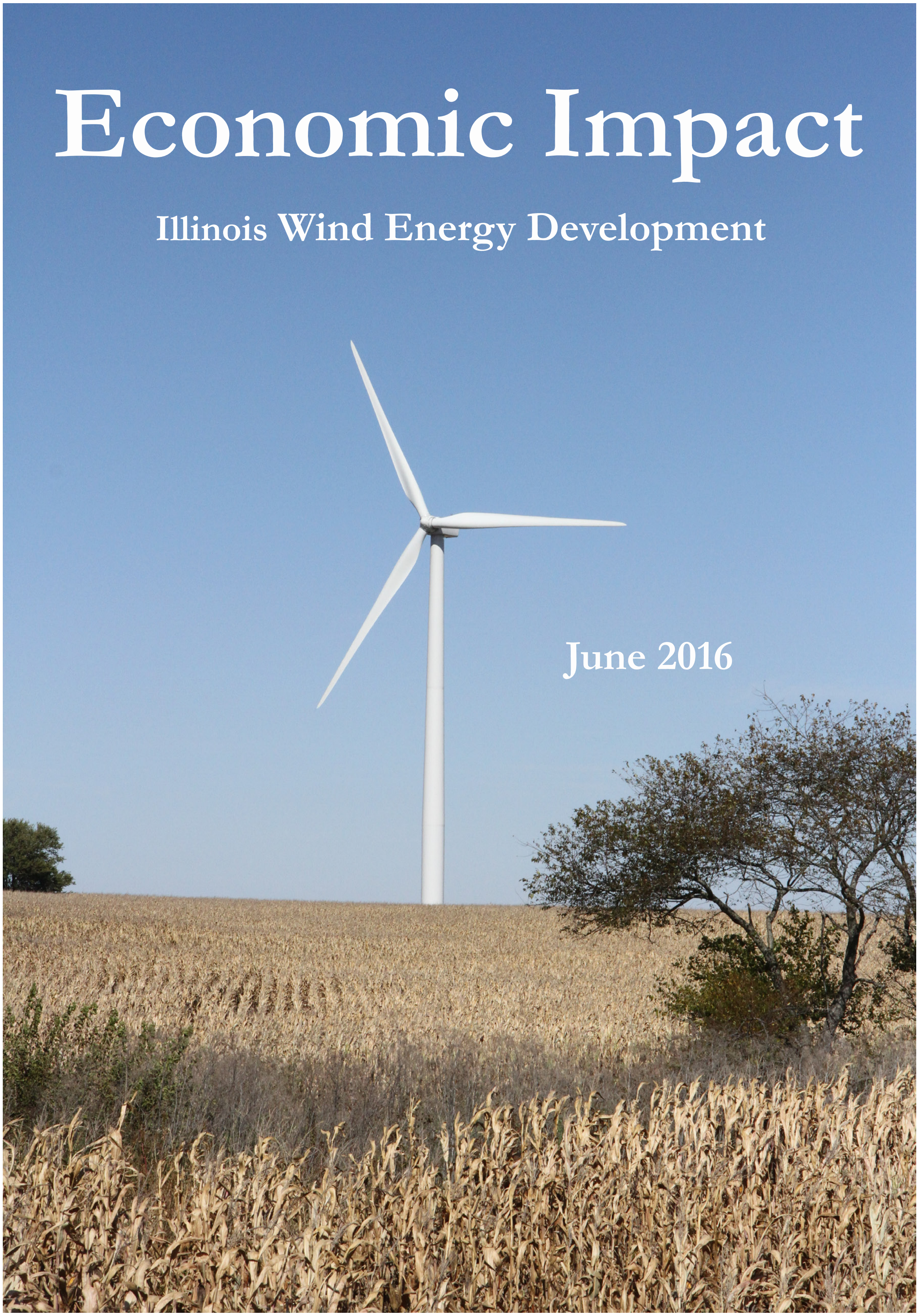
Economic Impact

Illinois Wind Energy Development

June 2016



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Illinois State University

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Illinois Wind Working Group

The Illinois Wind Working Group (IWWG) is affiliated with the U.S. Department of Energy's WINDExchange. IWWG is administered by the Center for Renewable Energy at Illinois State University.

WINDExchange is the U.S. Deparment of Energy Wind Program's hub of stakeholder engagement and outreach activities. The purpose of WINDExchange is to help communities weigh the benefits and costs of wind energy, understand the deployment process, and make wind development decisions supported by the best available science and other fact-based information.

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. IWWG is comprised of 300 key wind energy stakeholders from the state of Illinois.

For more information about the IWWG, please visit the website, 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 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 Avangrid Renewables, EDP Renewables, State Farm Insurance, Suzlon Wind Energy Corp., and the U.S. Department of Energy.

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

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

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U.S. DEPARTMENT OF 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 3,842.15 MW in 2016, 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 2016, Illinois ranked 5th in the United States in overall installed wind capacity, and ranked 14th in potential capacity. Illinois currently has 46 wind projects online which account for 3,842.15 MW of wind generating capacity. This report will analyze the economic impacts from only the projects that exceed 50 MW of capacity. Illinois has 25 projects larger than 50 MW, which account for 3,609.81 MW or 94% 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 that 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 25 largest wind farms in Illinois:

- Created approximately 20,173 full-time equivalent jobs[1] during construction periods
- Supports approximately 869 permanent jobs in rural Illinois areas
- Supports local economies by generating $30.4 million in annual property taxes[2]
- Generates $13.86 million annually in extra income for Illinois landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of $6.4 billion over the life of the projects[3]

[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 2,573 new jobs during construction; though the construction of the wind farms may have actually involved hiring closer to 5,000 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 because of several factors: (1) whether the county increases/decreases the local property tax rate; (2) depreciation over the life of the project; (3) inflation; and (4) if the state law 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
Pilot Hill	Iroquois and Kankakee	176.90
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
Hoopeston Wind	Vermilion	98.00
Bishop Hill II	Henry	80.00
GSG Wind Farm Phase I	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

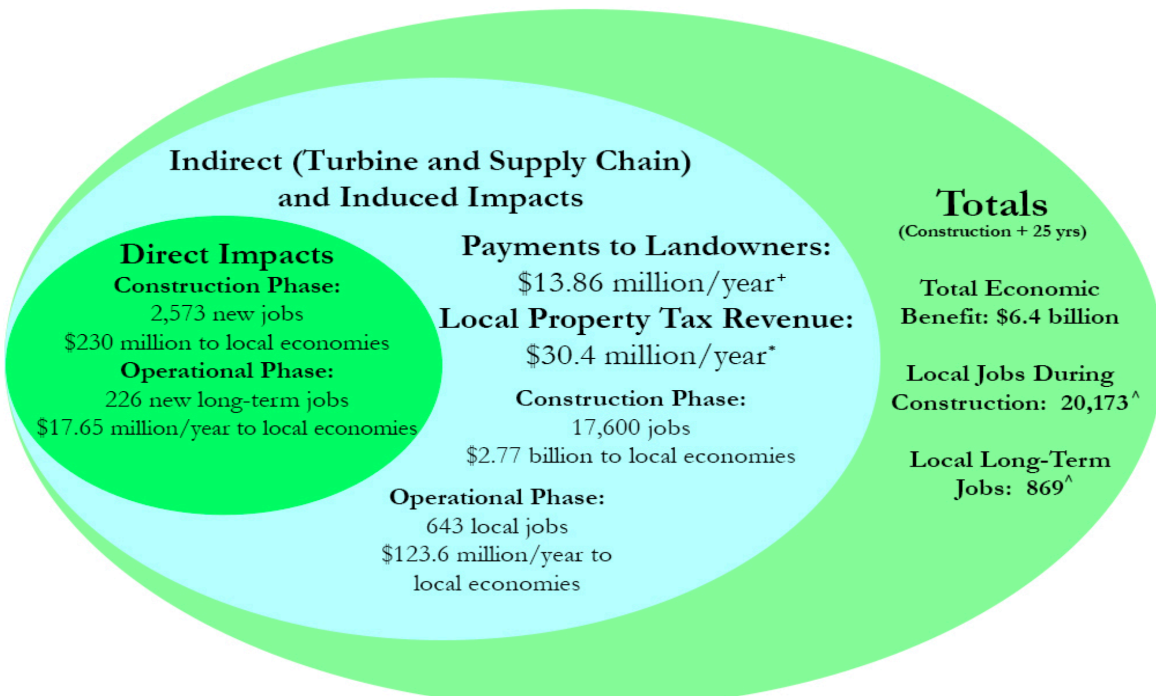


Figure 1.—Economic Impacts from Illinois' 25 Largest Wind Farms (3,609.81 MW)

