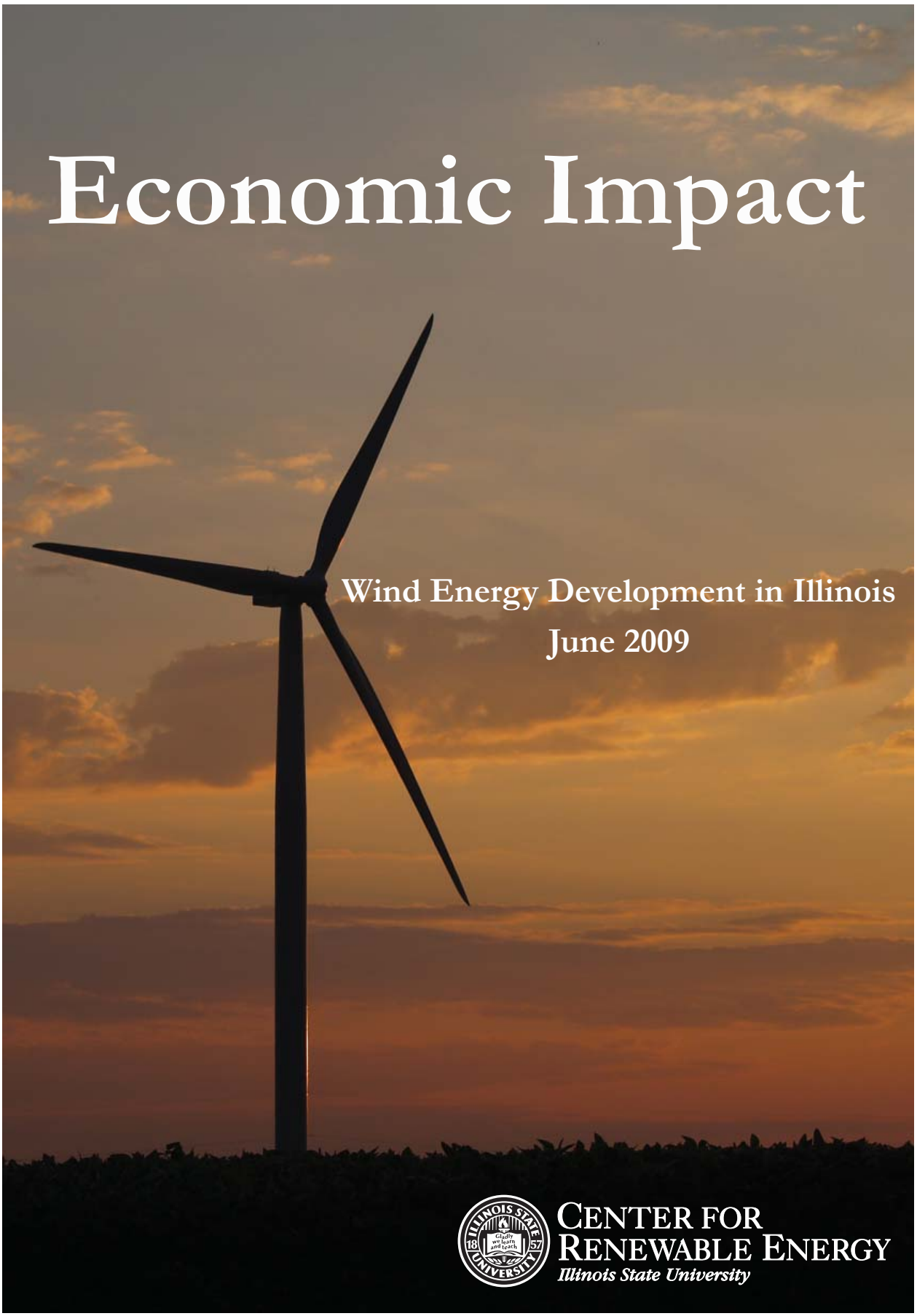

Economic Impact

Wind Energy Development in Illinois

June 2009

CENTER FOR RENEWABLE ENERGY
Illinois State University

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This report is also available as a PDF on www.renewableenergy.ilstu.edu.

