and permanently increased demand that arises from the RPS induces developers of renewable energy projects into the market. These suppliers of renewable energy (developers of renewable energy projects) are related to the natural resource endowments of each state as well as the cost competitiveness of the renewable energy generation. In the case of a state with an abundant wind resource and in-state renewable energy preference, wind developers are incentivized to enter. As of May, 2012, 29 states and Washington D.C. have an RPS and eight states have renewable portfolio goals (IREC, 2012).

Wind is an inexhaustible energy source and it is free from fuel price volatility, which can contribute to the nation's energy security. Because of fuel price uncertainty, electricity supply portfolios need to be diversified. Wind power can help diversify electricity supply portfolios, which can then lead to relatively more stable energy prices, which benefits ratepayers in the long run. If wind power is used on a large scale, and energy storage becomes economically and scientifically feasible, the demand for fuel used in electricity generation falls, which puts downward pressure on fuel prices. Over the past 20 years, wind energy costs have declined significantly; however, the cost of constructing a new coal plant has continued to rise. The wind energy cost decline is primarily due to technological advances in turbine design, as larger more efficient wind turbines that generate proportionally more power have put downward pressure on wind power costs (Bird et al., 2005). In addition, unlike fossil fuel-fired power plants, wind power is not subject to the uncertainty surrounding future carbon taxes, thus increasing its cost-competitiveness.

⁴Renewable portfolio standards across the country vary considerably in policy objectives and definitions of what constitutes renewable energy. In Illinois, renewable energy resources includes energy and its associated renewable energy credits from wind, solar thermal energy, photovoltaic cells and panels, biodiesel, crops and untreated and unadulterated organic waste biomass, trees and tree waste trimmings, hydropower that does not involve new construction or significant expansion of hydropower dams, and other alternative sources of energy such as landfill gas. Renewable energy resources do not include the incineration or burning of tires, garbage, general household, institutional, and commercial waste, industrial lunchroom or office waste, landscape waste other than trees and tree waste trimmings, railroad crossties, utility poles, or construction or demolition debris, other than untreated and unadulterated waste wood (IPA Act, 2007). For additional background information on the Illinois RPS, see Loomis and Pagan (2011).

Wind power does not contaminate water with pollutants, such as mercury, and it generates electricity without emitting gases that may contribute to climate change. Based on average EPA-generated 2004 emissions rates, a 396 MW wind farm such as Twin Groves displaces roughly 3,579 tons of NO_x, 6,541 tons of SO₂, 1,467,615 tons of CO₂, 102 pounds of mercury, 62,231 pounds of volatile organic compounds, and 185,397 pounds of particulate matter annually (Horizon, 2008). Cumulatively the installed wind power in Illinois avoids the production of 4.7 million metric tons of CO₂ each year (AWEA, 2012a). In addition, when a coal plant opens up near a neighborhood, not only do the housing values closest to the coal plant decline in value, but over time as the pollution from the plant becomes a problem for residents, housing values continue to decline along with residents' health. As the public becomes more concerned with the potential impact that CO₂ emissions have on the environment, the demand for carbon-neutral electricity generation increases, thus positively influencing the growth of wind energy. Wind energy can help reduce greenhouse gas emissions such as CO₂ (of which a large percentage of CO₂ emissions are polluted from automobiles) in the future to the extent that plug-in electric vehicles are widely adopted in the United States and charged at night (which is typically the time of day when the wind blows most often).

As mentioned previously, if energy storage becomes economically and scientifically feasible, and if wind power is used on a large scale, the demand for coal used in electricity generation falls, and this can significantly reduce greenhouse gas emissions. Wind power is a clean energy resource, and unlike coal plants, which generate a great deal of pollution and CO₂, when electricity is generated from wind turbines, there are not the negative externalities from pollutants in the air that contribute to acid rain, smog, and negative health-related impacts. "Almost half of all Americans live in counties where unhealthy levels of smog place them at risk for decreased lung function and aggravation of respiratory illness, according to the American Lung Association" (AWEA, 2009b, 6). As of 2010, installed wind turbines in the U.S. prevented the emission of 75 thousand metric tons of SO₂ and 50 thousand metric tons of NO_x each year, leading to a healthier environment (AWEA, 2010c).

Finally, wind power provides economic development opportunities that can revitalize rural communities around the United States. Despite an uncertain economy, 75,000 wind power related jobs were able to be sustained throughout 2010 and into 2011 (AWEA, 2011a). Illinois is home to Trinity Structural Towers and Winergy which are both large manufacturers in the wind power industry. These companies gave way to many smaller manufacturers, allowing for 28 different facilities to develop and grow. There are over 1,000 workers employed by the wind energy manufacturing sector alone (AWEA 2012a). Wind farm installations can create jobs in rural communities where local economies are often dependent on agriculture. Local jobs include construction-related jobs, operation and maintenance of the facility after it is constructed, and jobs induced by the additional money the workers spend in the local economy. Development of related in-state businesses and trained labor are crucial to maximizing the economic benefits of wind energy development within a state. Wind projects benefit rural economies by providing local jobs during construction and boosting activity at local businesses that can provide some of the needed materials and services for construction of the wind farm. Wind turbines raise the property tax base of a county, creating a new revenue source for education, fire departments, and other local government services. To the extent that governmental bodies want to promote the economic benefits from wind farm developments, appropriate incentives are put in place that contribute to the growth of wind energy development.

Environmental Benefits



Economic Development Opportunities

Illinois' Unique Attributes



Illinois' wind farms have grown rapidly over the past several years. On a calendar year basis (Figure 3), Illinois has installed as much as 800 MW in a year (2011).

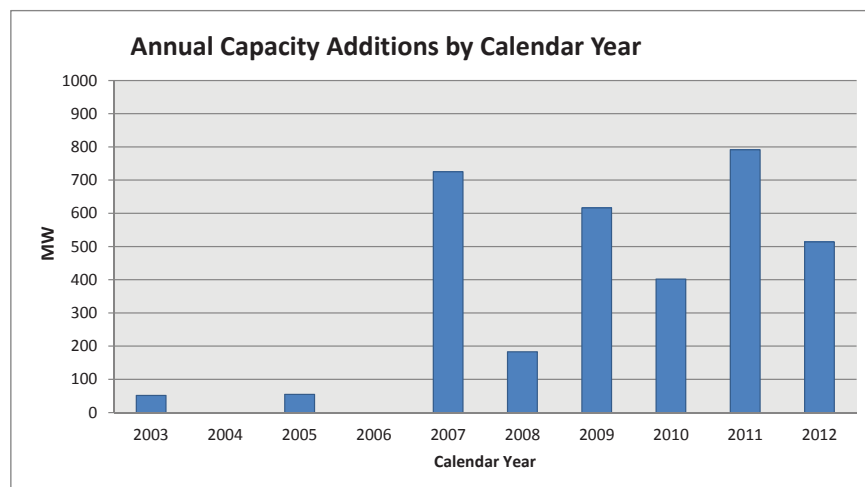


Figure 3.—Annual Capacity Additions by Calendar Year. Source: IWWG

This economic impact report is done annually in June so a fiscal year graph may be more helpful. For our purposes, we will consider the fiscal year to be July 1 through June 30. Figure 4 shows the wind farm capacity additions on a fiscal year basis. On this basis, 2012 was a record year with over 900 MW installed.

