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Converting Wind into Opportunity in Illinois

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The potential for wind energy generation in Illinois has yet to be fully realized, with slightly more than 300 megawatts (MW) installed at the end of 2007. By comparison, the American Wind Energy Association (AWEA) (2007) reports that the United States' wind energy capacity exceeded 16,000 MW—enough to power over five million homes annually. Data from Midwest ISO (2007), a power management organization, indicates that future development in Illinois could exceed 9,000 MW. Wind energy represents an economic development opportunity for rural communities by providing a source of landowner revenue, jobs, and tax revenue. One opportunity may be found in direct ownership of generation capacity or indirectly through land leases.

This report examines direct ownership of development opportunities by addressing the best practices and opportunities in Illinois. The focus is on rural stakeholders, specifically landowners and local governments who need assistance in properly assessing the viability of a project and how they can take advantage of the opportunity.

A majority of wind energy development occurs through private investment in multiple utility-scale turbines congregated in wind farms. Private equity wind farms make lease payments to land owners, generate jobs, and pay taxes to local governments. Community wind projects represent the remaining projects with some level of direct ownership by the community. For example, schools, rural or municipal electrics, local government, and/or landowners generate power for their consumption and/or sell excess power to the utility. These turbines are financed through various arrangements that can include grants, bonds, loans, and equity.

Both private equity projects and community-based projects can create value for communities. Understanding the requirements, impacts, and outcomes of wind energy development is complex, however. The key challenge is having access to the information needed to evaluate the opportunities.

Background

In 2001, the American Corn Growers Association conducted a nationwide survey of members in regards to wind energy. Some of that survey's findings were that 88 percent supported the development of wind energy, only 47 percent would invest in it, and 18 percent did not know. Since their land would be necessary for wind energy development, and farmers are risk takers by the nature of their business, it seems plausible that the difference could be a lack of information.

The U.S. Government Accountability Office (2004) reinforced this notion in its 2004 renewable energy report, *Wind Power's Contribution to Electric Power Generation and Impact on Farms and Rural Communities*, when it stated that "some farmers indicated it was difficult to make informed decisions about owning a wind power project or leasing their land to a commercial wind power developer because of a lack of readily accessible information" (p. 41).

Illinois's wind resource is less than some other states in the upper Midwest and the Great Plains. According to maps from the National Renewable Energy Lab (1986), the majority of Illinois has marginal or unsuitable wind

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power, while significant portions of Minnesota and Iowa are excellent. Illinois does have advantages in infrastructure and markets that compensate for the inferior wind resource. The advantages are due to the significant electricity generation capacity and transmission lines necessary to transport the electricity generated. Although renewable energy supplies in Illinois account for only 1.0 percent of the energy supply, nuclear generation contributed 52.1 percent of the energy generated, and, according to the Energy Information Administration of the Department of Energy (DOE), Illinois's nuclear capacity would rank 8th in the world if it were a nation (see Table 1).

Table 1. Illinois Power Generation for May 2007

Type	Supply	Share
Nuclear	7,863,000 MWh	52.1%
Coal-Fired	6,481,000 MWh	42.9%
Natural Gas/Oil	596,000 MWh	4.0%
Renewables	153,000 MWh	1.0%
Total	15,093,000 MWh	

Source: Energy Information Administration 2007

Best Practices

Local acceptance of projects is enhanced when an entire community perceives benefit—whether a project is proposed by a developer or by the residents. This public support facilitates smoother project development and implementation. Some European countries and states in the U.S. have implemented policies and incentives that create an environment conducive for wind energy development by communities. These programs influence the development pace and the type of ownership of wind turbines.

In Europe, there has been rapid development with several ownership models in place (Bolinger 2001). For example, Germany's wind environment is similar to Illinois, yet it leads the globe in wind energy production. The initial growth in wind energy resulted from a feed-in law. Originally, the law required utilities to pay for wind energy at a rate of 90 percent of the average retail rate. These rates have been reduced over the years, but the impact on wind energy development was, and continues to be, significant.