Notes: All dollar values have been converted to 2008 dollars. JEDI versions 1.09.03b, 1.09.03e, 1.10.03, and W06.28.16 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; (3) inflation; and (4) 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 good rebounding year in 2015, after two years of low growth. In 2015, wind power increased net capacity by 12.3%, bringing 8,598 MW of new generating capacity online. The additions in 2015 brought the total installed capacity in the United States to nearly 74,000 MW (see Figure 2). (AWEA 2016a)

The 2015 growth was 77% higher than in the previous year, and almost seven times higher than in 2013, but does not reach the record growth of 13,000 MW in 2012. AWEA attributes this to the extension of the Production and Investment Tax Credits. (AWEA 2016a, AWEA 2016b)

An increasing amount of wind turbines are assembled and built with components from the United States. According to Wiser & Bolinger, the overall domestic content of all wind turbine equipment used in the United States was about 40% in 2012 and rises to 60% when balance-of-plant costs are included (p. 24). Domestic content is highest for nacelle assembly (>90%), towers (70-80%), and blades and hubs (45-65%). (Wiser and Bolinger, 2015, p. v)

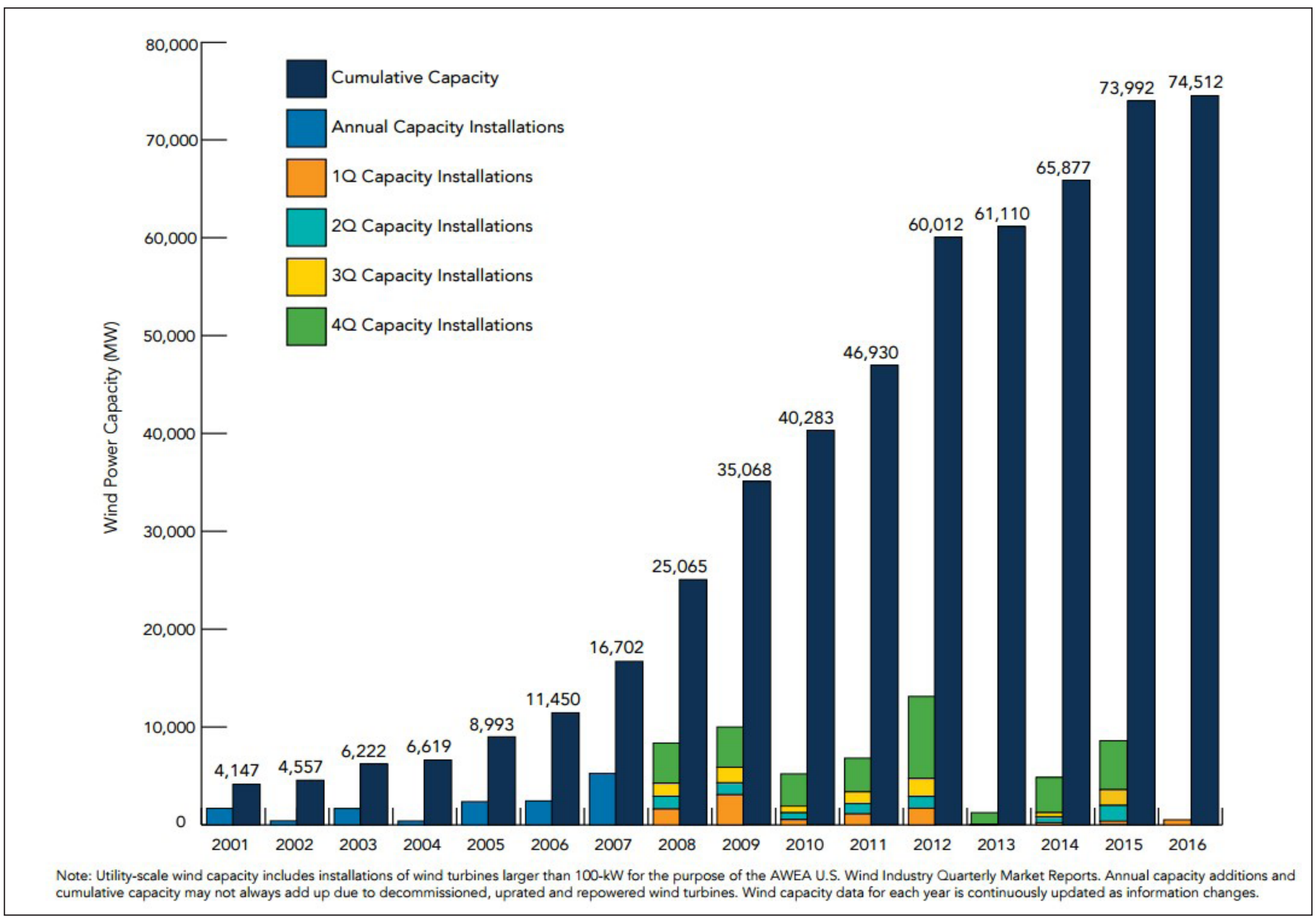


Figure 2.—U.S. Annual and Cumulative Wind Power Capacity Growth. Source: AWEA

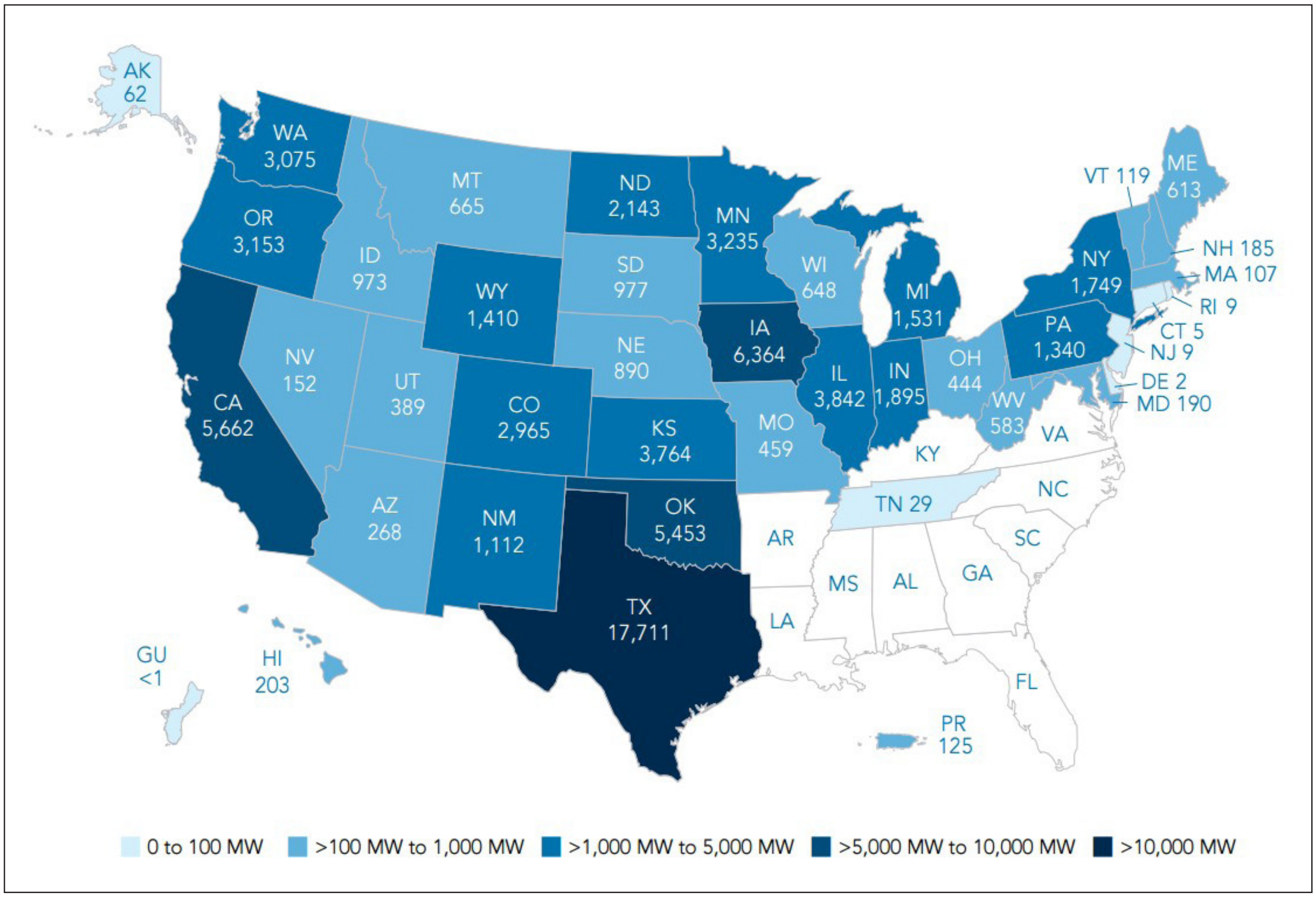


Figure 3.—U.S. Wind Power Capacity, by State. Source: AWEA

As of March 2016, Illinois ranked 5th in the United States in existing wind-powered generating capacity behind Texas, Iowa, California, and Oklahoma (see Figure 3). (AWEA 2016b)

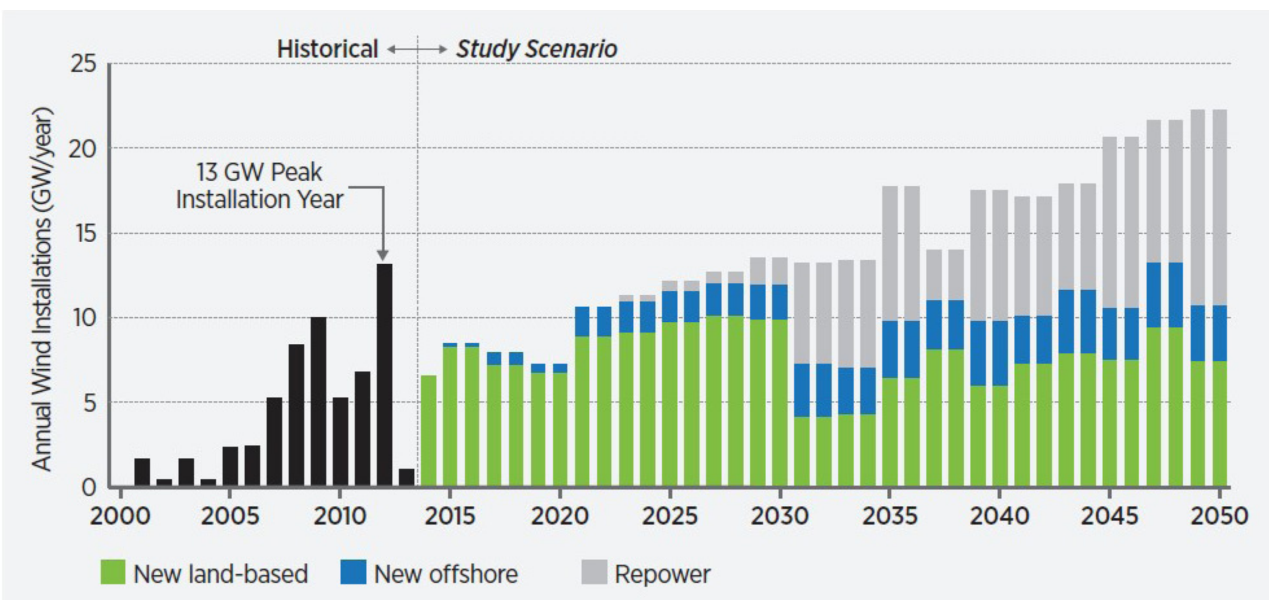
Illinois currently has 46 wind projects online, which accounts for 3,842 MW of wind generating capacity. A number of these projects, however, are very small and consist of only one turbine. This economic analysis will consider the impact of only the wind farms that are larger than 50 MW of capacity. Illinois has 25 of these projects, accounting for 3,609 MW of generating capacity. It is very important that stakeholders and decision-makers are educated about the economic development impact that 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' 25 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 Vision Report