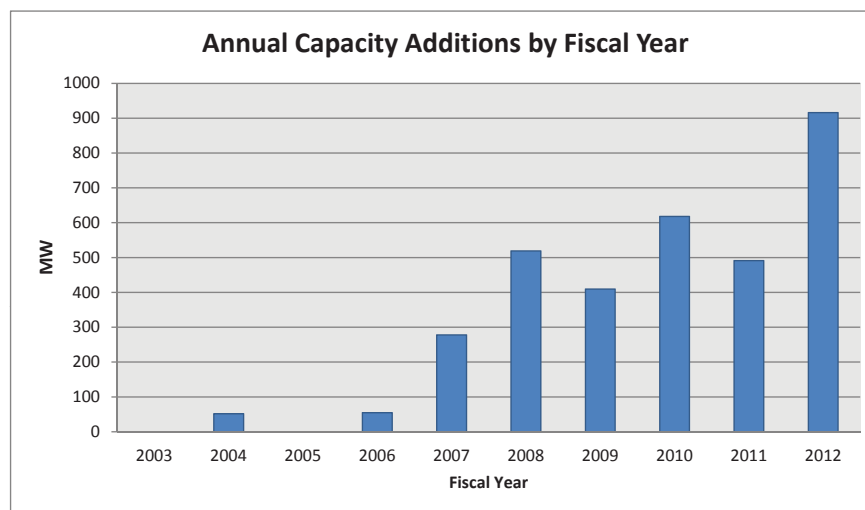


Figure 4.—Annual Capacity Additions by Fiscal Year. Source: IWWG

Wind farm development has been concentrated in the counties with the highest wind resources but is still fairly widespread. Seventeen different counties in Illinois have seen utility-scale wind farm development (Figure 5). McLean County has the most wind farm capacity with 546 MW or 16% of the total Illinois capacity. LaSalle County and Lee County have 11% and 10% respectively of the installed wind farm capacity in Illinois.

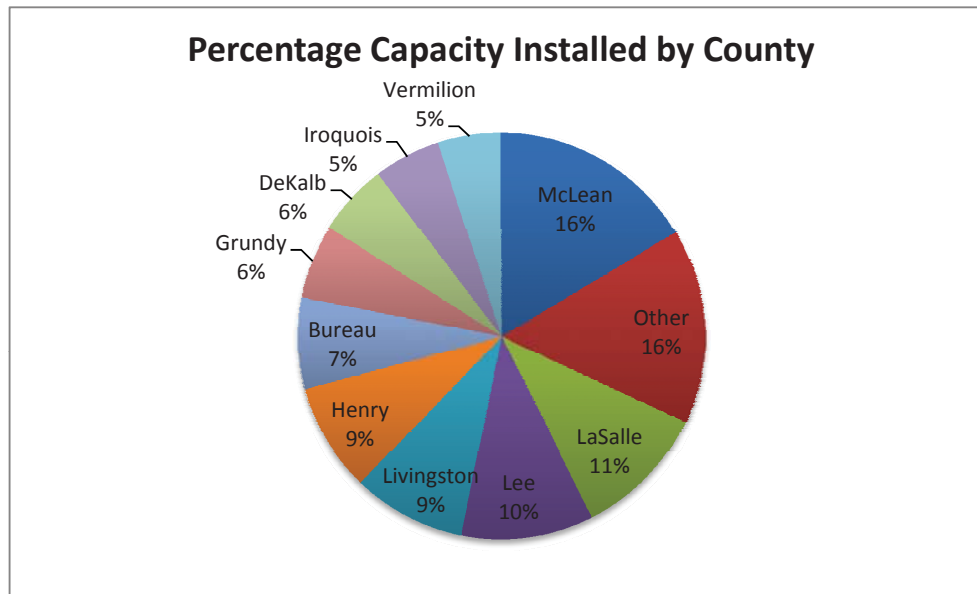


Figure 5.—Percentage Capacity Installed by County. Source: IWWG

The wind turbines installed in Illinois come from a variety of different manufacturers. GE Energy has the most turbines installed (weighted by capacity) in Illinois with 58% (Figure 6). Gamesa and Vestas are the second and third most popular turbine manufacturers with Suzlon number four.

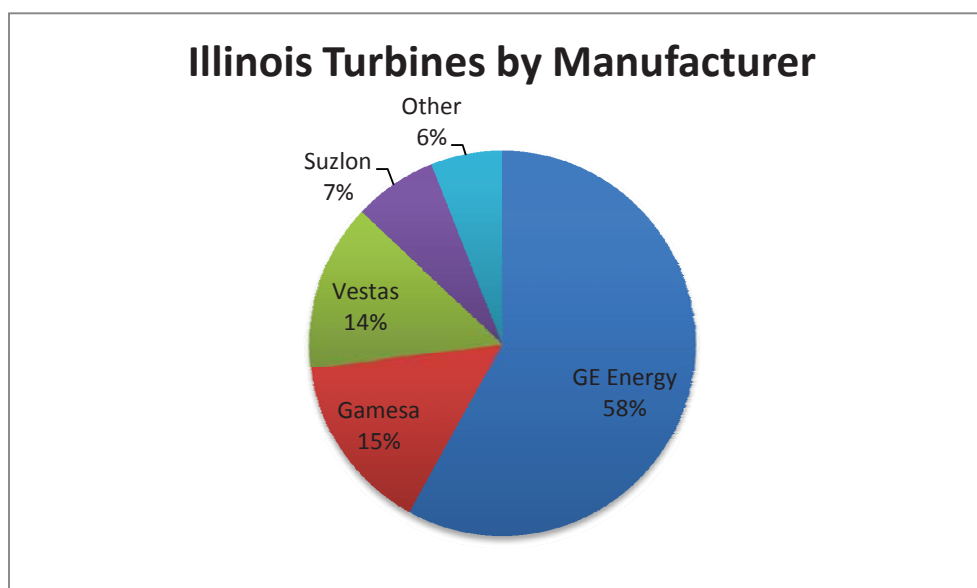


Figure 6.—Illinois Turbines by Manufacturer. Source: IWWG

Many different wind farm developers/owners have been active in Illinois. EDP Renewables owns 24% of the wind farms installed in Illinois followed closely by Invenergy with 19% (see Figure 7). NextEra Energy Resources and Iberdrola Renewables both have 11% of the Illinois market. There are numerous smaller developer/owners who comprise a total of 13% of the Illinois market.

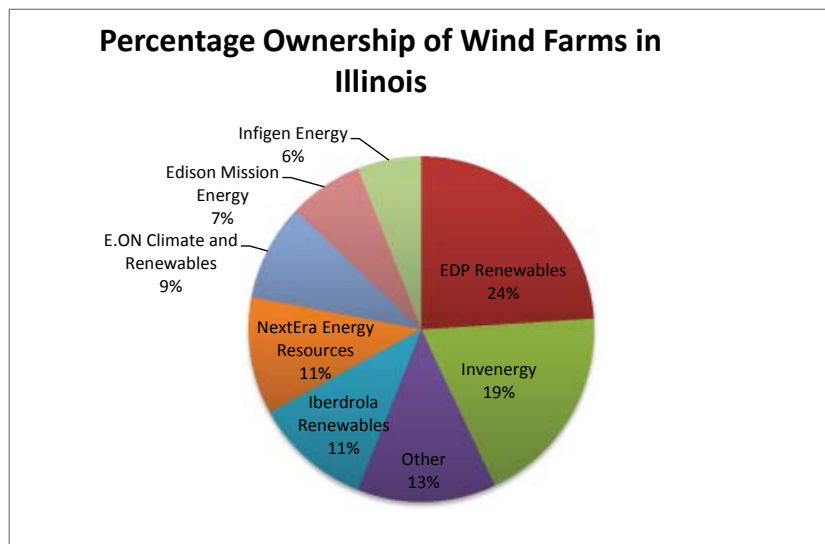


Figure 7.—Percentage Ownership of Wind Farms in Illinois. Source: IWWG

A number of state specific factors have contributed to the rapid growth of wind power capacity in Illinois from 50 MW in 2003 to over 3,300 MW in 2012 including the wind resource, access to unconstrained transmission, electricity demand, and policies promoting renewable energy.