In 2004, one-third of the wind capacity in Germany was owned by individual investors by way of Limited Liability Associations (LLA) of Landowners (Gipe 2004). This arrangement represented between 200,000 and 300,000 investors owning 4,000 MW of installed capacity. The LLA can be either restricted to landowners in the community of power generation or can include investors from other communities.

The LLA is actually a partnership between local investors and a developer. It is similar to the General Partnership in the United States. The developer is the general partner and local investors are limited partners in each project (Bolinger 2001). Just as in the U.S., revenue is proportionate to interest ownership and passed through to partners who then pay taxes at their personal rate.

Community wind projects also exist in the United States. Minnesota and Iowa lead the nation in community wind projects, with over half of the total number. Community wind projects, however, now exist in 11 states (see Table 2). Community development is fostered by information, policies, and incentives. It should be noted that the federal government also provides incentives for development, but the unique actions taken by each state are what drive the community development. For example, Minnesota requires that a portion of its renewable energy requirement be produced from community projects. This production is limited to a maximum of two MW per site. In addition, a cash production incentive of 1.5 cents per kilowatt hour (kWh) for the first ten years of production is provided by the state to supplement the sales price to the utility.

Table 2. Community Wind Projects

State	Community Projects
Minnesota	28
Iowa	15
North Dakota	7
South Dakota	5
California	5
Colorado	3
Illinois	3
Idaho	1
Montana	1
Wyoming	1
Oklahoma	1

Source: AWEA 2007

The combination of state or federal policies and incentives has created an excellent opportunity for community-owned turbines in Minnesota. Armed with the cash flow incentives provided by the state, individual investors have applied for U.S. Department of Agriculture (USDA) 9006 grants that provide a portion of the capital for construction. Small

projects, less than two MW, are known as MinWins and were also funded from this grant program.

Each project is designated by a number. For example, MinWin I and MinWin II, the first two projects, were owned by a total of 62 investors of which 85 percent were farmers. There are nine MinWin wind farms, with numbers III through IX being completed in 2004 (Windustry 2002). MinWins are Limited Liability Corporations in which single ownership cannot exceed 15 percent.

The federal incentives and policies are listed in Table 3. Generic state incentives and polices are cited to provide an example of the type of actions states are initiating to increase wind power.

Another significant project is Trimont, which is considered the largest landowner power plant in the United States. It consists of 100 MW of capacity and covers parts of two counties in southern Minnesota. It has 43 landowners with 67 turbines in an arrangement where the operations are contracted to PPM Energy—an experienced developer and operator in the wind energy field. The power is purchased by Great River Energy, a rural electric cooperative that generates power (PPM Energy 2005).

Iowa also has good wind resources and is a vast, rural agricultural region. Iowa differs from Minnesota in that it has several large-scale commercial wind farms and its community ownership is weighted toward school districts. There are also municipal utility turbines and landowner (individual investor) turbines. The school districts and landowners benefit from the net metering law of the state, which requires local utility providers to account for the turbine's production and compensate for that production. The utility offsets the owner's consumption with the turbine's production at the retail rate. If production exceeds consumption, the surplus is delivered to the utility. The utility purchases the surplus at a rate known as avoided cost or at a higher negotiated rate. *Avoided cost* is the incremental cost of having to generate the next watt of electricity. It is, essentially, the cost of the fuel.

Table 3. Examples of Incentive and Policies

State
Renewable Portfolio Standards – Mandates on an amount or a percentage of renewable energy delivered by utilities
Net metering – Producing all or a portion of own consumption with excess sold to local utility
Production tax credit
Production payments
Federal
Production tax credit of 1.9¢ per kWh
5-year accelerated depreciation
Community Renewable Energy Bonds (CREBs) – No interest loans
USDA 9006 grants – Available for landowner projects

Source: Shoemaker and Brekken 2006.

This arrangement can work well with a school because it can be the largest, single consumer of electricity in many rural communities, and the offsetting benefit impacts all taxpayers of that school. A turbine should be a size that eliminates retail consumption for maximum return on investment dollars, unless the rate received for surplus justifies the cost of a larger turbine.

