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# Wind Powering America: Progress, Plans and Perspectives

Larry Flowers  
NREL

Phil Dougherty  
DOE

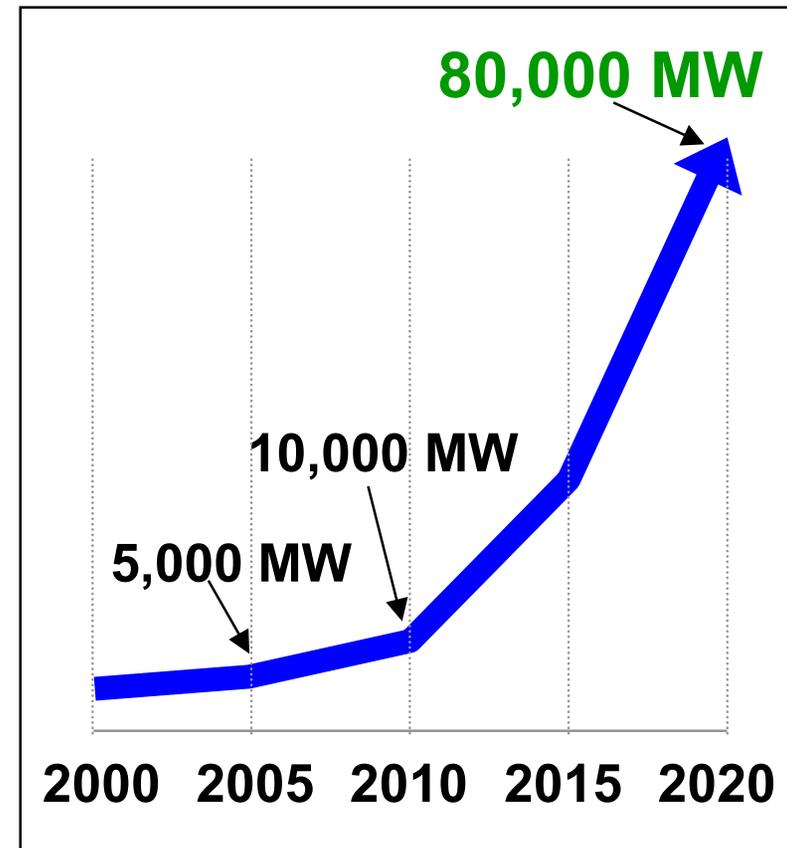
Windpower 2002  
Portland, OR  
5 June 2002



# Goals



- Provide at least 5% of the nation's electricity with wind by 2020
  - Install more than 5000 MW by 2005
  - Have more than 10,000 MW on-line by 2010
- Double the number of states that have more than 20 MW of wind capacity to 16 by 2005, and triple the number to 24 by 2010
- Increase wind's contribution to federal electricity use to 5% by 2010
- Supplemental goals
  - Federal agencies-2.5% RE by 2005;  
7 1/2% by 2010





# Operating Principles



- 
- Work at the market margins
  - Educate, equip, and support wind working groups
  - Leverage existing institutional partnerships
  - Create new partnerships
  - Create and disseminate targeted info, analyses, and tools
  - Pursue special opportunities



# Operating Principles (cont'd.)



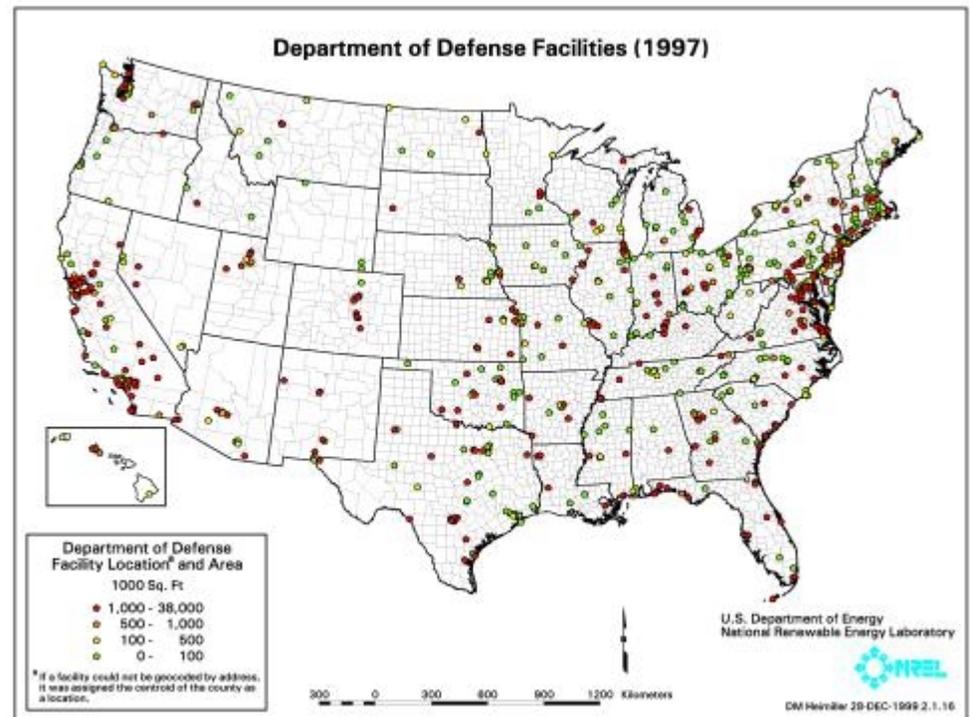
- 
- Select and address strategic challenges
  - Develop innovative pilot applications
  - Replicate successes
  - Coordinate with established wind institutional resources
  - Utilize existing national, regional, and local expertise
  - Document activities and resources

- Federal Load Aggregation
- Green Tags
- FEMP Coordination
- Agency Partnerships
- Federal Lands
- DoD