The quality of the wind resource is an important consideration in developing a wind farm (Bird et al., 2005). As a result of technological advances, turbines have become much larger, and the capacity of wind turbines has steadily risen over time (see Figure 8). New turbines have allowed states with lower wind speeds to be economically viable places to develop a wind farm. In addition, the increased heights of towers have enabled states such as Illinois to take advantage of and utilize the stronger winds farther up in the sky. In fact, an area with twice the wind speed will produce eight times the amount of electricity all else equal. This increase in wind resources at greater heights is illustrated in Figure 9 by the Illinois wind maps (IIRA, 2009)⁵. These new technological developments in turbines have positioned Illinois as a state with the opportunity to take advantage of its wind resources to generate electricity to power many of Illinois' homes and businesses. In fact, Illinois has one of the most robust wind resources in the PJM market⁶.

While there are other states that have gustier winds, Illinois has the advantage of nearby load and relatively unconstrained transmission. Access to unconstrained transmission lines is required for wind farm development (Bird et al., 2005). Illinois has a relatively large population, and large population centers, combined with other factors such as weather, keep the demand for electricity relatively high. The fact that load centers are relatively close to rural areas creates excellent wind farm development opportunities.

⁵ More wind map resources are available from the Illinois Institute for Rural Affairs website at: www.illinoiswind.org.

⁶ "PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia" (PJM, 2010).

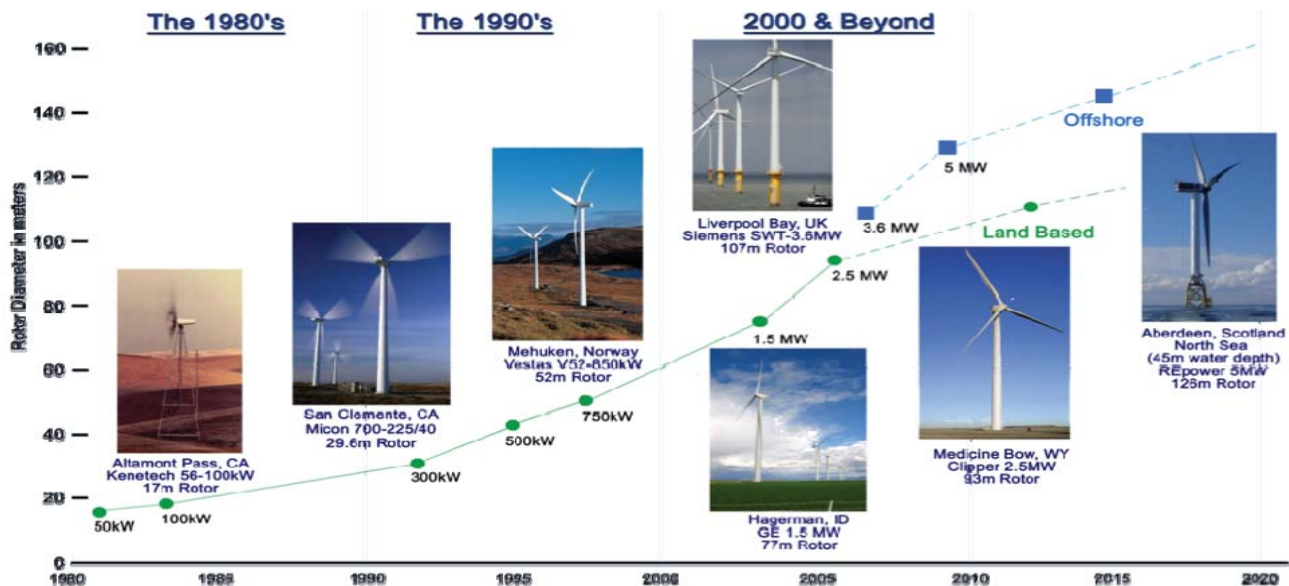


Figure 8.—Evolution of U.S. Commercial Wind Technology. Source: NREL

A large driver of wind power development is the renewable portfolio standard (RPS) (Bird et al., 2005; Brown and Busche, 2008). Illinois has an RPS of 25% by 2025 and this can be reached largely by utilizing the wind resources Illinois has. In fact, the Illinois Power Agency Act (P.A. 95-481, eff. 8-28-07) states, “To the extent that it is available, at least 75% of the renewable energy resources used to meet these standards shall come from wind generation” (20 ILCS 3855/1-75(c)(1)). Through June 1, 2011, renewable energy resources can be counted for the purpose of meeting the renewable energy standards only if they are generated from in-state facilities and provided that cost-effective renewable energy resources are available from those facilities (20 ILCS 3855/1-75(c)(3)). By June 1, 2011 at least 6% of each utility’s total supply to serve the load of eligible retail customers must be generated from cost-effective renewable energy resources (20 ILCS 3855/1-75(c)(1)). The percentage increases annually until the mandated 25% is reached by June 1, 2025. For more information on Illinois’ RPS goals visit the DSIRE website at www.dsireusa.org or go directly to the Illinois RPS page at www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=IL04R. The act also protects ratepayers by requiring that the renewable energy resources cannot cause rates to increase by more than a certain percentage each year. On December 28, 2009, the Illinois Commerce Commission approved a plan to allow the state’s utilities to purchase a portion of wind and other renewable energy through long-term contracts (Loomis and Pagan, 2011). This move has the potential to help project financing and create a more robust REC market in the state.

As an enterprise zone incentive in Illinois, both an investment tax credit and a jobs tax credit are available. The investment tax credit entitles a developer to a 0.5% income tax credit for investments in qualified property; for example, building, structures, and other tangible property. The jobs tax credit entitles an employer to a \$500 tax credit for hiring individuals certified as economically disadvantaged. The more important benefit to wind developers from an enterprise zone in Illinois is the sales-and-use tax exemption for building materials. Nearly 40 other states, including all adjacent states, automatically exempt wind energy generation equipment from any sales-and-use tax. If Illinois had not offered enterprise zone benefits, Illinois wind projects would have been at a competitive

