



Wind Energy for Rural Economic Development



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WINDPOWER 2005

May 18, 2005

Denver, CO

Outline

- Economic Development Basics
 - Introduction
 - Jobs
 - Manufacturing
 - Taxes
 - Landowner revenue
- Case Studies
- Wind Powering America (WPA) Activities
- Appeal to Industry



The Opportunity

***Economic security
and prosperity for
rural America
through local
production of energy***



Rural Economic Challenges

- Low commodity prices
- Fuel price uncertainty
- High fertilizer prices
- Migration to cities
- Eroding local tax bases
- Water shortages



Wind Energy Economic Security Benefits

Wind energy is an **indigenous**, homegrown, energy resource that contributes to national security.

Wind energy is **inexhaustible** and infinitely renewable.

Wind displaces electricity that would otherwise be produced by burning natural gas, thus helping to **reduce gas demand** and limit gas price hikes.

Wind energy is the **least cost** new energy source.

Wind energy boosts rural **economic development**.

Unlike most other electricity generation sources, wind turbines **don't consume water**.

Wind energy has many **environmental benefits**.

Wind energy can be used in a **variety of applications**.

Wind energy is the fuel of **today and tomorrow**.



Windy Rural Areas Need Economic Development

United States - Wind Resource Map

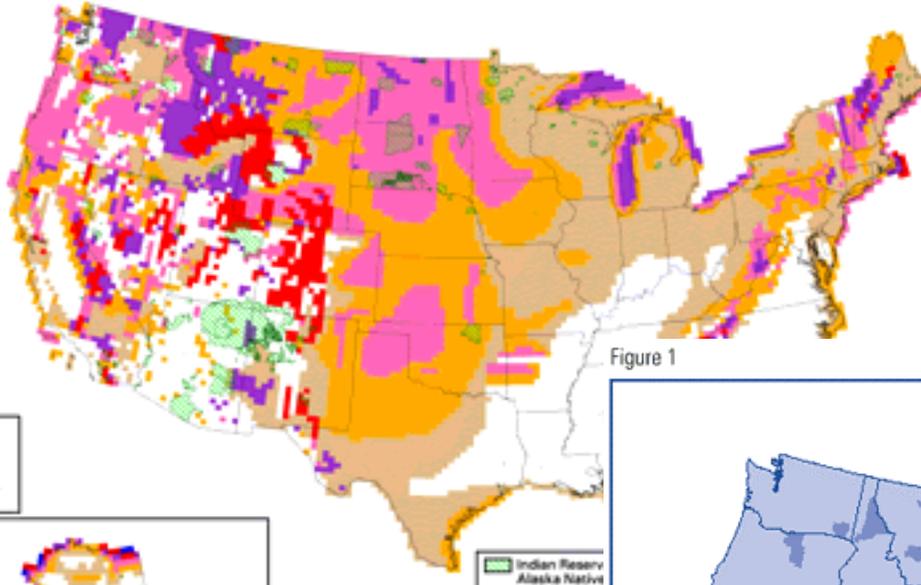
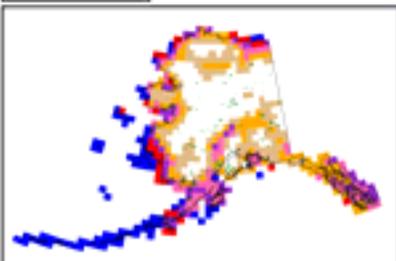


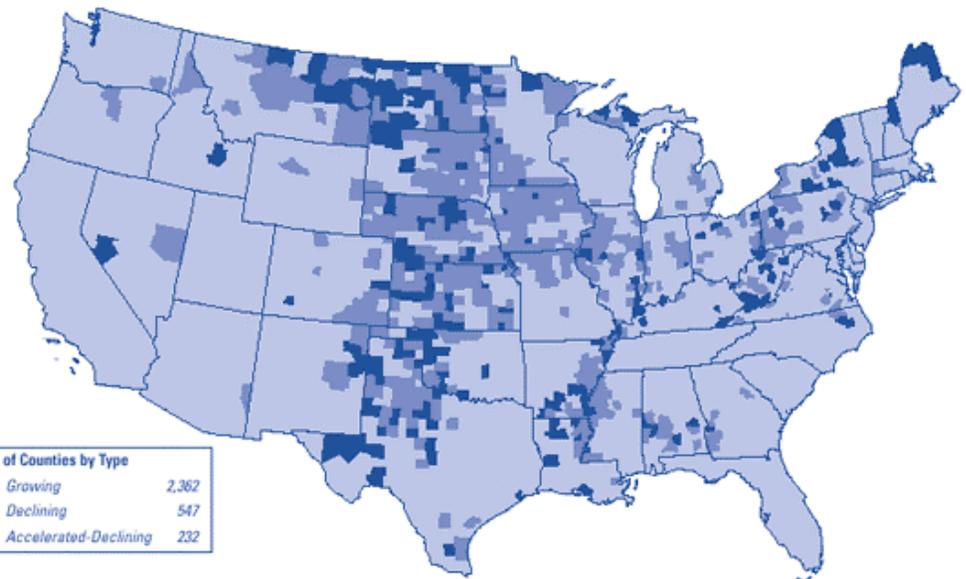
Figure 1



Wind Power Class	Resource Potential	Wind Power Density at 50 m. Wm ²	Wind Speed at 50 m. m/s
2	Marginal	200 - 300	5.6 - 6.4
3	Fair	300 - 400	6.4 - 7.0
4	Good	400 - 500	7.0 - 7.5
5	Excellent	500 - 600	7.5 - 8.0
6	Outstanding	600 - 800	8.0 - 8.8
7	Superb	800 - 1600	8.8 - 11.1

