Lessons & Concepts for
Advancing Community Wind

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For More Information

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ABOUT THE MINNESOTA PROJECT The Minnesota Project is a nonprofit organization that champions the sustainable production and equitable distribution of energy and food in communities across Minnesota.

Our programs are focused on the development, conservation and efficient use of renewable energy; farm practice and policy that promote profitable farms that protect and replenish the environment; and the production and consumption of local, sustainably grown foods.

Through collaborative leadership we demonstrate practical solutions as a basis for future policy. For over thirty years we have fostered local empowerment, bridged diverse interests, encouraged shared values, and initiated working dialogues that create positive action and effective policies.

Visit us on the web at www.mnproject.org, and check out our new blog, Centered on Sustainability, at www.mnproject.org/blog.

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Cover Photo *Windmills on Farmland* by Eric Gevaer

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Toward a sustainable energy future

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EXECUTIVE SUMMARY

As more and more Americans recognize the level of dependence we have on others for our energy there is growing interest in becoming truly energy independent. Independence means different things to different people. For some, independence means freedom from having to rely on foreign sources of fossil fuels. For others, independence means transportation, thermal and electric energy self-sufficiency as a nation. And for others still, energy independence begins (and ends) with the local community.

Regardless of one's definition of energy independence, the concept and its application are constantly evolving, and we are still in the early phase of that transition—where the rubber hits the road, so to speak. Achieving this broad goal will take projects of all types and sizes. No renewable energy technology can get ignored as each state and region possesses different renewable resources.

One renewable resource that is more widely available than most others is wind. Future potential aside, wind energy technology is one of the most cost competitive renewable energy technologies today. It is no secret why wind energy has experienced the largest growth rates over the past ten years compared to all energy systems, renewable or otherwise [1]. Wind energy continues to experience double digit growth rates because of the relatively cheap technology and the widespread availability of wind resources. Meanwhile, transmission restraints increasingly pose a problem to the development of large-scale wind farms located considerable distances from the load centers they serve.

So it seems the current situation is an apt opportunity for communities across America to pursue local community-owned wind energy projects to help meet their electricity and contribute to the national goal of sustainable energy independence while also maximizing the economic benefits of wind projects for local communities [2]. Numerous studies have now shown that locally-owned wind projects produce disproportionate benefits to the local community and region [3].

Yet, relatively few are familiar with concept and structure of community wind. Moreover, many economic and policy barriers currently stand in the way of further development of community wind. *Lessons and Concepts for Advancing Community Wind* provides three case studies of community wind projects that have pioneered different paths to a community wind destination. These case studies tell the stories of Winona County and the City of Willmar in Minnesota and Miner County in South Dakota. Community leaders in all three communities worked tirelessly (and continue to do so in the case of Winona) to take an idea from concept to completion. Each experienced numerous and varying hurdles and developed different strategies to overcome those hurdles.

Despite the different paths and experiences, three common characteristics define these case studies: vision, inclusion, and persistence. Perhaps the biggest indicator of success in completing a community wind project was the establishment of a larger vision for the community in which a community wind project was not the entire goal, but simply a

These case studies tell the stories of Winona County and the City of Willmar in Minnesota and Miner County in South Dakota. Leaders in all three communities worked tirelessly to take an idea from concept to completion. Each experienced numerous and varying hurdles and developed different strategies to overcome those hurdles.

Photo by Mark Lindquist

piece of the puzzle. Developing a community vision also presents the opportunity to lay the groundwork for consensus on pursuing a sizeable project such as a community-owned turbine.

Inclusion of the entire community in the planning and implementation discussion of the specific community-owned wind project also played a determining role in seeing a project to fruition. Public meetings and open forums to both present project plans and provide community members with opportunities to influence the project have proven in these case studies to enhance project success.


Photo by Marco Richter

These case studies demonstrate that even after extensive visioning and planning processes and community discussions, projects can run into numerous barriers. Persistence on the part of project leaders is imperative. Again, having gone through the visioning and planning process often helps instill a level of persistence to see the long process required to fulfill a large (and often distant) future community vision. Time and again, the willingness of project leaders to overcome difficulties, and even restart the entire project process in some cases, has proven a valuable asset and is evidenced in the case studies presented.

Community-wind project success is not simply a measure of community preparation or project leader determination. Unfortunately, the presence of numerous barriers stands as the rule, rather than the exception to community-owned wind projects. Understanding those barriers is the first step to addressing them on a project level as well as policy level. Common barriers include project financing, multiple regulatory processes and standards, electricity pricing negotiation, and transmission availability and access. *Lessons and Concepts for Advancing Community Wind* will examine each of these issues further in depth to prepare community members interested in pursuing projects as well as inform policy makers at the local, state, and federal level interested in providing policy solutions to reduce barriers in the community wind process.

While government policies or legislation cannot address all of the barriers outlined in this study, there are nonetheless a number of policy solutions that could help address some of the inordinate difficulties communities face in developing community-owned wind projects. Government policies will not change the need for strong local leadership or an inclusive planning process, but if designed well they will prove quite useful in simplifying the process to establish community wind projects, create more cost and income certainty, and help reduce information barriers that currently prohibit further community wind development. Most of the policy solutions presented in *Lessons and Concepts for Advancing Community Wind* apply at the state level where much of the regulatory control currently resides. In some policy solutions, simple definitional changes could create more opportunity for residents to participate in community-based wind projects. Other policy changes would address energy transmission access and availability through changes in regulatory processes or new methods of addressing transmission line planning. Still other policy changes would require stronger financial dedication on the part of states to ensure faster payback periods for community-owned projects.

INTRODUCTION

Energy issues seem to be omnipresent these days, and not just for those "in the field." All Americans have taken a heightened interest in energy as a result of the oil price run-up of 2007, which sent shockwaves throughout the American economy and society. What was once an afterthought for millions of Americans has become a painful reminder of just how dependent we have become on fossil fuels—whose cost and supply are largely controlled by companies and other nations.

The realization of dependence has come to a head regarding our electricity as well. Granted, the fossil fuels on which we are most dependent for our electricity—coal and natural gas—come from within the country. Recent increases in electricity costs have had a great cost on Americans of all stripes.

Millions of consumers have found that both forms of dependence have led to unhealthy relationships in which they are entirely beholden to distant entities. For both our transportation and electricity systems, millions of consumers essentially import energy into their area and export dollars, dollars that can no longer benefit the community. Under such circumstances the quest of energy independence has gained strength from all points of the political spectrum. Admittedly the idea of energy independence has been around for quite some time, but events of the last decade have only served to add impetus for true energy-independent systems.

For both our transportation and electricity systems, millions of consumers essentially import energy into their area and export dollars, dollars that can no longer benefit the community.

Under such auspices was born the concept of community wind. Tired of seeing minimal economic benefits remain in the communities which house wind energy farms, proactive industry and political leaders sought out organizational structures and legislative policies that would enhance the opportunities for local community ownership. Similarly, many communities did not want to wait around for outside wind experts to arrive in order to develop their wind energy. Many Midwestern residents hold onto that "can do" independent spirit.

Community Wind in Minnesota

Indicative of that spirit, the Minnesota Flip model developed in response to growing demand for local participation in ownership within a federal tax reality, which provided important investing advantages to large-scale investors with taxable passive income. The Federal Production Tax Credit (PTC), which provides a tax credit based on annual renewable energy production, was designed to apply only to passive or investment income. This stipulation places considerable restraint on its application. Essentially, only those making sizeable sums of money from investments can benefit from the PTC.

The Minnesota Flip developed to allow investors to take advantage of the Production Tax Credit while creating opportunity for community members to participate in ownership beyond simple land lease payments. For the first ten years of the project, investors own the lion's share of the project in order to obtain the 10-year Production Tax Credit to reduce taxable passive income. After that, the ownership flips to local investors so they may gain the income over the remaining life of the project [4].

Photo by Mark Lindquist

In 2005, the Minnesota Legislature passed the Community-Based Energy Development Initiative, better known as C-BED, which sought to increase local ownership opportunities in the burgeoning wind energy industry by defining ownership parameters, placing requirements on utilities to consider C-BED projects for filling Renewable Portfolio Standard requirements and offering unique payment methods that assist C-BED projects to more quickly and easily fill debt obligations, as well as creating state-funded loan programs designed to assist the development of C-BED wind projects.

Under current conditions, it is perhaps all the more imperative that we learn from the communities that have found a way to endure through the struggles of finding the financing and navigating the unfamiliar and relatively unsettled permitting process for community wind projects, all the while maintaining community support for projects that can take years from initial concept to construction and then operation.

Problems with each model aside, the Minnesota Flip and C-BED legislation helped spur community-owned wind while providing a sense of optimism for the future. In the wake of the 2005 passage of the initial C-BED legislation, Minnesota Governor Tim Pawlenty announced a goal of adding 800 megawatts of community-based energy development in Minnesota by 2010 [5]. To some extent, the ebullient attitude represented by Governor Pawlenty's C-BED proclamation had real potential. By July of 2008, Minnesota had 320 megawatts of installed community wind out of 1,299 megawatts of total installed wind [6]. Only Nebraska, with 73 megawatts of community-owned wind and Washington with 205 megawatts, came remotely close to matching Minnesota's success [7].

It appears to be no coincidence that Nebraska was the only other state in the nation with a C-BED policy similar to that of Minnesota's. Since then, reality has fallen far short of achieving the high expectations set out for community-owned wind. As of June 30th, 2009, a total of only 121.6 megawatts of C-BED projects have been completed in Minnesota, not including projects completed through the Minnesota Flip model [8]. Certainly the economic downturn, the largest now in the post-World War II period, played a part in the decline of community-owned wind. Few people, investors or otherwise, have much extra money lying around. Many are simply trying to make ends meet, let alone invest in wind energy projects.