Illinois Status and Opportunity

The first utility-scale turbines were installed at the Mendota Hills wind farm in late 2003 with 50 MW of capacity. In January of that year, the AWEA (2007) reported that Iowa had 423 MW, Minnesota had 336 MW, and Wisconsin had 53 MW. The late start in Illinois may be due to the relative difference in wind resources. Two of the next three projects in Illinois were community wind projects—Bureau Valley School and the Illinois Rural Electric Cooperative (see Table 4). These projects were accomplished through the hard work of champions within the respective organizations. In-state technical assistance was limited.

Organizations in Illinois provide technical assistance or financing for wind projects owned by Illinois entities. For example, state and federal programs provide grants and loans. At the federal level, USDA Rural Development (RD) has helped applicants secure funding from USDA 9006 grants to cover a portion of development costs. This grant

Table 4. Wind Energy Capacity in Illinois

County	Developer	Year	MW	# of Turbines
Lee	Mendota Hills	2003	50.40	63
Pike	Illinois Rural Electric Cooperative	2005	1.65	1
Bureau	Crescent Ridge	2005	54.00	33
Bureau	Bureau Valley School	2005	0.66	1
Bureau	AgriWind LLC	2007	6.00 to 8.00	4
Lee and LaSalle	GSG Wind Farm	2007	80.00	40
McLean	Twin Groves I	2007	198.00	120
	Twin Groves II*	2007	198.00	120
Stark and Marshall	Camp Grove Wind Farm	2007	150.00	100
Rock Island	Erie Community Unit School District*		1.20	1

*Under construction

Source: AWEA 2007; *Bureau County Republican* 2007

program is announced each spring with an application deadline in early summer.

Two grant programs unique to Illinois are provided by the Illinois Clean Energy Community Foundation (ICECF) and the Illinois Department of Commerce and Economic Opportunity (DCEO). The ICECF provides grant funds to not-for-profit entities for feasibility work and has purchased green tags on some of the same projects to assist in financing construction. These green tags are marketable commodity certificates with underlying value represented by a quantity of electricity generated from renewable resources. ICECF has also funded technical assistance activities conducted by institutions and agencies.

DCEO has periodically offered grant programs to partially fund small turbines intended for use by single households. In addition, it has funded technical assistance, targeting policy to create economic development and sustainable energy. The Illinois Finance Authority has also offered grant funds for wind turbines. The first two community projects completed were partially funded by the programs highlighted. The Bureau Valley School wind turbine received partial funding from ICECF and DCEO, while the Illinois Rural Electric Cooperative received partial funding from USDA RD, ICECF, and DCEO.

Technical assistance of a leveraged nature has been delivered through policy action and information disseminated via public forums, publications, and websites. Four organizations have led in this effort to educate and enable the public to pursue projects:

1. The ICECF has provided funding for information forums and feasibility studies for proposed projects.

2. The Environmental Law and Policy Center has been a leader in sound policy formation and has provided forums, publications, and Web information to educate leaders.

3. The Illinois Institute for Rural Affairs (IIRA) at Western Illinois University has held wind seminars beginning in 2004. It has also provided wind data to the public to inform and facilitate community wind development projects. These data are accessed on the Web and are used in feasibility studies and as part of grant requests. In 2007, the website, **www.illinoiswind.org**, received 7,070 unique visits of which 5,049 accessed wind data.

4. The Illinois Wind Working Group was established in 2007 at Illinois State University. This organization conducts seminars and pursues activities that contribute to the advancement of wind energy. The first annual conference had more than 200 participants. More than 300 participated in a late fall 2007 zoning workshop.

Gauging the success of leveraged technical assistance is difficult, but the Wind Data Program sponsored by ICECF in the IIRA provides one indication. Formally known as the Wind Monitoring Program, it began in 2005 and has a total of 23 monitoring locations (current or former collection sites) throughout the state (see Figure 1). The data are collected on either portable 50-meter (165-foot) towers or on communication towers at heights of up to 90 meters.