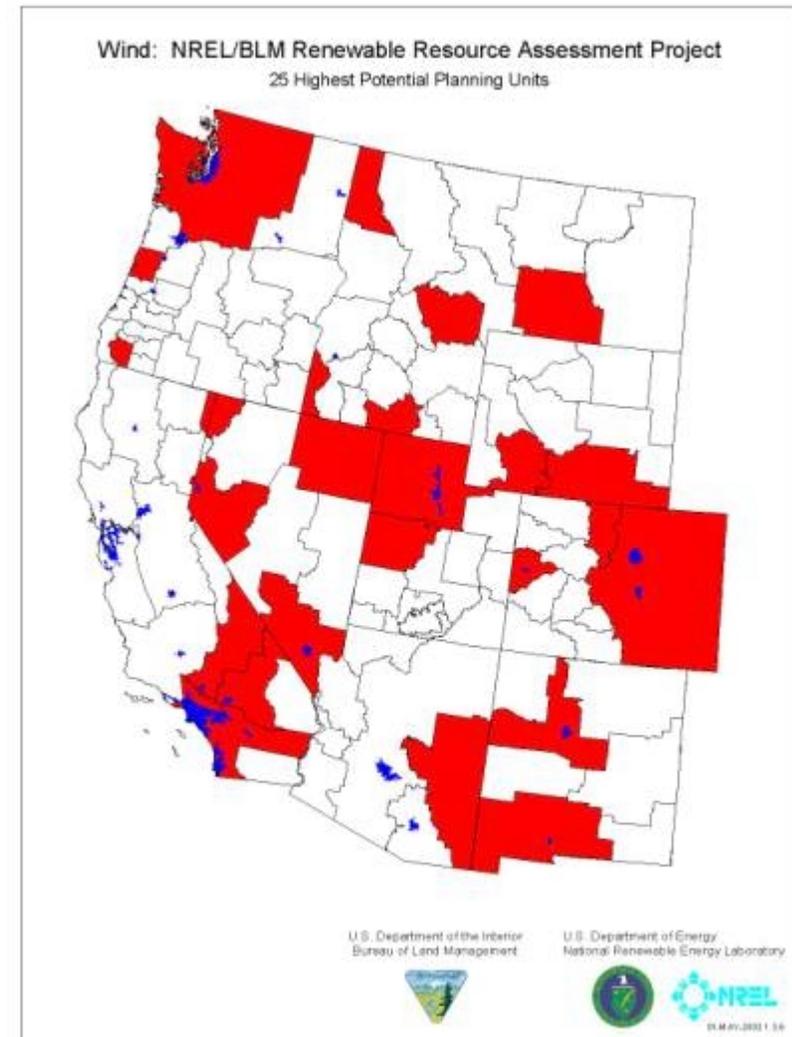
## Department of Defense

- \$6 million Senate set-aside from Military Construction budget for renewables study
- Identify potential Wind, Solar, and Geothermal projects “on or near” military bases in the continental U.S.
- Air Force heading study
  - Wind: Air Force
  - Solar: Army
  - Geothermal: Navy
- Wind study to be contracted to NREL by Air Force



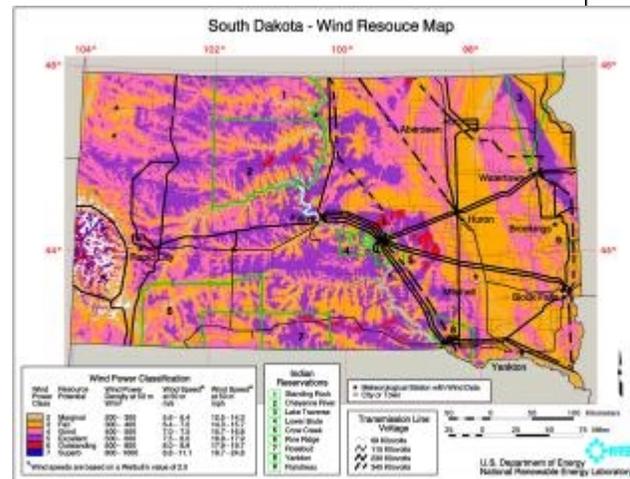
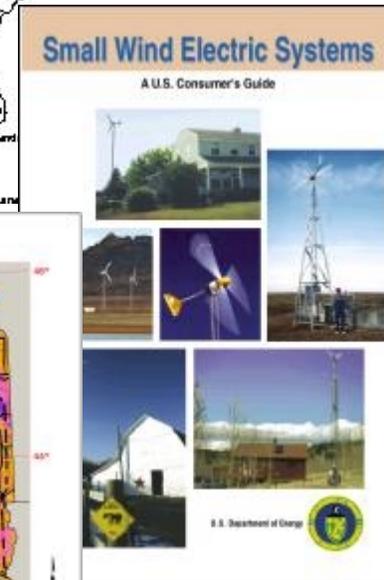
## Federal Lands

- Directed by Secretary Norton to ease permitting process for renewable energy
- BLM: lead agency
- Private-public partnership to identify and address barriers to development
- Prioritizing land use plans for out-of-cycle revision
- Identify several wind projects for fast-track success
- Establishing renewable energy training for field offices.

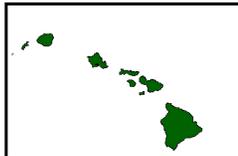
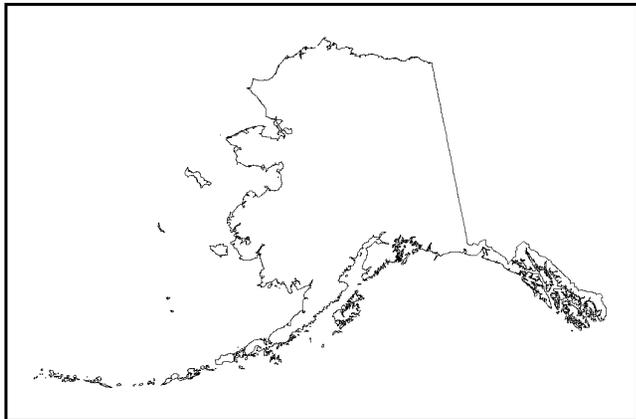
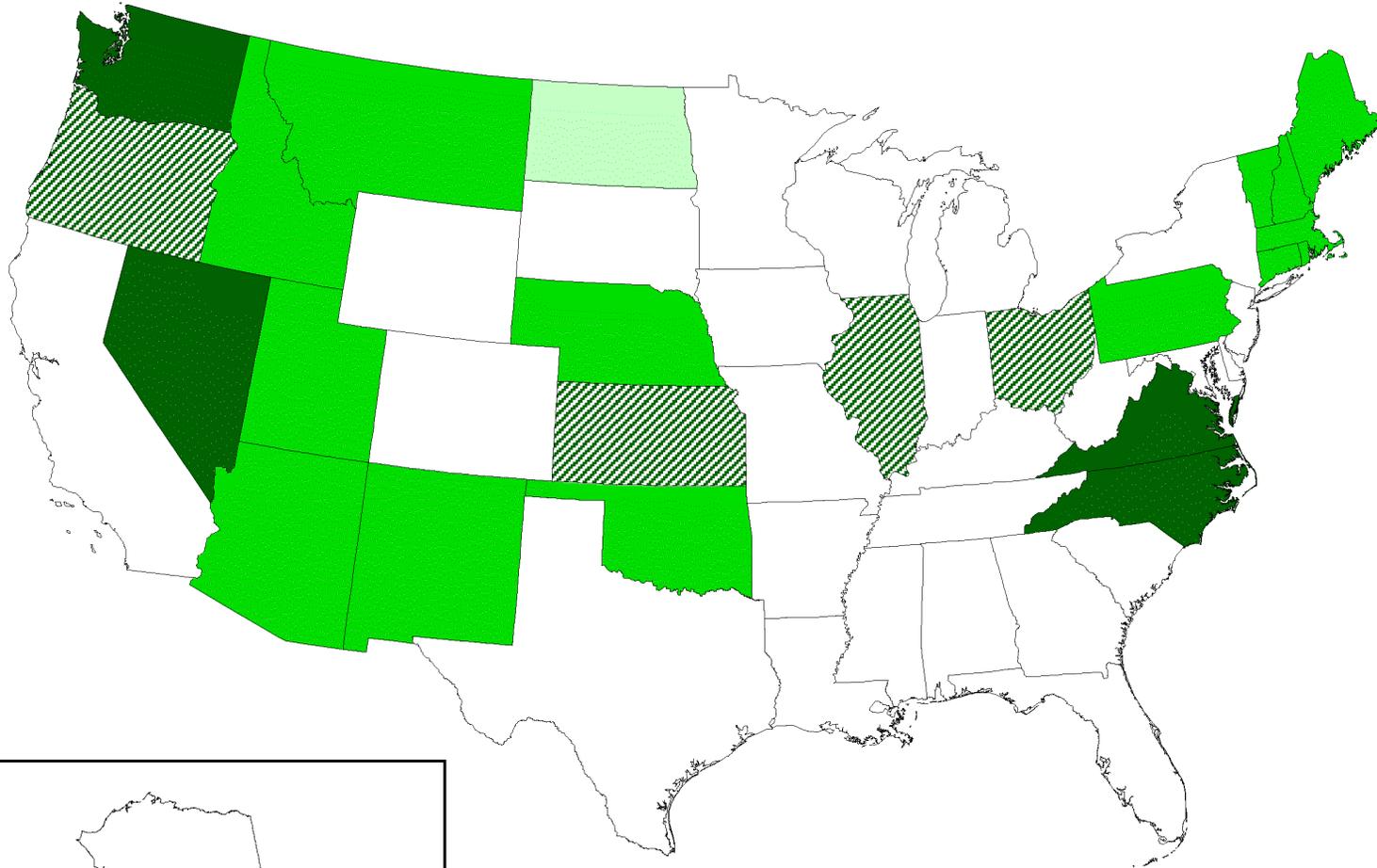