Communities Building a New Model

Unfortunately, other forces are at work as well to make C-BED projects more difficult than necessary. While the initial 2005 legislation and subsequent amendments have improved the usefulness of C-BED policies, difficulties nonetheless remain—but not just with policies and regulation. Issues of financing, zoning, local leadership, establishing transmission, and other problems have created a collection of barriers that can kill community wind projects at any stage of development—even in the early stages of scoping and feasibility.

Under current conditions, it is perhaps all the more imperative that we learn from the communities that have found a way to endure through the struggles of finding the financing and navigating the unfamiliar and relatively unsettled permitting process for community wind projects, all the while maintaining community support for projects that can take years from initial concept to construction and then operation.

The three case studies presented here examine their stories of success at beating the odds and overcoming the many barriers. Winona County and the City of Willmar in Minnesota and Miner County in South Dakota all developed community wind projects, using different paths to reach the same goal—community wind projects that provide local energy, spur local economic opportunity and provide an investment opportunity, while creating a project that both reflects and builds upon community empowerment. Through tireless dedication on the part of many,

these communities have found ways to not only beat the odds, but often to forge new pathways to success. Their experiences will prove useful in guiding other communities to success while also highlighting barriers and potential policy solutions.

The case studies presented will examine the community wind projects from within. The experiences of the leaders of these projects offer insight into the nuts and bolts aspects of moving projects to fruition as well as personal experiences in confronting barriers. The analysis following the case studies provide further insight into barriers, examining not just the experiences of those in the case studies, but delving into some of the details of the unique problems created by each barrier. Finally, this study will introduce a number of policy solutions to many of the barriers currently inhibiting community wind development. The policy solutions are targeted at the state level where government has the greatest role in shaping energy development and inciting or inhibiting individual projects.

The case studies and policy analysis presented here will prove useful for community leaders seeking examples of effective pathways. They can also inform policy makers at the local, state, or federal level interested in increasing clean energy opportunities for local communities. If we are to take strides toward energy independence, we will need new policies that simplify the community wind development process, and best-practice models that provide imperative insights into the complicated development process.

Local crew inspects base of Willmar turbine *provided by Jon Folkedahl*

SECTION ONE: COMMUNITY WIND CASE STUDIES

When comparing the three community wind programs, an abundance of differences become apparent. A divergence in everything from funding sources to potential wind capacity [9] separates these communities. Yet, these very differences underscore the possibility for wind energy programs not just in economically prosperous communities or on the wind-swept prairies of the Great Plains; but in a wide range of cities and towns throughout the country. As the next industrial revolution gains momentum, the ranks will not be drawn between those who can and those who cannot benefit from wind energy; but rather between those who will and those who will not.

As one will see in the three cases presented here, the greatest barrier to enacting wind energy programs on a community scale is not a lack of fruitful sites or effective technology, but a lack of communities establishing a vision and plan to use their natural resources in such a way as to maximize the benefit to the local economy.

As one will see in the three cases presented here, the greatest barrier to enacting wind energy programs on a community scale is not a lack of fruitful sites or effective technology, but a lack of communities establishing a vision and plan to use their natural resources in such a way as to maximize the benefit to the local economy. Too often, investments in alternative forms of energy are seen collectively as too expensive for communities to pursue, diverting precious resources from other necessary endeavors. For many, community wind projects are seen as a luxury. But, as in Miner County, these programs can become the centerpiece to economic revitalization, giving once-struggling rural communities the opportunity to not just develop local renewable energy, but also improve education, job creation, and overall quality of life. Not only can these community wind projects pay for themselves, as the citizens of Winona have discovered, tax payers stand to gain millions of dollars through the sale of electricity and energy-cost relief from escalating fossil fuel prices through their wind programs. And, as the Willmar Municipal Utility Company can attest, these projects are not dependent on agreements or assistance from outside energy companies or even the federal government. They can be both sustainable and self-sustaining.

The most notable commonality between these three communities is less about *how* they achieved their wind-power goals than *why* they were able to achieve them. In all three cases, the greatest difficulty came in convincing doubters of the profitability of wind power and navigating a labyrinthine system designed to benefit large corporations and utility companies. It was public will—often mustered by a tireless county commissioner or a provident local school teacher—that drove these plans, in spite of conflicting state and federal guidelines and the green-fatigue of pushing toward a place America is woefully late in reaching. After all the time and effort spent clearing these hurdles, the process of actually getting the turbines up and running seems almost simple in comparison, a basic public works project requiring the same considerations as building a bridge or a shopping mall: zoning, funding and a workforce to complete the construction.

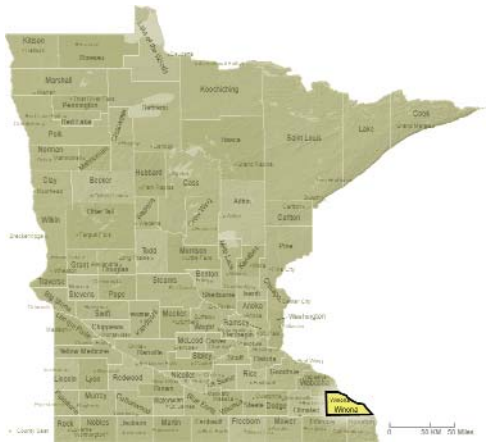
Photo by Rural Learning Center

These pioneering communities serve not just as practical models for other communities pursuing their own wind programs, but as trailblazers, whittling down the obstacles through legislative reform and expansion of access to funding for the communities to follow in their footsteps.

Winona County, Minnesota

Winona County's community wind project serves as an instructive model for the wind energy process, encapsulating many of the successes and challenges faced by communities with aspirations for early adoption of the technology. The effort, which began in 2005, has had its share of obstacles. But strong and sustaining public support in the face of such a lengthy planning stage is evocative of a general trend toward an environmentally sustainable industry in Winona, a trend the people behind the project intend to export to the rest of the region. In an explanation of the county's broader goals for the project, Linda Grover, director of the Winona County Economic Development Authority (EDA), wrote, "The project provides a model for other statewide Economic Development Authorities. Our experiences may make it easier for others to undertake renewable energy projects."

The Winona County EDA began studying the benefits of investment in a public wind energy program in July, 2005. In November of that year, the EDA secured a $200,000 grant from the Minnesota Department of Commerce (DOC) for the construction of a 2-megawatt turbine in Mount Vernon Township. This grant was one of two offered by the state that year to promote community wind. The cost of construction for the 2-megawatt turbine was estimated at $3 million. Between the DOC grant and private investments by equity partners, including St. Mary's and Winona State universities, the EDA concluded that the project could be not only feasible, but profitable, with an estimated return of $6 million throughout the turbine's expected 20-year lifespan. But the initial grant dictated that construction of the turbine be completed by June, 2007.



Winona County Snapshot

Population: 49,879 (2008)
Median Household Income: $44,485 (2007)
County Seat: City of Winona
Population: 26, 533 (2006)
Major Industries: manufacturing, agriculture, wholesale and retail trade

By the end of the summer of 2007, Winona was yet to break ground. The Department of Commerce extended the deadline for the grant, but the wind program languished amid a series of difficulties. Although the wind advocates on the county board of commissioners maintained a 4-1 majority in their voting, Commissioner Marcia Ward raised objections regarding the propriety of the county's role as financier and director of a project she felt should be privately funded and run [10]. The fact that this went in the face of the DOC's stated desire to promote community-owned wind (and that, if privatized, the project would be made ineligible for the DOC grant) did not sway Ward.

Commissioner Ward also felt the wind capacity study [11] project leaders had used to estimate production capacity—and thus feasibility—relied too heavily on outdated wind data. The county had attempted to conduct its own wind capacity study, in 2006, with anemometers borrowed from the DOC. But after spending almost a year on the site, supposedly gathering wind data, project leaders discovered that the anemometers were defective. While the other commissioners viewed this revelation as a minor setback and were content to rely on the data provided by a WindLogics study, Ward was skeptical. Though her lone dissenting vote was not enough to force the county to abandon the project, Ward was able to slow down the process by demanding further open meetings and studies before moving ahead with the final planning and construction phases.

"The project provides a model for other statewide Economic Development Authorities. Our experiences may make it easier for others to undertake renewable energy projects."

Linda Grover
Director, Winona County Economic Development Authority

Sustain Winona

Winona's wind project relied heavily on community support to weather the arduous five-year planning phase. One of the project's most visible allies was Sustain Winona, a consortium made up of seven of Winona's largest public and private organizations: Winona State University, the City of Winona, the County of Winona, Winona Area Public Schools, Minnesota State College- Southeast Technical, and Saint Mary's University of Minnesota. In addition to playing an integral role in the community wind project, Sustain Winona has launched numerous green initiatives throughout the county, the most ambitious of which is pursuing ISO 14001 status for its seven member organizations. ISO 14001 certification is awarded to institutions who create and follow an energy management system that reduces the institution's overall carbon footprint.

While the process to gain approval for the project from Commissioner Ward continued, other major players in Winona and area residents were learning about the effort and getting behind it. Sustain Winona, a coalition of many of Winona's most influential institutions and organizations, played a key role in building community support for the wind project. Sustain Winona certainly helped to rally community support, but they could not prepare the county for the next major hiccup in the development process.

In August, 2007 Winona was hit by a devastating flood that diverted attention and resources from the community wind program. The county was forced to put its wind energy ambitions on hold and focus on flood relief to get the community back on its feet.

Another problem was securing the actual turbine for the project from the county's wind developer, which proved to be more difficult than anticipated. Because Winona sought a single turbine, the county's request was queued up behind more lucrative, multiple-turbine orders from commercial wind farms. While this delay mired down Winona's quest for publicly-owned wind energy, it has greater implications for the American wind industry as a whole.

In a nation with a dwindling manufacturing sector, many easily see the benefits of serious investment in an industry that can create thousands of much-needed manufacturing jobs. That this industry did not have the supply to accommodate an increasing demand for its product at the peak of wind energy development, roughly between 2004 and 2008, speaks to its potential for growth. But because the domestic manufacture of commercial-grade turbines is still relatively nascent, many wind developers turn to foreign markets in Europe, and increasingly Asia, to source their turbines. Venturing into the manufacturing side of the industry is one of the methods communities have begun exploring to reap even more benefits than those gained from simply implementing a wind project. This strategy will be looked at more closely in the Miner County section of this study.