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Illinois Wind Working Group (IWWG)

The Illinois Wind Working Group (IWWG) is affiliated with the Department of Energy's Wind Powering America's state Wind Working Groups. The group is administered by Illinois State University's "Wind Energy Team" consisting of David Kennell (Technology), David Loomis (Economics) and 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 conference is hosted by Illinois State University through a grant from the U.S. Department of Energy and designed by the Illinois Wind Working Group which consists of over 120 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/

Center for Renewable Energy

Illinois State University created the Center for Renewable Energy in 2007 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 (US DOE) to research renewable energy, to establish a major in renewable energy at Illinois State and to run 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 ISU
- Serving the Illinois renewable energy community by providing information to the public
- Encouraging applied research on renewable energy at ISU and through collaborations with other universities.

Founding Members:

Founding members include Horizon Wind Energy LLC, 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 ISU.

Graduates of the proposed renewable energy program will be 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 on the Renewable Energy Undergraduate Major, please visit www.renewableenergy.ilstu.edu/major/.

Public Outreach:

The Center also serves the broader renewable energy community by providing information through conferences and materials. The Center has networked with individuals and organizations around the state that are interested in wind energy (one of the most viable forms of renewable energy in Illinois) to form the Illinois Wind Working Group (IWWG).

The Center hosts IWWG, in collaboration with the U.S. Department of Energy's Wind Powering America Program. The IWWG sponsors annual conferences to promote the use of wind energy through education and information. The IWWG will also provide information/materials to the media and individuals regarding the use of wind energy.

Applied Research:

Finally, the Center encourages applied research on renewable energy. The Center seeks to promote research by:

- Highlighting grant opportunities concerning renewable energy
- Coordinating meetings where cross-disciplinary faculty can showcase their research and identify areas of collaboration
- Providing "seed money" grants to ISU faculty interested in renewable energy research.

Executive Summary

A number of factors have contributed to the rapid growth of wind power capacity in Illinois from 50 MW in 2003 to over 1,000 MW in 2009, including federal and state policies, energy security, energy costs, environmental benefits, and economic development opportunities. One key policy driver in Illinois is 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 March 31, 2009, Illinois ranked 10th in the United States in existing wind-powered generating capacity and ranked 16th in the United States in potential capacity (AWEA, 2009). Illinois currently has 17 wind projects online, which account for 1,118.76 MW of wind generating capacity. Although project level data were used in this report, proprietary information about the wind farms will not be released. 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' wind energy, this report supplies interested parties with information concerning the economic development benefits of wind energy.

According to this economic analysis, 1,118.76 MW of wind generating capacity in the state of Illinois:

- Created approximately 6,019 full-time equivalent jobs during construction periods with a total payroll of over $306 million
- Supports approximately 292 permanent jobs in rural Illinois areas with a total annual payroll of over $15 million
- Supports local economies by generating $11.4 million in annual property taxes
- Generates $4.36 million annually in extra income for Illinois landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of $1.9 billion over the life of the projects.