- Wind Workshops
- Legislator Briefings
- Wind Working Groups
- Wind Maps
- Anemometer Loans
- Air Quality SEPs
- Small Wind Guidebooks
- SBC/RPS Support
- Regional WCC

States with Renewable Energy Requirements



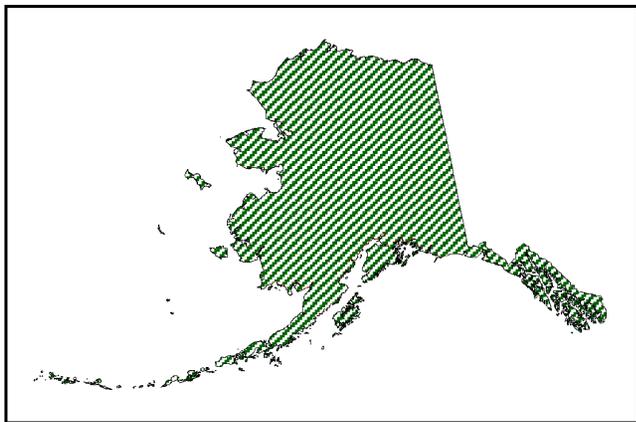
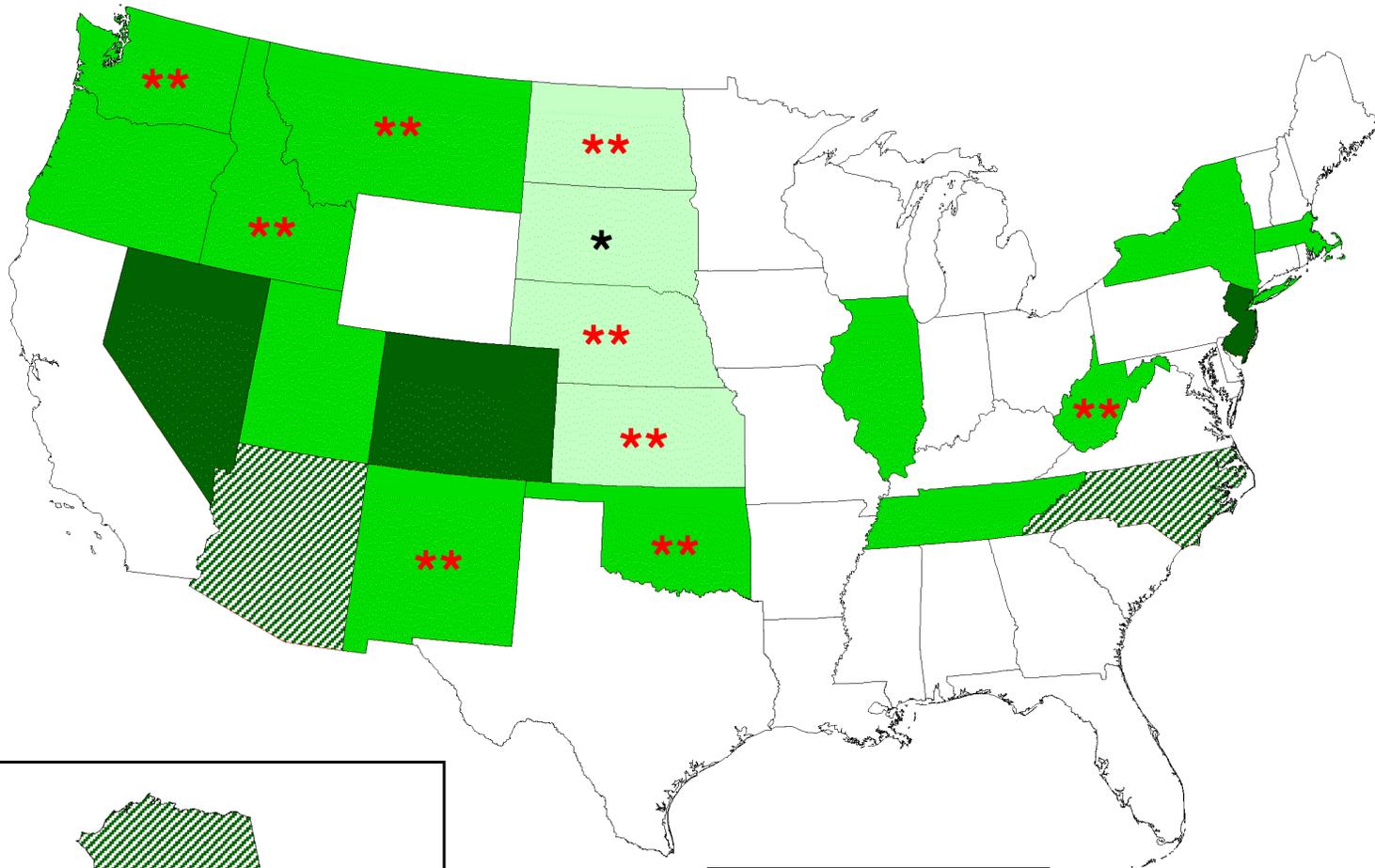
# Wind Working Group



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# Wind Powering America Workshops