"[We] discovered that the county did not actually have the legal authority to construct and own a turbine, much less sell the power that would be generated or issue debt for this project."

Linda Grover
Director, Winona County Economic Development Authority

Winona faced another challenge in 2006. That year, the county discovered that it was eligible for $3.2 million in interest-free Clean Renewable Energy Bonds (CREBs), which it could use to construct the turbine, and then pay off from the sale of electricity produced by the turbine. EDA Director Grover noted, however, that Winona officials did not count on state laws prohibiting counties from engaging in this type of business endeavor. "[We] discovered that the county did not actually have the legal authority to construct and own a turbine, much less sell the power that would be generated or issue debt for this project," Grover said. Using the federal CREB funding through the county would create a conflict with Minnesota law. This revelation sent the wind advocates in the EDA back to the drawing board. Regardless of what revenue source the county tapped to cover construction costs, it could not legally pay back investors or lenders with proceeds derived from selling the energy. Winona's wind project required a change in state law if it was to continue as a county project.

Over the next three years, the EDA worked with District 31 Senator Sharon Erickson-Ropes and Representative Gene Pelowski to enact legislation that would allow Winona County to enter into the wind business. They achieved incremental changes to the existing laws during the 2007 and 2008 sessions [12]. But during this period the EDA reexamined its business plan and realized that there was not enough potential for profit in the existing model to enable the county to pay off the Clean Renewable Energy Bonds, even with the zero-percent interest rate. After studying other projects that had used CREBs, Grover said, the county concluded that these projects typically relied on tax benefits—federal production tax credits, depreciation and interest deductions—for 60 percent of their revenue. Yet, as a governmental entity, Winona was ineligible for such incentives.

In November, 2008 Winona severed ties with its wind developer, Winergie Wind Energy Development, and signed a new contract with Juhl Winds Inc. During talks with Juhl, the EDA developed a new business plan with the potential to finally allow the county to begin building its turbine. By utilizing a hybrid public/private ownership model dubbed the Minnesota Flip, the county would be able to bring in private investors that could benefit from the federal tax incentives of the project and provide capital to cover the construction costs. Initially, the county would own only one percent of the turbine, with investors making up the other 99 percent. This ownership ratio would stay in place for the first 10 years of the turbine's operation while the investors collected the production tax credit, after which time the ownership would flip, giving the county 90 percent and investors 10 percent of the project.

By utilizing a hybrid public/private ownership model, the Minnesota Flip, the county would be able to bring in private investors that could benefit from the federal tax incentives of the project and provide capital to cover the construction costs.

To grant the county the authority to finalize this business arrangement, Winona needed to form a limited liability company (LLC), according to its county attorney. However, this too was not allowed under Minnesota law. So, during the 2009 legislative session, the EDA asked for a bill that would allow it to form a county-owned LLC with the authority to produce and sell wind energy. Sen. Ropes and Rep. Pelowski introduced such a bill [13], it passed, and Winona County Wind LLC was formed.

Construction of the turbine is expected to begin before the end of 2009, according to County Commissioner Dwayne Voegeli. Presently, the county is still finalizing its list of investors. But Winona has signed a power purchase agreement with Xcel Energy, a move that signals the county's intention to finally have the turbine up and running in 2010.

Project leaders and supporters in Winona had never expected that this would be an easy project, Linda Grover noted. But as new challenges emerged, so too did a renewed determination to meet them. Through it all, Winona has been acutely aware of its position as both a testing ground for community wind and as a symbol of an evolving energy model. Yet the community has also benefitted from the very impetus for change it has worked so hard to create. "I believe that national and state momentum played a major role here," said Grover. "The focus on renewables has never been stronger, so our struggle was a visible symbol here in the region."

Photo by Mark Lindquist

Kandiyohi County Snapshot

Population: 40,679 (2008)
Median Household Income: $46,136 (2007)
County Seat: City of Willmar
Population: 18,351 (2000)
Major Industries: manufacturing, wholesale and retail trade, construction

City of Willmar, Minnesota

Of the three wind projects studied here, the City of Willmar's had perhaps the most straightforward path. The project depended on a single local funding source, it was managed by a local project supervisor working in concert with the municipality, and, because Willmar, the seat of Kandiyohi County, is served by its own municipal utility, there was no need to engage in a power purchase agreement with an outside energy provider. Today, all the electricity generated by the community wind project goes to power the homes, businesses, and municipal buildings of Willmar. The project experienced relatively little political difficulty and a minimum of waste. Because of the absence of a for-profit corporation in the equation, there was no stipulation that the project make money for investors, only that it meet the community goals of creating meaningful savings for utility customers and reducing the community's dependence on imported sources of energy. Each stage of municipal investment was weighed pragmatically, with an emphasis on cost effectiveness. The relative ease and efficiency with which Willmar implemented the program bodes well for the community wind model's continued relevance to future wind projects elsewhere.

Ironically, Willmar's community wind program, which is the most co-op based of the three, actually began as a private business venture. In December 2005, Jon Folkedahl, president of Folkedahl Consulting Inc., an energy consulting firm based in Willmar, met with representatives from Willmar Municipal Utility (WMU). Folkedahl proposed building his own turbines in Willmar and selling the energy they generated to the utility. WMU determined that an investor-owned project like the one he proposed was too costly, and would drive up energy costs for its customers. However, WMU found the idea of investing in wind energy generation appealing. The utility asked Folkedahl if he would instead like to build the turbines for the municipality. This would essentially cut out the middleman (in this case, Folkedahl himself). One of the benefits of this model of community wind is its cost efficiency. Capital invested in the project to cover construction and generation costs needs only to be matched by money generated through energy production. After building and operating costs are recouped, all additional money earned translates into savings for consumers, rather than a profit handed out to satisfy shareholders. This is a perfect funding model for community wind, as the cost to maintain turbines is relatively low, and energy generation is virtually free.

The relative ease and efficiency with which Willmar implemented the program bodes well for the community wind model's continued relevance to future wind projects elsewhere.

Folkedahl agreed to oversee the project, and in May 2006, Willmar officially hired his company as its wind energy consultant. Folkedahl conducted a feasibility study and analyzed the various risks, costs, and permitting concerns involved with the project. The Willmar Municipal Utilities Commission reviewed his study and voted to proceed.

In September 2006, the most delicate phase of the planning began. Because potential wind capacity in Willmar is not particularly high compared to other places in the state, the project depended on two things to make it viable. First, siting for the turbines needed to be perfect, according to Folkedahl, in order to make up for a general lack of high-velocity wind in the area. Furthermore, because the turbines had to be erected within WMU's service territory, potential locations for the project were confined to the city limits. This restriction further exacerbated the

problem of finding a site with adequate wind capacity within such a relatively small area. Second, implementation needed to be completed in as cost-effective a manner as possible. What the project would lose in wind capacity, it had to make up for in efficiency. In most projects, the wind developer directs the entire process, acquiring the turbines and overseeing construction. But to achieve the low price point needed by the utility, Folkedahl decided to find the turbines himself and hire subcontractors to complete the construction, while he represented Willmar as the project's general contractor.

Willmar and Folkedahl spent the next year negotiating a land lease deal with the Minnesota State Colleges and Universities system over a potential site for the turbines located within the boundaries of Ridgewater College in Willmar. Just as the two parties appeared close to finalizing the agreement, the Minnesota Department of Transportation stopped the project, expressing concerns over how the turbines might interfere with air traffic patterns to and from Willmar Municipal Airport. Disappointed, Folkedahl turned his attention to another location on the opposite side of the city, adjacent to Willmar High School. The new site proved satisfactory to both the City of Willmar and School District 347, who owned the land. The location had good wind exposure, though not as good as the first site, according to Folkedahl. But it had the added benefit of being within sight of the school, which gave teachers the opportunity to integrate the turbines and wind energy generation into their curricula.

The Willmar project embodies the ethos of self-sufficiency and environmental sustainability that are the guiding principles of community energy.

In February 2008, Folkedahl called for bids from manufacturers on a pair of two-megawatt turbines. He didn't get any responses. America was still in the midst of its building boom, and demand for turbines was high. Also, Willmar required a bid bond from any manufacturer interested in selling the WMU its turbines. According to Folkedahl, the idea of entering into a public biding process when the supply and demand equation tipped so drastically in favor of manufacturers simply didn't make sense to anyone selling turbines at the time. "It was absolutely a seller's market, and manufacturers felt no need to extend themselves for a two-turbine sale," Folkedahl recalled. "Times have changed a bit now, but the same sentiment reigns. Some are willing to sell turbines to small communities in small numbers, but not if it requires placing effort or capital at risk." So, just as Winona was experiencing during nearly the same period, Willmar was forced to put its wind program on hold until it found a manufacturer willing to offer bid security and the right model turbines.

Folkedahl continued his unsuccessful pursuit of the turbines until May 2008 when Dave Laursen, president of Windations, a wind development company based in Willmar, approached him. Laursen had heard of WMU's trouble securing turbines, and he wanted to help. By becoming a turbine vendor, he could expand Winations' share in the wind business while helping Willmar acquire the turbines it needed for its municipal wind project. Laursen entered into an exclusive supply agreement with the manufacturer DeWind. He agreed to serve as an intermediary between WMU and DeWind, thereby guaranteeing delivery of the turbines and eliminating Willmar's need for a bid bond from the manufacturer.

Willmar turbines *provided by Jon Folkedahl*

Folkedahl opened up the public bidding process again in October 2008, this time calling for offers from excavation companies well versed in large-scale concrete foundation projects. This round received a considerably larger response than his initial request for manufacturer bids. A half dozen construction companies put in bids for the contract. The following month, Folkedahl and the WMU settled on Chad Monson Excavating Company, a local outfit with the capacity and machinery to complete such a large project.