Overview of Illinois’ Current Policies

Renewable Portfolio Standard

Enterprise Zones and High Impact Businesses

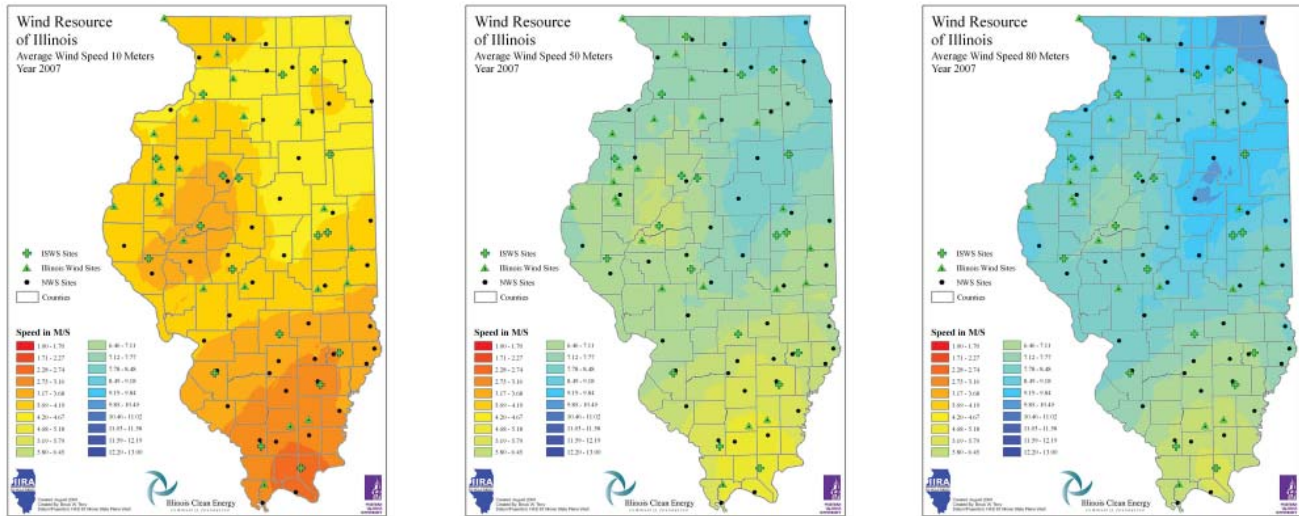


Figure 9.—Wind Resource of Illinois. Source: IIRA

disadvantage, which is why every major wind project in Illinois has been located in an enterprise zone. Fortunately, Senate Bill 1923 (P.A. 96-28, eff. 7-1-09) amended the Illinois Enterprise Zone Act, to provide that businesses that intend to establish a new wind power facility in Illinois may be considered “high impact businesses” allowing them to claim a full exemption from sales-and-use tax without having to apply for enterprise zone status, which has been a cumbersome tax-exemption process used until the passage. More importantly, enterprise zones are completely unavailable in some counties in Illinois that have good wind resources. This new piece of legislation puts Illinois on more equal footing with its neighboring states, which all exempt wind energy generation equipment from sales-and-use taxes as previously mentioned.

Property Tax Legislation

As wind energy facilities were first being proposed in different counties in Illinois, local tax assessors were faced with the challenge of assessing the value of the wind turbines. The turbines in Illinois ended up being assessed differently in each county, which meant identical turbines sometimes had vastly different taxable values across the state. Fortunately, in 2007, legislation was passed setting a state standard for valuation of wind turbines for five years (P.A. 95-644, eff. 10-12-07). The wind energy property assessment division of the Illinois Property Tax Code specified wind energy devices larger than 500 kilowatts (kW) that produce power for commercial sale be valued at \$360,000 per megawatt (MW) of capacity and annually adjusted for inflation according to the U.S. Consumer Price Index (35 ILCS 200/Art. 10 Div. 18 heading). The depreciation allowance may not exceed 70% (Ryerson, 2009). Although wind developers have criticized the taxes from this legislation as too high, the certainty the law provides is a net benefit to wind development in the state of Illinois. An extension of the law (H.B. 4797 which amended 35 ILCS 200/10-610) was recently signed and extends the current valuation methodology until the end of 2016, providing greater certainty for all stakeholders in wind energy developments. For more information regarding Illinois property tax legislation, refer to “Wind Farm Implication for School District Revenue” by Matt Aldeman (Senior Energy Analyst, Illinois State University, Center for Renewable Energy).

Wind farm installations can create jobs in rural parts of Illinois where local economies are often dependent on agriculture. Local jobs include construction-related jobs, operation and maintenance of the facility after it is constructed, and jobs induced by the additional money the workers spend in the local economy. This section reviews some of the published studies of the economic benefits of wind energy.

AWEA announced that for every 10 MW of installed wind generation, an additional wind technician is required. The growth of the wind farm industry ties directly into the growth of the work force required to run it. In order for the wind industry to provide 20% of the nation's electricity the current wind related workforce will have to double. Specifically project development, engineering, environmental assessment, and wind power plant operations will need an increased number of qualified workers (NREL 2010). A greater demand for graduate level education in these related fields leads to higher paying green jobs.

Lantz and Tegen (2008) conducted an analysis pertaining to variables affecting economic development of wind energy. The authors assert that “creating policies to ensure maintenance materials are supplied by in-state business and that the local labor force is trained to perform wind turbine maintenance is also likely to have a large impact for wind power plants operating for 20 or more years” (Lantz and Tegen, 2008, 15). Development of related in-state businesses and trained labor are crucial to maximizing the economic benefits of wind energy development in Illinois.

Wind projects benefit rural economies by providing local jobs during construction and boosting activity at local businesses that can provide some of the needed materials and services for construction of the wind farm. Lantz and Tegen (2008) point out that “wind farms rely heavily on non-turbine construction materials like sand, gravel, asphalt, and concrete for construction of roads and foundations” (10). Because these materials are prevalent in conventional construction industries, “most regions are capable of supplying a high level” of the materials to wind projects (Lantz and Tegen, 2008, 10). Many developers try to hire local construction companies. Pedden (2006) notes that “some local governments offer incentives to developers in return for the developer agreeing to hire local labor” (7).

The operation and maintenance needs of a wind farm create permanent, high-quality local jobs ranging from field technicians who service the turbines to accountants and managers. In Illinois alone, 5,000- 10,000 jobs were supported by the wind industry in 2010 (AWEA 2012a). Wind farms need staff to operate and regularly service the turbines throughout their 20- to 30-year lifetimes.

III. Economic Impacts of Wind Farm Development

Wind Energy Creates Skilled, High Paying Green Jobs

Building Trades, Construction and Installation

Operation and Maintenance

Landowner Benefits



Landowners who lease their land to wind developers benefit from having a stable source of income. On a per acre basis, the revenue landowners receive from leasing their land is usually greater than that from ranching or farming and it does not require any work from the landowners. In some cases wind turbines are able to be located on land that was not able to be farmed. This gives productivity to unusable land, and generates revenue for the landowner that was never there to begin with (NREL 2009).

Landowners can be compensated in a variety of ways: option payments, construction disturbance or installation payments, land leases/easements, and/or royalties. While royalty payments represent a percentage of gross income received by the wind farm owner from the sale of power, land easements represent a specific amount paid to the landowner each year and are typically adjusted for inflation.

Pedden (2006) conducted a comparative analysis on the economic impact of wind farms in rural communities across the country and concluded that more direct benefits are found in rural communities, especially those with few industries and those primarily with farming. He explains that the supplementary income paid to farmers and the local taxes greatly contribute to the economic development impacts of these communities.

The Twin Groves Wind Farm, developed by Horizon Wind Energy in McLean County, signed option and land lease agreements with property owners. In total, 130 different landowners leased land to Horizon for the wind turbines, more than 30 different landowners granted overhead transmission easements, more than 50 different landowners granted underground distribution easements, more than 70 different landowners granted ROW (Right-of-Way) easements for road improvements, and more than 50 different landowners signed to neighbor agreements (Whitlock, 2008).

Increased Tax Revenues

Local governments receive significant amounts of revenue from permitting fees. For example, Logan County received \$245,000 for wind farm zoning fees and permits from the 29 turbines that are located in the county for the Rail Splitter Wind Farm (Niziolkiewicz, 2010). In addition, the EcoGrove project has provided more than \$750,000 in revenue for Stephenson County through enterprise zone fees, zoning application fees, and turbine permit fees (Morse, 2008).

Wind turbines raise the property tax base of a county, creating a new revenue source for education and other local government services. In his comparative analysis, Pedden (2006) points out that taxes collected by state and local governments can support many sectors of the economy such as schools, road improvements, hospitals, and fire and rescue. Lantz and Tegen (2008) point out that property tax payments “can increase the local tax base allowing for budget increases or a lowering of the taxing district’s general tax rate” (6).

School districts can also benefit from wind farms located in their property tax base. Typically when new economic development occurs in an area, the school district receives an increase in its property tax revenue, accompanied by an increase in population, and thus costs associated with new students relocating in their district. However, when a wind farm moves to the area, the school district benefits from a large increase in revenue without a concomitant increase in costs. The additional funding can then be used to increase school budgets to enhance educational opportunities or replace decreasing state aid.