*Wind speeds are based on a Weibull k value of 2.0

Geographic Distribution of Depopulation

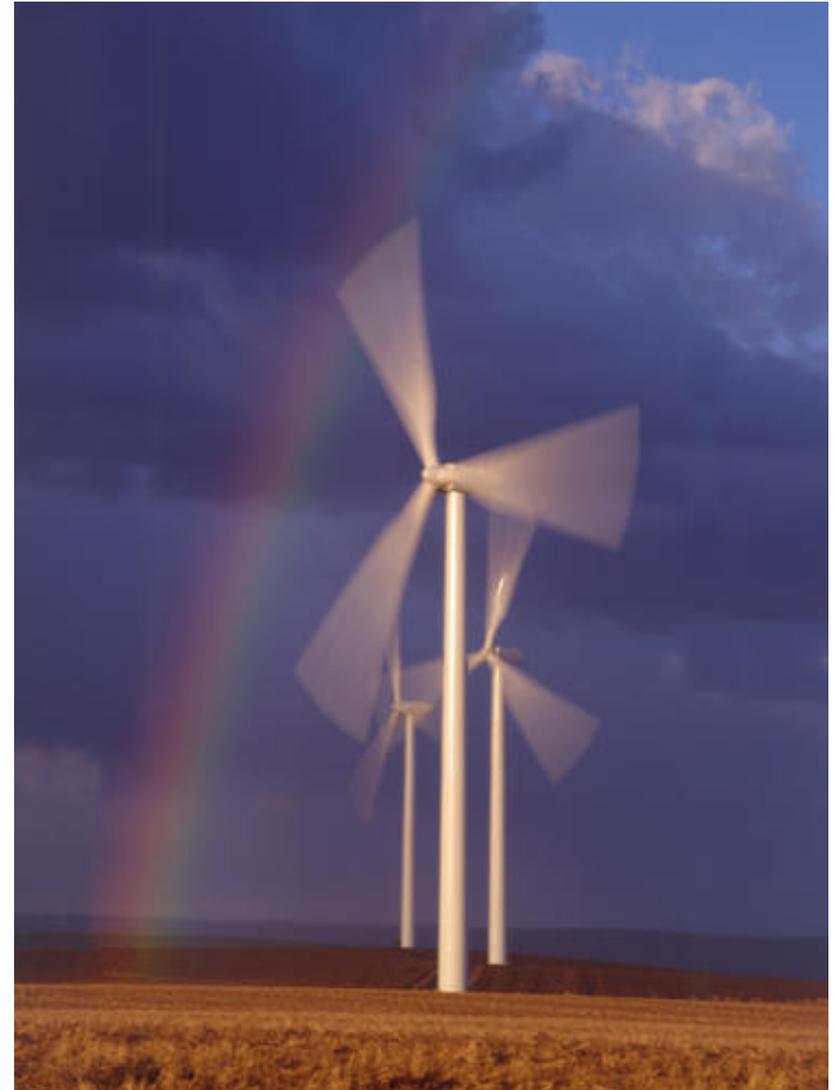


No. of Counties by Type	
Growing	2,362
Declining	547
Accelerated-Declining	232

Source: 2000 Census compared with 1970 Census.

Economic Development Impacts

- Construction
- Operations and maintenance
- Property tax revenues
- Landowner revenues
- Manufacturing
- Multiplier effect
- Net economic development impacts of wind vs. fossil fuels



Economic Development Impacts: Jobs



- **40-140 jobs during construction per 100 MW (less for new projects)**
- **6-20 permanent O&M jobs per 100 MW (average 10 per 100 MW)**
- **Local construction and service industry – local contracts**
- **Local benefits if local labor base has robust technical and construction resources**
- **Multiplier effect: increased local income induces spending on other local goods and services**

Calculating Economic Development Impacts

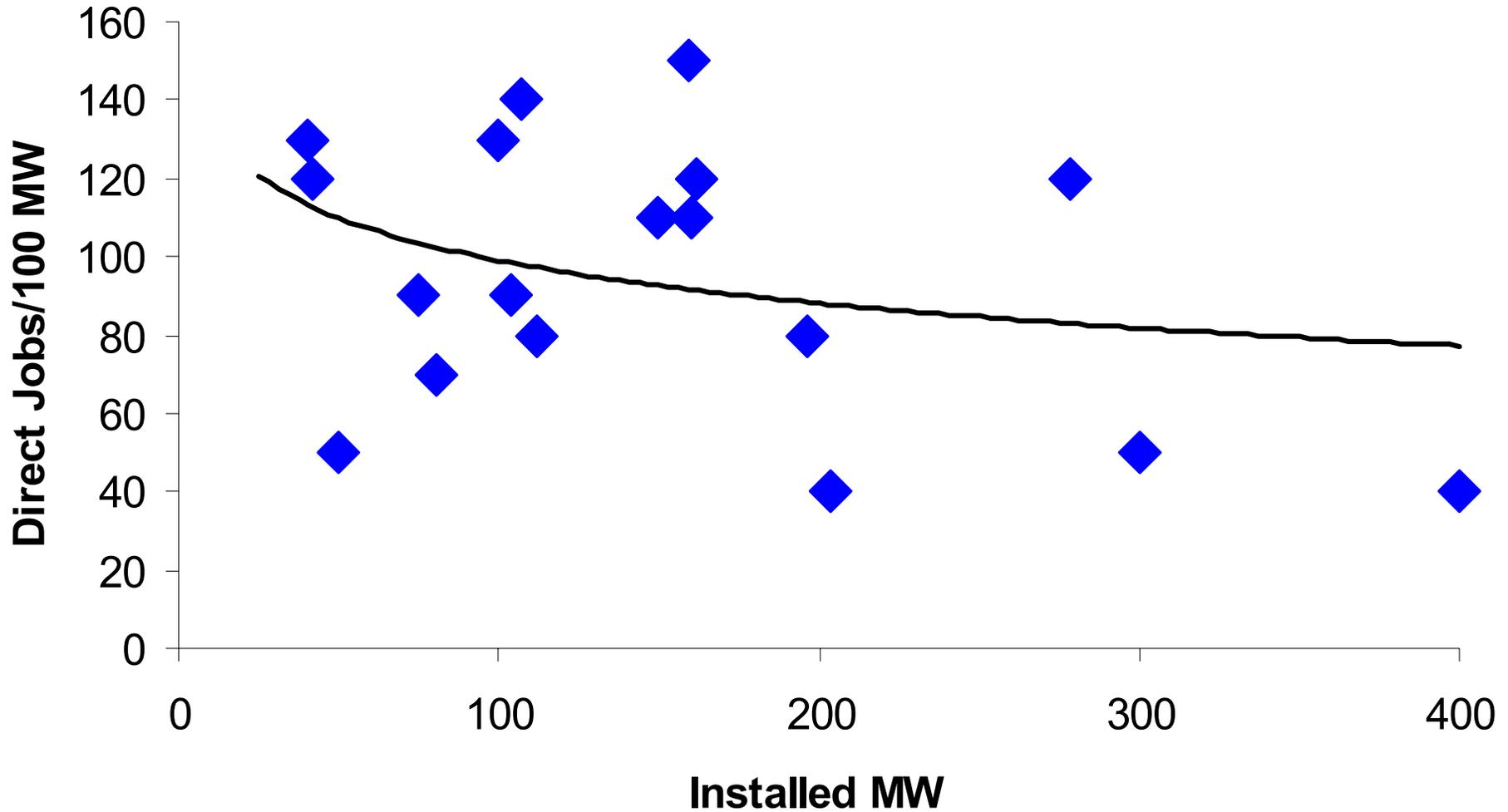
- **Direct:** Immediate effect of project expenditures (on-site contractors and local manufacturing)
- **Indirect:** Increase in local economic activity (bankers, local services)
- **Induced:** Change in wealth that occurs from the spending of people directly and indirectly employed by the project.