Construction on the 256-foot, twin Dewind 2-megawatt turbines began almost immediately, and was completed in August 2009. There was a dedication ceremony on September 3 celebrating the completion of the first two wind turbines in the state to be owned by a municipality. WMU officials expect Willmar's turbines to provide up to five percent of the city's energy. Folkedahl's projections are a bit more conservative. He is expecting a figure closer to 3.5 percent. In either case, community wind will make a significant difference in Willmar. Not only will the city produce 236,000 tons less carbon [14] over the lifespan of the turbines, Willmar residents can expect to see a marked decrease in energy costs over the next 20 years. And the city is one step closer to energy self-reliance.

"We were concerned about opposition from the start, so we worked to inform everyone in advance of our plans and projected outcomes."

Jon Folkedahl
President, Folkedahl Consulting, Inc.

The Willmar project embodies the ethos of self-sufficiency and environmental sustainability that are the guiding principles of community energy. In part, this is because Willmar was already participating in a form of cooperative energy via its municipal utility. But this is also due to a conscious effort on the part of the project's planners. Folkedahl is a strong proponent of community wind. In fact, he believes the state must do more to encourage community-based energy development (C-BED), particularly in the face of Minnesota's (and perhaps the federal government's) upcoming renewable energy requirements. While it is good that energy companies will be making use of more renewable sources, he is concerned that it will be at the expense of localized energy programs. "I hate to see Minnesota companies go to North Dakota for wind power," Folkedahl said. "Minnesotans are paying the price [for the wind energy]. They should gain the economic benefits as well. Legislation should not only require that utilities purchase a certain amount from a C-BED project, but that those C-BED projects be within Minnesota."

Now that the City of Willmar's turbines are operational, WMU is looking to the future. Folkedahl expects the city to commission more turbines, perhaps in the location he originally chose for the first two. That site is still considered the strongest for wind velocity, and Folkedahl believes Willmar and the airport can reach a new accord. And the city was recently awarded a CREB to implement further clean energy development. With one project completed, he expects future projects to go more smoothly. In part, this is due to the relationships fomented over the past three years. But public sentiment will also play a deciding role. According to Folkedahl, community support was significant the first go around. "I think if there had been opposition instead of support, we might not have gotten it done, regardless of our desire or determination," Folkedahl said. "We were concerned about opposition from the start, so we worked to inform everyone in advance of our plans and projected outcomes." Keeping residents involved has paid off. There is considerable collective interest in continuing the pursuit of renewable energy sources in Willmar and, judging by the positive response, more turbines will be going up soon.

Willmar turbine dedication *provided by Jon Folkedahl*

Miner County, South Dakota

More than either of the two previous communities studied, Miner County and the city of Howard, the county seat, represent the marriage of industry and environmental sustainability in rural America. In this case, the driving forces of energy and economic self-sufficiency play off each other, presenting an unprecedented model not just for clean energy and solid local investment, but also for the development of countless environmentally-minded programs and businesses that have transformed formerly economically moribund Miner County into a hub for South Dakota commerce.

Ten years ago, the City of Howard and Miner County appeared to be headed for regional irrelevance. The county's once-thriving farming industry was suffocating under the corporate agriculture boom of the last 40 years. Family farms were disappearing and parcels of land were being gobbled up by huge corporations with few ties to South Dakota. Jobs were in short supply, local companies were going under, and families were moving to more centralized suburban centers in search of work. It was this environment of hopelessness that spurred Miner County onto the path toward community wind energy, and the first step was taken in a classroom at Howard High School [15].

Miner County Snapshot

Population: 2,435 (2008)
Median Household Income: $36,281 (2007)
County Seat: City of Howard
Population: 891 (2008)
Major Industries: agriculture, manufacturing

In 1995, Howard students in the Future Business Leaders of America program surveyed county residents and found about half of them were shopping at large retailers outside the county for most of their household needs. The students analyzed their findings and estimated that the county could bring in more than $7 million if residents increased their local spending by a mere 10 percent. By the end of the following year, as word of the students' findings continued to circulate throughout the county, sales in Miner were up by more than 40 percent. These findings inspired the students' teacher, Randy Parry, to address the community's financial woes in a more direct fashion. Parry took a $20,000 grant to the high school and used it to create the Rural Resource Center, a program within Howard High designed to bring local business owners and other community leaders together with students for brainstorming about ways to improve their community.

It was an environment of hopelessness that spurred Miner County onto the path toward community wind energy, and the first step was taken in a classroom at Howard High School.

It was in this climate of collective involvement that residents began meeting to discuss specific ways to reinvigorate the economy of the county. These meetings grew organically into an unofficial planning commission. In 1998, as a result of the work done by this group, the Rural Resource Center and other community projects, Miner County attracted the attention of the Northwest Area Foundation (NWAF), a Minnesota-based nonprofit dedicated to poverty relief. The foundation was looking for an agriculture-dependant community with fewer than 5,000 residents that had experienced a sharp decline in population over the last half-century to work with on a 10-year project. The intent was to study methods of reversing the downward economic trend in farming communities throughout the country.

In November, 1998, during a raging blizzard that has since become part of Miner County mythology, representatives from the NWAF came to Howard to meet with local leaders and discuss a possible partnership. Though roads were nearly impassable, a large group of Miner residents met the NWAF envoys. They explained their ideas for revitalizing their community, and expressed a need for outside assistance to bring these ideas to fruition.

Because Miner County fit the criteria laid out by the NWAF—and because county leaders, like Parry, showed an understanding of the dynamic between economic, social and environmental issues—the foundation chose Miner as its partner for what would amount to a sweeping socio-economic experiment with the ultimate goal of invigorating the county's economy, while creating a new financial model for rural communities everywhere. The foundation gave the county $500,000 for initial planning, part of which it used to make the planning group an official membership organization, called Miner County Community Revitalization (MCCR). Parry retired from teaching and joined the organization as its executive director.

MCCR drafted a plan detailing its vision for the county's future. The goals laid out in the plan centered on education, economic, social, and environmental development. The idea was to halt the population exodus and create more jobs to encourage young people to stay in the community.

MCCR drafted a plan detailing its vision for the county's future. The goals laid out in the plan centered on education, economic, social, and environmental development. The idea was to halt the population exodus and create more jobs to encourage young people to stay in the community. In February 2001, the NWAF board approved the plan, and the foundation entered into a formal 10-year partnership with Miner County. This agreement came with a $5.8 million grant to aid the county in meeting its goals.

In one of its first official moves, MCCR applied to the U.S. Department of Agriculture (USDA) for a Rural Community Development Initiative grant. The USDA fund, which offers dollar-for-dollar support to rural communities for financial growth, was used to create the Fund for Rural America (the USDA's contribution was matched with funds from the NWAF grant). This move exemplified the resolve of Miner County leaders to reinvest the NWAF money in such a way as to create enough capital to completely reshape the county's economic culture. "Howard and Miner County had gotten out of the habit of spending money," Kerstin Gorham, former NWAF liaison to Howard, recalled. "They were just waiting for the catastrophe they knew was coming. Getting them to reinvest it instead was huge."

While MCCR worked on implementing its strategic plan for revitalizing Miner, the county benefitted from the fortuitous return of a native son. Joe Kolbach had been a student of Parry's at Howard High before moving to nearby Gary, S.D., where he started a small wind turbine refurbishing shop called Energy Maintenance Services (EMS). Kolbach had been following the developments in his home town, and he and Parry met to discuss the possibility of bringing EMS to Howard. With the help of a revolving loan program set up by MCCR, Kolbach built a central headquarters for EMS on the outskirts of Howard. His relocation to Howard went beyond creating a mutually-beneficial business relationship between his company and the county: it proved to be the central event that set the community wind program in motion. This program, in turn, served as a catalyst for much of the economic development that would take place in Howard over the following decade.

EMS helps construct turbines *by Rural Learning Center*

Community wind energy generation seemed like the next logical step for the county. MCCR proposed using funds from the NWAF partnership to build two tax payer-owned wind turbines in Howard. Although meteorological studies didn't show hugely prodigious winds in the area, they predicted enough velocity to make the turbines cost effective in the long term. And the wind plan fit within the county's goal of employment expansion by creating a

need for people to service the turbines. Kolbach began training a group of Howard residents in turbine construction and repair. He worked under the assumption that Miner County's many out-of-work tractor mechanics had the right background to easily learn to build and service the turbines. He also felt, and those in the MCCR agreed, that EMS could market its expertise to the rest of wind-rich South Dakota. This prescient reasoning has proven sound.

As the business of agriculture becomes increasingly consolidated between a handful of global corporations, the void left in the rural workforce—combined with favorable topography and low population density—has given rise to a new economy in rural America. There is a lot of talk about this new economy in Miner, and the county has invested its future on the idea that the old ways cannot nurture a community any longer. "We can't go back to the complacency of living off our equity," said Parry. "You find yourself driving down the streets and there are things you should notice, but you don't, because you're complacent. Things are decaying, and they're not getting rebuilt. To change this, you have to involve grassroots people in the planning. That way, the people own the change." Alternative energy generation, in all its forms, will continue to reshape our pastoral landscape. In the Midwest, community wind will be at the center of this change. Kolbach saw this, and capitalized on it. He made a bid for the construction contract of the two turbines, and the county accepted it.

"Things are decaying, and they're not getting rebuilt. To change this, you have to involve grassroots people in the planning. That way, the people own the change."

Randy Parry
President, Rural Learning Center

In October 2001, EMS raised two 108-kilowatt Micon turbines on the outskirts of Howard. Today, the electricity they generate feeds directly into the Howard Municipal Utilities grid, and provides for 10 percent of the city's energy. In July of the following year, EMS, using money from the Fund for Rural America, put up a third turbine in the town of Canova, also in Miner County. The company built a fourth turbine in nearby Carthage in May of 2003. The power from the turbines in Carthage and Canova is sold to Xcel Energy. But, because South Dakota does not allow for net metering agreements between utilities and alternative energy producers, the towns are paid only for avoided energy cost, which generates well under half what they would get under typical net metering agreements.

