

Developing Locally Owned Wind Farms

REU Program Presentation

June 7, 2011



Enervation

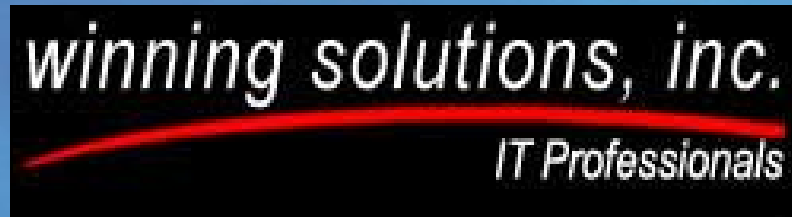
Wind Energy Background

- Founded company in 2005
- Started developing an unsolicited wind farm project from scratch for the City of Ames and ISU.
- That lead to work for juwi USA Wind on the IAMWind project
- Current focus is on developing locally owned 1.5MW to 20MW projects



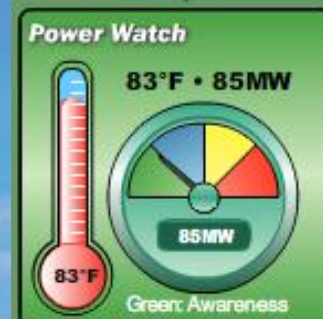
Occupation

- www.winningsolutionsinc.com



- Custom software and web development company
- Lead WSI's industrial wind generation development practice
 - Developed Power Watch System for Ames Electric Services
 - Web development work for Iowa Energy Center

DDC Online



Why power the world
with wind energy?



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- By 2031, just 25 years from now China's oil consumption will be larger than the whole world's current production, based on the current growth rate.
- China currently mines a $\frac{1}{4}$ of the world's coal.
- It was once said that the U.S. consumes the most resources, this is no longer true.
- China consumes more steel, meat, coal, grain, the U.S. still consumes more oil.

Source: Lester Brown of the Earth Policy Institute



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- We now put 7 billion tons of carbon dioxide into the atmosphere, 50 years ago it was less than 2.3 billion, 50 years from now ?.
- From the year 1000 to the 1800's 280 out every million molecules inhaled was carbon dioxide.
- Today 380 out of million molecules are carbon dioxide
- Carbon dioxide is increasing by 2 parts per million per year

Source: Princeton Professor Robert Socolow's presentation during World Bank's Energy week March 9, 2006.



“The most exciting single development today is what is happening with wind energy...”

Lester Brown of the Earth Policy Institute



Distributed Wind Projects

- Reduced transmission losses¹
- Transmission upgrades deferred or eliminated¹
- Create five to ten times more economic activity and 3.4 times more local jobs²

Sources:

1 http://www.puc.state.mn.us/portal/groups/public/documents/pdf_files/000436.pdf

2 <http://www.iowapolicyproject.org/2005docs/050405-wind.pdf>



Current Projects

- 25MW project here in Story County, Iowa
 - Converted to 4 smaller projects due to transmission constraints
- 10MW project in Sac County Iowa
 - On hold due to low power purchase prices
- 850kW on site industrial generation project
 - Stopped by NIMBY opposition



From Start to Operating

- Qualify wind resource
- Identify transmission, interconnection study
- Assess landowner/farmer/investors commitment
- Environmental Review
- Work toward PPA and turbine procurement
- Manage grant application process
- Layout wind farm, permitting
- Documentation for financing
- Construction contracting
- Operations and Maintenance



Continued

- Vendor selection
 - Transmission, collection and sub station engineering
 - Meteorological tower installation and data analysis
 - Accounting, Tax and Financial analysis
 - Legal – PPA – Interconnection – Turbine Supply
 - Civil engineering
 - Maintenance and Operations



Key Challenges

- Transmission
- Land acquisition
 - Expanding project past core group
- Turbine supply
 - Reasonable warranty terms
- Qualifying vendors
- Competing with the customer
- Balancing benefits of local ownership with potential higher costs to the utility's customers



Small But Important Challenges

- Met tower placement
- Turbine placement
- Serial development vs. parallel development
- Adversity to risk
- The ticking clock



SECONDWIND



Two state of the art 60M tall tilt up meteorological towers being unloaded North of Nevada Iowa. One is operational North of Story City, Iowa, it was sold to Clark Thompson's Story Wind Energy, LLC single turbine project. The other was installed December 6, 2009.

What is Enervation doing?

- Working with farmers and utilities to bring them together
- Providing management, expertise and organization
- Working to keep the related economic benefits local
- In the final stages of developing 4-5 GE 1.6MW wind turbines



Working to power the Midwest



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