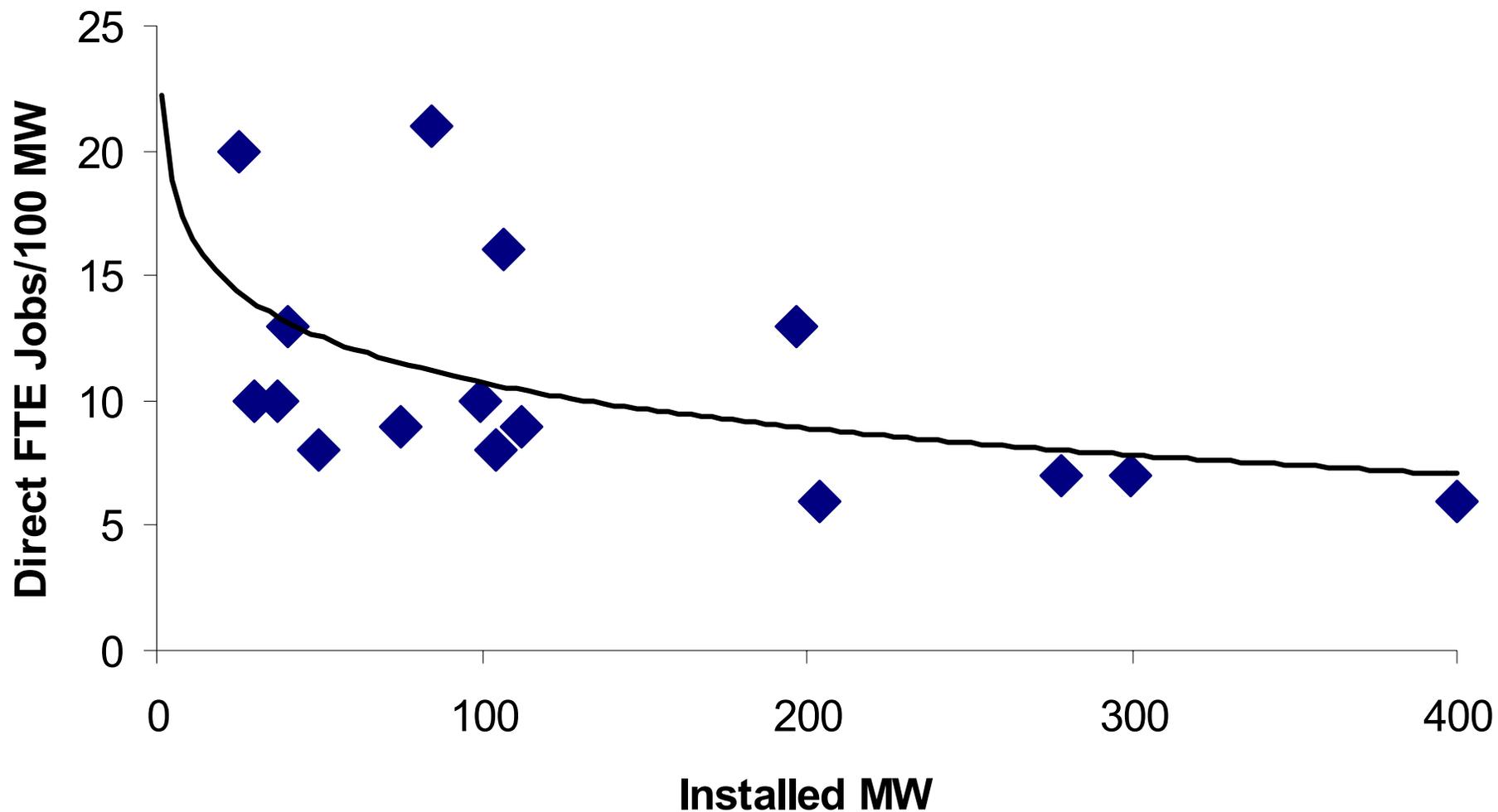
\$1M construction	Direct jobs created
Logan Co, CO	11.1
Navajo Co, AZ	12.5
McCone Co, MT	15.8

\$30M investment in a wind plant	Direct, indirect, and induced jobs
Nevada	43
California	64