South Dakota's net metering restriction is only a minor obstacle to widespread wind development in the state, according to Parry. The real concerns for commercial projects, in his mind, are transmission and the national energy grid. "The big issue of the future for South Dakota is getting the power out of the state," Parry said. "Once our grid is full, which will happen within a couple of years, we will need to export it. To do that, we will need an investment on the scale of the one Eisenhower made to get the [interstate] highways built in the 1950s." Parry sees the Green Power Express as the only answer to his state's inevitable need for energy exportation. But in the short term, and particularly within the community wind vision, net metering is of vital importance. Farmers and small towns rely on the incentives provided by net metering to initiate wind projects in their communities. But they're not getting that type of financial encouragement in South Dakota. And Parry doesn't expect that to change any time soon, due, in part, to the consolidated influence of utility companies.

Two Miner County turbines *by Rural Learning Center*

The benefits of Miner County's wind turbines go far beyond energy generation or avoided cost payments, however. The community wind program created something of a reverse-domino effect for the economy of Miner, with other business ventures, many of them environmentally-minded, piggybacking on its successes. In 2003, an organic beef producer, Dakota Beef, began processing its meat in an old slaughterhouse in Howard. In 2007, Knight and Carver, a California-based yacht company that also manufactures blades for wind turbines, opened up a satellite manufacturing plant in an industrial park built by MCCR to attract new businesses. And MCCR has now become the Rural Learning Center, an organization (with a $6 million facility in Howard) dedicated to sharing the strategies for success that worked so well in Miner County with other rural communities throughout the state. Yet, while Miner County residents and members of MCCR take pride in these reversals of fortune (and population) the wind program helped to bring about, many feel the change goes far deeper than county coffers or Census Bureau findings, touching the proverbial soul of the community. "Our wind turbines in Howard are really a symbol of us reinventing our economy," said Lindsey Karlson, a colleague of Parry's at the Rural Learning Center. "They symbolize our attempt to find industries and opportunities that push toward the future instead of the past, which in agricultural communities is a real struggle." It would seem Miner County has found its way into the new economy, and a lasting place in the future of South Dakota.

"Our wind turbines in Howard are really a symbol of us reinventing our economy."

Lindsey Karlson
Community Outreach Coordinator, Rural Learning Center

Turbine in Carthage, SD, purchased through USDA's Fund for Rural America *by Rural Learning Center*

Community wind projects face unique barriers in addition to barriers experienced by more common utility-scale wind projects. Both types of projects experience siting, financing, and transmission access barriers, but those experienced by community-owned projects, in many ways, become compounded by the unique nature of the community ownership formulas. Unlike utility-scale projects, community wind projects lack two aspects important for project success: considerable staff knowledge of project development and ready access to financing. Due to the need for strong organizational leadership in order to overcome these barriers, many community wind projects get placed into the hands of existing local government agencies or offices. Moreover, the independent nature of community wind projects can often create added difficulties in establishing integration into the existing electrical network.

Community-based energy projects face additional hurdles through unique requirements placed upon community-based projects. While community-based energy development is designed to provide more benefits to the local community, often such projects get sited on public or community land, increasing the burden of gathering support from community members and government agencies. Fortunately, the case studies just discussed provide examples of pathways around these and other barriers.

Compared to other technological fields, renewable energy is relatively young, with most development and growth occurring in the last 15 years. As with any new field, not only must standards and information get developed, but so also must human knowledge and experience with new energy generation technologies and associated policies grow and develop. Much like in the personal computer and software industries in the 1980s and 1990s, knowledge growth in many areas must occur in an emerging field before considerable advancements in productivity or efficiency may occur. It takes time to build institutional knowledge, or the collective abilities and knowledge of interacting participants in a field.

All of the case studies outlined here typify the importance of establishing a community vision and strategic action plan to help pave the way for subsequent community wind projects.

Visioning and Planning

All community wind projects must begin with a plan. Effective project plans often stem from the development of a comprehensive community vision and strategic action plan. While certainly not a requirement, community visions help illustrate the purpose and direct benefit residents will experience as a result of implementing a community wind project. A vision and strategic action plan essentially will draw focus to the benefits of projects such as community wind. Moreover, the process of establishing a community vision and strategic action plan, while often a time-intensive process, will help draw area residents into communication regarding projects and get them thinking about major issues (either those they currently face or will face in the near future) rather than directing their focus toward the past and any desires to avoid problems and change associated with a community wind project.

Willmar community members at turbine dedication *by Ryan Stockwell*

All of the case studies outlined here typify the importance of establishing a community vision and strategic action plan to help pave the way for subsequent community wind projects. Winona's project grew out of a grassroots effort to move the community toward sustainability. Miner County proceeded through a more formal visioning and planning process aimed at rural community revitalization. And Willmar's community wind project resulted from considerable discussions surrounding concerns for rising energy costs and the prospect of increasing instability in energy costs and availability. While each of the communities' visions addressed different concerns, they each nonetheless paved the way for community support and the collective vision of community wind projects providing part of the solution.

The form of leadership and project management knowledge of project leaders had a fairly considerable influence in determining the success and ease of implementation. It is important to note that, as with many challenges, determination and coordination can make up for shortcomings in knowledge and direct experience.

Project Leadership

Once community coalescence developed around a community wind project as part of their strategic action plan to achieve a community vision, project planning had to develop. This is usually the point at which many people begin to recognize the need for leadership, although it is clearly evident much work and leadership occurs before this stage.

Within the field of wind energy broadly, and community-based wind development specifically, the experience level is relatively low. As more and more individuals move into wind energy development, that experience level will rise, bringing with it the knowledge level and overall ability to move projects forward. However, the case of community wind is somewhat unique in that in many cases, a local resident will play the project lead with no prior experience in wind development and with little intentions of taking the experience and knowledge gleaned from their community's wind project and applying it to other community wind projects. Community wind has this stark disadvantage. Of course, one route around this problem would be the development of niche project developers targeted at moving along community wind projects by bringing expertise and partial financing [16].

Of course, for those communities interested in leading their own wind project without a project developer, particular knowledge, skills, and abilities must be developed in order to provide some assurance of effective project leadership for project completion. Common among the issues project leaders face include planning, permitting, financing, and negotiating the power purchase agreement [17].

Community leaders in Northeast MN tour wind turbines *by Lissa Pawlisch*

Project leadership took different forms in each of the case studies. For the city of Willmar, the presence of a municipal utility with energy knowledgeable staff became a clear choice. In Miner County, project leadership came from both energy-knowledgeable residents and community leaders. In Winona, leadership originated with the Sustain Winona group and eventually was coupled with a contracted project manager.

The form of leadership and project management knowledge of project leaders had a fairly considerable influence in determining the success and ease of implementation. It is important to note that, as with many challenges, determination and coordination can make up for shortcomings in knowledge

and direct experience. The Willmar community wind project had a clear advantage in navigating the permitting process in that Willmar Municipal Utilities played the lead role in the project. On the other end, the Winona project faced a steeper uphill climb due to the lack of direct connections to area utilities that could have facilitated project development and the permitting process, as well as a more limited knowledge base of permitting and familiarity with this type of utility-scale project. But what Winona leadership lacked in knowledge they made up for with determination and perseverance, overcoming setbacks with project refinements and determined communications efforts with both project partners and community members.

Photo by photobank.kiev.ua

Involving the Community

Just as important as project planning and leadership is the process of community involvement throughout the entire project life. Taking lessons from the early actors in the case studies, it is clear that community participation and communication with the community was not only initiated during the visioning and strategic planning process, but was maintained throughout the project planning and construction phase. This is an important aspect to recognize: projects may die because of changes in plans or unexpected issues arising. In these situations, community support played a vital role in maintaining a groundswell of support for the project. Without community support, local project permitting agencies or utilities would feel their permit denial or project opposition would be more welcome by the community. Furthermore, community support helps buoy project leaders through difficulties while also sending the message to partnering investors that the community would not block the development of the project [18].

Community support played a major role in seeing Willmar project through. To maintain community support for their project, Willmar Municipal Utility kept open communication with the public throughout every step of the project. So when a siting issue arose and project location and size shifted, area residents maintained their support. Using the message of electric price stability for the future, Willmar project leaders kept the community not only interested, but involved in pushing the project forward through siting and other delays [19].

Financing and Pricing

Community wind projects experience financing hurdles similar to some utility-scale wind projects, but also must meet certain funding parameters in order to qualify as community wind. In some ways, financing community wind projects requires walking a metaphorical tightrope. In order for project success, community investment is needed. But often the local community cannot cover the entire cost and so outside investment or alternative funding is required to see the project to fruition. Minnesota Community-Based Energy Development (C-BED) law requires that at least 51 percent of project revenues flow to Minnesota-based residents and other local entities [20]. This means up to 49 percent of investment may come from outside the

What are CREBs?

Clean Renewable Energy Bonds (CREBs) are a type of tax credit bond. The Energy Tax Incentives Act of 2005 authorized $800 million in tax credit bonds to be issued for certain renewable energy projects. This incentives program allows municipalities, cooperative electric companies, and Indian tribal governments to issue bonds for clean energy projects at a zero-percent interest rate. In lieu of interest, CREBs issuers receive a quarterly federal tax credit. Some examples of projects eligible for CREBs are wind, solar, biomass, geothermal, hydropower, and refined coal.

community, and technically even outside the state. However, except for local governments, which may be the sole owners of C-BED projects, no single investor may own more than 15 percent of a project [21].

So, in order for community-based energy projects to remain true to their purpose of maximizing the benefits to the communities in which the projects get developed, as much investment as possible must come from within the community. However, more often than not, and particularly during this economic recession, few communities have the resources to fully fund a project that can have an up-front capital expense upwards of $6 million. For projects to move forward, outside resources must be leveraged. There are some avenues around this resource shortfall, as evidenced by the case study communities.