**Year Conducted**

- 2000
- 2001
- 2002
- Planned for 2002

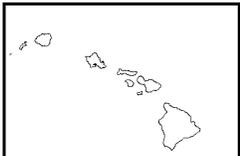
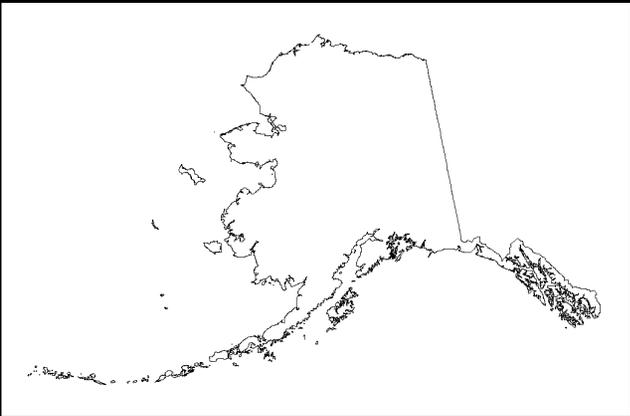
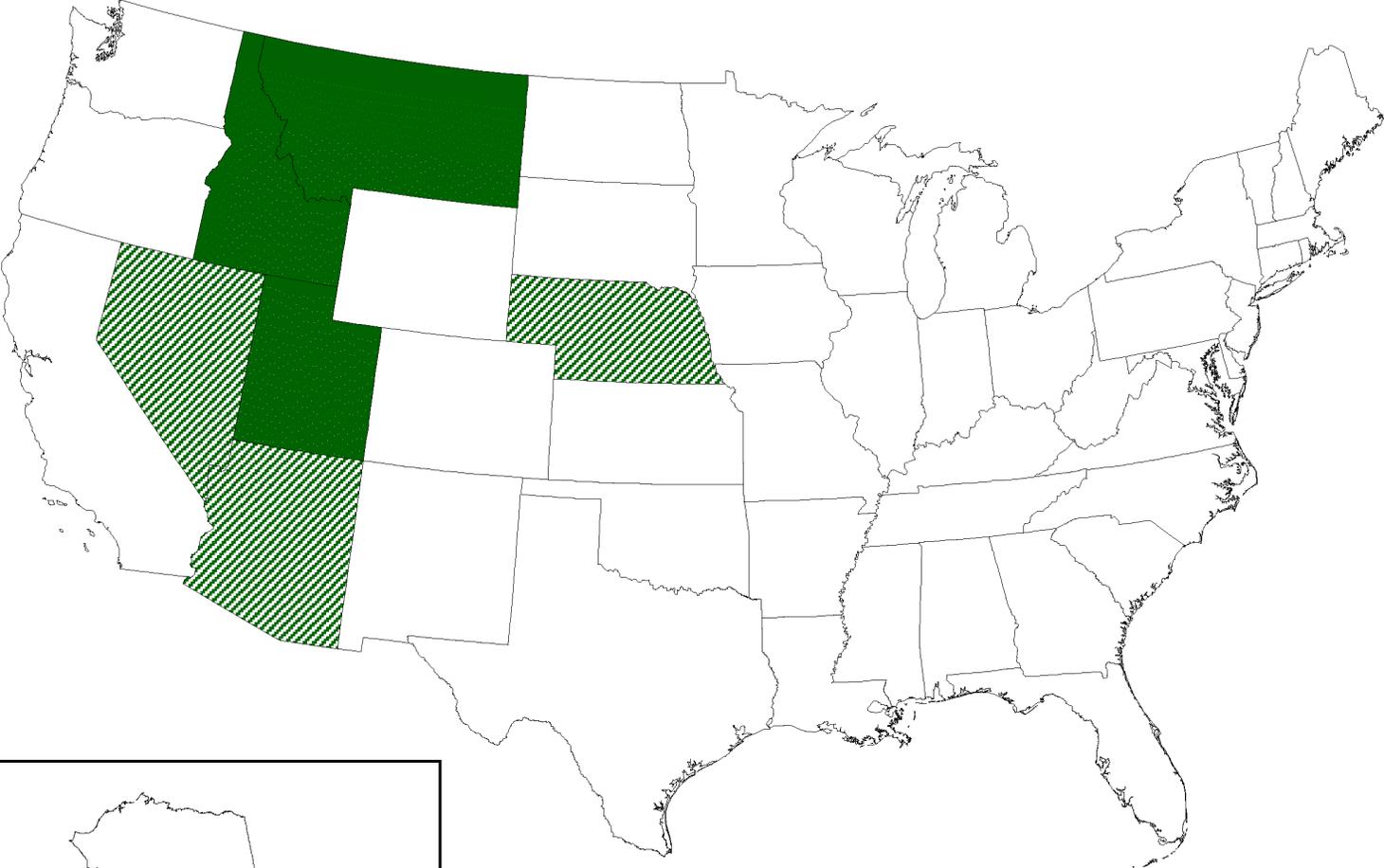
★ Additional meeting held in 2001

★★ Additional meeting in or planned for 2002

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# Legislative/State Agency Briefings



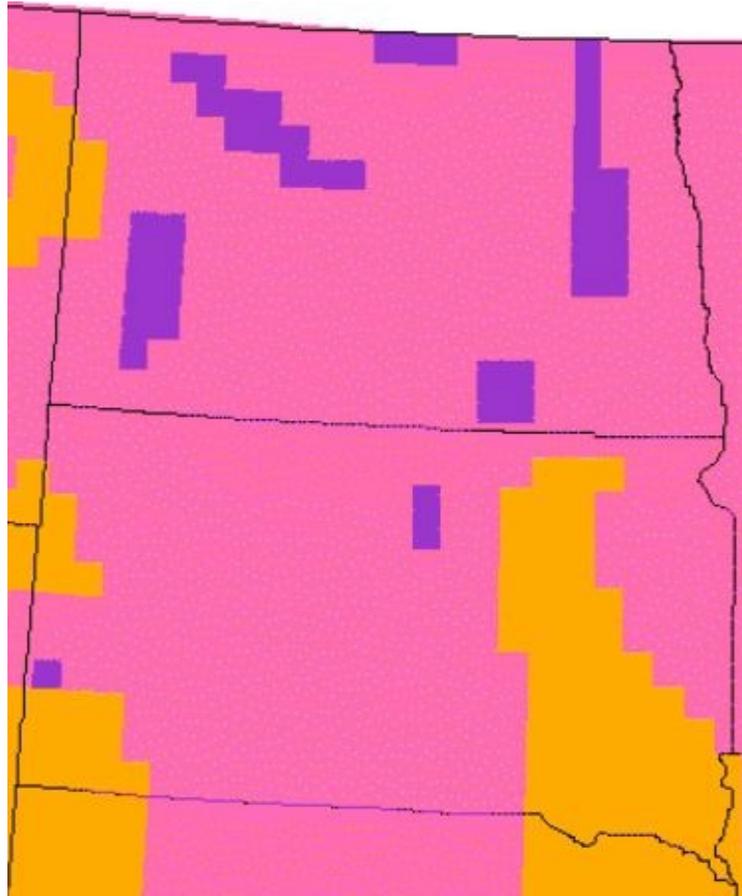
**Year Conducted**

- 2000
- 2001
- 2002
- Planned for 2002

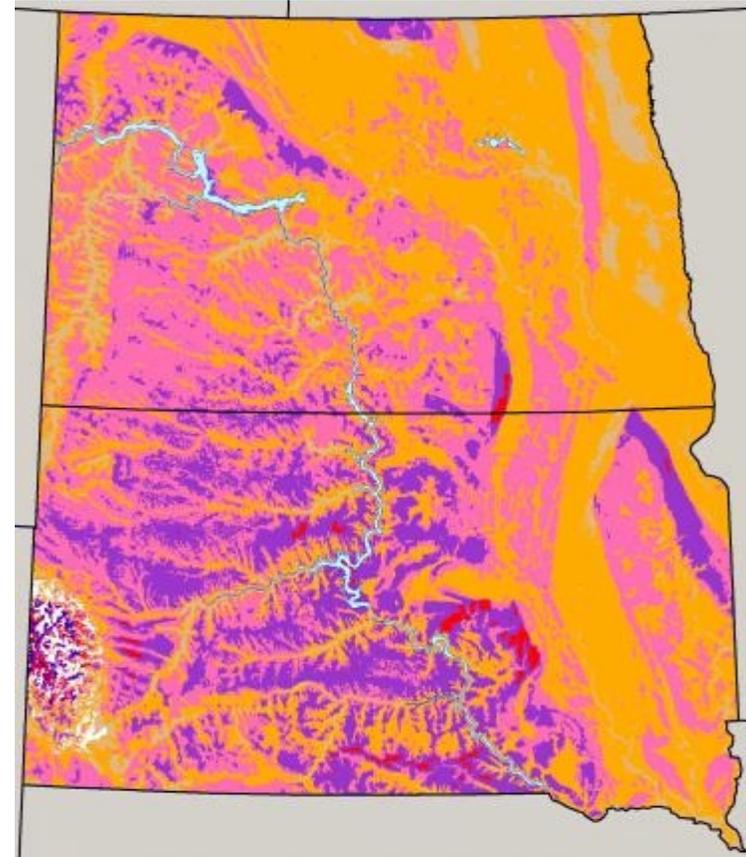
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# Comparison of Digital Wind Map from 1987 U.S. Wind Atlas and New (2000) High-Resolution (1-km<sup>2</sup>) Wind Map North and South Dakota