Direct Construction Jobs

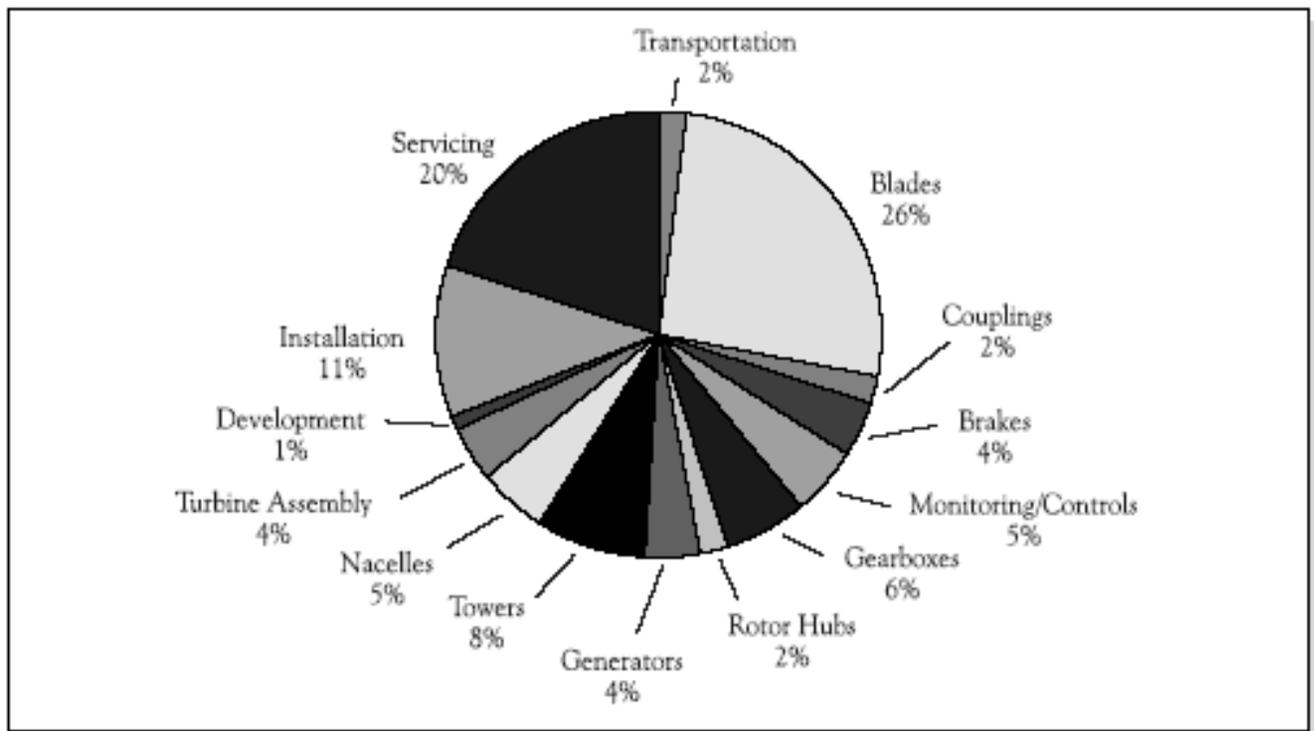


O&M Jobs



Jobs Created by Wind Power

Figure 3. Labor Requirements for Wind by Activity



A 37.5-MW wind farm creates 180 person-years of work over a 10-year period

2,000 MW of wind power creates 9,694 person-years of work

Source: REPP

Economic Development Impact: Manufacturing

- 3000 manufacturing jobs per 1000 MW (REPP)
- The U.S. wind industry employs more than 2,000 people, and contributes to the economies of 46 states (AWEA)
- In a mature wind market, these numbers are larger. The Danish Wind Manufacturers Association estimates:
 - that wind power creates 22 direct and indirect jobs for each MW of installed capacity
 - 5 jobs/MW (installation)
 - 17 jobs/MW (manufacturing related)



ND towers and blades are valuable state exports:

- LM Glasfiber blade manufacturing plant created 130 jobs, 20% of the ND lignite industry
- DMI has towers installed in 12 states

Spanish company Gamesa is building new plant in PA, creating 1,000 new jobs over next 5 years and \$40M in new investment

Economic Development Impact: Property Taxes

- Typically 1%-3% of **assessed** value
- A typical 100-MW wind farm creates \$500K - \$1M/year
- Assessed at the county level
- Varies greatly from county to county, depending on assessed value, abatements, tax rate, exemptions
- Some states receive payments in lieu of taxes
- Wind farms are often assessed more taxes than other forms of generation



Economic Development Impacts: Property Tax Revenues for Rural Areas



Prowers County Medical Center



Examples:

- **CO: 162 MW**
 - **26% increase in revenues for Prowers County**
 - **including \$821K/yr to the school district**
 - **\$195K/yr to the Medical Center**
 - **815K/yr to the general fund**
- **IA: 240 MW = \$2M/yr**
- **IA: 320 MW = \$2.5M/yr**
- **MN: 107 MW = \$611K/yr**
- **OR/WA: 300 MW = \$1.2M/yr**
- **SD: 40 MW = \$250K/yr**
- **TX: 1,100 MW = \$11.7M/yr to school districts in 10 counties**
- **WY: 85 MW in Carbon Co. = \$480K/yr**
- **WI: 20 MW in Kewaunee Co. = \$200K/yr in property taxes; 50% of county's budget**

Economic Development Impacts: Landowner Revenues

- Land lease payments: 2%-3% of gross revenue; \$2500-\$4000/MW/year
- May be negotiated as a flat rate up front or vary over the life of the project
- Local ownership of wind projects can greatly increase local impact



Case Study: Texas



Utilities and wind companies invested \$1B in 2001 to build 912 MW of new wind power, resulting in:

- **2,500 quality jobs with a payroll of \$75M**
- \$13.3M in tax revenues for schools and counties
- \$2.5M in 2002 royalty income to landowners
- Another 2,900 indirect jobs as a result of the multiplier effect
- \$4.6M increase in Pecos County property tax revenue in 2002

107-MW Minnesota wind project

- **\$500,000/yr in lease payments to farmers**
- \$611,000 in property taxes in 2000 = 13% of total county taxes
- 31 long-term local jobs and \$909,000 in income from O&M (includes multiplier effect)



240-MW Iowa wind project

- \$640,000/yr in lease payments to farmers (\$2,000/turbine/yr)
- \$2M/yr in property taxes
- \$5.5M/yr in O&M income
- **40 long-term O&M jobs**
- **200 short-term construction jobs**
- Doesn't include multiplier effect