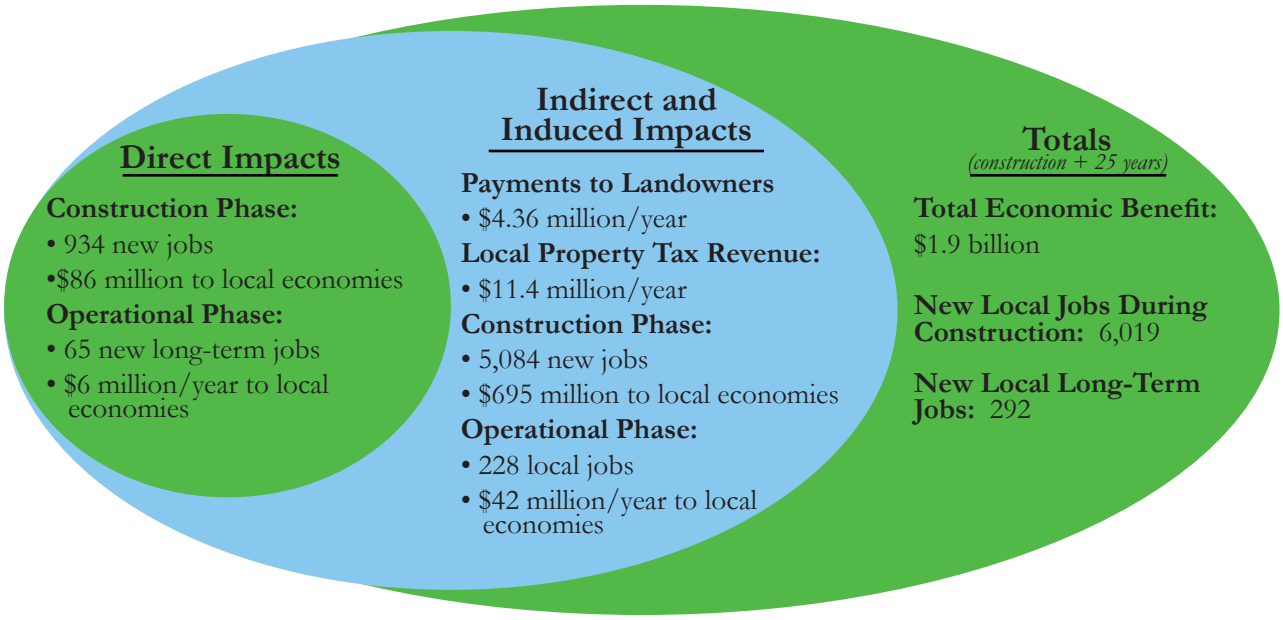

Table 1. -- Illinois Wind Farm Projects

PROJECT	LOCATION (COUNTY)	CAPACITY (MW)
Twin Groves Wind Farm Phase I	McLean	198.00
Twin Groves Wind Farm Phase II	McLean	198.00
Camp Grove Wind Farm	Marshall and Stark	150.00
EcoGrove Wind Farm Phase I	Stephenson	100.50
Rail Splitter Wind Farm	Logan and Tazewell	100.50
Grand Ridge Wind Farm Phase I	LaSalle	99.00
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	50.40
Agriwind Wind Farm	Bureau	8.40
Turbine Adam	Lee	2.50
Illinois Rural Electric Cooperative	Pike	1.65
Erie Community Unit School District #1	Whiteside	1.20
Gob Nob	Montgomery	0.90
Bureau Valley School District	Bureau	0.66
Sherrard High School	Rock Island and Mercer	0.60

I. Introduction

According to the American Wind Energy Association (AWEA 2009), wind generating capacity grew by 50% in 2008, and the United States wind energy industry surpassed all previous records by installing 8,545 megawatts (MW) of new generating capacity, which can power over 2 million households. In total, at the beginning of 2009, the United States wind energy generating capacity was 25,170 MW, which can power about 7 million homes. The additional capacity, which accounts for about 42% of the entire new power-producing capacity added nationally in 2008, will avoid 44 million tons of carbon emissions, which is the equivalent of taking over 7 million cars off the road. It has also channeled an investment of $17 billion into the U.S. economy. Regarding job creation in the United States, AWEA claimed that there has been tremendous growth in manufacturing and that the share of domestically manufactured wind turbine components has grown from less than 30% in 2005 to about 50% in 2008. Over 55 new facilities that manufacture wind turbine components were announced, added, or expanded in 2008, and these new facilities created 13,000 new jobs (AWEA, 2009).

As of March 31, 2009, Illinois ranked 10th in the United States in existing wind-powered generating capacity and ranked 16th in the United States in potential capacity (AWEA, 2009). Illinois currently has 17 wind projects online, which account for 1,118.76 MW of wind 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' first 1,118.76 MW of wind energy, 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.

This report focuses on the benefits of wind energy to Illinois' economy. Section II provides an overview of some of the factors driving wind energy growth. Section III provides a brief literature review of the economic impacts of wind farm development. Section IV discusses the analytical method used in this analysis. Section V presents the results and economic impacts in Illinois. Section VI discusses Illinois' future in the wind power industry. Section VII provides some concluding remarks.

II. Wind Energy Growth Factors

A number of factors have caused the rapid growth of wind power capacity in Illinois from 50 MW in 2003 to 1,118.76 MW in 2009. There are a number of factors driving wind energy development:

- Federal and State Policies
- Energy Security
- Energy Costs
- Environmental Benefits
- Economic Development Opportunities

Federal and state policies are huge drivers of wind power development. 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. ARRA 2009 extends the Federal Production Tax Credit (PTC) for wind energy through 2012. The PTC is a major driver of wind power development. The Federal Production Tax Credit (PTC) provides a 10-year, inflation adjusted production tax credit for power generated by certain types of renewable energy projects. The PTC stood at $21/MWh in 2008 for wind. The credit expired in 1999, 2001, and 2003, and the result was a huge reduction in new wind power installations in 2000, 2001, and 2004 (AWEA 2009).