In a presentation at last year's annual Illinois Wind Working Group Siting, Zoning and Taxing Conference, Dr. Larry Dodds, Superintendent of Ridgeview School District in McLean County, discussed how important wind farm tax revenue has been to his district. General state aid to the district has declined by \$754,779 over the last three years. The district's portion of tax revenue attributable to wind farms in the county increased to \$1,848,404 in fiscal year 2011, more than offsetting the decline in state aid (Dodds, 2011, 9). For more information regarding school district benefits, refer to "Wind Farm Implication for School District Revenue" by Matt Aldeman (Senior Energy Analyst, Illinois State University, Center for Renewable Energy).

The construction of wind farms frequently requires public road upgrades. The developers strengthen the roads, then widen them to put in the private access roads that lead to the turbines. Following road upgrades, developers then can begin construction. A road use agreement between the county and the developer is usually passed and typically pays for upgrading roads that will be used during construction.

School District Benefits

Road Improvements



IV. Analytical Method

The JEDI Model



The economic analysis of wind power development presented here uses the National Renewable Energy Laboratory's (NREL's) latest Jobs and Economic Development Impacts (JEDI) Wind Energy Model⁸. The JEDI Wind Energy Model is an input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output. That is, the JEDI Model takes into account that the output of one industry can be used as an input for another. For example, when a developer purchases wind turbines, the turbines are comprised of components made from fiberglass, aluminum, steel, copper, and other materials. In this way, the entire supply chain for wind energy components is impacted from a turbine purchase. The purchase not only increases demand for manufactured components and raw materials, but also supports labor. When a developer purchases a wind turbine from a manufacturing facility, the manufacturer uses some of that money to pay employees. The employees use a portion of their compensation to purchase goods and services within their community. The JEDI Wind Energy Model reveals how purchases of wind project materials not only benefit local turbine manufacturers, but also the local industries that supply the concrete, rebar, and other materials (Reategui et al., 2009). The model utilizes construction cost data, operating cost data, and data relating to the percentage of goods and services acquired in the state to calculate the associated jobs, earnings, and economic activity. The results from the model are broken down into the construction period and the operation period of the wind project. Within each period, impacts are further divided into direct, turbine and supply chain (indirect), and induced impacts.

The Jobs and Economic Development Impacts (JEDI) Model was developed in 2002 to demonstrate the economic benefits associated with developing wind farms in the United States. The model was developed by Marshall Goldberg of MRG & Associates, under contract with the National Renewable Energy Laboratory. The JEDI model utilizes state-specific industry multipliers obtained from IMPLAN (Impact Analysis for PLANning). IMPLAN software and data are managed and updated by the Minnesota IMPLAN Group, Inc., using data collected at federal, state, and local levels. The JEDI model considers 14 aggregated industries that are impacted by the construction and operation of a wind farm: agriculture, construction, electrical equipment, fabricated metals, finance/insurance/real estate, government, machinery, mining, other manufacturing, other services, professional service, retail trade, transportation/communication/public utilities, and wholesale trade (Reategui et al., 2009). This study does not analyze net jobs. It analyzes the gross jobs that the new wind farm development supports.

⁸The economic development impacts from the first 1,105.61 MW of wind energy in Illinois were estimated using JEDI release number W1.09.03b. The economic development impacts from the following 729 MW of wind energy in Illinois were estimated using JEDI release number W1.09.03c. The latest annual additions of 587.4 and 913 MW of wind energy in Illinois were estimated using JEDI release number W1.10.03. The JEDI model can be downloaded at <http://www.nrel.gov/analysis/jedi/>. The JEDI model has been used throughout the wind energy economic development literature (see Lantz and Tegen, 2008, 2009ab; Lantz, 2009; NREL, 2008a-k, 2009; Reategui and Tegen, 2008; Reategui et al., 2009; Williams et al., 2008).

Direct Impacts

Direct impacts during the construction period refer to the changes that occur in the onsite construction industries in which the direct final demand (i.e., spending on construction labor and services) change is made. Final demands are goods and services purchased for their ultimate use by the end user. Onsite construction-related services include engineering, design, and other professional services. Direct impacts during operating years refer to the final demand changes that occur in the onsite spending for wind farm workers.

Direct jobs consist primarily of onsite construction and project development labor such as the following:

- | | |
|--|----------------------------|
| o Utility and Power Engineers | o Truck Drivers |
| o Geophysical/Structural Engineers | o Tower Erection Crews |
| o Site/Civil Engineers | o Crane Operators |
| o Concrete-Pouring Companies | o Backhoe Operators |
| o Wind Energy Project Developers | o Interconnection Labor |
| o Developer's Construction Management | o Earthmovers |
| o Clerical and Bookkeeping Support | o Excavation Service Labor |
| o Developer's Legal Team | o Electricians |
| o Road Builders/Contractors | o Wind Farm Operators |
| o Site Safety Coordinator | o Site Administrators |
| o Environmental and Permitting Specialists | o Maintenance Mechanics |
| o Microelectronic/Computer Programmers | o Field Technicians |
| o Operations and Maintenance Personnel | o Construction Crews |

The initial spending on the construction and operation of the wind farm creates a second layer of impacts, referred to as “turbine and supply chain impacts” or “indirect impacts.” Indirect impacts during construction period consist of the changes in inter-industry purchases resulting from the direct final demand changes, and include construction spending on materials and wind farm equipment and other purchases of goods and offsite services. Essentially, these impacts result from “spending related to project development and on-site labor such as equipment costs (turbines, blades, towers, transportation), manufacturing of components and supply chain inputs, materials (transformer, electrical, HV line extension, HV sub-interconnection materials), and the supply chain of inputs required to produce these materials” (JEDI Support Team, 2009, 2). Concrete that is used in turbine foundations, increases the demand for gravel, sand, and cement. As a result of an expenditure for concrete there is increased economic activity at quarries and cement factories and these changes are indirect impacts. The accountant for the construction firm and the banker who finances the contractor are both considered indirect impacts. All supply chain component impacts/manufacturing-related activities are included under indirect impacts; therefore, the late stage turbine assembly process, which includes gearbox assembly, blade production, and steel rolling are all included under the construction period indirect impacts category.



Turbine and Supply Chain (Indirect) Impacts



Indirect impacts during operating years refer to the changes in inter-industry purchases resulting from the direct final demand changes. Essentially, these impacts result from “expenditures related to on-site labor, materials, and services needed to operate the wind farms (e.g., vehicles, site maintenance, fees, permits, licenses, utilities, insurance, fuel, tools and supplies, replacement parts/equipment); the supply chain of inputs required to produce these goods and services; and project revenues that flow to the local economy in the form of land lease revenue, property tax revenue, and revenue to equity investors” (JEDI Support Team, 2009, 3). All land lease payments and property taxes show up in the operating-years portion of the results because these payments do not support the day-to-day operations and maintenance of the wind farm but instead are more of a latent effect that results from the wind farm being present (Eric Lantz, February 25, 2009, e-mail message to Jennifer Hinman).