Case Study: New Mexico

- 204-MW wind project built in 2003 in DeBaca and Quay counties for PNM
- 150 construction jobs
- 12 permanent jobs and \$550,000/yr in salaries for operation and maintenance
- \$550,000/year in lease payments to landowners
- **\$450,000/year in payments in lieu of taxes to county and school districts**
- Over \$40M in economic benefits for area over 25 years

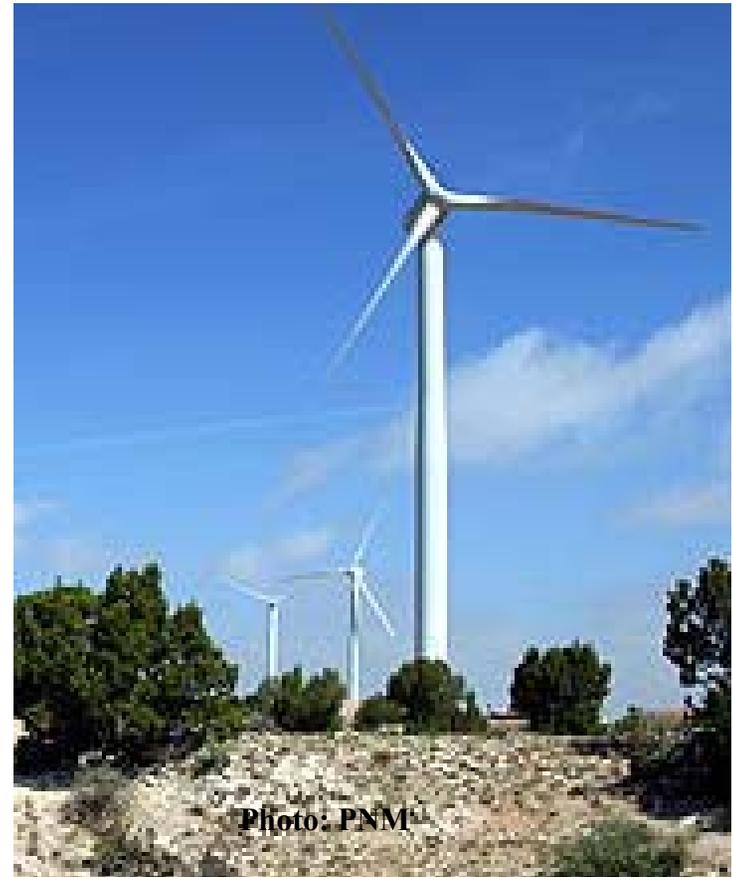


Photo: PNM

Case Study: Hyde County, South Dakota

- **40-MW wind project in South Dakota creates \$400,000 - \$450,000/yr for Hyde County, including:**
 - More than \$100,000/yr in annual lease payments to farmers (\$3,000 - \$4,000/turbine/yr)
 - \$250,000/yr in property taxes (25% of Highmore's education budget)
 - 75 -100 construction jobs for 6 months
 - 5 permanent O&M jobs
 - Sales taxes up more than 40%
 - Doesn't include multiplier effect



Case Study: Prowers County, Colorado



- 162-MW Colorado Green Wind Farm (108 turbines)
- \$200M+ investment
- 400 construction workers
- 14-20 full-time jobs
- Land lease payments \$3000-\$6000 per turbine
- **Prowers County 2002 assessed value \$94M; 2004 assessed value +33% (+\$32M)**
- **Local district will receive 12 mil tax reduction**
- Piggyback model

“Converting the wind into a much-needed commodity while providing good jobs, the Colorado Green Wind Farm is a boost to our local economy and tax base.”

John Stulp, county commissioner, Prowers County, Colorado

Local Ownership Models

- Minnesota farmer cooperative (Minwind)
- FLIP structure
- Farmer-owned small wind
- Farmer-owned commercial-scale



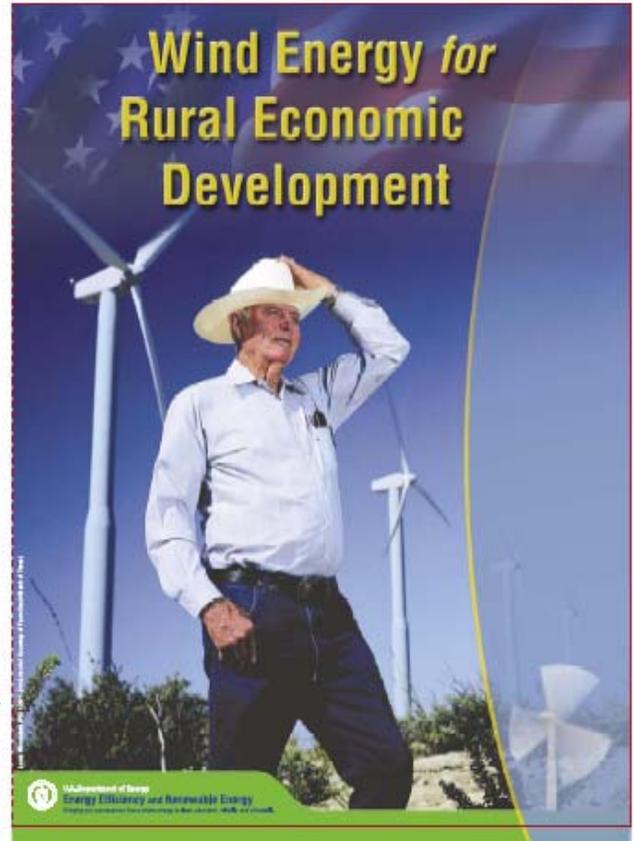
WPA Economic-Development-Related Activities

- Outreach to ag sector and rural communities
- Farm Bill
- Job and Economic Development Impact (JEDI) model
- Economic development information database
- Comparative analysis of generation sources
- Outreach to Native American community
- Economic impact of ownership options



Outreach to Rural Communities and Ag Sector

- Agricultural outreach team
- State wind working groups (WWGs) outreach at ag forums and town meetings
- State wind resource maps
- Economic development brochure, exhibit, articles, and fact sheets
- Regional and national speakers
- Wind for Schools pilot project
- Economic development Web page