1987



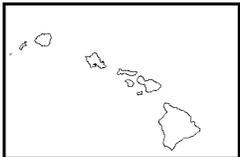
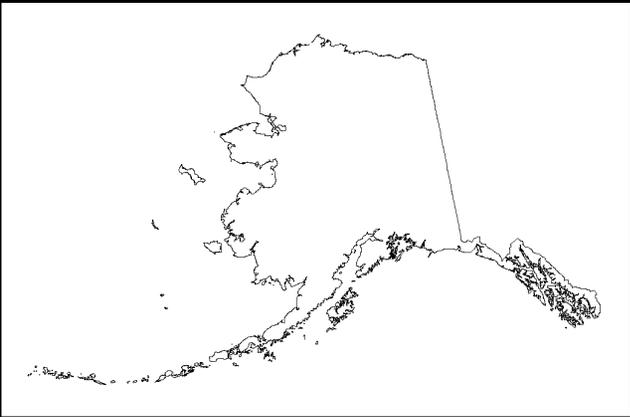
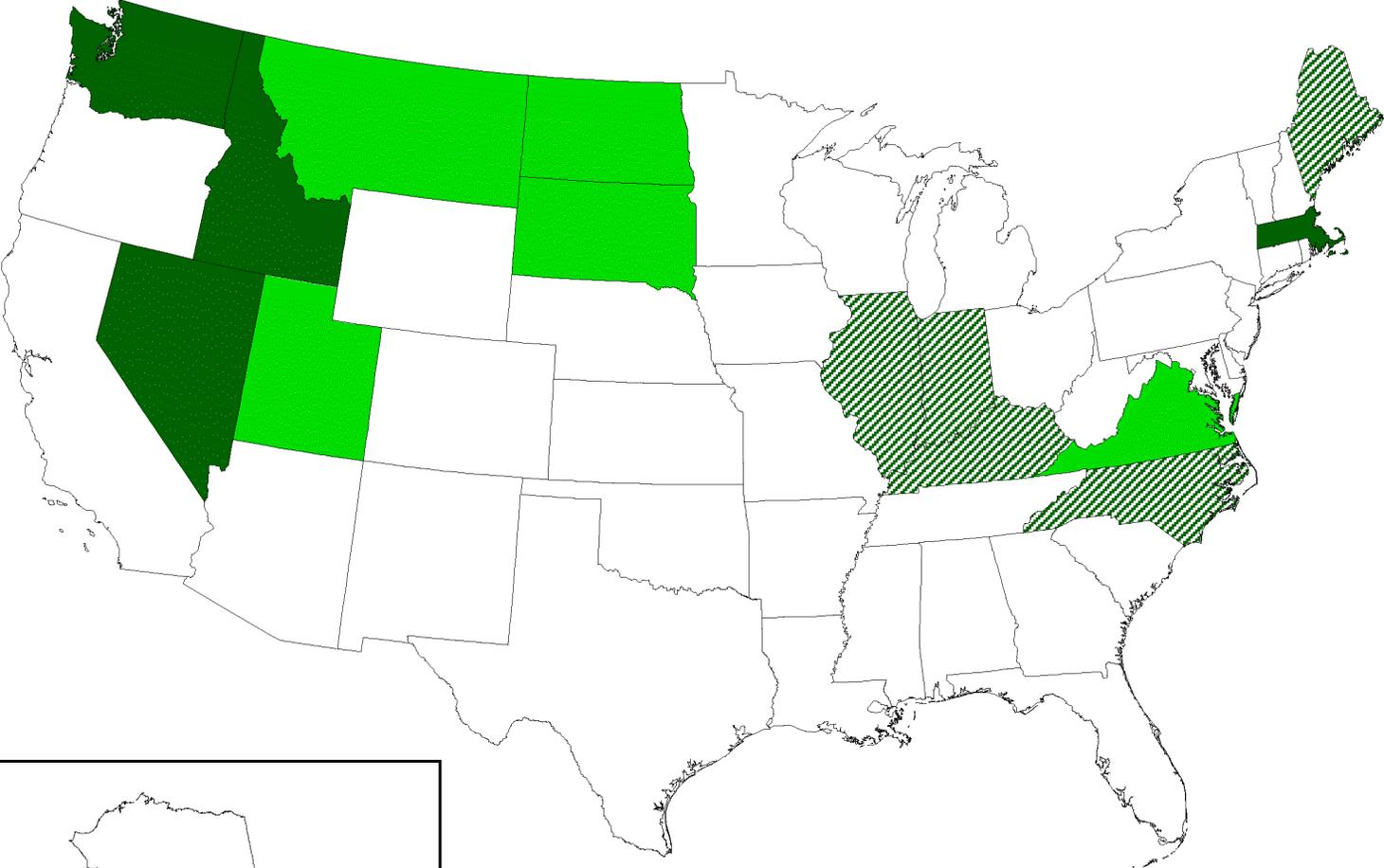
2000

Wind Power Classification				
Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m <sup>2</sup>	Wind Speed <sup>a</sup> at 50 m m/s	Wind Speed <sup>a</sup> at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