The Wind Vision Report is a publication of the U.S. Department of Energy (DOE). Its purpose is to revisit previous findings by the DOE and build upon them to provide an analysis of current wind energy in the U.S. up to 2013, and to provide a picture of the potential benefits of wind energy becoming 10% of total electricity demand in 2020, 20% by 2030, and 35% by 2050. Referred to as the study scenario, those percentages were chosen using a Business-As-Usual (BAU) model, and selecting a middle range based on the impact of various economic sensitivities.

As of 2013, wind power supplied 4.5% of the electricity demand in the U.S. This led to many different benefits including increased public health through greatly reduced levels of carbon dioxide, sulfur dioxide, and nitrous oxide pollution, and reduced water consumption. If wind energy continues to grow to be 35% by 2050, we can expect that there will actually be a 2% savings in electric rates for consumers, and a 3% savings in power system costs. Pollution and water use will continue to fall, and 600,000 jobs will be supported across the nation.

The following chart shows the projected growth of land-based and offshore wind for the U.S.



Note: New capacity installations include capacity added at a new location to increase the total cumulative installed capacity or to replace retiring capacity elsewhere. Repowered capacity reflects turbine replacements occurring after plants reach their useful lifetime. Wind installations shown here are based on model outcomes for the *Central Study Scenario* and do not represent projected demand for wind capacity. Levels of wind capacity to achieve the penetration trajectory in the *Study Scenario* will be affected by future advancements in wind turbine technology, the quality of the wind resource where projects are located, and market conditions, among other factors.