During the three-year period of the program, 125 applications were received. Applicants included farmers, economic development personnel, school districts, community colleges, county government, city government, a municipal electric association, a rural electric association, and small businesses. Commercial development activity is underway on three sites as an outcome of the program, plus one community and several school districts are pursuing the feasibility of funding projects with wind data in hand. In addition, the concept of allowing schools to site turbines in appropriate wind locales as opposed to only on school premises was conceived because of this program

Figure 1. Wind Monitoring Locations

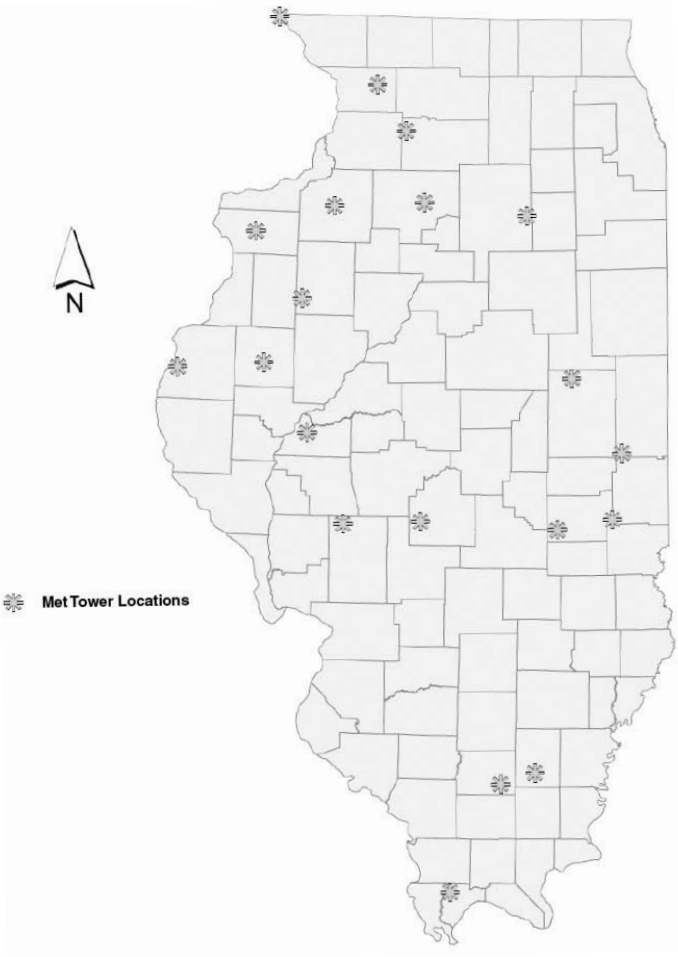


Table 5. Illinois Legislative Action, 2007

Bill	Title	Summary	Status
HB 0620	Zoning – Wind Farms	County ordinances standardized	Public Act 95-0203
SB 843	Education – Tech	Provides for school ownership jointly with other schools and in appropriate areas	Public Act 95-0390
SB 0680	Electricity Net Metering	Systems up to 2,000 kW qualify: Up to 40 kW systems, customer carries a credit on monthly excess generation and unused credits expire at end of year; systems 40 to 2,000 are reimbursed monthly on excess at avoided cost.	Public Act 95-0420
HB 0285	School Renewable Energy Grants	Establishes program to assist school districts in adding renewable energy sources—50% cost share, up to $1 million	Public Act 95-0046
SB 1592	Utilities – Renewable Energy	Establishes renewable energy portfolio—2% at end of 2008, then increasing annually at various rates to 25% by 2025	Public Act 95-0481