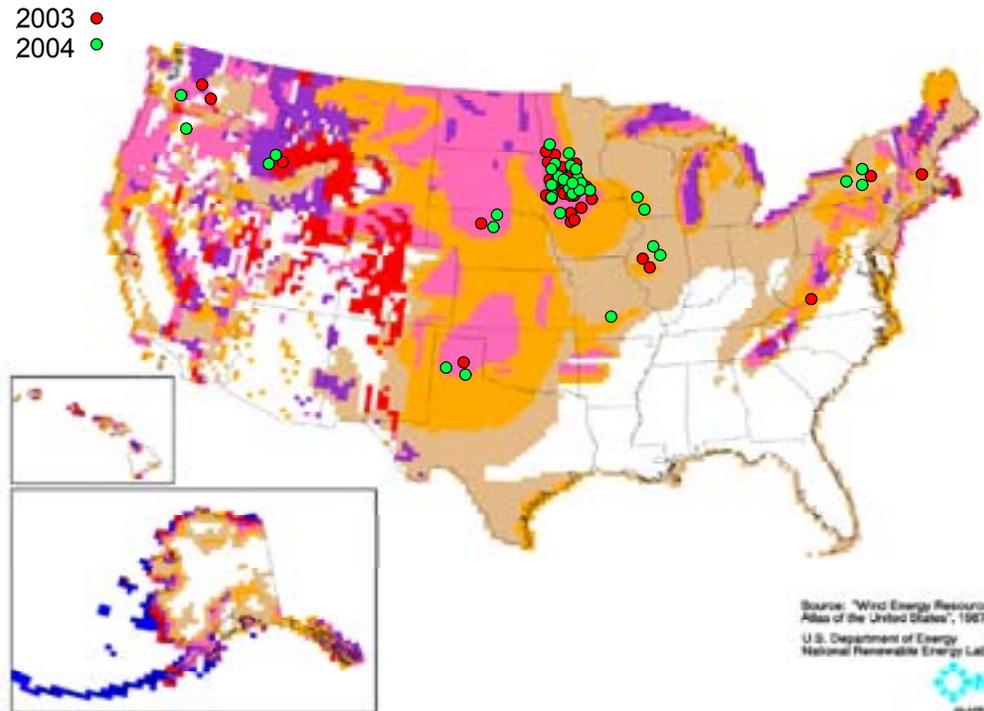


Topical Articles:

- *The New Cash Crop: What Landowners Should Know*
- *Wind Energy and the Natural Gas Crisis*
- *Economic Development for Rural Communities*
- *USDA Farm Bill Section 9006 Provides Funding for Farm and Ranch Wind Projects*
- *Electricity from the Wind: A New Lesson for Schools*

WPA Farm Bill Activities

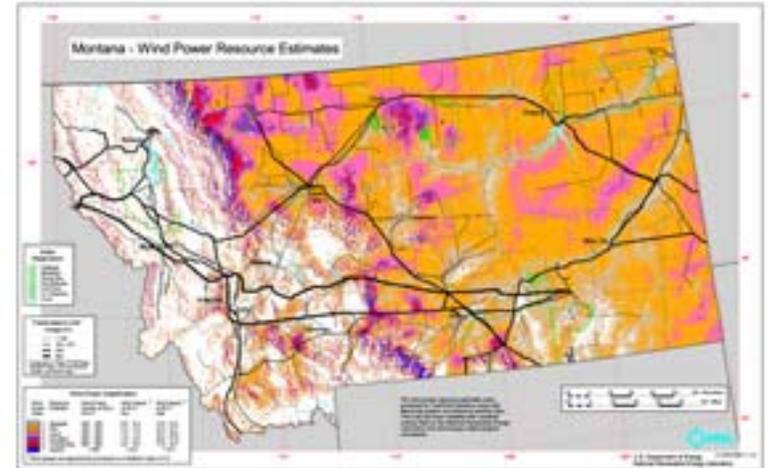
- Collaborate with USDA in developing process and outreach materials
- Fact sheets, Web site, Webcasts
- Sample application development
- Workshops for potential applicants (jointly with USDA and State WWGs)
- Review proposals for technical quality
- '03 Farm Bill wind awards: \$4.8M, 13 projects
- '04 Farm Bill wind awards: \$7.9M, 38 projects



Job and Economic Development Impact (JEDI) Model

- **Assesses the economic development impacts of constructing and operating wind plants**
- **Based on IMPLAN**

County, Local Ownership %	Project Size (MW)		
	5.0	20.0	100.0
Blaine			
0%	\$ 125,026	\$ 3,458,018	\$ 17,273,587
50%	\$ 236,163	\$ 3,796,448	\$ 18,965,738
Cascade			
0%	\$ 1,411,518	\$ 5,630,655	\$ 28,130,155
50%	\$ 1,558,729	\$ 6,219,499	\$ 31,074,375
Glacier			
0%	\$ 1,023,166	\$ 4,080,456	\$ 20,383,970
50%	\$ 1,111,328	\$ 4,433,104	\$ 22,147,210
McCone			
0%	\$ 862,354	\$ 3,435,991	\$ 17,159,815
50%	\$ 943,539	\$ 3,760,733	\$ 18,783,526
Park			
0%	\$ 1,073,558	\$ 4,281,226	\$ 21,386,617
50%	\$ 1,172,194	\$ 4,675,770	\$ 23,359,337
Prairie			
0%	\$ 789,234	\$ 3,144,651	\$ 15,704,830
50%	\$ 870,008	\$ 3,467,749	\$ 17,320,322