Figure 4.—Historical and Forward-Looking Wind Power Capacity in the Central Study Scenario.
Source: US DOE Wind Vision Report 2015

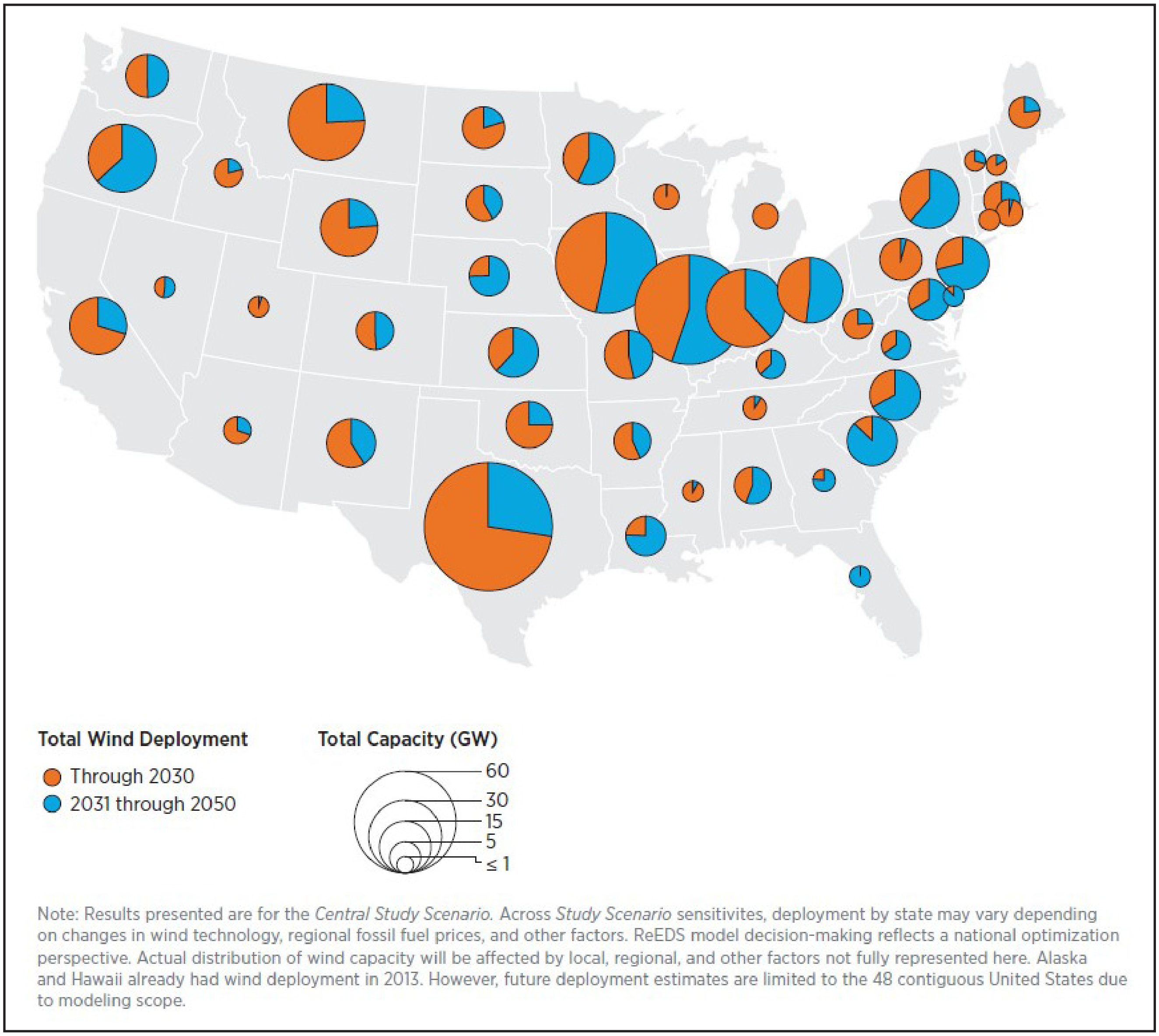


Figure 5.—Study Scenario Distribution of Wind Capacity by State in 2030 and 2050. Source: US DOE Wind Vision Report 2015

As for Illinois, the Wind Vision Report projects it to be the state with the second largest wind capacity development through the year 2050, behind only Texas. Texas currently was 17,700 MW and is far ahead of Iowa, the second largest state with 6,364 MW. Therefore, if the Wind Vision Report projections are accurate, Illinois would surpass Iowa, California, and Oklahoma, to become the second largest wind state ranked by capacity.

This is largely due to the Eastern United States' growing demand for electricity, and high transmission costs to bring even more low-cost wind from further west. While Illinois may not be the most efficient state for wind power potential, it is closer to the east coast than some other states that may be able to produce more wind energy at lower costs.

Figures 6 and 7 show the projected growth of land-based and offshore wind capacity in Illinois:

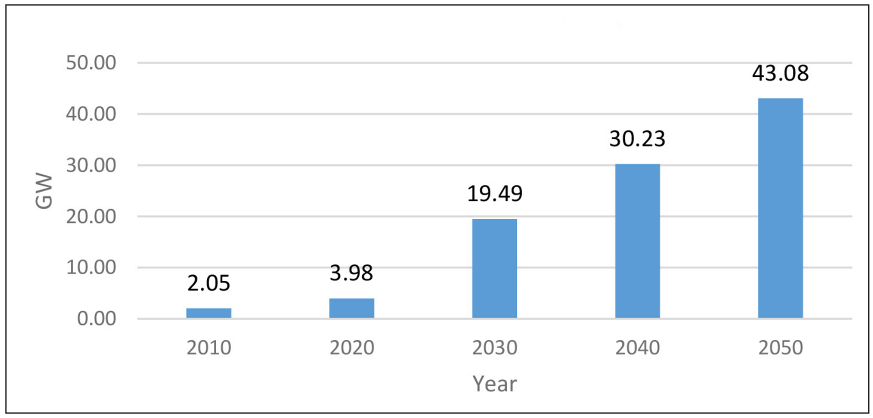


Figure 6.—Land-Based Illinois Wind Capacity. Source: US DOE Wind Vision Report 2015

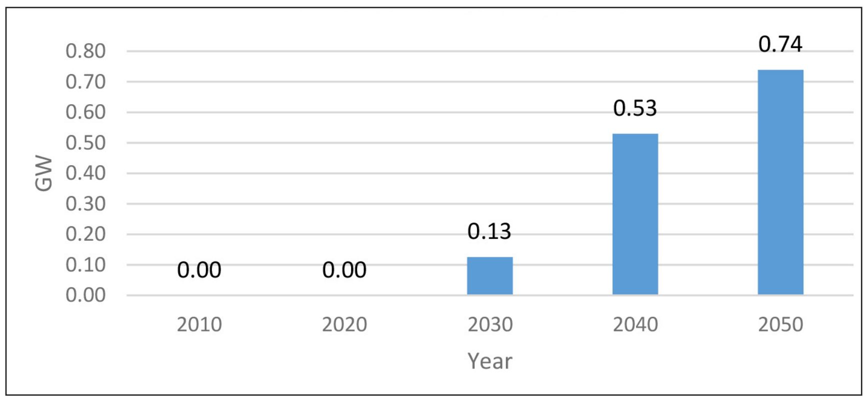


Figure 7.—Offshore Illinois Wind Capacity. Source: US DOE Wind Vision Report 2015

If the Wind Vision Report holds true, Illinois could see a five times increase in capacity from 2020 to 2030 and then a doubling of capacity from 2030 to 2050. In addition, Illinois could see offshore wind capacity begin by 2030 and increase to 740 MW by 2050.

This scenario also has transformational changes for other sources of electrical generation. Figure 8 shows the electrical generation mix in Illinois in 2010 according to the Wind Vision Report. It shows that 49% of the electricity comes from nuclear and almost 47% comes from coal. According to the report, by 2050, Figure 9 shows 0% of Illinois' electricity coming from nuclear, 12% coming from coal and over 75% coming from land-based wind.

