Getting Community Wind Off the Ground
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Topics I Will Cover

• Corporate vs. Community Owned Wind Projects
• Examples of Community Wind Projects
• Key Issues for Community Wind Projects
• Development Steps for Various Types of Community Wind Projects
• Policies Need to Make Community Wind Possible
Ownership of Wind Farms

• Until the last couple of years, most wind generation was owned by independent power producers, such as Florida Power and Light, with power sales contracts to the local electric utility.

• Now, a few electric utilities are building wind farms, such as Xcel, MidAmerican Energy, Alliant, and OGE (Colorado, Iowa, Wisconsin, Montana, Oklahoma)

• These two ownership categories account for 97+% of the total MW

• The remaining 2-3% of the wind generation is owned by farmers, businesses, cooperatives, municipal utilities, schools, and colleges. This group of owners is collectively called “Community Wind”
Larger Scale Community Wind Projects

- Larger Community Wind generation projects usually sell all of their wind power to the local utility. However, in some cases the power is used by the owner to reduce their own electric power bill, such as a school or college using a wind turbine to reduce their electricity purchases.
- Community ownership usually provides more financial benefits to the local community per MW of capacity, because the ownership benefits stay in the community.
- Often times, the near-term benefits are modest in comparison to the long-term benefits.
- Because of favorable state policies in Minnesota and Iowa, it is economically feasible for farmers, landowners, schools, colleges and small businesses to own large wind turbines.
Examples of Community Wind Projects
What Is a Community Wind Project?

- Tom Wind’s Definition: A wind generation project owned by farmers, businesses, schools, governments, or locally owned utilities in the area where the wind power is used
- Majority of ownership benefits stay in the local community
- Typically a single turbine or a small cluster of turbines
- Often connected to the local distribution system

Single 900 kW Wind Turbine Owned by the Community of Waverly, Iowa and Connected to Their Local 13.8 kV Distribution Line
Examples of Community Wind Projects
Wind Turbines at Schools and Colleges

- Twelve Iowa schools and colleges in Iowa, and five in Minnesota have wind turbines. All projects are the result of three major factors:
  1) Supportive Public Policies
     - Net Metering
     - Grants
     - Low cost financing
     - Tradable state tax credits
     - Green tags or RECs
     - Administrative and technical support from state
  2) Significant savings in power bills
  3) Determined local champions who do not give up easily

**Iowa Schools:** Spirit Lake, Nevada, Sentral, Clay-Everly, Akron-Westfield, Forest City, Clarion, Eldora, Iowa Lakes Community College, Grinnell College

**Minnesota Schools:** Lac Qui Parle, Pipestone, Carleton College, St. Olaf, U of M at Morris
Wind Turbines at City-Owned Utilities
Wall Lake, Iowa

- Small town of Wall Lake, Iowa was determined to have its own wind turbine.
- Finding a suitable site was an issue
  - Because of very low voltage electric system (only 2.4 kV), turbine had to be close to substation.
  - There were height restrictions due to local airport.
- City received $250,000 CDBG grant.
Wind Turbines at City-Owned Utilities
Lenox, Iowa

• The local pharmacist had an interest in renewable energy and he convinced the city to study the feasibility

• Major Issues:
  – “All Requirements” provision in the Lenox municipal utility’s wholesale power contract
  – Very weak grid & 4.16 kV system limited size of wind turbine

• City received Community Development Block Grant (“CDBG”) of $250,000 toward a 750 kW wind turbine
Rural Electric Cooperatives

• Due to long-term contracts with their wholesale power suppliers, it has been difficult for many rural electric cooperatives to own wind turbines
• Several cooperatives in Illinois are allowed to buy or generated up to 5% of their power from other sources
• Illinois Rural Electric Cooperative installed a 1.65 MW turbine. Rural Electric Convenience Cooperative will install a 0.9 MW turbine this spring.
• Iowa Lakes, a distribution cooperative, will install two 10+ MW wind farms in 2009
Wind Turbines at Farms

