



Wind Energy Development Overview

Presented by:

Bill Poole – NRC, Inc.

SAME

Midwest Small Business Expo

March 11, 2010

Why Develop A Wind Energy Project?


ENVIRONMENTAL REASONS

- Reduce Greenhouse Gases
- Improve Air Quality
- Reduce Environmental Impacts



Why Develop A Wind Energy Project?

BUSINESS REASONS

- Offset Commercial Electric Consumption
 - Comply With Federal/State RPS
 - Profit
- 

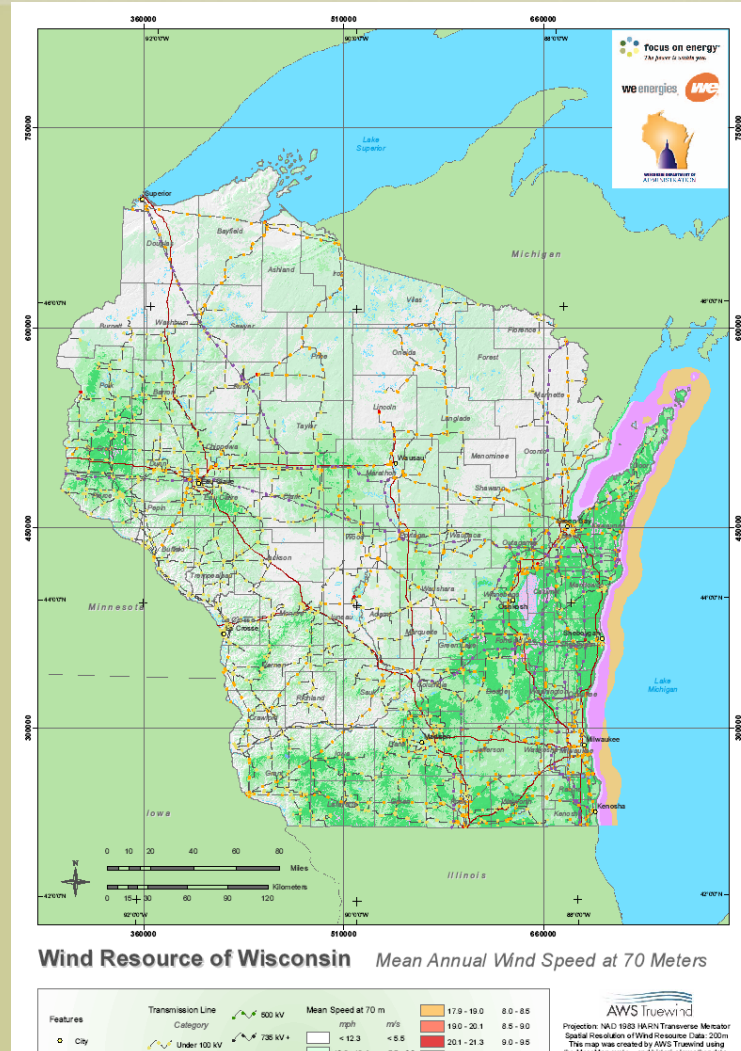
Simple Process?



Development Process

- Phase I (Simultaneous Activities)
 - Initial Wind Resource Assessment
 - Initial Site Selection
 - Initial Economic Feasibility
 - Wind Data Collection

Example Wind Resource Map



Meteorological Tower



Development Process

- Phase II
 - Turbine Selection
 - Pre-construction Engineering
 - Construction Bidding