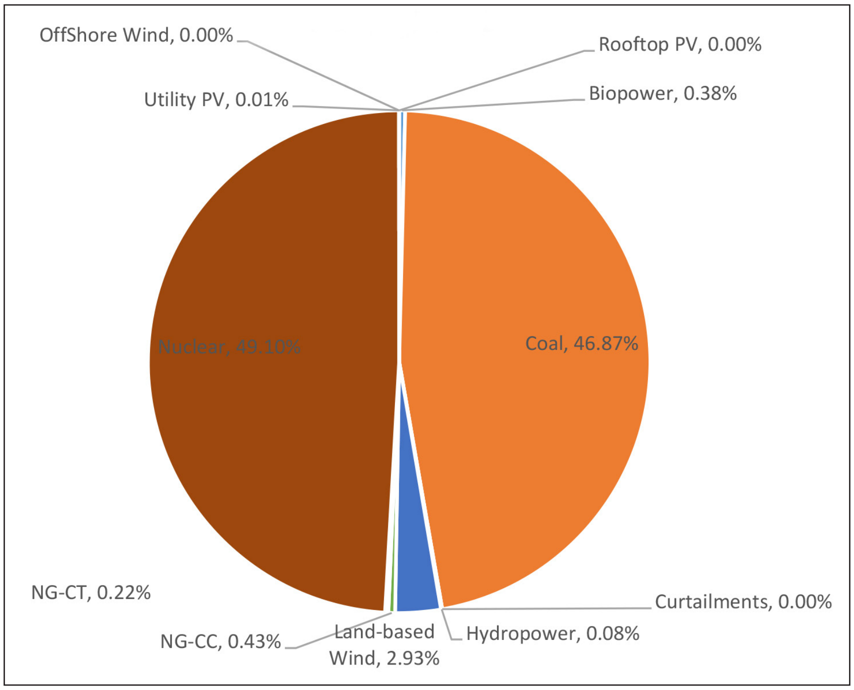


Figure 8.—Generation Mix, 2010. Source: US DOE Wind Vision Report 2015

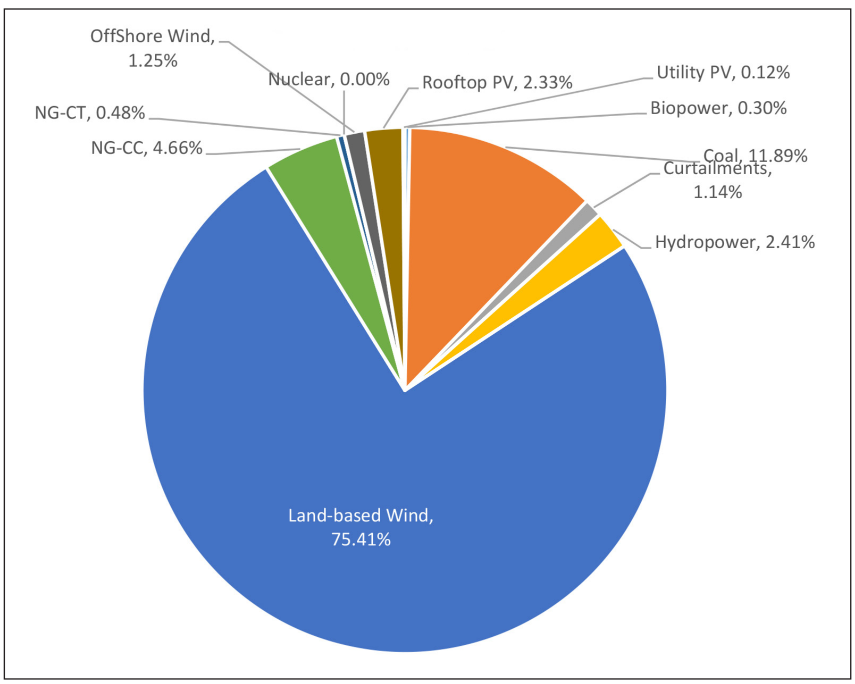


Figure 9.—Generation Mix, 2050. Source: US DOE Wind Vision Report 2015

The large ramp-up of land-based wind has a direct impact on jobs (the report did not predict indirect or induced jobs due to uncertainty about where manufacturing would take place). Figure 10 shows that onsite construction jobs supported by land-based wind could rise to 1,270 by 2050. In addition, onsite operations and maintenance jobs could rise to 2,160 by 2050 according to Figure 11.

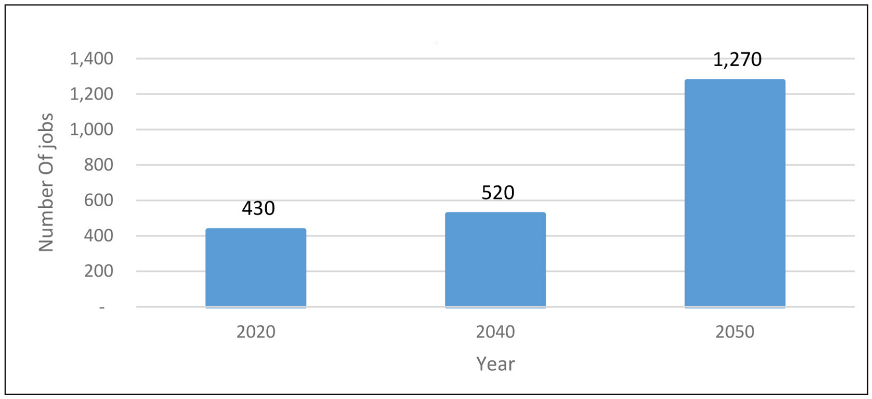


Figure 10.—On Site Construction Jobs in Wind in Illinois (Low Domestic Content). Source: US DOE Wind Vision Report 2015

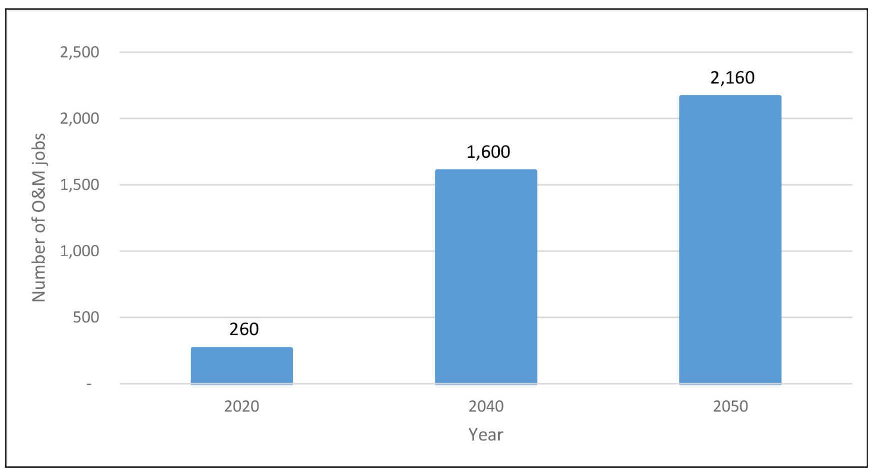


Figure 11.—On Site O&M Jobs in Wind in Illinois (Low Domestic Content). Source: US DOE Wind Vision Report 2015

III. Illinois Wind Industry Growth

Illinois' wind farms grew rapidly from 2007 to 2012. However, in 2013 and 2014, no new wind farms were built in the state. There were two main causes for this slowdown. First, there was federal policy uncertainty surrounding the expiration of the production tax credit (PTC). Second, there was state policy uncertainty surrounding the implementation of the renewable portfolio standard and shifting load from default service into municipal aggregation. Two new wind farms were completed in 2015 and there is one new wind farm under construction (Kelly Creek). Several more were permitted recently and could start construction soon.

On a calendar year basis (Figure 12), Illinois has installed as much as 800 MW in a year (2011).