<sup>a</sup> Wind speeds are based on a Weibull k value of 2.0



# Anemometer Loan Program



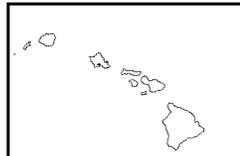
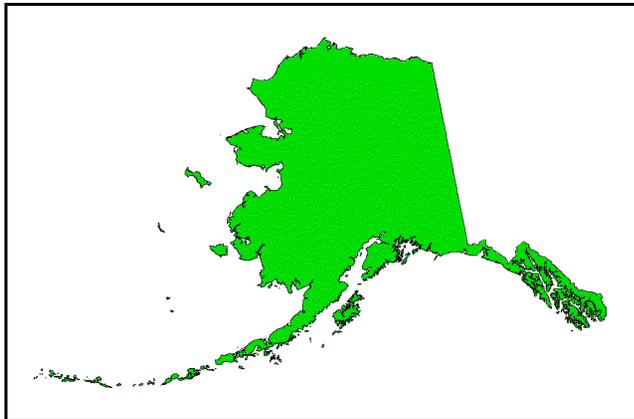
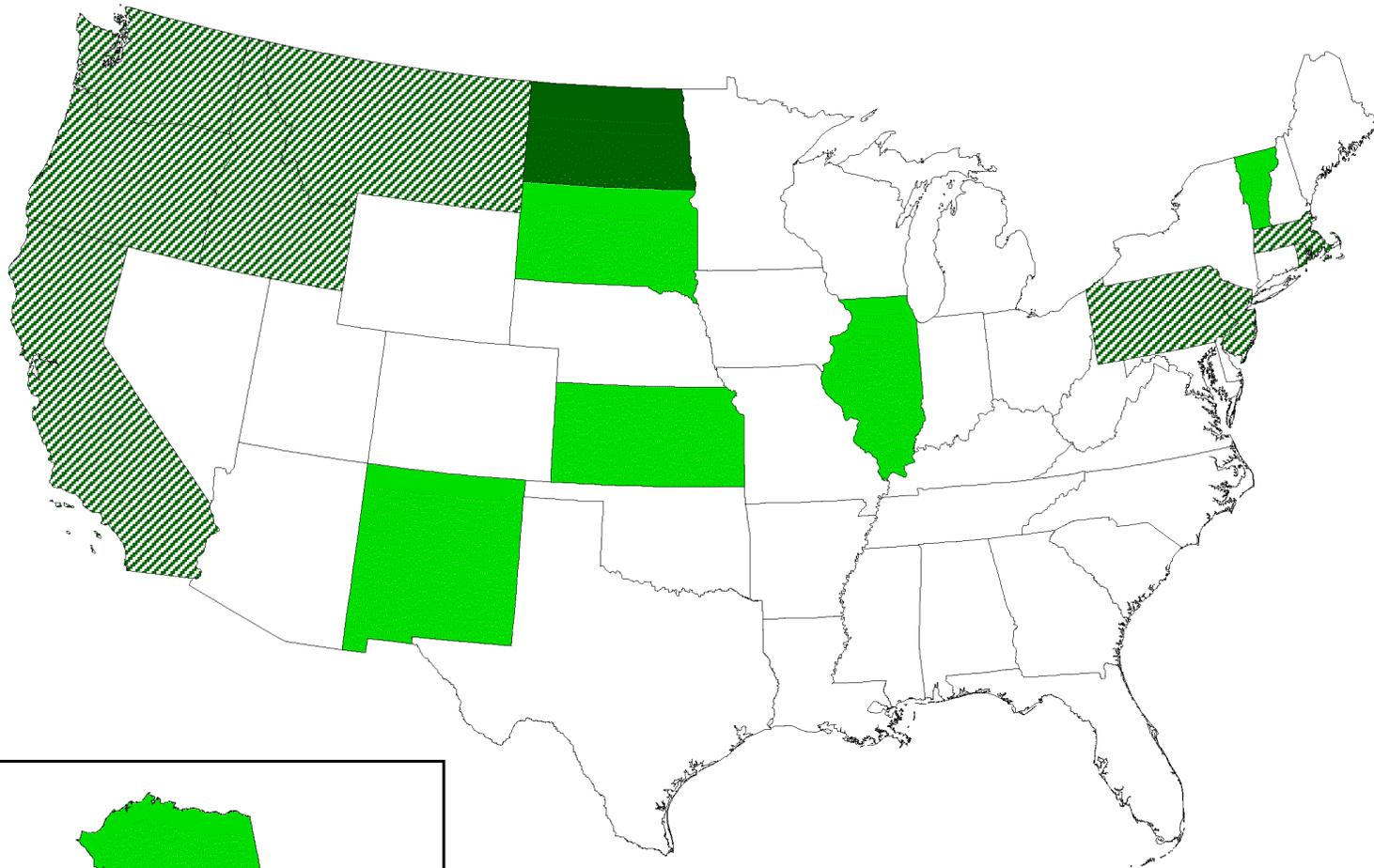
**Year Participated**

- 2000
- 2001
- 2002
- Planned for 2002

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# Small Wind Electric Systems Consumer Guides



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“The wind offers energy independence for many Kansas residents. Federal, state, and local governments should work together to provide access to affordable energy choices.”

*State Representative Tom Sloan, Lawrence, Kansas*





“You don’t have to be a utility commissioner to see that we need better regulatory policies to achieve the diversity, economic development, and environmental benefits of wind power.”

*Bob Anderson, Montana Public Service Commission, Helena, Montana*





# Rural Economic Development



- Irrigation/Net Metering Pilot
- Landowner Outreach
- State Anemometer Loan Programs
- Rural EcoDev Spreadsheet
- Innovative Ownership Pilot (RFV)
- Rural Coop Outreach
- County Commissioner Outreach
- Irrigation Analysis Spreadsheet
- Project Analysis Tool
- Agricultural Community Partnerships
- Native American Outreach





“Wind is a homegrown energy that we can harvest right along side our corn or soybeans or other crops. We can use the energy in our local communities or we can export it to other markets. We need to look carefully at wind energy as a source of economic growth for our region”

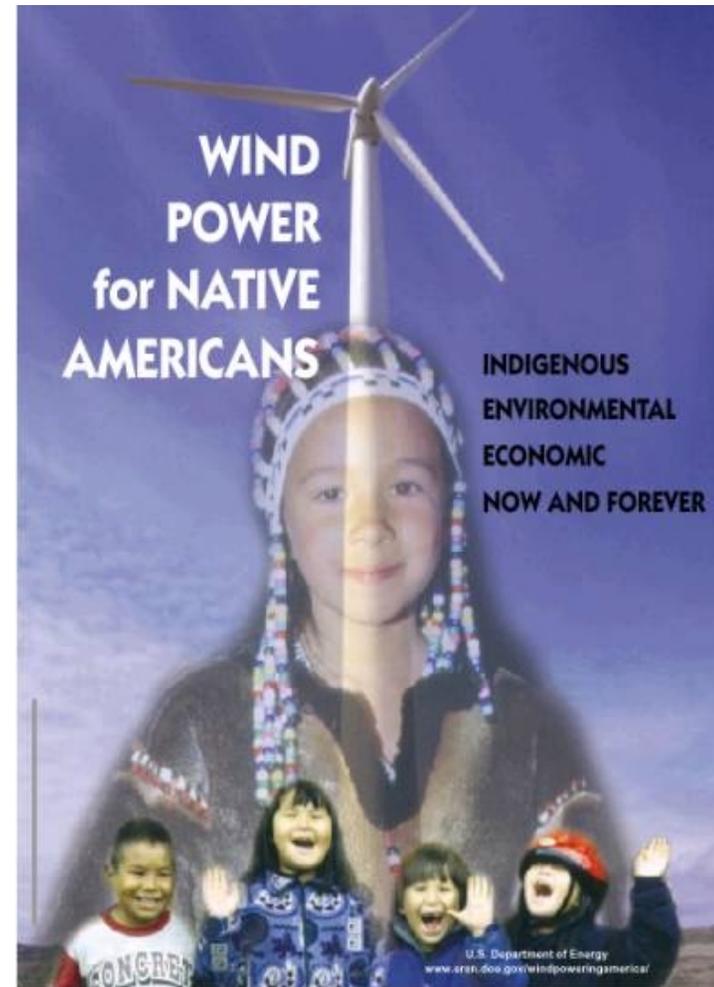
*David Benson, Farmer and County Commissioner, Nobles County, Minnesota*



