

# Wind Farm Development 101



**NEBRASKA WIND POWER 2009**



# Wind Farm Development 101



- **FIRST PRIVATE COMPANY TO DEVELOP A PROJECT IN NEBRASKA – 80 MW ELKHORN RIDGE**
- **CURRENT PROJECT DEVELOPMENT PORTFOLIO - 5200 MWS**
  - Six projects (568 MWs) currently on line or under construction
  - Selected for two more 80 MW PPA negotiations w/NPPD at Petersburg and Broken Bow
- **MWE IS RESPONSIBLE FOR ALL PROJECT DEVELOPMENT WORK FROM “CONCEPT TO CONSTRUCTION”**





# Finding Suitable Sites



1. Best Possible Wind Resource
  - ~8.75-9.0 m/s wind speed in Nebraska
  - Topography a good indicator
  - Lots of publicly available data suitable for prospecting
  
2. Transmission Availability
  - Proximity of existing transmission...  
**with capacity**
  - Is it possible to run a private transmission line? If so, how far?
  - Factor in necessary upgrades to substations





# Finding Suitable Sites



## 3. Sufficient Landowner Interest

- Meet with landowners to gauge interest
- Will the project be supported by the community?
- Enough land to develop a project (approx 4000 acres for an 80 MW project)

## 4. Other Factors

- Federal, State, County/local regulations
- Any environmental concerns?
- Likelihood of obtaining a Power Purchase Agreement





# Looks Good So Far



Sites that meet the previous criteria now need:

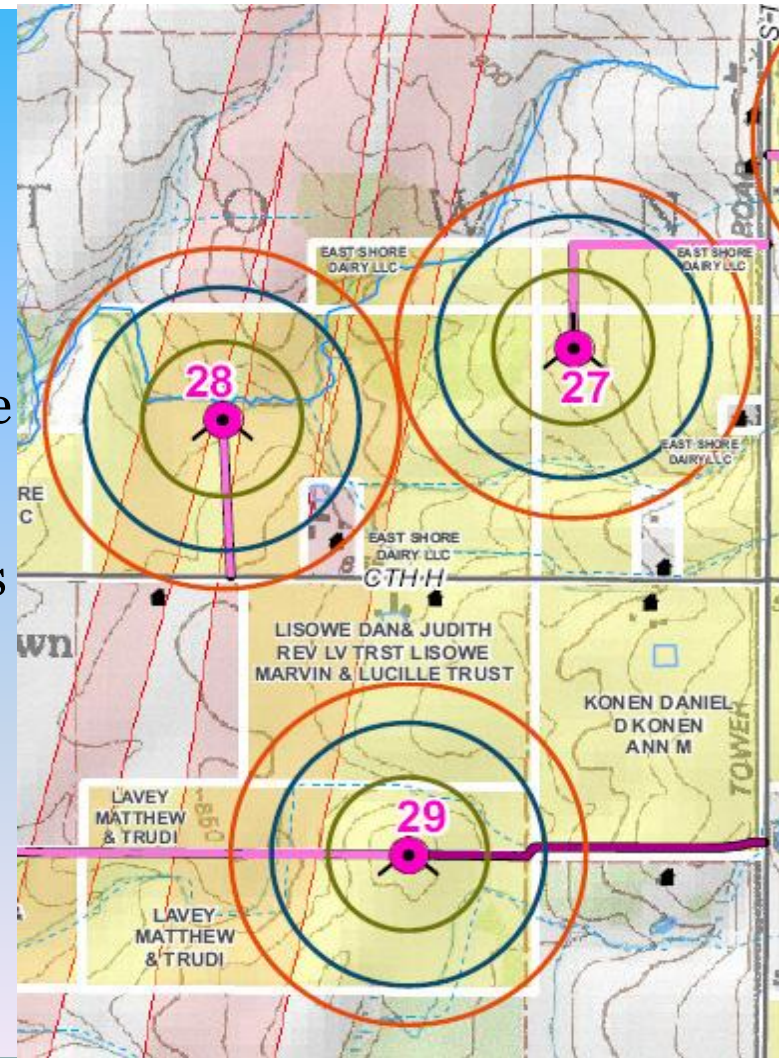
1. A project company and funding
2. Cooperation Agreements with Landowners (initial land rights)
3. On-site wind data
4. Initiate fatal flaw review
5. Begin transition from prospecting into development



# Turbine Layout Plan

What factors into a Turbine Layout Plan?

1. Setbacks applied to project acreage to obtain buildable area.
2. Within buildable area, wind resource and constructability used to determine turbine sites.
3. Landowners approve locations of turbines and access roads.
4. Other factors include microwave beam paths, environmental issues, pipelines, etc.
5. Final plan used to submit for permits.





# Energy Production Estimate



- Used to determine how much power a given wind turbine or farm will produce in a year
- Most important value is the “Net Capacity Factor” or the % of power produced versus maximum rating
- Individual turbine NCF and rankings used to make adjustments to increase production
- Also estimates losses due to wake effect and line loss





# Wind Turbine Lease



- 25 year land lease for each turbine site and associated access roads and underground cables
- 100' x 100' square centered on turbine base plus 16' gravel access road is the only ground taken out of production
- Rent paid annually per turbine either by MW or % of revenue of entire farm
- All commercial terms mirror any power purchase agreement that is obtained
- Contains provisions for crop damages, decommissioning, repowering, etc







# Obtaining Permits

- Obtaining all permits is the “critical path” for a project and can take two years or longer
- Begin interaction with Federal and State agencies as soon as possible
- Environmental protection is an important focus (Army Corps, USFWS, NGPC)
- Local zoning process is the main forum for communities to discuss wind development
- Also need approvals from the FAA, FCC and other agencies





# Interconnection and PPA's

- Interconnection process is another critical path issue taking at least a year
- Involves working with transmission owner (NPPD), regional transmission operator (SPP) and power purchaser through complicated regulatory process
- Available capacity dictates project size
- Could add \$\$\$ to the project depending on upgrades needed to the system





# Finishing Up

- Finalize turbine layout plan
- Obtain final FAA approvals
- Finish entitlements (leases, easements, local permits, etc)
- Finalize energy production estimate
- Execute Power Purchase Agreement
- Execute Interconnection Agreement
- Commence construction





# Construction

- Construction takes about a year
- It takes ~2500 man/hours to construct each turbine or approx 1.25 full-time jobs for one year
- The crawler crane takes 18 semi-truck loads to deliver to the site
- Each foundation is a continuous pour needing 60-80 cement truck loads
- One full-time job created for every 10 MW's
- A typical 80 MW wind farm generates enough power 24,000 houses



**MIDWEST**



**WIND ENERGY**

# Questions?



Tom Swierczewski, AICP  
Project Developer  
Midwest Wind Energy  
847-909-8579  
[tswierczewski@midwestwind.com](mailto:tswierczewski@midwestwind.com)

**MIDWEST**



**WIND ENERGY**