By having the Willmar Municipal Utility a major partner in their wind project, the community had access to more significant utility capital intended for such a project and infrastructure expenditures. Moreover, rural municipal utilities and rural power cooperatives have access to low-cost loans through the Rural Utility Service Electric Loan Program, which leverages billions of dollars per year toward rural electric infrastructure [22]. In many cases, however, rural cooperative leadership has taken a philosophical opposition to local wind and other renewable sources, closing the door to much of the financial resources available to them that could be used for community-based energy development. Because the local municipality participated as a partner, they had a vested interest in seeing the project obtain a reasonable rate of return on investment. In that situation, negotiation for the PPA (power purchase agreement) involved collaborators rather than competing interests. The same cannot be said for community projects established as independent power producers (IPPs), which do not benefit from having a utility engaged as a full partner on the project. IPPs must negotiate with utilities seeking to minimize electricity costs.

Miner County, South Dakota, stands as a fairly unique case. By jumping to the forefront of the rural community revitalization issue, that community attracted considerable attention and support from various government agencies and foundations. The capital sources procured through these avenues for the most part were designed as one-time efforts to establish economic revitalization demonstration projects to clarify the redevelopment process and establish educational opportunities to help other communities more effectively navigate their own revitalization efforts. Their efforts at visioning, planning, and project development are nonetheless instructive.

The experience of the Sustain Winona group in pursuing their community wind project in Winona County stands as perhaps the most illustrative when it comes to financing community-based energy projects. Most communities interested in community-based wind projects will be faced with the situation experienced by Sustain Winona. This group did not have access to a local municipality or a willing rural cooperative partner through which to access low cost capital. Nor did Sustain Winona have access to philanthropic dollars. They had to find financing through more traditional avenues.

Throughout the early stages of the project, leaders sought local investment from residents. They also researched financing opportunities through Clean Renewable Energy Bonds (CREBs). However, the CREB process was rather cumbersome and had a number of stipulations placed upon the funds, making it an untenable option. CREBs appear to help local government agencies or utilities in raising capital, but in the Winona situation, the group had many institutional supporters, but not an entity for which CREBs were designed. With initial local resident and public financing options proving insufficient for capital resources, project leaders opted to both reduce the project size to limit up-front capital requirements and to bring in an experienced project developer to find additional investors to round out the capital resources.

The hiring of a qualified project manager made two immediate impacts on advancing the task of raising capital. First, the developer brought extensive investor connections to the Winona project. These investors also became more willing to support the project knowing that an experienced developer was leading the project and essentially increasing the likeliness of project completion, which provides a more certain return on investment.

Once the project developer negotiated a better PPA with the utility, the feasibility of the project improved dramatically, raising interest and support from financial sources.

The project developer also played a vital role in negotiating a more favorable power purchase agreement with the utility serving the area. Until the developer stepped in, the utility offered a relatively low price for purchasing the power produced from the community wind project. This low PPA had a negative impact on efforts to obtain equity and debt as investors and lenders recognized the low return on investment due to the low price offering. Once the project developer negotiated a better PPA with the utility, the feasibility of the project improved dramatically, raising interest and support from financial sources.

Siting, Permitting, and Interconnection

These steps in the process stand as the most locally variable in terms of environment, regulations, and relationships with stakeholders. It is also within these stages that uncertainty in regulations consistently occurs, resulting in frustration, roadblocks that lead to alterations in project plans, and sometimes the death of community wind projects.

The three projects outlined in the case studies experienced a range of difficulties in these bureaucratic steps, impacting each in different ways. For example, the Willmar project experienced a site change to the area high school after the State of Minnesota refused to allow the project to move forward on the originally chosen location on state-owned property after a state agency voiced a prior claim to the property. Fortunately, this project had little difficulty in the interconnection process again because of participation on the part of the local municipal utility, which had an interest in seeing the project to fruition while also acting as the power purchasing utility.

As with financing and power pricing, the Winona project stands as perhaps the most illustrative for community projects seeking to become independent power producers.

Winona faced interconnection hurdles due to unclear regulations and uncertainty in local zoning, compounded by the threat of legal ramifications from a nearby utility if some of the power from the project were to reach that utility's service area and potentially impact their delivery systems. These hurdles caused numerous delays and changes in project plans.

Wind turbine site *by Lissa Pavlisch*

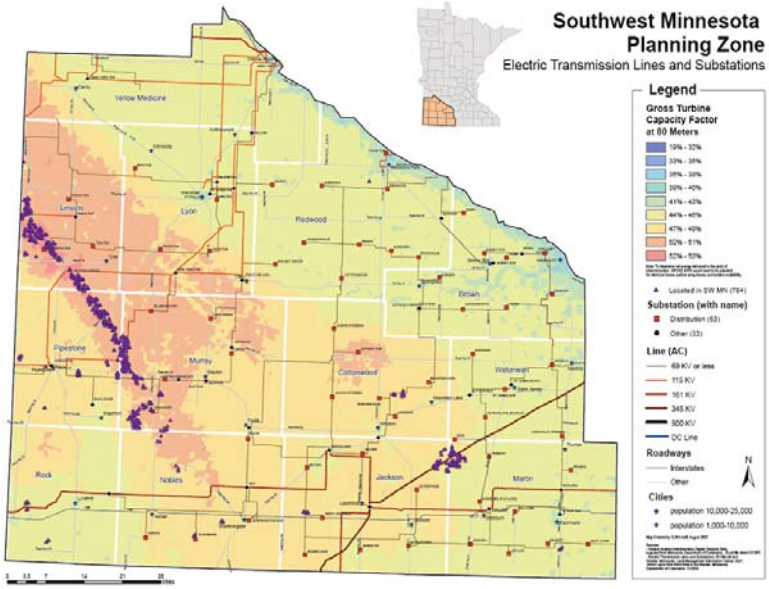
Public policies—mostly at the state, but also at the national level—have the potential to effectively address many of the roadblocks and difficulties identified in the case studies. That is not to say that policy is always the solution to the numerous problems noted throughout this report. Non-policy solutions can play a major role, as well. However, it is fair to conclude that in a sector as highly shaped by regulation and policy as electricity, simple changes in regulation stand to yield significant improvements in the opportunities and viability of community-based wind projects. The following is a brief discussion of a number of policy solutions to identified problems. Most of these solutions center on addressing pricing and regulatory uncertainty. But first we will present an analysis of policies that can potentially change utility acceptance of community-based projects.

In a sector as highly shaped by regulation and policy as electricity, simple changes in regulation stand to yield significant improvements in the opportunities and viability of community-based wind projects.

Most utilities currently follow the model of highly centralized energy production delivered to vast geographic areas via high voltage transmission lines and large networks of distribution lines. This path results from the particular types and levels of technologies available at the time when the American public and political leaders viewed electricity as a necessity, and steadily ramped up generation to meet that growing demand. In the 1930s when much of America still lacked access to electricity, development centered on the creation of large electricity production facilities. The dominant cultural concept at the time was efficiency through economies of scale. Truly, many celebrated large projects as a sign of an advancing civilization through ever-increasing human control over all aspects of the earth. "Harnessing rivers" through large hydroelectric projects embodies this cultural love affair with large technological projects.

Dispersed Generation Studies

It is rather difficult to shake free from both the cultural origins and the policy ramifications of this development. Awareness is beginning to grow, however slowly, of the usefulness and additional benefits of distributed power, or power sources located near demand centers and matched closely to demand needs. Further advancement is needed in both the awareness of the advantages of distributed power and ways to implement such power into the existing power grid. This becomes all the more imperative as transmission line upgrades make further development of centralized power sources cost prohibitive.



Dispersed generation study map of Southwest Minnesota

Some states such as Minnesota have begun reviewing opportunities for distributed renewable power integration into the existing grid to both meet future demand and delay the need to upgrade transmission lines. The results of the most recent study have shown a number of areas in which wind projects less than 40 megawatts would have the most positive impact on grid stability [23]. Through this research, not only are utility leaders informed of the benefits of dispersed generation (where most community wind would be classified), but key information gets developed which will help integrate such projects. Similar studies at the local level, rather than the state level, could further indicate numerous "sweet spots" where

dispersed renewable generation may most effectively serve loads and thus delay the process of adding centralized production and the associated transmission line upgrades. Key to producing effective dispersed generation studies will be the inclusion of full cost analysis. Under full cost analysis, all costs of energy generation are included in the analysis. Imminent carbon legislation and transmission line construction often get disregarded as a future cost or get shared among all generation sources on the assumption each require similar access to distant markets in order to operate efficiently. In reality, small generation (5 megawatts or less) typical of community wind projects rarely need access to distant markets in order to operate cost-effectively.

Siting and Permitting Standardization

For many local authorities and residents, wind is a relatively new issue. The first wind development to an area typically brings uncertainty, uneasiness, and even acrimony to county zoning boards trying to balance beneficial local economic development with private property rights. More often than not, these county zoning and permitting boards must figure out on their own not only how they want to address wind development, but in the process, what zoning regulations to create, apply, and enforce upon wind developments. This process can take months and even years in some cases, causing delays for wind projects, which can and have led to the cancellation of projects.

Standard zoning regulations, yet to be developed by the Wisconsin Public Service Commission through a stakeholder advisory process, will provide clarity and simplicity for all participants including local and state regulators, project developers, landowners, and community members.

Efforts have begun to address the uncertainty of developing wind projects in areas without specific wind ordinances. There are two ways around this issue. First, model wind ordinances have been developed by third-party organizations in an attempt to provide information that can speed up the process of ordinance development by a local zoning board [24]. County planning and zoning boards may turn to these models to both educate themselves of the issues surrounding wind development and to develop their own zoning ordinance language.