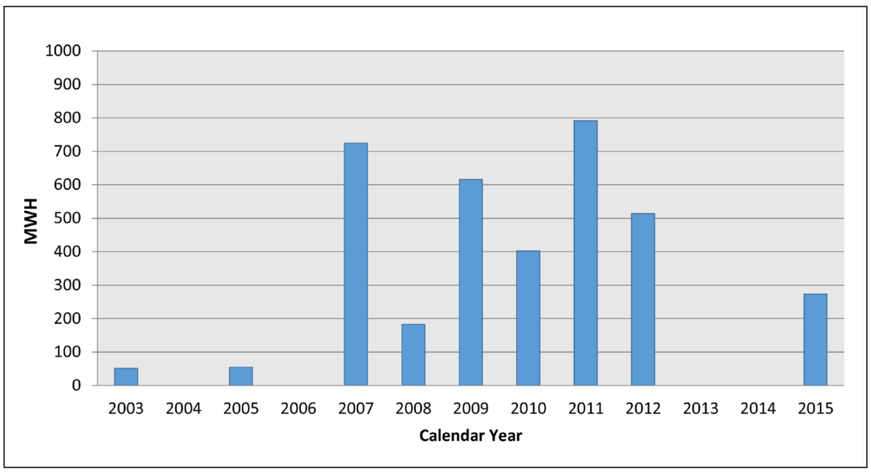


Figure 12.—Annual Illinois Wind Capacity Additions by Calendar Year. Source: IWWG

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 13 shows the wind farm capacity additions on a fiscal year basis. On this basis, 2012 was a record year with over 900 MW installed.

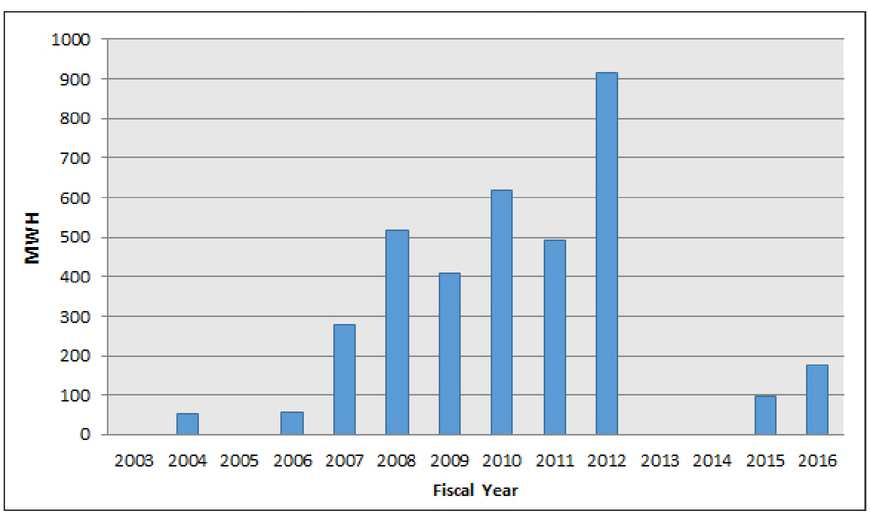


Figure 13.—Annual Illinois Wind Capacity Additions by Fiscal Year. Source: IWWG

Wind farm development has been concentrated in counties with the highest wind resources but is still fairly widespread. Eighteen different counties in Illinois have seen utility-scale wind farm development (Figure 14). McLean County has the most wind farm capacity with 546 MW or 15.1% of the total Illinois capacity. LaSalle County and Lee County have 9.8% and 9.7%, respectively, of the installed wind farm capacity in Illinois.

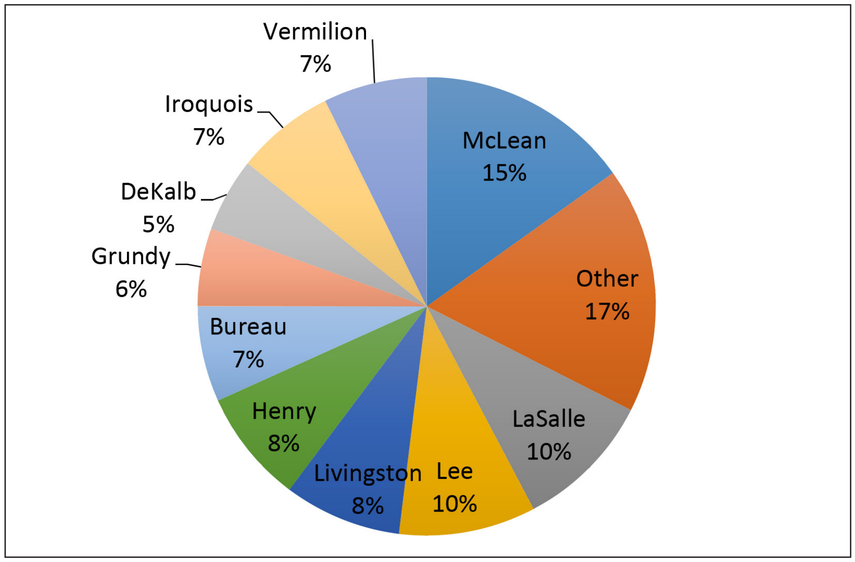


Figure 14.—Percentage Wind Capacity Installed by County in Illinois. Source: IWWG

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 15). Vestas and Gamesa are the second and third most popular turbine manufacturers with Suzlon being the fourth.

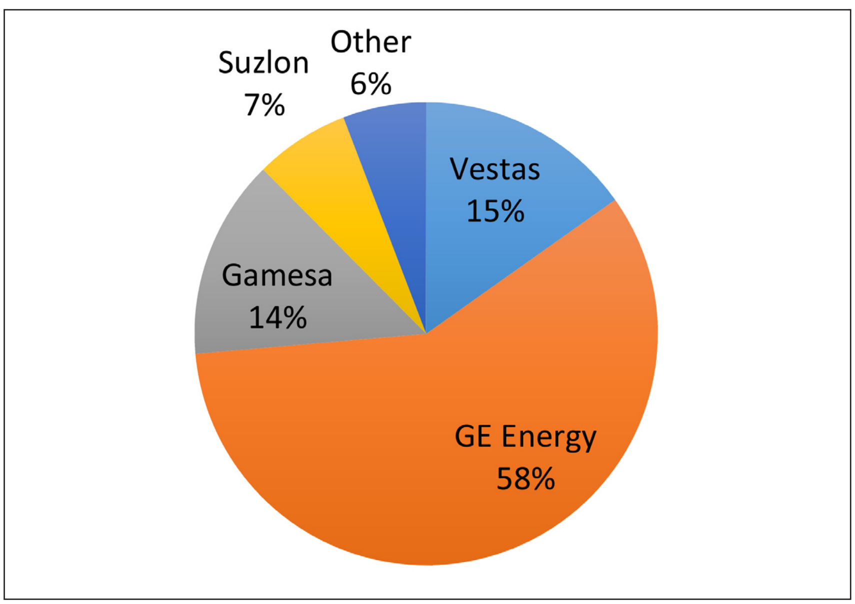


Figure 15.—Illinois Wind Turbines by Manufacturer Installed in Illinois. Source: IWWG

Many different wind farm developers/owners have been active in Illinois. EDP Renewables owns 22% of the wind farms installed in Illinois followed closely by Invenergy with 18% (see Figure 16). NextEra Energy Resources and Iberdrola Renewables both have 10% of the Illinois market. E.On, Edison Mission Energy, EDF Renewable Energy and Infigen have a combined 25% market share.