Source: Illinois General Assembly 2008

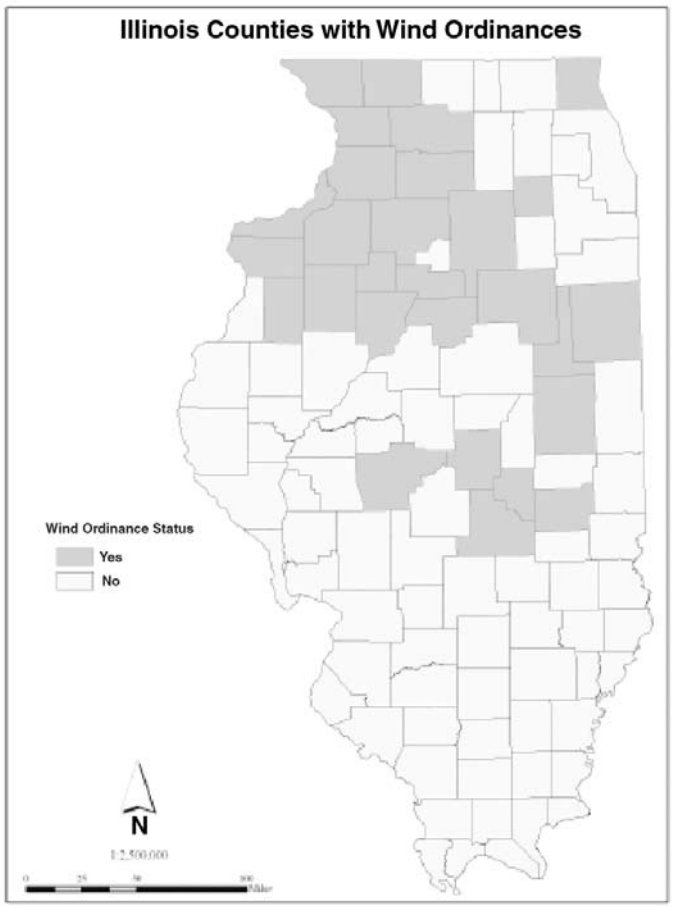
(Public Act 95-0390, passed in 2007) (Illinois General Assembly 2008) (see Table 5).

Many issues and challenges are involved in developing wind energy in the state, but most are beyond the scope of this report. One issue that may be reflected in community projects, however, is zoning. Shoemaker and Brekken (2006) observed that simplified regulatory requirements, such as zoning laws, facilitate community wind projects. For example, in some states, the zoning process for wind farms is at the state level.

In Illinois, zoning is handled at the county level, and 45 out of Illinois's 102 counties do not have zoning requirements. In a survey conducted by IIRA, 30 counties have developed a wind ordinance either for existing projects or in anticipation of future projects (see Figure 2). Fifteen of the counties took action following wind development activity. A model ordinance, created by the Chicago Environmental Law Clinic and Baker & McKenzie, was used either directly or indirectly in most counties (visit **www.illinoiswind.org** for more information).

The indirect use was by accessing ordinances from counties that had crafted their ordinances based on the Internet model. The requirements and processes vary based on specific needs of the counties. In the fall of 2007, the state took action through legislation to define minimum requirements and jurisdictions such as the requirement for a hearing and jurisdictions of counties and respective incorporated areas to facilitate consistent processes.

Figure 2. Wind Ordinance Status



The Future

The recognition of wind as a resource rather than a nuisance is made possible by improvements in technology, policy, and access to information. This recognition is creating economic opportunities for communities to engage in wind energy projects. The establishment of renewable energy mandates will assist in the development of wind energy throughout the state. Advances in technology will also create more opportunities. Moore's Law states that computer data processing power doubles every 18 months to two years. A similar rule seems to hold true for wind

turbine technology as turbine capacity has doubled nearly every three years. Since increasing height is a key component to the capacity growth, the acceptance of taller turbines may plateau the trend.

The pace of change in infrastructure, policy, and stakeholder acceptance is not at the same steady rate as technology and will resemble a step change, which means dramatic shifts will be preceded and followed by static periods. For example, adding transmission requires complicated and prolonged regulatory activity, followed by extensive time to construct. Once in place, however, there will be a dramatic shift in capacity. Policies have the same step change since enactment can create an influx of new activity.

Community projects will be possible with the assistance of sound state policy, appropriate technical assistance, and affordable mid-sized turbines. This is not an established market yet since wind farms seek maximum capacity turbines. Mid-sized, usually from 100 to 600 kWh capacity, are right-sized for community projects so that generation stays within usage on an annual basis and costs remain less than the large-scale turbines. The demand—and therefore supply—is limited at the moment, but changes in policy and incentives could create demand and open up this market.

Communities throughout the state are investigating the potential for generating electricity from wind. It is possible that local electricity generation may be viable for many, thus creating changes in rural electric power unlike anything since the establishment of rural electric cooperatives.

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