Examples of jobs, services and turbine-related components in this category include⁹:

- | | |
|---------------------------------|---|
| o Steel Producers | o Industrial Control Manufacturers |
| o Gear Producers | o Transmission Line Manufacturers |
| o Gearbox Assemblers | o Glass Fiber Manufacturers |
| o Manufacturing Engineers | o Rolled Steel Shape Manufacturers |
| o Material Engineers | o Electrical Equipment Wholesalers |
| o Manufacturing Managers | o Metal Fabricators |
| o Welders | o Heavy Equipment Rental Companies |
| o Turbine Manufacturers | o Transportation Service Providers |
| o Blade Manufacturers | o Bookkeepers |
| o Tower Manufacturers | o Accountants |
| o Turbine Suppliers | o Motor Vehicle Retailers |
| o Blade Suppliers | o Hardware and Tool Retailers |
| o Tower Suppliers | o Tool Manufacturers |
| o Gravel Workers | o Maintenance Providers |
| o Rebar Manufacturers | o Material Suppliers |
| o Wood Products Suppliers | o Insurance Agents |
| o Epoxy and Resin Manufacturers | o Gas Station Attendants |
| o Generator Manufacturers | o Local Government Employees |
| o Cement Producers | o Turbine, Blade, and Tower Component Suppliers |
| o Lumber and Building Materials | o Computer-Controlled Machine Tool Operators |
| o Hardware and Supplies | o Engine and Other Machine Assemblers |
| o Bearing Manufacturers | o Electronic Controls and Equipment Manufacturers |
| o Speed Changers | |
| o Cable Manufacturers | |
| o Local Utilities | |
| o Banks | |
| o Attorneys | |

⁹ Much of this section is adapted from <http://www.nrel.gov/analysis/jedi/results.html> and http://www.nrel.gov/analysis/jedi/pdfs/jedi_update_2009.pdf (JEDI Support Team, 2009).

Induced impacts during construction refer to the changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects of final demand changes. Local spending by employees working directly or indirectly on the wind farm project who receive their paychecks and then spend money in the community is included. Additional local jobs and economic activity are supported by these purchases of goods and services. For example, the increased economic activity at quarries and cement factories results in increased revenues for the affected firms and raises individual incomes. As workers receive additional income, a portion of that income will most likely go towards purchases of more goods and services from local businesses. This increased economic activity may result from “construction workers who spend a portion of their income on lodging, groceries, clothing, medicine, [going to] a local movie” theater, restaurant, or bowling alley; or a “steel mill worker who provides the inputs for turbine production and spends his money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy” (JEDI Support Team, 2009, 2).

Induced impacts during operating years refer to the changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects from final demand changes. Some examples include a “wind farm technician who spends income from working at the wind farm on buying a car, a house, groceries, gasoline,” or movie tickets; or a “worker at a hardware store who provides spare parts and materials needed at the wind farm and who spends money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy” (JEDI Support Team, 2009, 3).

Some examples of induced jobs, services, activities, materials, and spending can be associated with the following types of businesses:

- o Grocery Stores
- o Child Care
- o Clothing Stores
- o Retail Stores
- o New Cars
- o Restaurants
- o Medical Services
- o Hotels
- o Gas Stations
- o Movie Theaters

Induced Impacts



Research Data



Lists of Illinois' wind power projects were obtained from the American Wind Energy Association¹⁰ and the Illinois Wind Working Group¹¹ databases (AWEA, 2011c; IWWG, 2011). The project lists contained information regarding wind project name, developer, owner/operator, power purchaser, location, capacity (MW), project status, year online, turbine manufacturer, number of turbines, and turbine size. Data collected for the 23 largest wind projects in Illinois (see Table 2 and Figure 10), which amounts to 3,334.91 MW of wind generating capacity, were used in this analysis. Project-specific information on each wind project was entered into the JEDI model to estimate the income, economic activity, and number of job opportunities accruing to the state from the project.

The data used in the JEDI model was collected from the following sources: wind energy developers; media information; wind conference presentations by developers, attorneys, county board members, and members of the communities; corporate press releases; school district, project developer, county board, and electric cooperative websites; news releases from the Illinois state government; and information from the Illinois Department of Revenue website. After collection, an e-mail with the project specific data was sent to each developer for confirmation of the accuracy of the input numbers. Much of the information required by the JEDI model is considered proprietary by many developers. Consequently, information about individual wind farms will not be released. For input information that was unattainable publicly or directly from developers, JEDI model defaults for Illinois were used.

Table 2.—Illinois Wind Farm Projects Larger than 50 MW with Project Details

Wind Farm	Developer/Owner/Operator	Location (County)	Capacity (MW)	Turbines	Units	Year Online
Bishop Hill I	Invenergy	Henry	209.40	GE Energy	133	2012
Bishop Hill II	MidAmerican Energy Holding	Henry	80.00	GE Energy	50	2012
California Ridge	Invenergy	Champaign/Vermilion	214.00	GE Energy	134	2012
Pioneer Trail	E.ON Climate and Renewables	Iroquois/Ford	150.00	GE Energy	94	2012
Settlers Trail	E.ON Climate and Renewables	Iroquois	150.00	GE Energy	94	2012
Shady Oaks	Goldwind USA	Lee	109.50	Goldwind	71	2012
White Oak	NextEra Energy Resources	McLean	150.00	GE Energy	100	2011
Top Crop II	Horizon Wind Energy	Grundy	198.00	GE Energy	132	2011
Big Sky	Midwest Wind Energy	Bureau, Lee	239.40	Suzlon	114	2011
Streator Cayuga Ridge South	Iberdrola Renewables	Livingston	300.00	Gamesa	150	2010
EcoGrove	Acciona Windpower	Stephenson	100.50	Acciona Windpower	67	2009
Grand Ridge II, III, and IV	Invenergy	LaSalle	111.00	GE Energy	74	2009
Lee-DeKalb	NextEra Energy Resources	DeKalb, Lee	217.50	GE Energy	145	2009
Rail Splitter	Horizon Wind Energy	Logan, Tazewell	100.50	GE Energy	67	2009
Top Crop I	Horizon Wind Energy	LaSalle	100.50	GE Energy	67	2009
Grand Ridge I	Invenergy	LaSalle	99.00	GE Energy	66	2008
Providence Heights	Iberdrola Renewables	Bureau	72.00	Gamesa	36	2008
Twin Groves II	Horizon Wind Energy	McLean	198.00	Vestas	120	2008
Camp Grove	Orion Energy Group, enXco	Marshall, Stark	150.00	GE Energy	100	2007
GSG	Infigen Energy	Lee, LaSalle	80.00	Gamesa	40	2007
Twin Groves I	Horizon Wind Energy	McLean	198.00	Vestas	120	2007
Crescent Ridge	Infigen Energy	Bureau	54.45	Vestas	33	2005
Mendota Hills	Infigen Energy	Lee	50.40	Gamesa	63	2003