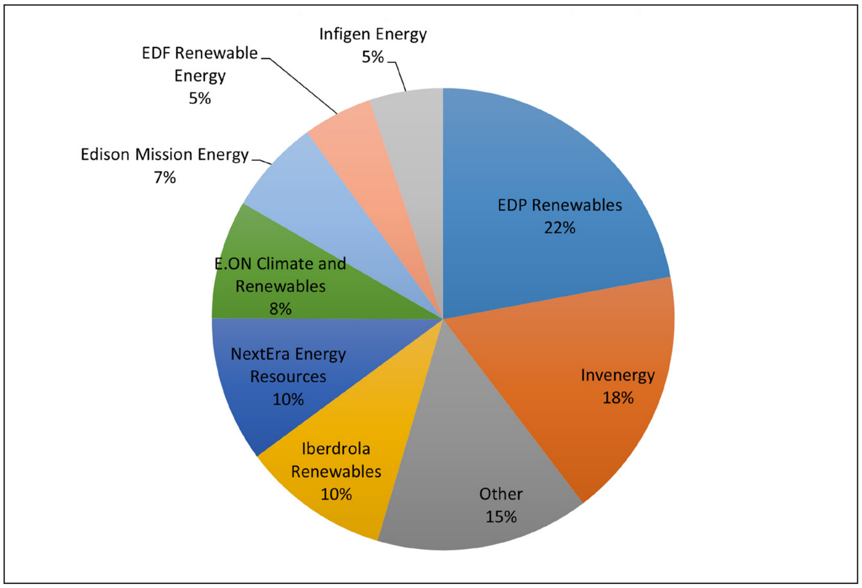


Figure 16.—Percentage Ownership of Wind Farms in Illinois. Source: IWWG

IV. Analytical Method

The JEDI Model

The economic analysis of wind power development presented here uses the National Renewable Energy Laboratory's (NREL) latest Jobs and Economic Development Impacts (JEDI) Wind Energy Model[4]. 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. 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 those funds 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 JEDI model was developed by Marshall Goldberg of MRG & Associates, under contract with NREL in 2002, to demonstrate the economic benefits associated with developing wind farms in the U.S. The 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, instead it focuses on the gross jobs that the new wind farm development supports.

[4] The 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 were estimated using JEDI release number W1.09.03e. The annual additions of 587.4 and 913 MW were estimated using JEDI release number W1.10.03. The latest addition of 274.9 MW was estimated using JEDI release W06.28.16. 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 Tegen, Keyser, Flores-Espino, Zammit, and Loomis, 2016; Tegen, Keyser, Flores-Espino, and Hauser, 2014; Zammit and Miles, 2013).

Direct Impacts

Direct impacts during the construction period refer to the changes that occur in onsite construction industries in which the final demand (i.e., spending on construction labor and services) is made. Final demands are goods and services purchased for their ultimate use by the consumer. 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:

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

Turbine and Supply Chain (Indirect) Impacts

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 the construction period consist of the changes in inter-industry purchases. They result from the direct final demand changes, and include construction spending on materials and wind farm equipment as well as other purchases of goods and offsite services. Indirect impacts during operating years refer to the changes in inter-industry purchases resulting from the direct final demand changes.

Examples of jobs, services, and turbine-related components in this category include[5]:

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

Induced Impacts

Induced impacts during construction refer to the changes that occur in household spending as that income increases or decreases resulting from the direct and indirect effects of final demand changes. Local spending by employees working directly or indirectly on the wind farm project who receive paychecks and subsequently spend money in the community is included. Additional jobs and economic activity are supported by these purchases of goods and services. Induced impacts during operating years refer to the changes that occur in household spending as that 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:

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

[5] 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).

Research Data

Lists of Illinois' wind power projects were obtained from the American Wind Energy Association[6] and the Illinois Wind Working Group[7] databases (AWEA, 2016; IWWG, 2016). 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 25 largest wind projects in Illinois (see Table 2 and Figure 17), which amounts to 3,609 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 accuracy. 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. JEDI model defaults for Illinois were used for information that was not available from developers.

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

Wind Farm	Location (County)	Capacity (MW)	Turbines	Units	Year Online
Pilot Hill	Iroquois and Kankakee	176.90	GE Energy	103	2015
Hoopeston Wind	Vermilion	98.00	GE Energy	49	2015
California Ridge	Champaign and Vermilion	214.00	GE Energy	133	2012
Bishop Hill I	Henry	209.40	GE Energy	50	2012
Pioneer Trail	Iroquois and Ford	150.00	GE Energy	134	2012
Settlers Trail	Iroquois	150.00	GE Energy	94	2012
Shady Oaks	Lee	109.50	GoldWind	94	2012
Bishop Hill II	Henry	80.00	GE Energy	71	2012
Big Sky Wind Farm	Bureau and Lee	239.40	Suzlon	100	2011
Top Crop Wind Farm Phase II	Grundy	198.00	GE Energy	132	2011
White Oak Wind Farm	McLean	150.00	GE Energy	114	2011
Streator Cayuga Ridge South	Livingston	300.00	Gamesa	150	2010
Lee-DeKalb Wind Energy Center	DeKalb and Lee	217.50	GE Energy	67	2009
Grand Ridge II, III, and IV	LaSalle	111.00	GE Energy	74	2009
Rail Splitter Wind Farm	Logan and Tazewell	100.50	GE Energy	145	2009
Top Crop Wind Farm Phase I	LaSalle	102.00	GE Energy	67	2009
Grand Ridge Wind Farm Phase I	LaSalle	99.00	GE Energy	67	2009
EcoGrove Wind Farm Phase I	Stephenson	100.50	Acciona Windpower	66	2008
Twin Groves Wind Farm Phase II	McLean	198.00	Vestas	36	2008
Providence Heights Wind Farm	Bureau	72.00	Gamesa	120	2008
Twin Groves Wind Farm Phase I	McLean	198.00	Vestas	100	2007
Camp Grove Wind Farm	Marshall and Stark	150.00	GE Energy	40	2007
GSG Wind Farm Phase I	Lee and LaSalle	80.00	Gamesa	120	2007
Crescent Ridge Wind Farm	Bureau	54.45	Vestas	33	2005
Mendota Hills Wind Farm	Lee	51.66	Gamesa	63	2003

[6] http://stats.awea.org/WindProjects/Report
[7] http://renewableenergy.illinoisstate.edu/wind/databases/