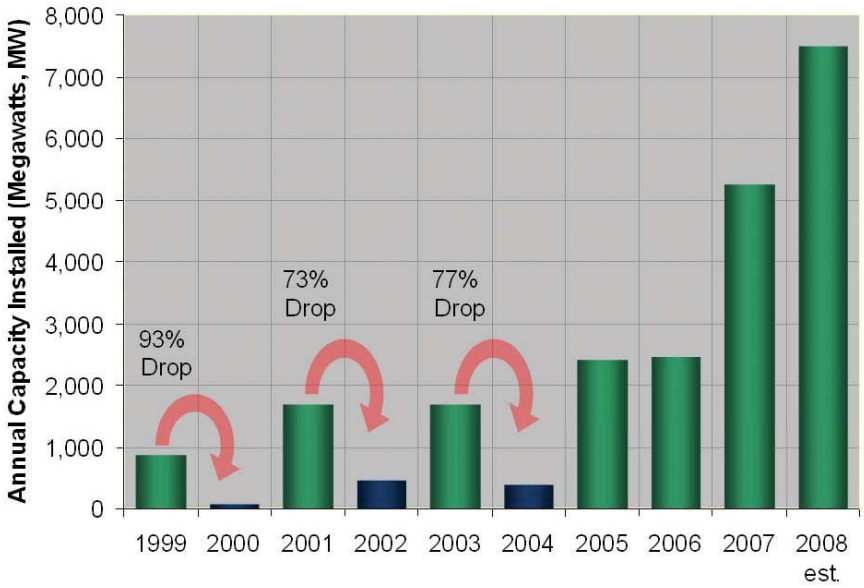

Figure 1.—Impact of PTC Expiration on Annual Installation of Wind Capacity. Source: AWEA

Wind is an inexhaustible energy source and it is free from fuel price volatility. 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 more stable energy prices, which benefits ratepayers in the long run. If wind power is used on a large scale, the demand for fuel used in electricity generation falls, which puts downward pressure on fuel prices (AWEA 2009).

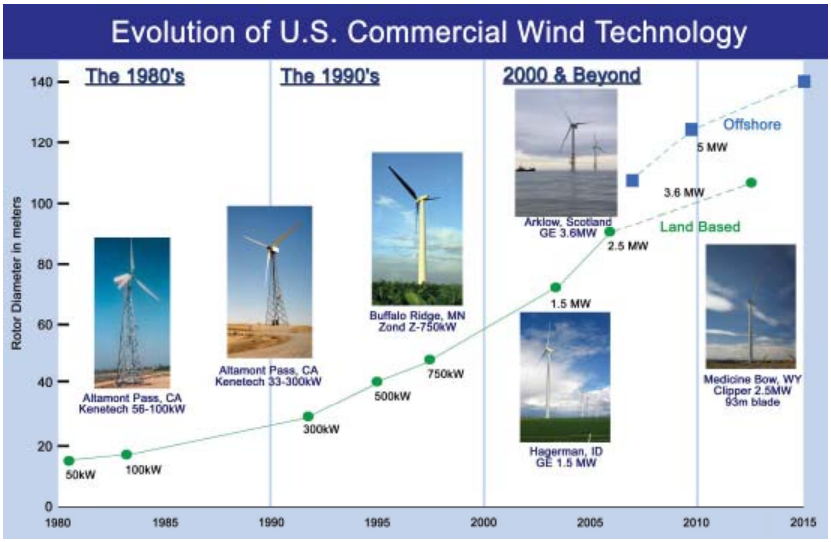

Figure 2.—Turbine Sizes Over the Years

Over the past 20 years, wind energy costs have declined significantly. However, the cost of constructing a new coal plant has continued to rise. 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. Due to technological advances in turbine design, larger wind turbines, which generate proportionally more power, have helped drive down wind power costs.

Wind power is also a clean energy resource; it helps improve the quality of the air we breathe and slow climate change. Unlike coal plants, which generate a great deal of pollution, when electricity is generated from wind turbines, there is not the negative externality of pollutants in the air that contribute to acid rain and smog, which reduces everyone's quality of life. Finally, wind power provides economic development opportunities that can revitalize rural communities around the United States. Despite the economic downturn, 35,000 new wind power-related jobs were created in 2008 (AWEA 2009).

Illinois' Unique Attributes

Wind Resource

The wind speed in an area is an important consideration in developing a wind farm. Illinois has Class 3 wind power, with several pockets of Class 4 winds throughout the state. In fact, an area with twice the wind speed will produce 8 times the amount of electricity all else equal. However, as a result of technological advances, turbines have become much larger (see Figure 2), and the capacity of wind turbines has steadily risen over time. In addition, the increased height of wind turbines has allowed places like Illinois to take advantage of and capture the wind energy that is stronger the higher up one goes.