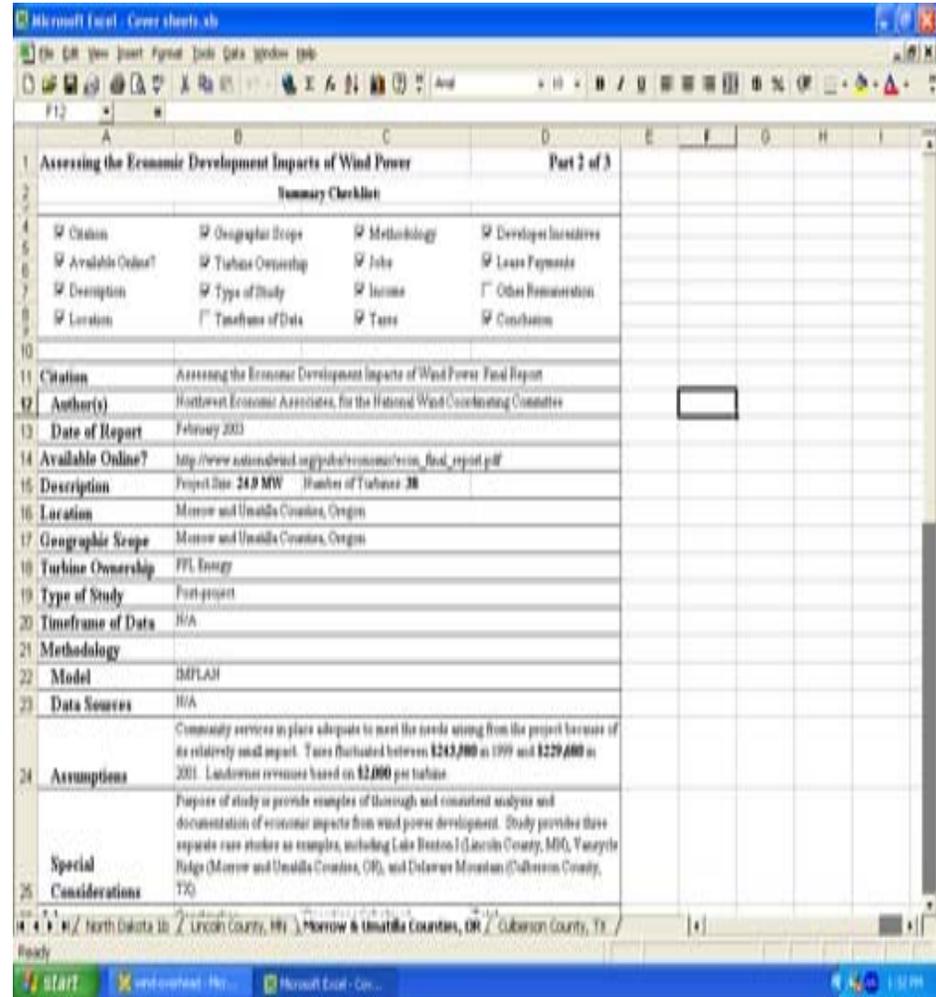


- **Users: project-specific data**
- **Model calculates project expenditures, economic activity, and number of jobs generated**
- **Working with state agricultural universities and state WWGs to analyze potential impacts in windy counties**

Economic Development Information Database

Purpose: to catalog economic development impacts for a variety of wind projects (both actual and prospective)

- Developed case study template
- Implemented as spreadsheet database
- 37 projects inventoried in 13 states
- 21 have pre-project information, 15 post-project information (12 have both)

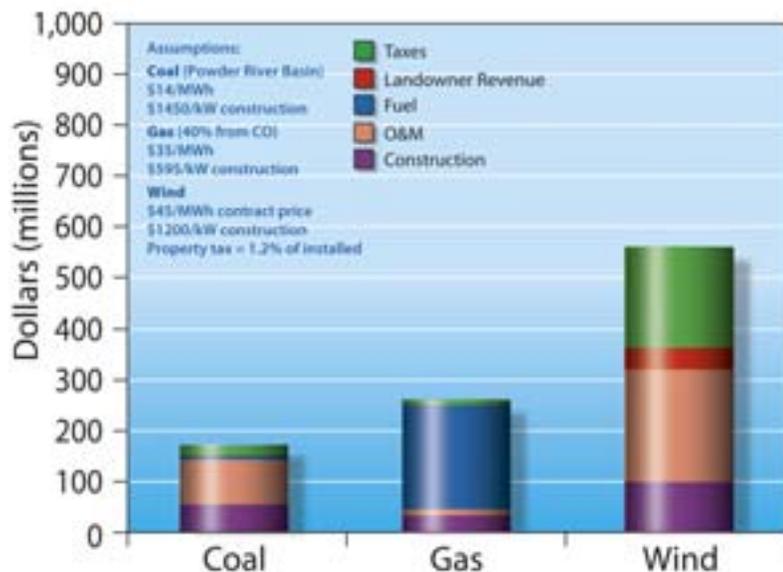


The screenshot shows a Microsoft Excel spreadsheet titled 'Cover sheets.xls'. The spreadsheet is a 'Summary Checklist' for a report titled 'Assessing the Economic Development Impacts of Wind Power - Final Report, Part 2 of 3'. The checklist includes various categories with checkboxes and corresponding data entries.