¹⁰ <http://www.awea.org/projects/Projects.aspx?s=Illinois>

¹¹ <http://renewableenergy.illinoisstate.edu/wind/databases/>

Illinois Wind Projects and Wind Resources

2012

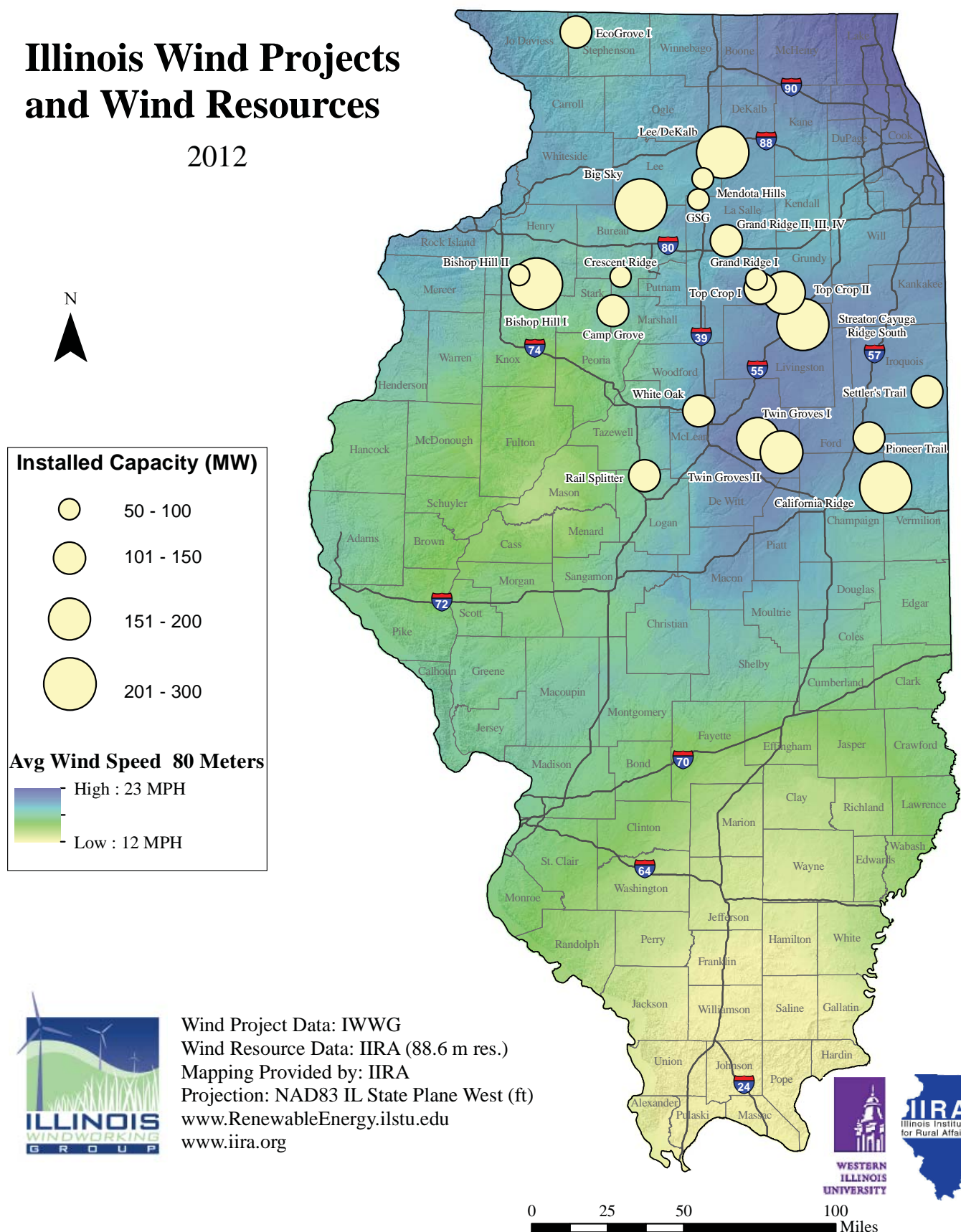


Figure 10.—Illinois Wind Projects and Wind Resources, Source: IIRA

V. Analysis and Results

Employment Impacts



Property Tax Revenue Impacts

Employment impacts can be broken down into several different components. Direct jobs created during the construction phase typically last anywhere from 6 months to over a year depending on the size of the project; however, the direct job numbers present in Figure 6 and Table 3 from the JEDI model are based on a full time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2,080 hours worked in a year. A part time or temporary job would constitute only a fraction of a job according to the JEDI model. For example, the JEDI model results show 2,412 new jobs during construction; though the construction of the wind farms may have actually involved hiring closer to 3,500 workers. Due to the short-term nature of construction projects, the JEDI model significantly understates the number of people actually hired to work on the project. It is important to keep this in mind when looking at or reporting the numbers. Direct jobs created during the operational phase last the life of the wind farm, typically 20-30 years. Direct construction jobs, and operations and maintenance jobs both require highly-skilled workers in the fields of construction, management, and engineering. These well-paid professionals boost economic development and make a significant impact in rural communities where new employment opportunities are welcome and populations are much smaller (Reategui and Tegen, 2008). Based on the model's results, the 23 largest wind power projects in Illinois created approximately 19,047 full-time equivalent jobs during construction periods with a total payroll of over \$1.1 billion, and are supporting approximately 814 permanent jobs in rural Illinois with a total annual payroll of nearly \$48 million.

Wind power projects increase the property tax base of a county, creating a new revenue source for education and other local government services. Illinois has higher property tax rates than most of the surrounding states and the tax revenue impacts are substantial. According to the model's results, the 23 largest wind power projects in Illinois support local economies by generating over \$28.5 million in annual property taxes¹².

¹² Property tax revenue is listed for the first year (where there are property tax abatements during the first few years of the wind farm project or Payments in Lieu of Taxes (PILOT), an average figure over the first ten years is utilized). This figure will change over time due to several factors: (1) whether the county increases/decreases the local property tax rate; (2) depreciation over the life of the project; and (3) if the state law regarding wind farm valuation changes in the future.

Landowners benefit when they lease their land to wind developers because of the stabilized income stream. According to the model's results, the 23 largest wind farms in Illinois are generating more than \$13 million annually¹⁵ in extra income for Illinois residents who lease their land to wind farm developers.

Output refers to economic activity or the value of production in the state or local economy. According to the model's results, the 23 largest wind farms in Illinois will generate a total economic benefit of \$5.98 billion over the life of the projects (construction and 25 years of operations were assumed in this calculation).

Landowner Revenue Impacts

Economic Activities Impacts

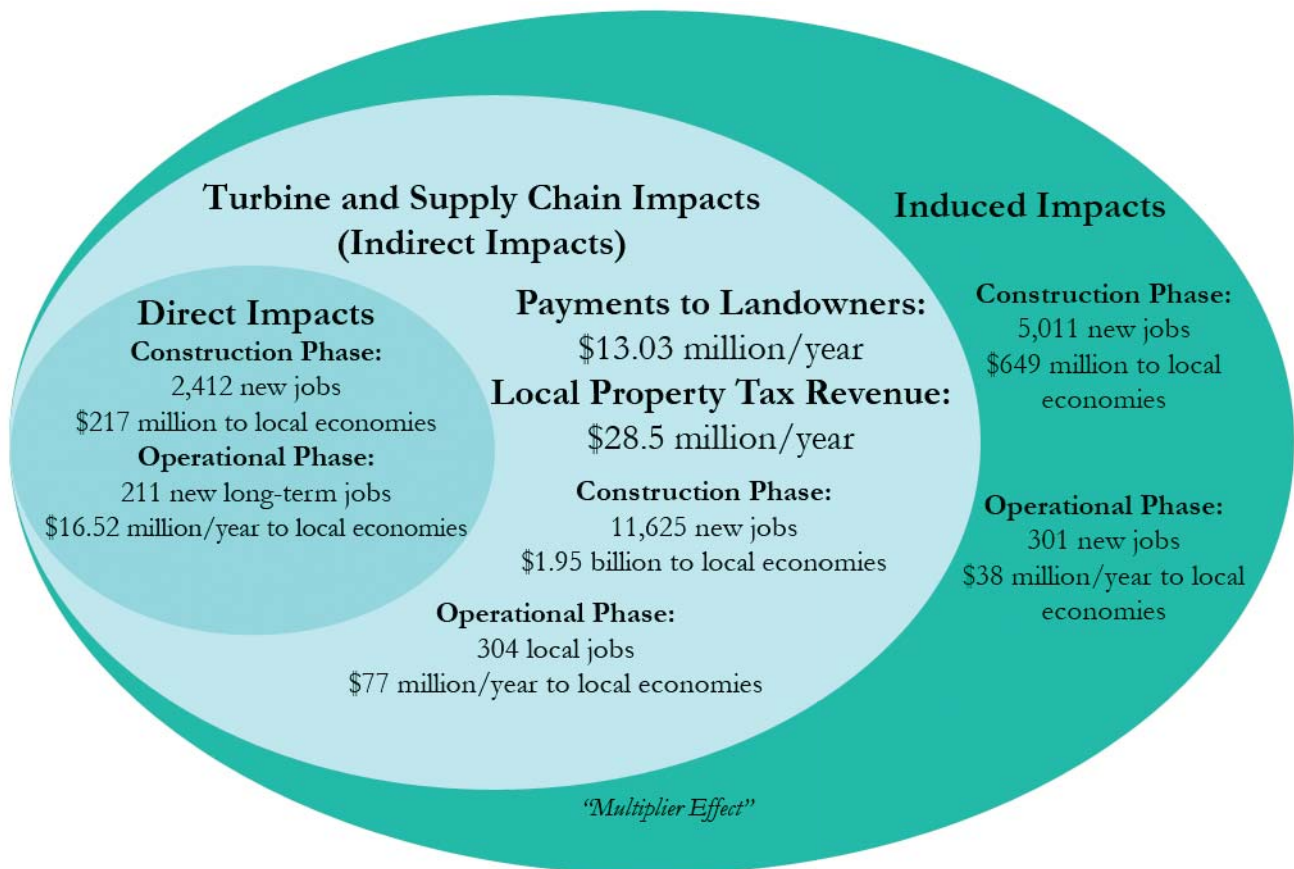


Figure 11.—Direct, Indirect and Induced Impacts from 3,334.91 MW of Wind Energy Development in Illinois