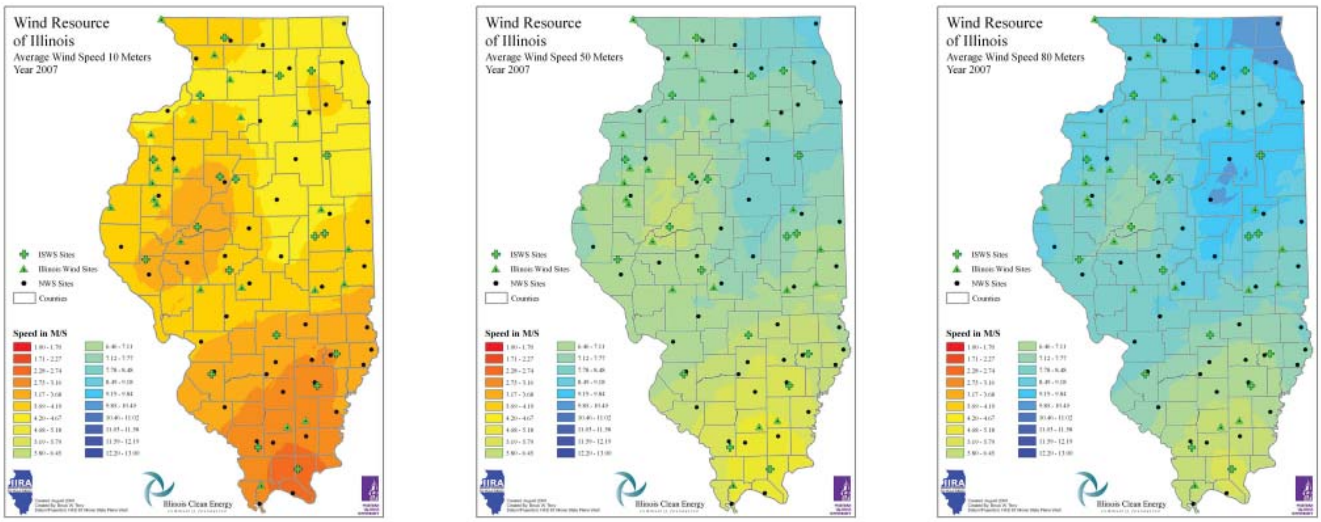

Figure 3.—Wind Resource of Illinois

Transmission

This increase in wind resources can be seen in the Illinois wind maps that compare the wind resource at different heights (see Figure 3). These new technological developments in turbines have allowed Illinois to take advantage of its wind resources to generate electricity to power many of Illinois' homes and businesses. In fact, Illinois has the most robust wind resource in the PJM market. More wind map resources are available from the Illinois Institute for Rural Affairs website at: www.illinoiswind.org.

While there are other states that have gustier winds, Illinois' transmission system is less constrained. This availability of transmission capacity helps alleviate some of the expenses to transmit electricity from wind farms to end users. Transmission lines are needed to carry the electricity from the wind farm or other generator to the load center, where the demand is. Transmission is very expensive to build and it can sometimes take years to site. When transmission lines are congested, no more power can be transmitted on them. Therefore, having unconstrained transmission lines nearby is required for a wind farm.

Demand

Illinois has a relatively large population. 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.

Overview of Illinois Current Policies

Renewable Portfolio Standard

A large driver of wind development in Illinois is the Renewable Portfolio Standard (RPS). A Renewable Portfolio Standard (RPS), also known as a Renewable Electricity Standard (RES), requires a percent of energy sales (MWh) or installed capacity (MW) to come from renewable resources. The share accounted for by renewables usually increases incrementally from a base year to an ultimate target. There are about 30 states including Washington D.C. that have an RPS mandate. Illinois currently has an RPS of 25% by 2025 and this can be reached largely by utilizing the wind resources Illinois has. In fact, Public Act 95-0481, also known as the Illinois Power Agency Act, 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" (Illinois Power Agency Act 2007, 35). 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. By June 1, 2009 at least 4%, and by June 1, 2010 at least 5%, of each utility's total supply to serve the load of eligible retail customers must be generated from cost-effective renewable energy resources. The percentage increases annually at various rates until the mandated 25% is reached by June 1, 2025.