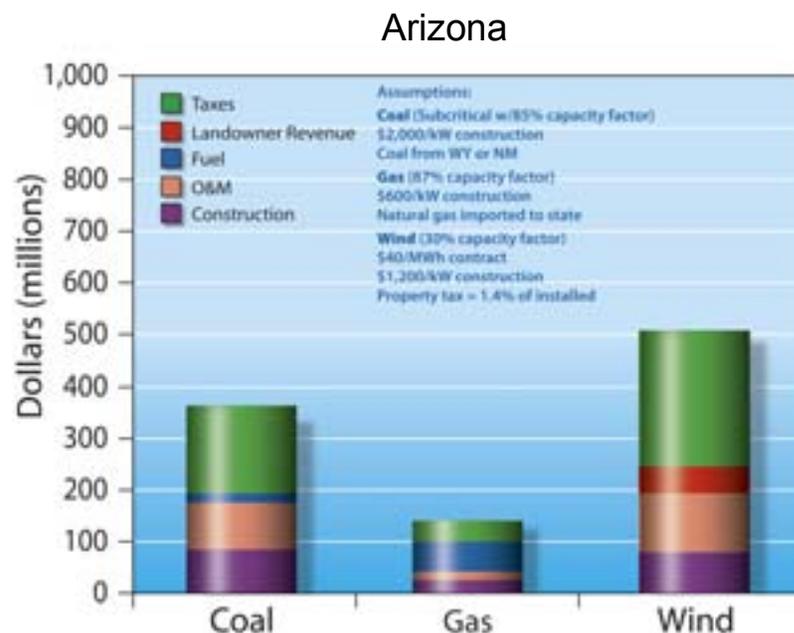
Summary Checklist			
<input checked="" type="checkbox"/> Citation	<input checked="" type="checkbox"/> Geographic Scope	<input checked="" type="checkbox"/> Methodology	<input checked="" type="checkbox"/> Developer Initiatives
<input checked="" type="checkbox"/> Available Online?	<input checked="" type="checkbox"/> Turbine Ownership	<input checked="" type="checkbox"/> Jobs	<input checked="" type="checkbox"/> Loan Payments
<input checked="" type="checkbox"/> Description	<input checked="" type="checkbox"/> Type of Study	<input checked="" type="checkbox"/> Income	<input type="checkbox"/> Other Reimbursement
<input checked="" type="checkbox"/> Location	<input type="checkbox"/> Timeframe of Data	<input checked="" type="checkbox"/> Taxes	<input checked="" type="checkbox"/> Conclusions
11 Citation	Assessing the Economic Development Impacts of Wind Power - Final Report		
12 Author(s)	Hortlewood Economic Associates, for the National Wind Coordinating Committee		
13 Date of Report	February 2003		
14 Available Online?	http://www.sustainable.org/pubs/economic/real_report.pdf		
15 Description	Project Size: 24.9 MW Number of Turbines: 38		
16 Location	Marion and Umatilla Counties, Oregon		
17 Geographic Scope	Marion and Umatilla Counties, Oregon		
18 Turbine Ownership	PPL Energy		
19 Type of Study	Post-project		
20 Timeframe of Data	N/A		
21 Methodology			
22 Model	IMPLAN		
23 Data Sources	N/A		
24 Assumptions	Community services in place adequate to meet the needs arising from the project because of its relatively small impact. Taxes fluctuated between \$243,000 in 1999 and \$229,400 in 2001. Landowner revenues based on \$2,000 per turbine.		
25 Special Considerations	Purpose of study is provide examples of thorough and consistent analysis and documentation of economic impacts from wind power development. Study provides three separate case studies as examples, including Lake Benton 1 (Lacrosse County, MN), Vantage Ridge (Marion and Umatilla Counties, OR), and Delmar Mountain (Culberson County, TX).		

Plan to add to Web site at www.windpoweringamerica.gov

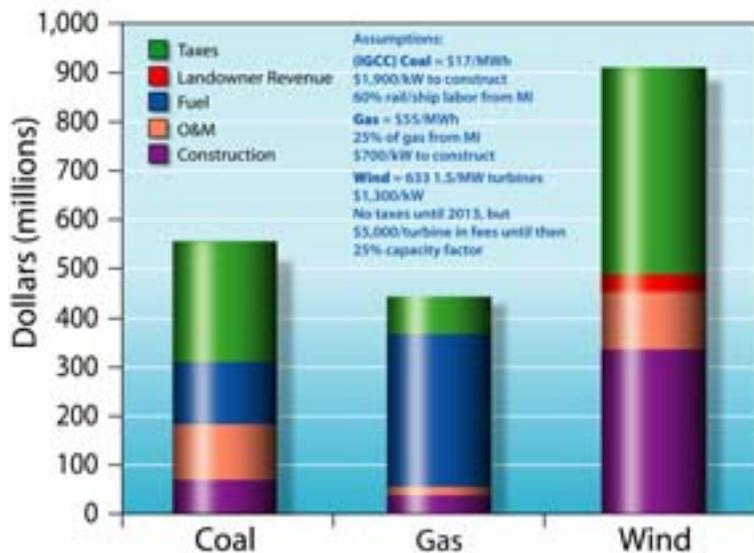
Economic Impacts of Alternative Generation



Colorado

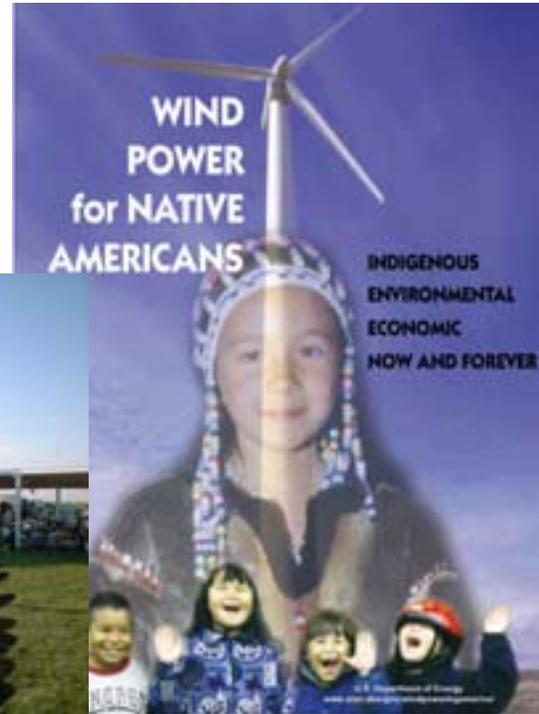


Michigan



Outreach to Native American Community

- Native American Wind Interest group (NAWIG)
- Regional NAWIG workshops
- Anemometer loans
- Lakota wind assessment options
- Tribal Wind Maps
- Technical Assistance to DOE tribal RE grantees
- Tribal representatives to WEATS
- NA section on WPA Web site
- NAWIG Newsletter



Appeal for Partnership in Data Collection

- Data on the impacts of wind applications to local, state and regional economies are critical to many stakeholders:
 - *county commissioners*
 - *public utility commissioners*
 - *state energy officials*
 - *rural economic development officials*
 - *state legislators*
 - *NGOs*
 - *project developers*
 - *advocates*
 - *ag organizations*
- WPA is a credible source of ED information to these stakeholders
- WPA needs help from the wind industry on project data for impact analysis





Carpe Ventem - Harvest the Wind

www.windpoweringamerica.gov

Photo credit: Vestas