A more proactive effort is also beginning at the state level to speed up the process of ordinance development and wind regulation at the local level. Moreover, these efforts are designed to provide a level of uniformity in local ordinances, simplifying the process for wind developers seeking to develop projects, especially projects that may cross county zoning boundaries. The state of Wisconsin recently enacted zoning standards to be set by the Public Utility Commission. These standards set maximum restrictions local zoning authorities may place on wind energy systems. Zoning authorities may, however, develop more stringent zoning regulations, but only when it is evident such regulations are necessary to protect public health, and only if the more stringent regulations do not significantly increase the cost of the system or decrease its efficiency, but allow for a comparable alternative system [25]. The standard zoning regulations, yet to be developed by the Wisconsin Public Service Commission through a stakeholder advisory process, will provide clarity and simplicity for all participants including local and state regulators, project developers, landowners, and community members.


Photo by Mark Lindquist

Establishing or Improving C-BED Legislation

Currently only a handful of states have established community-based energy development (C-BED) laws. It is no coincidence these states possess the vast majority of all community energy projects [26]. Such legislation lays out requirements of utilities to equally consider C-BED

Table 1: **Benefits of Local Ownership**

	Outside	Local
Local Income	$1.3 million	$4 million
Job Creation	18	41

This data comes from a NREL study that compares one 40 MW plant owned by outside investors to twenty 2 MW plants owned locally. [27]

projects while also providing some level of regulatory uniformity for C-BED projects. Such legislation defines the local ownership requirements and power off-take contract (power purchase agreement) structures between C-BED projects and utilities. These regulations can have a sizeable impact on community energy projects, as evidenced by the fact that Minnesota, with the most well-defined and structured C-BED legislation, has the highest amount of installed community-based energy generation.

Net metering requires utilities to accept excess generation at predetermined rates, creating the stable income stream necessary for investment to occur in such projects.

However, that does not mean the Minnesota legislation is perfect. In its current form, the legislation has been moderately effective. The original intent of the law sought to simplify the process and reduce the financing barriers, which so often proved almost insurmountable for many projects. The Minnesota C-BED legislation's biggest success came in establishing net present value considerations and higher pricing in the first half of the power purchase agreement. This law calls for 20-year contracts with C-BED projects. Moreover, these contracts must be front loaded in the payment structure to make debt payback easier. In order to get this stipulation included, legislators made the trade off of ensuring that the net present value of the contracted energy would not go above the utility's normally used discount rate when considering future costs. Essentially, C-BED projects get more money early on to help them pay off debt and utilities get an overall lower cost for the total life of the contract. See *Table 1* above for a quantification of the income and job creation benefits of locally-owned projects versus those owned by outside investors.

Rural Utility Service Loans

More often than not, community wind projects have developed and will continue to develop in rural areas. More developed urban and suburban areas make project siting and permitting more difficult, on top of the fact that there is generally much less land available for wind projects of any type. Many rural areas are served by a rural electric cooperative. Through the national Rural Utility Service (RUS), these co-ops have access to technical guidance and low cost financing to help maintain energy services to their member owners. Under this broad banner of maintaining quality service to member owners, co-ops can use low cost loans from the RUS to cover costs of distribution wires, other infrastructure, and even energy generation including renewable energy [28].

Unfortunately, many utility boards and managers do not see wind projects, not even community-based wind projects, as a worthwhile investment. This effectively shuts off a strong potential funding avenue for community wind projects as Rural Utility Service loans and loan guarantees fund significant portions of rural electricity infrastructure, but such funding has historically flowed almost entirely to rural utility-owned or led projects. Legally, any corporate entity may apply for RUS loans, however, such funding has rarely found its way to non-cooperative entities [29]. Creating more access for rural community-based projects to this financial tool would create much-needed stability in funding availability while yet allowing the Rural Utility Service to fulfill its mission of serving rural cooperative members by financing energy infrastructure.

Investment Tax Credit or Cash Grant

For years, the federal Production Tax Credit stood as an important tool in stimulating the development of renewable energy facilities. In theory, the PTC made sense. Investors in renewable energy would receive a tax credit based on the amount of electricity the renewable energy facility produced. However, a key provision has limited the applicability of the PTC. To take advantage of the PTC, an investor needed a tax load from passive income or income earned from investment sources, against which to use the PTC. Under such stipulations, few Americans actually qualified to receive a tax credit for investing in renewable energy.

The American Relief and Recovery Act improved the accessibility of the PTC by making it available as an up front cash grant through the U.S. Treasury. This was an important first step in expanding the accessibility of the PTC to most people without passive income and projects that did not rely on large investors with passive income. Despite this change, renewable energy investment has not expanded as hoped by the Obama Administration.

Under pricing regimes in which early adopters get penalized, few people will willingly take the first step—knowing that if they wait, someone else will do it.

Steps must be made to extend the availability of the PTC as a cash grant so that more people may invest in energy projects, particularly community-based projects that depend more upon local investing [30]. A second option to improving investment opportunities in local renewable energy would include opening the tax credit to all forms of income, rather than the original restriction to passive income.

Net Metering

Net metering, or utility purchasing of excess electricity from "behind the meter" energy generation technologies, provides consumers with the opportunity to own smaller scale wind and other electricity generation to reduce or eliminate their electricity purchases. Net metering law requires utilities to purchase any excess generation, often at the retail rate. In this relationship the customer gets a guaranteed contract and good rate of return on their investment and the utility gets renewable decentralized generation capacity that reduces their overall demand load and also contributes to reducing transmission needs. Yet, many utilities have opposed net metering legislation often because such projects involve a higher amount of labor (both administrative and on-the-ground infrastructure) than simply relying on old systems that depend on large-scale generation. Moreover, a general lack of familiarity with these types of projects makes many utility leaders and staffers uncomfortable with such a concept. However, as smaller-scale technology improves and the costs for large transmission and fossil fuel generation continue to grow, the benefits of working with dispersed renewable generation will become more evident.

US Capitol *by Geographically Speaking*

Net metering has the potential to create opportunities for community wind projects. It can become crippled, however, and rather limited in its application by the ceiling set on the generation capacity of individual projects. In Minnesota, for example, any project under 40 kilowatts in total generation capacity qualify for net metering. Conversely, any project over the 40-kilowatt threshold does not qualify. Other states possess higher thresholds, creating more opportunities for consumer-side electricity generation [31]. A major difficulty community wind projects currently face is establishing a long-term power purchase agreement that provides reasonable, stable, and guaranteed market for the electricity produced. Net metering requires utilities to accept excess generation at pre-determined rates, creating the

stable income stream necessary for investment to occur in such projects. Net metering and the next two policy solutions discussed here (advanced renewable tariffs and standard offer contracts) present different means to the same end of creating more stability in project income, which then creates a stronger investment environment.

With a high net metering ceiling, community wind projects would see more stable pricing and return opportunities than through the more traditional power purchase agreement pursued as an independent power producer. Under Pennsylvania's net metering law, for example, non-residential customers may place energy generation sources up to 3 megawatts in capacity behind the meter. In such a situation, a local school, farm, industry, commercial entity, or government service such as a wastewater treatment facility, preferably one with larger on-site demand, could work with a community energy partnership to place a community wind project on-site. The site owner could negotiate a mutually-beneficial contract with the community wind development regarding costs and payments.

Standard offer contracts remove what at times can become expensive and time-consuming negotiations.

Advanced Renewable Tariffs

In many ways advanced renewable tariffs address the same problem of price and contract uncertainty. Also known as feed-in tariffs, this pricing structure requires utilities to offer contracts to individuals or communities seeking to build a renewable energy project. Tariffs offer two distinct advantages. First, prices are set for each technology. This allows customers and communities to implement the technology that best meets their needs. Second, the tariffs may be reviewed periodically by the Public Utility Commission and readjusted as the technology advances, ensuring that early adopters are not economically penalized and late adopters reap higher returns. This point cannot be overlooked. Under pricing regimes in which early adopters get penalized, few people will willingly take the first step—knowing that if they wait, someone else will do it. The problem is that most other people will also see the same incentive to wait.

On a macro level, this pricing structure does two things to encourage developments in renewable energy. First, guaranteed prices at technology-specific rates provide a guaranteed market for renewable energy industries, spurring initial investment. Second, through continued application of these renewable technologies, producers will make production and technology advancements that reduce production costs and improve technology efficiency.

Photo by Rural Learning Center

Standard Offer Contracts

A third approach to improving the stability and certainty of revenue streams of community wind projects is through the implementation of standard offer contracts. As noted earlier, under current policy, utilities negotiate separate contracts for each Individual Power Producer, including community wind projects. This imposes a difficult and sometimes costly hurdle for some wind projects. It also poses, in another way, an unfair negotiating situation. Many areas are served by a single utility under essentially contracted monopolies with state and federal regulators. Community wind projects do not have access to a competitive market for the power purchase agreement they seek. Contracts are designed to establish relationships between independent entities. However, the nature of electricity distribution creates dependent relationships. Essentially, projects are in a "take it or leave it" situation when it comes to negotiating a contract.

Standard offer contracts level the playing field by requiring the use of a single, uniform contract. Implementing a single contract system helps balance the relationship between utility and wind project. Further, standard offer contracts remove what at times can become expensive and time-consuming negotiations. Additionally, such contracts provide stability for utilities in establishing prices while simplifying cost-benefit comparisons between standard offer contracted projects and construction of other generation sources by utilities.

Increasing Renewable Portfolio Standards

A final policy option worth examining addresses overall demand for renewable energy. Until states began enacting Renewable Portfolio Standards, few utilities pursued renewable energy projects, including community-based projects. Utilities had no incentive to pursue, or penalty to refuse, developing renewable energy. With Renewable Portfolio Standards, however, utilities began to face penalties for not possessing enough renewable energy credits (RECs). This market for RECs helped spur growth in renewable energy projects, particularly wind.