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. For example, in 2008, rates could not increase by more than 0.5% of the amount paid per kilowatthour (kWh) by those customers during the year ending May 31, 2007; and in 2009, rates cannot increase by the greater of an additional 0.5% of the amount paid per kWh by those customers during the year ending May 31, 2008 or 1% of the amount paid per kWh by those customers during the year ending May 31, 2007. However, by June 30, 2011, the Illinois Commerce Commission must review the limitation on the amount of renewable energy resources procured and report to the General Assembly its findings as to whether that limitation unduly constrains the procurement of cost-effective renewable energy resources (Illinois Power Agency Act 2007, 37).

Enterprise Zones

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, buildings, structures, and other tangible property. The jobs tax credit entitles an employer to a $500 tax credit for hiring individuals certified as economically disadvantaged. In an enterprise zone in Illinois, there is a sales/use tax exemption for building materials used in certain projects including wind energy development. Nearly 40 other states, including all adjacent states, automatically exempt wind energy generation equipment from any sales/use tax. If Illinois did not offer enterprise zone benefits, Illinois wind projects would be at a competitive disadvantage, which is why every major wind project in Illinois is located in an enterprise zone.

Property Tax Legislation

In past years, wind energy devices in Illinois were assessed differently in each county, which meant identical turbines could have vastly different taxable values across the state. However, in October 2007, legislation was passed setting a state standard for valuation of wind energy devices for at least 5 years. Public Act 095-0644 specified that wind energy devices larger than 500 kilowatts (kW) and producing power for commercial sale be valued at $360,000/megawatt (MW) of capacity, annually adjusted for inflation based on the U.S. Consumer Price Index. The depreciation allowance may not exceed 70% (Ryerson, 2009). Illinois has one of the nation's highest property taxes on wind farms. 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.

Economic Impacts of Wind Farm Development

Wind Energy Creates Skilled, High Paying Green Jobs

Building Trades, Construction and Installation

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. Eric Lantz and Suzanne Tegen (2008) conducted an analysis pertaining to variables affecting economic development of wind energy. Lantz and Tegen (2008) 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" (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).

Operation and Maintenance

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. Wind farms need staff to operate and regularly service the turbines throughout their roughly 20 to 30-year lifetimes.

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. 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. 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 that rely primarily on farming. He explains that the supplementary income paid to farmers and the local taxes greatly contribute to the economic development impacts in 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

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). For example, 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).

School District Benefits

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, with no concomitant increase in costs. The new revenues can then be used to enhance the education provided by the school.

Road Improvements

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 can begin construction. A road use agreement between the county and the developer is usually passed and sometimes pays for upgrading roads that will be used during construction.

Environmental Benefits

Wind power does not contaminate water with pollutants, such as mercury, and it generates electricity without emitting gases that cause global warming. According to the AWEA, "wind power is one of the cleanest and most environmentally benign energy sources in the world today" (2009). Based on average EPA-generated 2004 emissions rates, a 400 MW wind farm such as Twin Groves displaces 3,579 tons of NOx, 6,541 tons of SO_2, 1,467,615 tons of CO_2, 102 pounds of mercury, 62,231 pounds of volatile organic compounds, and 185,397 pounds of particulate matter annually (Horizon 2008).

IV. Analytical Method

The JEDI Model

The economic analysis of wind power development presented here utilizes the National Renewable Energy Laboratory's (NREL's) latest (release number JEDI W1.09.03b) Jobs and Economic Development Impacts (JEDI) Wind Energy Model. 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. For example, JEDI 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 JEDI model uses construction cost data, operating cost data, and data relating to the percentage of goods and services acquired in the state to calculate jobs, earnings, and economic activities that are associated with this information. The results are broken down into the construction period and the operation period of the wind project. Within each period, impacts are further divided into direct, indirect, and induced impacts. Although the model uses project level data, no proprietary information on the projects analyzed here will be released.

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. This analysis uses the JEDI Wind Energy Model release number JEDI W1.09.03b, and can be downloaded at http://www.nrel.gov/analysis/jedi/. Essentially, JEDI is an input-output model, which takes into account the fact that the output of one industry can be used as an input for another.

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.

Examples of Direct Impacts:

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

Indirect Impacts

The initial spending on the construction and operation of the wind farm creates a second layer of impacts, referred to as "indirect impacts." Indirect impacts during the 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. Concrete 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 also 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. Also turbine parts/component manufacturers such as bearing producers, steel producers, and gear producers are also in this same category. Permitting fees such as building permits show up in the construction period indirect results (Eric Lantz, February 25, 2009, email message to author).