Wind Modeling

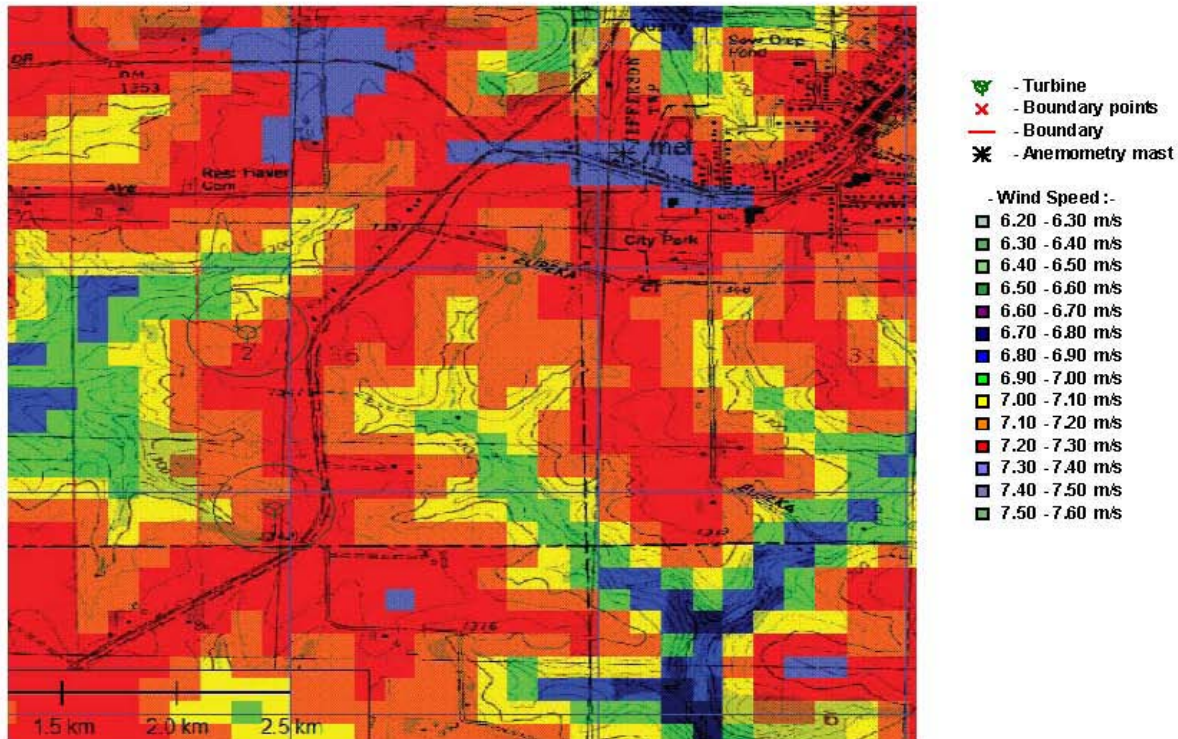


Figure 1 - Wind Speed and topo map, plus turbines used in report

Noise Analysis

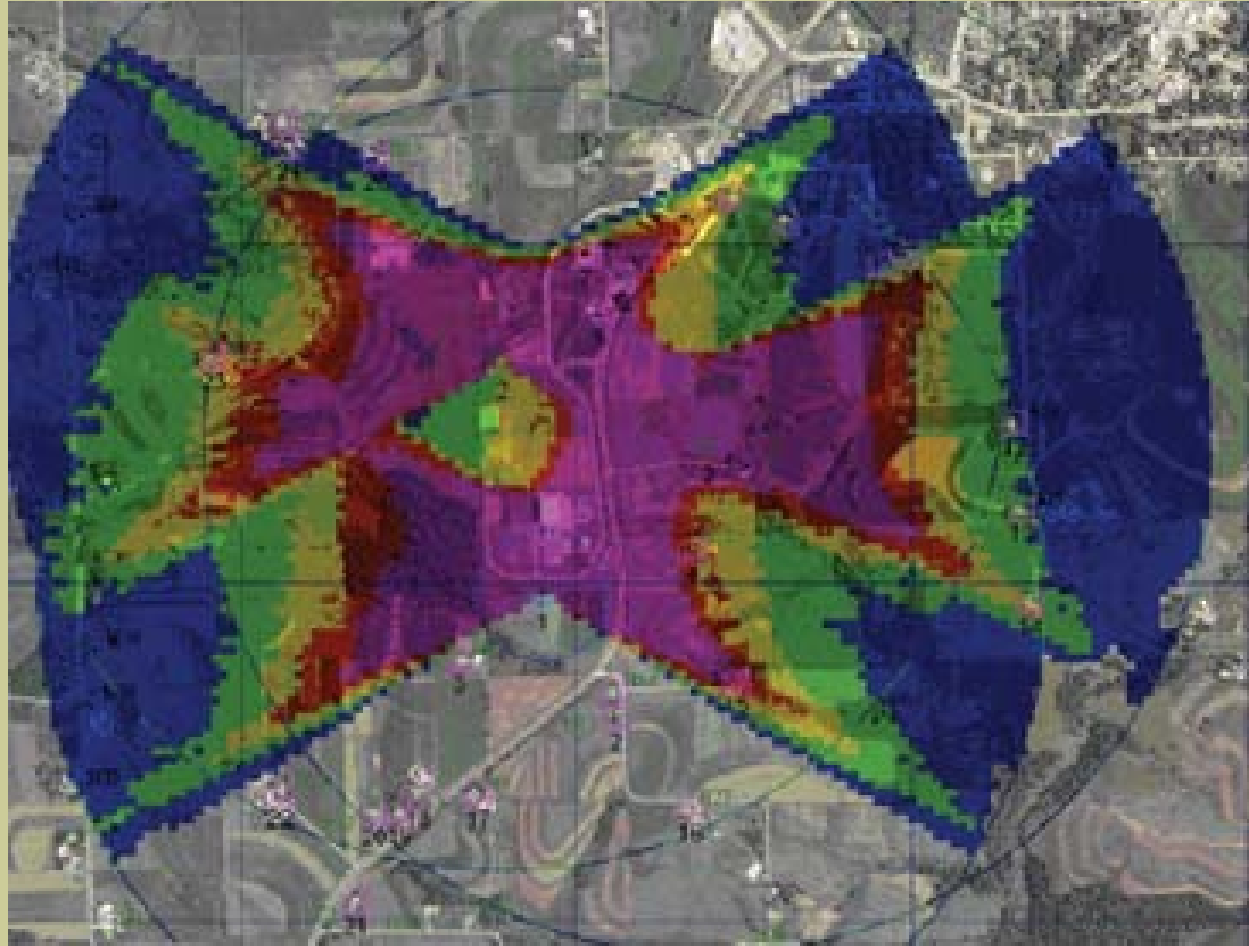


* - шумовыи марк

- Noise :-

- 22:00 - 00:00 (A) (B) 00.04 - 00.27
- 00:00 - 02:00 (A) (B) 00.24 - 00.04
- 02:00 - 04:00 (A) (B) 00.02 - 00.24
- 04:00 - 06:00 (A) (B) 00.22 - 00.02
- 06:00 - 08:00 (A) (B) 00.02 - 00.22
- 08:00 - 10:00 (A) (B) 00.22 - 00.02
- 10:00 - 12:00 (A) (B) 00.07 - 00.22
- 12:00 - 14:00 (A) (B) 00.27 - 00.07
- 14:00 - 16:00 (A) (B) 00.08 - 00.27

Shadow Flicker



Development Process

- Phase III
 - Site Preparation
 - Project Management
 - Construction
 - Commissioning
 - Operation



Environmental Concerns

Does Clean/Renewable Energy = No
Environmental Issues?



Regulated Natural Resources

- Wetlands & Waterways
 - Migratory Birds
 - Endangered & Threatened Species
 - Other Resource Considerations
 - Wildlife Refuges
 - State/National Forests
 - Bats
- 



Wetlands & Waterways

Shallow Marsh



Stream



Wetlands & Waterways

Federal Policy & Regulation

- River & Harbors Act of 1899
 - Structures and fill in navigable waters

- Clean Water Act, Section 404
 - Wetland fill

Wetlands & Waterways

- State Wetland & Waterway Regulations

 - Local Regulations & Influences
 - Shoreland / Wetland Zoning
 - Floodplain Zoning
 - Environmental Corridors
- 
- 

Wetland & Waterway Concerns

Aren't Wind Turbines Typically on Hill Tops or in Farm Fields?