An increase in Renewable Portfolio Standards by either states or the federal government would boost the demand for RECs generated by all renewable energy projects, including those by community wind projects. This policy option, unfortunately, would fail to address barriers specifically facing community-based projects, namely financing, electricity pricing and contract negotiation. Certainly a higher renewable portfolio standard would increase the overall demand for renewable energy. But without addressing the barriers specific to community-based energy development, in all likelihood a higher Renewable Portfolio Standard would result in more opportunities only for investor-owned projects.

Table 2: **Summary of State Renewable Portfolio Standards**

State	Amount	Year	Organization Administering RPS
Arizona	15%	2025	Arizona Corporation Commission
California	33%	2030	California Energy Commission
Colorado	20%	2020	Colorado Public Utilities Commission
Connecticut	23%	2020	Department of Public Utility Control
District of Columbia	20%	2020	DC Public Service Commission
Delaware	20%	2019	Delaware Energy Office
Hawaii	20%	2020	Hawaii Strategic Industries Division
Iowa	105 MW		Iowa Utilities Board
Illinois	25%	2025	Illinois Department of Commerce
Massachusetts	15%	2020	Massachusetts Division of Energy Resources
Maryland	20%	2022	Maryland Public Service Commission
Maine	40%	2017	Maine Public Utilities Commission
Michigan	10%	2015	Michigan Public Service Commission
Minnesota	25%	2025	Minnesota Department of Commerce
Missouri	15%	2021	Missouri Public Service Commission
Montana	15%	2015	Montana Public Service Commission
New Hampshire	23.80%	2025	New Hampshire Office of Energy and Planning
New Jersey	22.50%	2021	New Jersey Board of Public Utilities
New Mexico	20%	2020	New Mexico Public Regulation Commission
Nevada	20%	2015	Public Utilities Commission of Nevada
New York	24%	2013	New York Public Service Commission
North Carolina	12.50%	2021	North Carolina Utilities Commission
North Dakota*	10%	2015	North Dakota Public Service Commission
Oregon	25%	2025	Oregon Energy Office
Pennsylvania	8%	2020	Pennsylvania Public Utility Commission
Rhode Island	16%	2019	Rhode Island Public Utilities Commission
South Dakota*	10%	2015	South Dakota Public Utility Commission
Texas	5,880 MW	2015	Public Utility Commission of Texas
Utah*	20%	2025	Utah Department of Environmental Quality
Vermont*	10%	2013	Vermont Department of Public Service
Virginia*	12%	2022	Virginia Department of Mines, Minterals, and Energy
Washington	15%	2020	Washington Secretary of State
Wisconsin	10%	2015	Public Service Commission of Wisconsin

Percentages refer to a portion of electricity sales and megawatts (MW) to absolute capacity requirements. Most of these standards phase in over years, and the date refers to when the full requirement takes effect. Data from US DOE EERE [32].

*Five states, North Dakota, South Dakota, Utah, Virginia, and Vermont, have set voluntary goals for adopting renewable energy instead of portfolio standards with binding targets.

CONCLUSION

We are currently in the midst of two slow revolutions, one technological and the other in popular thinking. Governments, businesses, researchers, and others are rapidly developing new methods and technologies for the way electricity is created and delivered. Meanwhile, the broader population is in a collective shift in the way they look at electricity—its production, distribution, and associated consequences.

Global climate change has altered everyone's perspective to no longer allow such an antiquated "head in the sand" approach.

Both revolutions preclude us from maintaining the "out of sight, out of mind" mentality that had until recently pervaded the thinking of energy leaders and the general public. Global climate change has altered everyone's perspective to no longer allow such an antiquated "head in the sand" approach. The energy crisis has similarly forced Americans to pull their heads out of the sand regarding where and how we get our energy. In any revolution it takes time to both develop new ideas and propagate them to have full effect. Everyone from political leaders and energy experts to residents and local business owners must educate themselves to most effectively face the issues confronting us.

Community Wind presents an effective method for playing a role in addressing the multiple problems we face. By educating ourselves and our community and political leaders, we may establish the most effective policies and develop the knowledge and capacities that most best serve the people and move clean energy forward.

Photo by Mark Lindquist

ENDNOTES

1 For data on wind energy growth see the American Wind Energy Association Annual Review: http://www.awea.org/publications/reports/AWEA-Annual-Wind-Report-2009.pdf For comparative data on the growth rates of all electricity production sectors see the Energy Information Administration Annual Energy Review 2008: http://www.eia.doe.gov/aer/pdf/pages/sec8_8.pdf

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3 See: Community Wind 101: A Primer for Policymakers by Patrick Mazza http://www.ef.org/docs/CommWind_web.pdf

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6 Community Wind includes projects developed through the Minnesota Flip model as well as through C-BED policies. Conversely, C-BED includes only projects developed through that legislation and thus do not include projects developed through the Minnesota Flip model.

7 Community Wind Overview, Windustry: http://www.windustry.org/communitywind#overview accessed Oct. 6, 2009.

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11 Winona wind study, prepared by WindLogics (Oct. 21, 2005): http://www.co.winona.mn.us/school1000179/images/files/ wind_logics_report.pdf (accessed Oct. 6, 2009).

12 Minnesota House of Representatives, legislative session 85, H.F. 3585: https://www.revisor.mn.gov/revisor/pages/search_status/ status_detail.php?b=house&f=HF3585&ssn=0&y=2008 (accessed Oct. 6, 2009).

13 Minnesota House of Representatives, legislative session 86, H.F. 1251: https://www.revisor.mn.gov/bin/bldbill.php?bill=H1251.1.html &session=ls86 (accessed Oct. 6, 2009).

14 "Willmar Finishes Construction of Wind Turbines," Ambar Espinoza, Minnesota Public Radio (June 8, 2009): http://minnesota.publicradio.org/display/web/2009/06/08/willmar_wind/ (accessed Oct. 6, 2009).

15 "New Crop: In Bid to Hang On, Miner County, S.D., Downsizes Dreams; As Farmers Dwindle, Towns Make Best of What's Left; Big Grant Helps Fight Odds; Windmills and Organic Beef," Jonathan Eig, Wall Street Journal (Print Ed., March 25, 2005).

16 In the Winona case study, Juhl Wind, Inc. was brought in as a project developer and has a long history of supporting community wind projects. National Wind, Inc. has targeted their work to focus on community projects. Other wind developers focusing on community scale projects certainly exist and more will develop as awareness of and interest in this model increases. For a more complete list of community-oriented wind developers see: Community Wind Financing: A Handbook by the Environmental Law & Policy Center," available at: http://elpc.org/wp-content/ uploads/2009/11/ELPC-Community-Wind-Book-09.pdf. Also, a directory of project developers serving Minnesota and surrounding states is available at www.rediresources.org, a new wind energy directory in beta test at the time of publication of this report.

17 An excellent guide for community wind projects is the "Community Wind Development Handbook" provided by the Agricultural Utilization and Research Institute and available at the Southwest Initiative Foundation website as part of their Rural Energy Development Initiative: http://www.swifoundation.org/documents/CommunityWindDevelopmentHandbook1-31-08.pdf

18 The importance of communications and public sentiment toward community energy projects is also noted by Sarah-Patricia Breen, "Community Owned Independent Power Production: Challenges and Opportunities," Renewable Energy World North America Magazine (Oct. 28, 2009): http://www.renewableenergyworld.com/rea/news/article/2009/10/community-owned-independent-power-production-challenges-and-opportunities?cmpid=WNL-Friday-October30-2009 (accessed October 30, 2009).

19 The importance of messaging community benefits such as energy price stability and job creation in noted in an effort to maintain public support for the Delmarva-Bluewater Wind Project, a leading edge off-shore wind project. See: Rikki Stancich, "US Wind Project Finance: The Waiting Game," Wind Energy Update October 30, 2009, http://social.windenergyupdate.com/qa/us-wind-project-finance-waiting-game (accessed October 30, 2009).

20 2009 Minnesota Statutes, 216B.1612 Community-Based Energy Development; Tariff https://www.revisor.mn.gov/statutes/?id=216B.1612. It is unclear in this most recent revision of C-BED legislation exactly how much must flow to the local community, or exactly what is defined as the local community, although it is stated within the law a percentage of the benefits that must flow to qualifying owners, which may not necessarily include the local community.

21 Community-Based Energy Development (C-BED) Tariff.
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23 See Dispersed Renewable Generation Transmission Study Phase II Volume 1 Docket Number E999/DI-08-649 for study results. http://www.state.mn.us/mn/externalDocs/Commerce/DRG_Transmission_Study_Phase_II_Vol_I_091509020354_DRG_PhaseII_Study_Report_Volume_I.pdf (accessed October 28, 2009).

24 See Clean Energy Resource Teams Model Wind Ordinance- 2005: http://www.cleanenergyresourceteams.org/files/2005_model_wind_ordinance.pdf

25 Wisconsin Legislature, Senate, 2009-2010 Legislature, http://www.legis.state.wi.us/2009/data/SB-185.pdf

26 States with C-BED legislation include Minnesota and Nebraska.

27 U.S. Government Accountability Office, Renewable Energy: Wind Power's Contribution to Electric Power Generation and Impact on Farms and Rural Communities," Sept. 2004, p.82-3. www.gao.gov/new.items/d04756.pdf

28 Rural Utility Service website http://www.usda.gov/rus/electric/faqs.htm (accessed October 29, 2009).

29 Personal communication with John Moore, Environmental Law and Policy Center.

30 Information regarding the Production Tax Credit was provided by Susan Sloan of the American Wind Energy Association, Lloyd Ritter of 25 x '25, and Bentham Paulos of the Energy Foundation.

31 A few examples of higher net metering capacities include Iowa at 500 kilowatts, Pennsylvania at 3 megawatts for non-residential customers, 2 megawatts for non-residential customers in Oregon, and 1 megawatt in California for all customers. For a full review of state net metering laws, visit: www.dsireusa.org

32 Summary of State Renewable Portfolio Standards from US DOE EERE, http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm#chart (accessed Dec. 2, 2009)

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