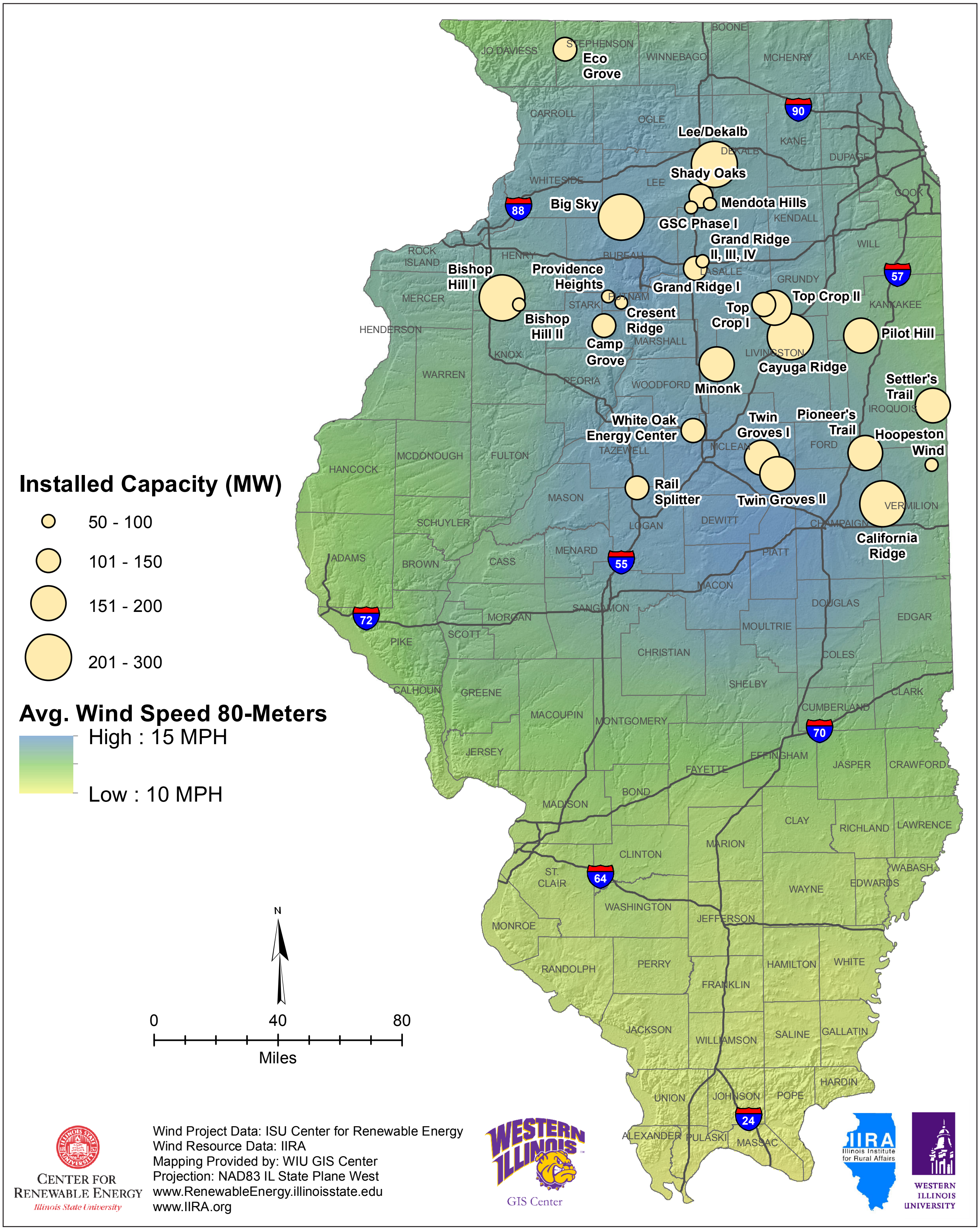


Figure 17.—Illinois Wind Projects and Wind Resources 2016. Source: Illinois Institute for Rural Affairs, Western Illinois University

V. Analysis and Results

Employment Impacts

Employment impacts can be broken down into several different components. Direct jobs created during the construction phase typically last anywhere from six months to over a year depending on the size of the project. However, the direct job numbers present in Figure 18 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 2,573 new jobs during construction; though the construction of the wind farms may have actually involved hiring closer to 5,000 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, as well as operations and maintenance jobs, all 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 25 largest wind power projects in Illinois support approximately 20,173 full-time equivalent jobs during construction periods, and are supporting approximately 869 permanent jobs in rural Illinois.

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 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 25 largest wind power projects in Illinois support local economies by generating over $30.4 million in annual property taxes[8].

[8] 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.

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 25 largest wind farms in Illinois are generating almost $14 million annually[9] 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 25 largest wind farms in Illinois will generate a total economic benefit of $6.40 billion over the life of the projects (construction and 25 years of operations were assumed in this calculation).

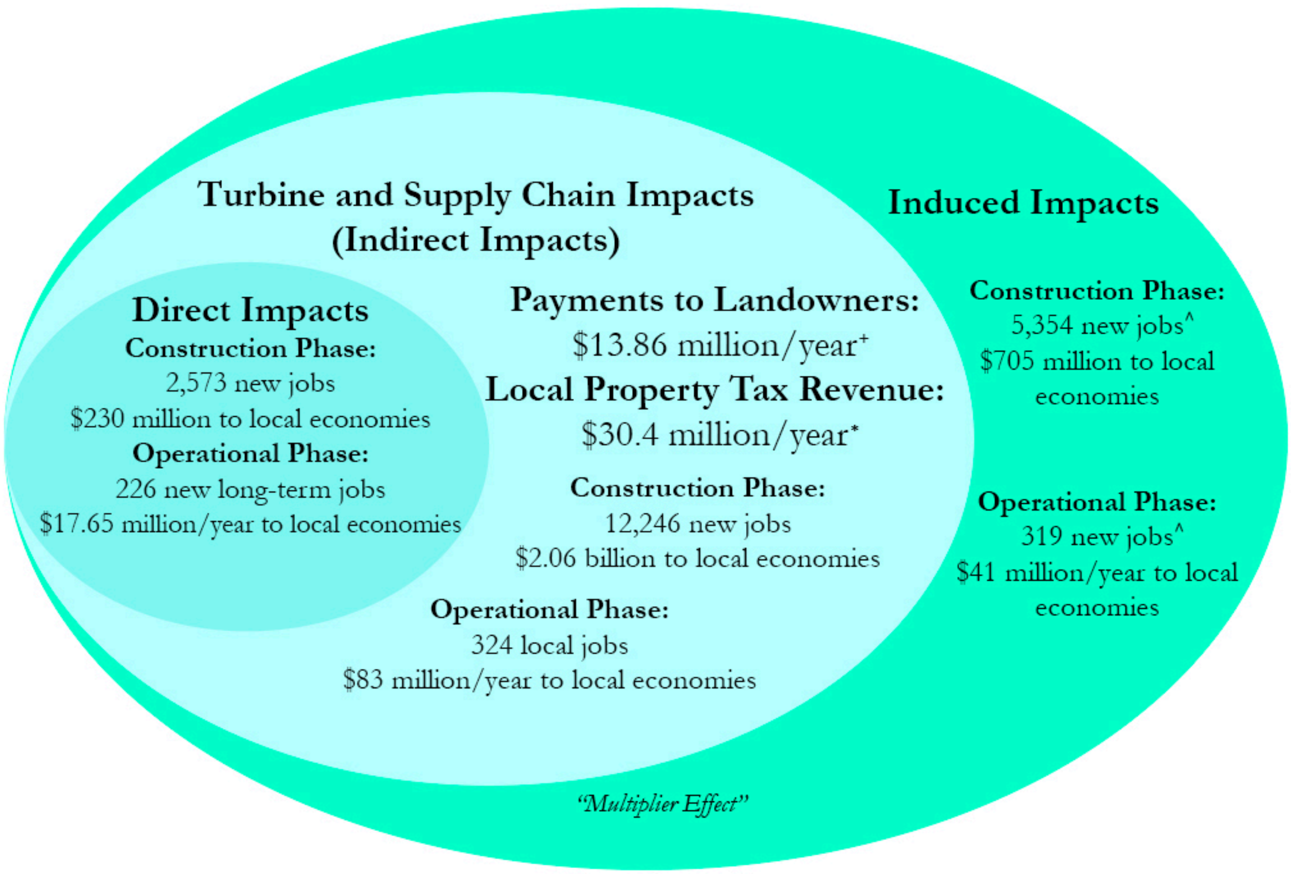


Figure 18.—Direct, Indirect and Induced Impacts from 3,609.81 MW of Wind Energy Development in Illinois

Notes: All dollar values have been converted to 2008 dollars. JEDI versions 1.09.03b, 1.09.03e, 1.10.03, and W06.28.16 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; (3) inflation; and (4) 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.

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

Table 3.—Economic Impacts from Illinois' 25 Largest Wind Farms (3,609.81 MW)

	Total Jobs^	Total Output
Construction		
Project Development and Onsite Labor Impacts	2,573	$ 230 million
Turbine and Supply Chain Impacts	12,246	$2,064 million
Induced Impacts	5,354	$ 705 million
Local Jobs during Construction	**20,173**	
Operations		
Onsite Labor Impacts	226	$ 17.65 million/year
Local Revenue and Supply Chain Impacts	324	$ 83.1 million/year
Induced Impacts	319	$ 41 million/year
Local Long-Term Jobs	**869**	
Total Economic Benefit	**$6.40 billion**	
Payments to Landowners+	**$13.83 million/year**	
Local Property Tax Revenue*	**$30.40 million/year**	

Notes: All dollar values have been converted to 2008 dollars. JEDI versions 1.09.03b, 1.09.03e, 1.10.03, and W06.28.16 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; (3) inflation; and (4) 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.

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