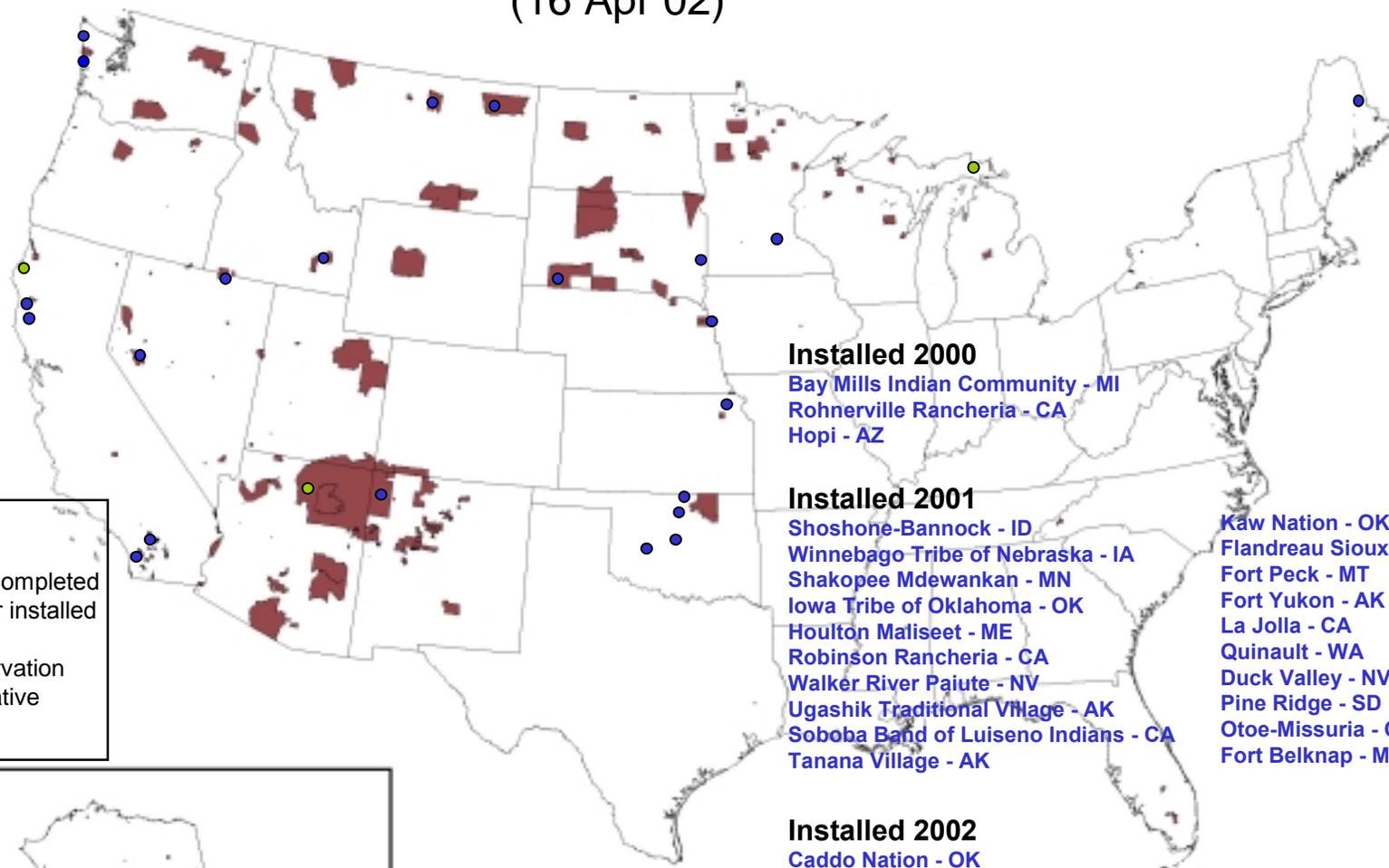
“It seems only natural for rural utilities to do everything they can to advance both farm-based renewable energy development and rural economic development in a cost-effective way. In my opinion, wind energy is the next great chapter in the rural electrification story.”

*Aaron Jones, Washington Rural Electric Cooperative Association; Olympia, WA*

- Native American outreach
- Regional NAWIG workshops
- Anemometer loans
- Tribal development strategies
- Lakota wind assessment options
- TA to DOE tribal RE grantees
- Tribal reps to WEATS
- NA section on WPA website

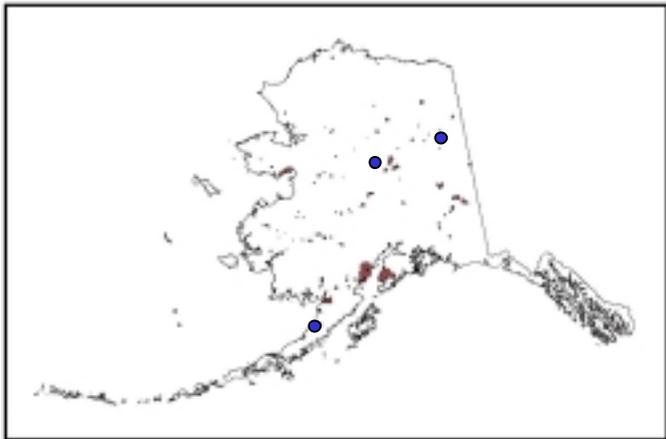


# WPA Native American Anemometer Loan Program Installation Sites (16 Apr 02)



**Legend**

- Monitoring Completed
- Anemometer installed
- Indian Reservation or Alaska Native Village Area



**Installed 2000**  
 Bay Mills Indian Community - MI  
 Rohnerville Rancheria - CA  
 Hopi - AZ

**Installed 2001**  
 Shoshone-Bannock - ID  
 Winnebago Tribe of Nebraska - IA  
 Shakopee Mdewankan - MN  
 Iowa Tribe of Oklahoma - OK  
 Houlton Maliseet - ME  
 Robinson Rancheria - CA  
 Walker River Paiute - NV  
 Ugashik Traditional Village - AK  
 Soboba Band of Luiseno Indians - CA  
 Tanana Village - AK

Kaw Nation - OK  
 Flandreau Sioux - SD  
 Fort Peck - MT  
 Fort Yukon - AK  
 La Jolla - CA  
 Quinault - WA  
 Duck Valley - NV  
 Pine Ridge - SD  
 Otoe-Missuria - OK  
 Fort Belknap - MT

**Installed 2002**  
 Caddo Nation - OK  
 Sac & Fox - KS  
 Navajo - AZ  
 Sherwood Valley Rancheria - CA  
 Quileute - WA





“In evaluating the potential of wind energy generation, Native Americans realize that wind power is not only consistent with our cultural values and spiritual beliefs, but can also be a means of achieving Native sustainable homeland economies.”

*Ronald Neiss, Rosebud Utility Commission President, Rosebud Sioux Reservation, South Dakota*



# Utility Partnerships



- PMA Green Tags
- Public Power Workshops
- NRECA/APPA Partnerships
- UWIG brochure
- Transmission Analysis
- Wind-Hydro Analysis
- Coop Outreach





“Our customers wanted this wind program and it was our job to deliver it. It has turned out to be a huge source of community pride. The turbines are a visible landmark showing the Moorhead Community’s commitment to a better world for our children.”

*Christopher Reed, Moorhead Public Service, Moorhead, Minnesota*



“Wind energy adds diversity to our generation fleet and provides a hedge against fossil fuel price increases. In addition, the development of renewable energy resources is widely supported by the public and our customers.”

*Rick Walker, director, Renewable Energy Business Development, AEP Energy Services, Inc., Dallas, TX*



*Wind Powering America    Regional Activities    Native Americans    Public Power    Small Wind Turbines*

**I Have A Question...**

*WPA Highlights*

- \* *Global Windpower 2002  
WPA Presentation  
(PDF 2.5 MB)  
[Download Acrobat Reader](#)*
- \* *Great River Energy  
[Wins National Recognition  
for Wind Power Program](#)*
- \* *March Stakeholder  
[Interview](#)*
- \* *Wind Energy Development  
[for Communities of Color](#)*
- \* *Wind Power Update  
(PDF 3.3 MB)  
[Download Acrobat Reader](#)*
- \* *Funding Opportunity  
[Renewable Energy  
Development on Tribal  
Lands](#)*

Wind Powering America is a commitment to dramatically increase the use of wind energy in the United States. This initiative will establish new sources of income for American farmers, Native Americans, and other rural landowners, and meet the growing demand for clean sources of electricity.



Through Wind Powering America, the United States will achieve targeted regional economic development, protect the local environment, reduce air pollution, lessen the risks of global climate change, and increase energy security.

While visiting the Wind Powering America Web site you can find state wind maps, small wind consumer's guides, wind workshops that are going on in your area, and much more. Visit the "Regional Activities" section above to read news articles, press releases, and fact sheets for the area of your interest.