- Wind turbines can be installed at farms to offset electricity purchases from the local utility.
- The economics depend in large part on the availability of net metering and the use of a single part electric rate (no demand charge).
- The economics are generally not favorable for very large agricultural facilities to use wind generation due to two part rates and the lack of net metering for large facilities.
- Farmer-owned 1500 kW wind turbine by Armstrong, Iowa sells all power to utility rather than using it for large nearby hog farrowing operation.
Wind Turbines at Businesses

- Wind turbines can be installed by businesses to offset electricity purchases from the local utility.
- Again, the economics depend in large part on the availability of net metering and the use of a single part electric rate (no demand charge).
- The economics are generally not attractive for most businesses since most large businesses require relatively short payback periods for capital investments.
- Smaller family-owned businesses that have a keen interest in renewable energy are more likely to justify the longer payback periods in excess of 7 to 10 years.
Key Issues
Key Issues: Wind Turbine Procurement

• It is a Seller’s Market! Most major manufacturers have no wind turbines available for 2008 and 2009
  – Large wind farm developers have purchased most wind turbines
  – Earliest delivery for major new projects may be in 2010
  – A few turbines become available as construction schedules slip
  – Five years ago, delivery time was 20-25 weeks
• Manufacturers favor larger orders rather than smaller orders since they make more money
  – In many cases, no manufacturers may even be interested in supplying a single wind turbine
• To get a turbine in the near future manufactured by the leading wind turbine companies you may have to work through a larger developer
• Single turbine projects cost more money!
• Prices won’t drop until manufacturing capacity catches up to demand.
Key Issues: Turbine Selection

- Larger wind turbines provide lower cost wind power
  - Less capital cost per kW
  - Operating and Maintenance costs are less per kW
  - Higher hub heights provides higher wind speeds
  - Newer technologies increase efficiency
- Sizes of new turbines available are 50 kW with jump to 900 kW
  - Some intermediate sizes available from overseas but costs are high due to very small market and currency exchange rates
- Refurbished wind turbines with sizes between 50 kW and 900 kW
  - Can lower capital costs,
  - Often designed for higher wind speeds
  - May be less efficient and may have higher maintenance costs
  - Difficult to find units larger than 200 kW since they are likely to be in use
Key Issues: Siting

- **Wind Resources:**
  - Your best site from a logistical perspective may not have the best wind speed in the area, and wind speed does make a big difference. This is less of an issue in flat areas.

- **Interconnection**
  - A wind turbine project that is used to offset purchases can almost always interconnect to the existing service or the local distribution system already serving the facility.
  - Larger projects with only a few large turbines can save money by connecting to the existing distribution system.

- **Point of Interconnection** has to be relatively close to the distribution substation to avoid voltage flicker and voltage level problems.

- **Distance of 0-4 miles, depending primarily on upon substation transformer size, conductor size, and turbine size.**
Key Issues: Financing & Overall Economics

• Wind projects that offset energy purchases cannot receive the federal Production Tax Credit unless the power is sold to an unrelated third party
• Due to high capital cost, getting the lowest interest rate or cost of capital is very important
• Larger wind projects designed to sell all power often use a Partnership Flip financial structure
  – Outside Investor for utilizing income tax benefits ("Tax Investor") becomes a partner in your LLC and provides the majority of the capital
  – Majority ownership flips sometime after 10 years from Tax Investor to local owner when the tax benefits lapse or when the Tax Investor achieves his target rate of return
Key Issues: Financing & Overall Economics

- Other Financial incentives
  - Generally, some type of incentive is required to make a “small” project competitive with larger wind generation projects, such as state production tax credits or payments, grants, or zero interest loans

- Non-Profit utility can use zero interest CREB financing with a term of about 15 years
Key Issues: Operations and Maintenance

- Wind turbine manufacturers will usually be responsible for maintenance during the 2 to 5 year warranty period.
- How close are the manufacturer’s service facilities?
- Are there third party maintenance providers nearby?
- The cost of long-term Repair and Replacement of the gearbox, blades, and generator is usually uncertain and can be very significant.
Development Steps