Indirect impacts during operating years refer to the changes in inter-industry purchases resulting from the direct final demand changes. 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, email message to author).

Examples of Indirect Impacts:

- Steel Producers
- Gear Producers
- Gearbox Assemblers
- Engine and Other Machine Assemblers
- Computer-Controlled Machine Tool Operators
- Manufacturing Engineers
- Material Engineers
- Manufacturing Managers
- Welders

Induced Impacts

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. Thus, for example, the increased economic activity at quarries and cement factories results in increased revenues for the affected firms and raises individual incomes. Individuals employed by these companies then spend more money in the local economy, e.g., as workers receive income, they may decide to purchase more expensive clothes, or higher quality food along with other goods and services from local businesses.

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

- Grocery Stores
- Child Care
- Clothing Stores
- Retail Stores
- New Cars
- Restaurants
- Medical Services
- Hotels

Research Data

A list of Illinois' wind power projects was obtained from the American Wind Energy Association (AWEA) and the Illinois Wind Working Group (IWWG) databases. The project lists contain information including the wind power 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 first 17 wind projects in Illinois (see Table 2), which amounts to 1,118.76 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 project costs, income, economic activity, and number of job opportunities accruing to the state from the project. JEDI model inputs consist of detailed information which many developers consider proprietary. As such, sometimes the default settings in the JEDI model had to be used. Background research was conducted for each of the projects. Research consisted of collecting information from the following sources: media information; presentations that developers, attorneys, county board members, and members of the communities presented at wind conferences; corporate press releases; information from the websites of school districts, project developers, and electric cooperatives; news releases from the Illinois state government; and information from the Illinois Department of Revenue website. Proprietary information about the wind farms will not be released.

Table 2. -- Illinois Wind Farm Projects

WIND FARM	DEVELOPER	LOCATION (COUNTY)	CAPACITY (MW)	TURBINES	UNITS	DATE ONLINE
Twin Groves Wind Farm Phase I	Horizon Wind Energy	McLean	198.00	Vestas	120	2007
Twin Groves Wind Farm Phase II	Horizon Wind Energy	McLean	198.00	Vestas	120	2008
Camp Grove Wind Farm	Orion Energy Group	Marshall and Stark	150.00	GE Energy	100	2007
EcoGrove Wind Farm Phase I	EcoEnergy/The Morse Group and Acciona Windpower	Stephenson	100.50	Acciona	67	2009
Rail Splitter Wind Farm	Horizon Wind Energy	Logan and Tazewell	100.50	GE Energy	67	2009
Grand Ridge Wind Farm Phase I	Invenergy	LaSalle	99.00	GE Energy	66	2008
GSG Wind Farm	FPC Services/ GSG Wind	Lee and LaSalle	80.00	Gamesa	40	2007
Providence Heights Wind Farm	Midwest Wind Energy, Iberdrola, and Community Energy	Bureau	72.00	Gamesa	36	2008
Crescent Ridge Wind Farm	Midwest Wind Energy, Community, and Eurus Energy America, Inc.	Bureau	54.45	Vestas	33	2005
Mendota Hills Wind Farm	Navitas Energy	Lee	50.40	Gamesa	63	2003
Agriwind Wind Farm	Stewardship Energy, LLC	Bureau	8.40	Suzlon	4	2008
Turbine Adam	FPC Services/ GSG Wind	Lee	2.50	Clipper	1	2007
Illinois Rural Electric Cooperative	Illinois Rural Electric Cooperative	Pike	1.65	Vestas	1	2005
Erie Community Unit School District #1	Erie CUSD #1 and Johnson Controls	Whiteside	1.20	Vensys	1	2008
Gob Nob	Rural Electric Convenience Cooperative Project	Montgomery	0.90	Emergya Wind Technologies	1	2009
Bureau Valley School District	Engineers Architects Professional Corp.	Bureau	0.66	Vestas	1	2004
Sherrard High School	Ameresco Energy Services Company of Chicago	Rock Island and Mercer	0.60	Vestas	1	2008

V. Analysis and Results

Table 3 - Economic Impacts from 1,118.76 MW of Wind Energy Development in Illinois

	Construction Phase Impacts	Operational Phase Impacts
Direct Impacts	934 jobs	65 new long-term jobs
On-site and Project Development	$86 million to local economies	$6 million/year to local economies
Indirect Impacts	3,426 jobs	104 local jobs
Turbine and Supply Chain Impacts	$499 million to local economies	$27 million/year to local economies
Payments to Landowners		$4.36 million/year
Local Property Tax Revenue		$11.4 million/year
Induced Impacts	1,658 jobs	124 local jobs
	$196 million to local economies	$15 million/year to local economies
TOTALS		
Jobs	6,019 jobs during construction	292 long-term jobs
Total Economic Benefit	$1.9 billion	

Notes: All values are 2008 constant dollars. Totals assume construction plus 25 years operations.