¹⁵ Landowner payments are typically adjusted for inflation throughout the contract life. This estimate does not adjust for inflation, so the actual payments will actually be much higher in the future.

Table 3.—Economic Impacts from Illinois’ 23 Largest Wind Farms (3,334.91 MW)

	Total Jobs [^]	Total Output
Construction		
Project Development and Onsite Labor Impacts	2,412	\$ 217 million
Turbine and Supply Chain Impacts	11,625	\$1,950 million
Induced Impacts	5,011	\$ 649 million
Local Jobs during Construction	19,048	
Operations		
Onsite Labor Impacts	211	\$ 16.5 million/year
Local Revenue and Supply Chain Impacts	304	\$ 77 million/year
Induced Impacts	301	\$ 38 million/year
Local Long-Term Jobs	816	
Total Economic Benefit	\$5.98 billion	
Payments to Landowners⁺	\$13.03 million/year	
Local Property Tax Revenue[*]	\$28.50 million/year	

Notes: All dollar values have been converted to 2008 dollars. JEDI versions 1.09.03b, 1.09.03e and 1.10.03 were utilized in the calculations.

⁺The landowner payments are appropriately adjusted for inflation throughout the life of the project such that the amount received each year will most likely increase.

^{*}Property tax revenue is listed for the first year. This figure will change over time because of several factors: (1) whether the county increases/decreases the local property tax rate; (2) depreciation over the life of the project; and (3) if the state law changes in the future.

[^]All jobs reported are full-time equivalent (e.g., one person works half-time for one year, it is counted as 0.5 jobs; four people working full-time for three months = 1 job). Job calculations are based on a full time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2080 hours worked in a year. A part time or temporary job may be considered one job by other measures, but would constitute only a fraction of a job according to the JEDI model. For example, if an engineer worked only 3 months on a wind farm project (assuming no overtime), that would be considered one-quarter of a job by the JEDI model.



Lantz and Tegen (2008) argue that “the single largest potential driver of economic development benefits is local manufacturing. Policymakers seeking to maximize economic development benefits from wind power are likely to gain the greatest increased benefit by attracting new wind power manufacturing to their state” (11-2). Wind energy requires highly skilled manufacturing workers who take part in designing, building, and assembling wind turbines. A report developed by the Renewable Energy Policy Project concluded that as many as 31,522 new jobs could be created by manufacturing wind power components in Illinois. This could help revitalize more than 457 manufacturing firms in Illinois (Blue Green Alliance, 2007).

Some economic benefits from the wind turbine supply chain have already been experienced in Illinois. For example, Trinity Structural Towers in Clinton manufactures towers, and Siemens Energy and Automation facility (Winergy Turbine Drives) in Elgin produces wind turbine gear drivers; both of these manufacturers have created local jobs in their respective communities. Finkl and Sons in Chicago supplies wind turbine components. Thanks to a Federal Stimulus Grant, Ingersoll Machine Tools plans to retrofit their existing Rockford facility to manufacture wind turbine components that will allow the company to retain nearly 70 existing jobs and create over 80 new jobs. There are also several small wind turbine vendors in Illinois. These facilities produce goods that help their customers meet the growing demand for sustainable energy resources. For more information about the economic impacts of the wind turbine supply chain, see the Center for Renewable Energy’s report titled, “Economic Impact of Wind Turbine Supply Chain” by Loomis, Carlson, and Payne (2010).

The skill sets of residents in the community largely determine whether the wind farm developer hires local labor for the construction and operation and maintenance stages of the wind farm development. Highland Community College in Freeport, Illinois received accreditation for Illinois’ first associate degree program for wind turbine technicians in 2008. As the United States continues to develop and build more wind energy facilities, the demand for well-trained turbine technicians will keep increasing, which provides more stable and reliable jobs for communities (EcoEnergy, 2008). The two-year program instructs students on wind turbine technology, turbine maintenance, tower safety, and wind economics. Ultimately, graduates will learn how to assemble, maintain, and repair wind turbines used in energy generation (Highland, 2012).

VI. Illinois’ Future

Manufacturing Impact

Workforce Development and Technical Training



Wind Energy Businesses

Illinois State University, located in Normal, Illinois, started a Renewable Energy interdisciplinary undergraduate major in the fall of 2008. The curriculum includes courses in technology, economics, and agriculture. Students in the program may choose between a technology track or an economics/public policy track. Renewable energy experts and potential employers who make up the program advisory committee review the curriculum to ensure that its scope and depth will result in graduates that are highly trained and knowledgeable. Graduates are expected to be well versed in diverse disciplines, including technical, managerial, political, and economic issues important to renewable energy.

Illinois Valley Community College developed a curriculum designed to train students to become wind turbine mechanics. The Illinois Institute of Technology (IIT) won a major US Department of Energy grant in 2009 to lead a consortium studying pioneering wind energy technologies. Members will perform focused research on critical wind energy challenges including wind technology challenge, grid system integration, and workforce challenge¹⁶. In 2012, Illinois Valley Community College received an additional grant from the USDA to support the program. USDA Illinois State Rural Development Director Colleen Callahan proclaims, “We are proud to partner with IVCC in developing a high tech work force needed to power our country toward energy independence” (The Times, 2012).

Danville Area Community College recently began offering a Wind Turbine Technician AAS degree. The program is designed to prepare students for technical field work in the industry immediately after the two-year program. The program prepares individuals with an industry influenced curriculum including courses in electrical power generation, worksite safety, mechanical devices, hydraulic systems, and electrical systems (DACC, 2012).

Besides manufacturing industries, other wind energy businesses have opened up around the state. They have either brought new employees who contribute to total spending in the local economy, or they have created new jobs for people in that community. There are close to ten wind energy companies with U.S. headquarters in Chicago. There are numerous other wind energy-related industries in the state, but far too many to name.

¹⁶The IIT-led consortium’s research and development plan includes advanced concepts for rotor control and drive train control, robust sensors for blades, and improved aero elastic models to improve wind turbine performance and reliability. <http://windforillinois.blogspot.com/2009/10/illinois-institute-of-technology-to.html>

Illinois' 23 largest wind energy projects support jobs, generate landowner revenue, increase tax revenue, increase economic activity, and have numerous environmental benefits. In order for Illinois to take advantage of all the economic benefits from wind energy, more supply chain manufacturing should be established in the state, which can help revitalize Illinois' manufacturing industry. Additional wind turbine technician training facilities are needed in Illinois to prepare the workforce. Overall, wind power development in Illinois helps ensure a positive future for the state in preserving the environment and contributing to a secure energy future.

VII. Conclusion



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