Photo by Bill Sutton
Typical Wind Project Development Process

This is not always a straightforward process and the steps are not always in this order. Sometimes the steps are repeated in an iterative fashion to optimize the economics of the project.
Development Steps Depend on Type of Project

- Development Process depends to some extent on its ownership
  - Consumer Owned Utilities
  - Schools, Colleges, other Governmental Entities
  - Local businesses
  - Local Investors

1650 kW Wind Turbine at Iowa Lakes Community College in 2005
Unique Aspects of Consumer Owned Utility Projects

- Decision to install wind generation may be based on several factors, not just the cost of wind power
- Local area site versus remote site
  - If local area site is used, interconnection to utility’s grid becomes key factor that may determine size and location of project
  - A remote windier site may be used if more wind power is needed
- Local airports often affect siting due to height restrictions
- Getting incentives or grants often “tip the balance”
- Raising the money is usually not a problem

Three 750 kW Turbines at Algona Iowa Jointly Owned by Seven Iowa Towns
Unique Aspects of School & College Wind Projects

- Educational issues are often part of the justification
- Usually a single person or small group that pushes the project
- Grants and low interest loans often used
- Occasionally the utility is generous in their agreement with the school
- Demand charges have a big impact on economics and will usually kill a project
- Schools usually have a long-term perspective and immediate savings and near-term payback are not as important

600 kW Turbine at School in Forest City, Iowa
Unique Aspects of Farmer-Owned Wind Farm Projects

- Farmer-Owned wind farms often have several wind turbines that sell all of their power to local utilities under long-term Power Purchase Agreements (PPA).
- A partnership flip financial structure is used with an equity partner that can utilize the federal PTC and accelerated depreciation.
- To be price competitive with larger corporate owned wind farms, the farmer-owned wind farm needs financial incentives or alternatively a mandate for utilities to buy their power at above market rates.
- A good economic return is essential to attract the equity partner and to justify the farmer’s out-of-pocket development costs.
The Overall Economics of Wind Generation is Determined by a Balance of Factors

- Cost of O&M
- Cost of Money
- Cost to Interconnect
- Cost of Turbine

- Financial Incentives
- Value of Green Tags
- Price of Electricity
- Wind Speed

Higher Values **DISCOURAGE** Wind Generation

Higher Values **FAVOR** Wind Generation
Policies Needed for Community Wind
State Policies are the Key to Community Wind

• Because of economies of scale, larger corporate owned wind projects usually produce lower cost wind power
  – Windiest sites that have transmission access
  – Lower cost per turbine
  – Lower cost installation
  – Lower cost of money
• Since community owned projects lack most of these benefits, they typically can’t compete on a cost per kWh basis
• Community wind projects provide more benefits to local communities
• Some type of incentive or advantage is required to enable community wind, justified by economic benefits to local communities
State Policies Needed for Community Wind Generation

• To enable schools and businesses to use wind turbines to effectively reduce their power bills, they need:
  – Net Metering rules for turbines up to 1 MW
  – Demand charge billing credits that recognize value of wind generation to the grid
  – Utility buy back rates above avoided costs or equal to utility owned cost of wind power

• To enable farmer or landowner-owned wind generation projects they need:
  – State production incentives that are justified on the local economic benefits of wind generation
  – Other common incentives such as abated property and sales taxes
  – Utility mandate to purchase a certain amount of community wind power
Federal Policies Needed for Community Wind Generation

• To enable farmer, landowner, and small business ownership of wind generation, they need:
  – Continuation of the USDA Section 9006 guaranteed loan and grants for wind generation energy projects
    • The new Farm Bill will eliminate the PTC haircut, thereby doubling the economic benefits from the grant
  – Removal of the restrictions on the use of the federal production tax credits, so that the tax credits can also be used against active income instead of passive income only
    • Corporate wind farm developers and owners are typically opposed to this change

• To enable farmers and businesses to use wind turbines to effectively reduce their power bills, they need:
  – To receive the federal production tax credit for all wind power generated, instead of only the power sold back to the utility.
Community Wind Starts with State Policy

State Legislators need to be convinced that the benefits from local ownership of wind generation offsets the costs of the incentives or mandates necessary to make community wind happen.