The results from the JEDI model show significant economic impacts from the first 1,118.76 MW of wind energy development in the state of Illinois (see Table 3). Payments to landowners and local property tax revenue along with impacts on employment and local economic activity during the construction and operational periods are illustrated in Table 3.

Employment 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. 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 in rural communities where new employment opportunities are welcome due to economic downturns (Reategui and Tegen 2008). Based on the model's results, the first 1,118.76 MW of wind power development in Illinois created approximately 6,019 full-time equivalent jobs during construction periods with a total payroll of over $306 million, and is supporting approximately 292 permanent jobs in rural Illinois areas with a total annual payroll of over $15 million. These 292 jobs make a significant impact because the wind farms are located in rural areas, where populations are much smaller.

Property Tax Revenue Impacts

Wind power projects increase the property tax base of a county, creating a new revenue source for education and other local government services. Illinois actually has higher property tax rates than most of the surrounding states. Thus, the property tax revenue impacts are substantial. According to the model's results, the first 1,118.76 MW of wind power development in Illinois supports local economies by generating over $11.4 million in annual property taxes.

Landowner Revenue Impacts

Landowners benefit when they lease their land to wind developers because of the stabilized income stream. According to the model's results, the first 1,118.76 MW of wind power development in Illinois is generating $4.36 million annually in extra income for Illinois residents who lease their land to wind farm developers.

Economic Activities Impacts

Output refers to economic activity or the value of production in the state or local economy. According to the model's results, the first 1,118.76 MW of wind power development in Illinois will generate a total economic benefit of $1.9 billion over the life of the projects (construction plus 25 years of operations was assumed in this calculation and tax abatements were accounted for).

VI. Illinois' Future

Manufacturing Impact

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" (11-12). 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, "Illinois' Road to Energy Independence" found 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, Illinois created more than 150 local jobs. Siemens Energy and Automation facility (Winergy Drive) employs about 355 workers in the Chicago suburb of Elgin to produce wind turbine gear drivers. Finkl and Sons in Chicago supplies wind turbine components. These facilities produce goods that help their customers meet the growing demand for sustainable energy resources.

Workforce Development and Technical Training

The skill sets of residents in the community largely determine whether the wind farm 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. The two-year program requires students to take courses in subjects including electronics, meteorology, math, business, speech, and physical education. EcoEnergy is involved with the main focus of the program, teaching students how to assemble, maintain, and repair wind turbines. EcoEnergy is also planning to offer scholarships for the program. 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). Illinois State University in Normal, Illinois, has a Renewable Energy interdisciplinary undergraduate major as of fall 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 comprise the program advisory committee reviewed the curriculum to ensure that its scope and depth will result in graduates that are highly trained and knowledgeable. Graduates are expected to be conversant in diverse disciplines, including technical, managerial, political, and economic issues important to renewable energy.

Wind Energy Businesses

Besides manufacturing industries, other wind energy businesses have opened up around the state. They have either brought new employees to the state who contribute to total spending in the local economy, or they have created new jobs for people in that community. Horizon Wind Energy, Acciona Wind Energy USA, Midwest Wind Energy, and Vestas American Wind are just a few of the wind energy businesses that have opened offices in Chicago. Horizon Wind Energy also has offices in Bloomington and Hopedale. Invenergy Wind North America has an office in Galva. There are numerous other wind energy-related industries in the state, but far too many to name.

VII. Conclusion

The economic impact from Illinois' 1,118.76 MW of wind energy supports jobs, generates landowner revenue, increases tax revenue, increases economic activity, and has numerous environmental benefits. In order for Illinois to take advantage of all the economic benefits from wind energy, more supply-chain manufacturing needs to be established in the state, which can definitely help revitalize Illinois' manufacturing industry. More wind turbine technician training facilities are needed to prepare the workforce in Illinois. A longer-term property tax law needs to be established so that developers can have more certainty. Wind power development will contribute to preserving the environment and a more secure energy future in Illinois.

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