Wetland & Waterway Concerns

- Access Roads
- Cabling
- Construction
- Erosion Control



Wetland & Waterway Concerns

Access Roads



Cabling



Wetland & Waterway Concerns

Construction



Erosion Control



Migratory Birds

Migratory Bird Treaty Act





Endangered & Threatened Species

- Federal - Endangered Species Act
- State – Endangered & Threatened Species Regulations



Endangered & Threatened Species


Prairie Chicken



Blanding's Turtle



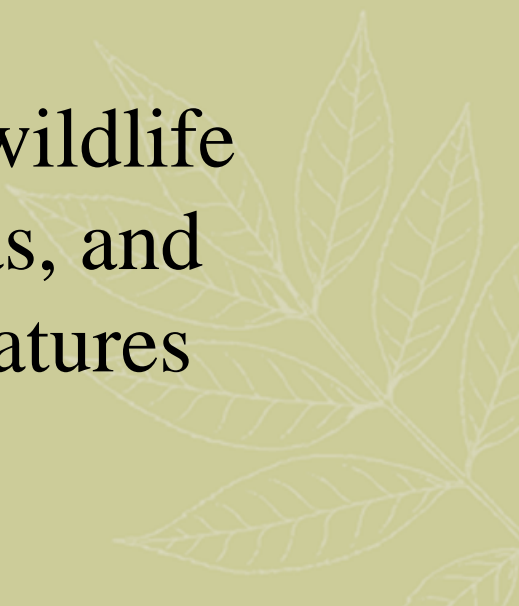
Land Conservation Programs

- CRP
 - CREP
 - WHIP
 - WRP
 - Farmland Protection Program
- 

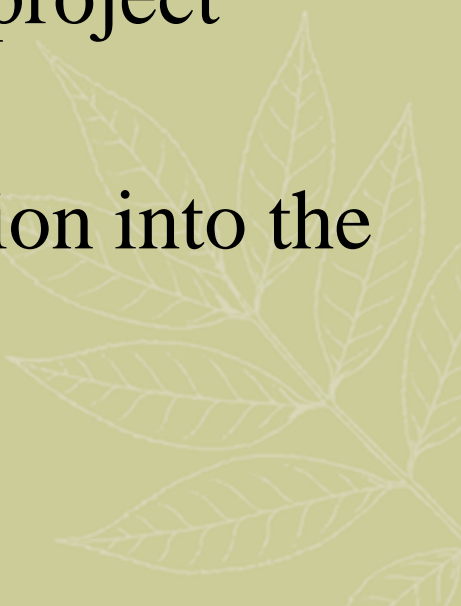
Non-Regulated Resources

“Those resources that may not have any formal protection but warrant consideration”

Examples:

- Bats
 - Close proximity to wildlife refuges, natural areas, and certain landscape features
- 

Addressing Environmental Concerns

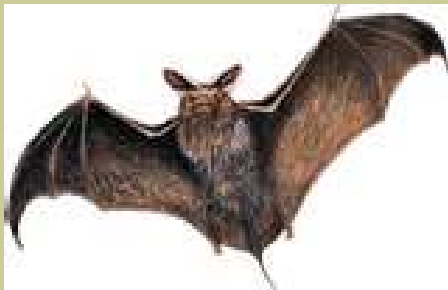
- Early Consultation with Resource Agencies
 - Early identification of regulated or special natural resource features within or adjacent to the project area
 - Incorporate this information into the turbine siting process
 - Monitor during and after construction
- 

Impact Avoidance & Minimization


- Wetlands & Waterways
 - Access roads
 - Cabling routes
 - Construction & crane routes
 - Substation placement
 - Erosion control BMP's

Impact Avoidance & Minimization


- Migratory Birds & Bats
 - Pre-construction surveys
 - Post construction fatality surveys
 - Operation monitoring & curtailment



Impact Avoidance & Minimization

- Endangered & Threatened Species
 - Database review
 - Avoid known locations of listed species
 - Conduct habitat assessment
 - Conduct species surveys
 - Time of year construction restrictions
- 

Wind Energy Is Environmentally Friendly

- Identify potential risks early in the planning process
 - Plan accordingly to comply with regulatory requirements
 - Implement appropriate environmental protection measures as necessary
 - NEPA documentation
- 

Oh So Simple!!!