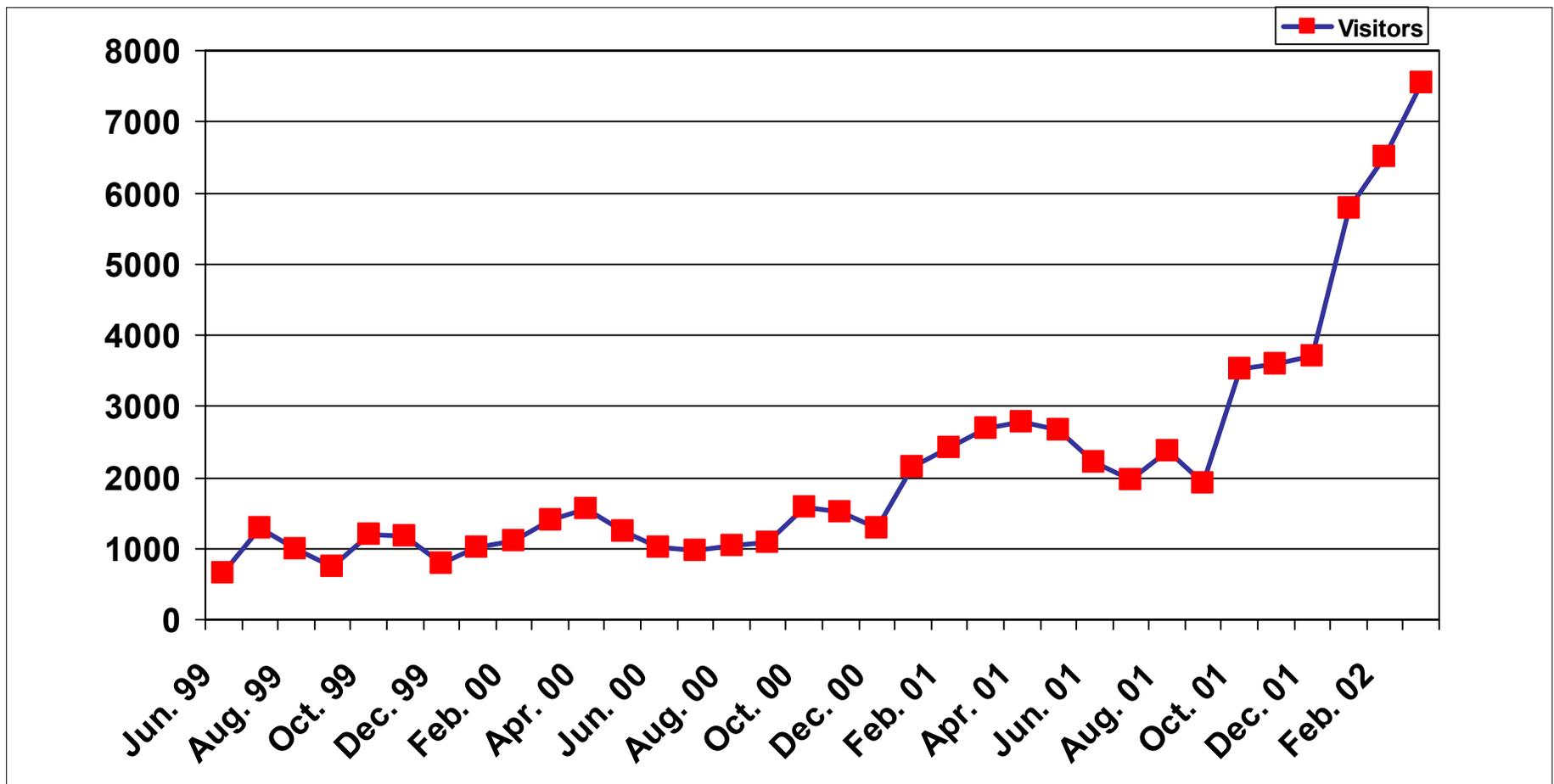


*Business Information  
Wind Turbine Photos*

Calendar						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

# Visitors Per Month

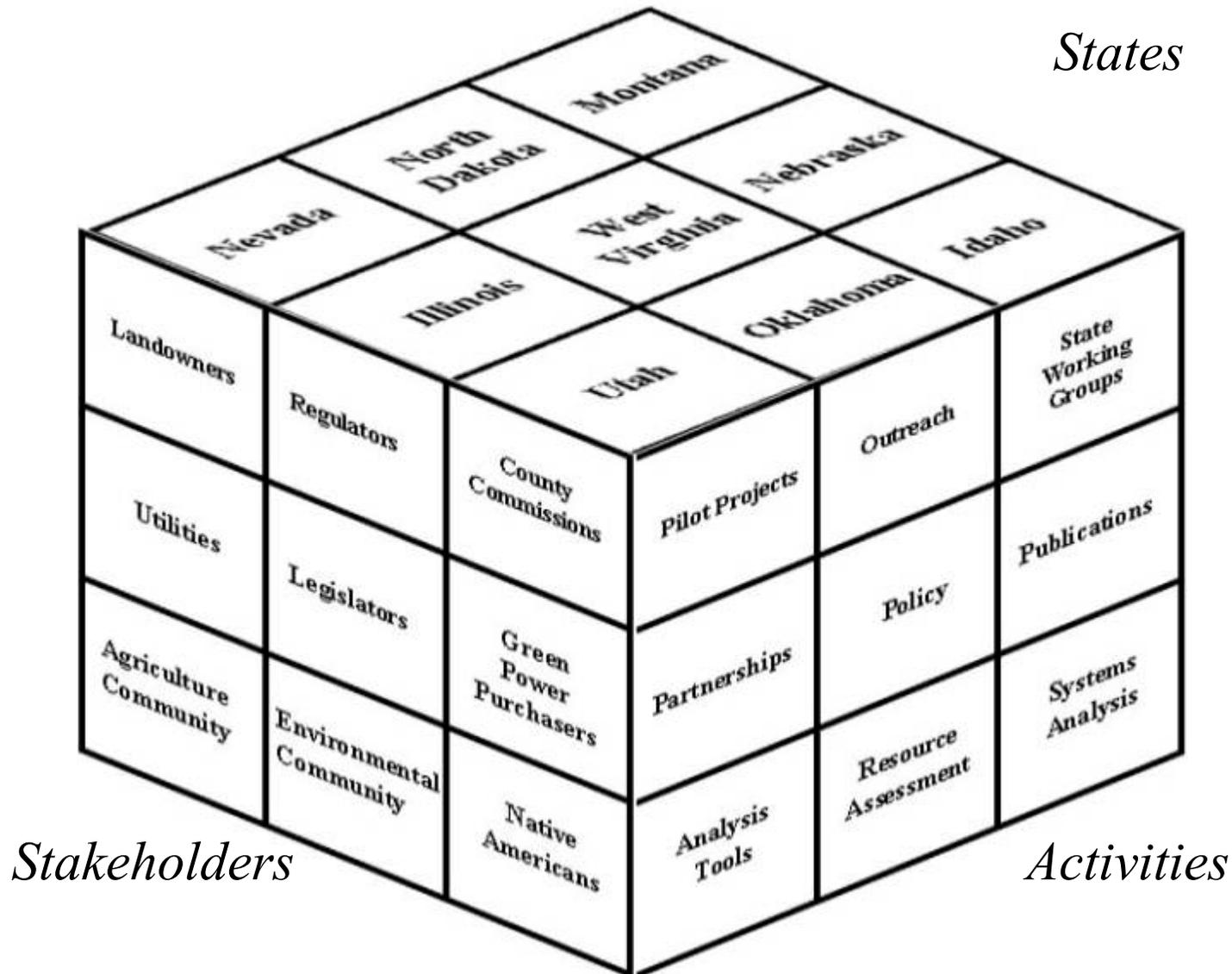
June 1999- March 2002



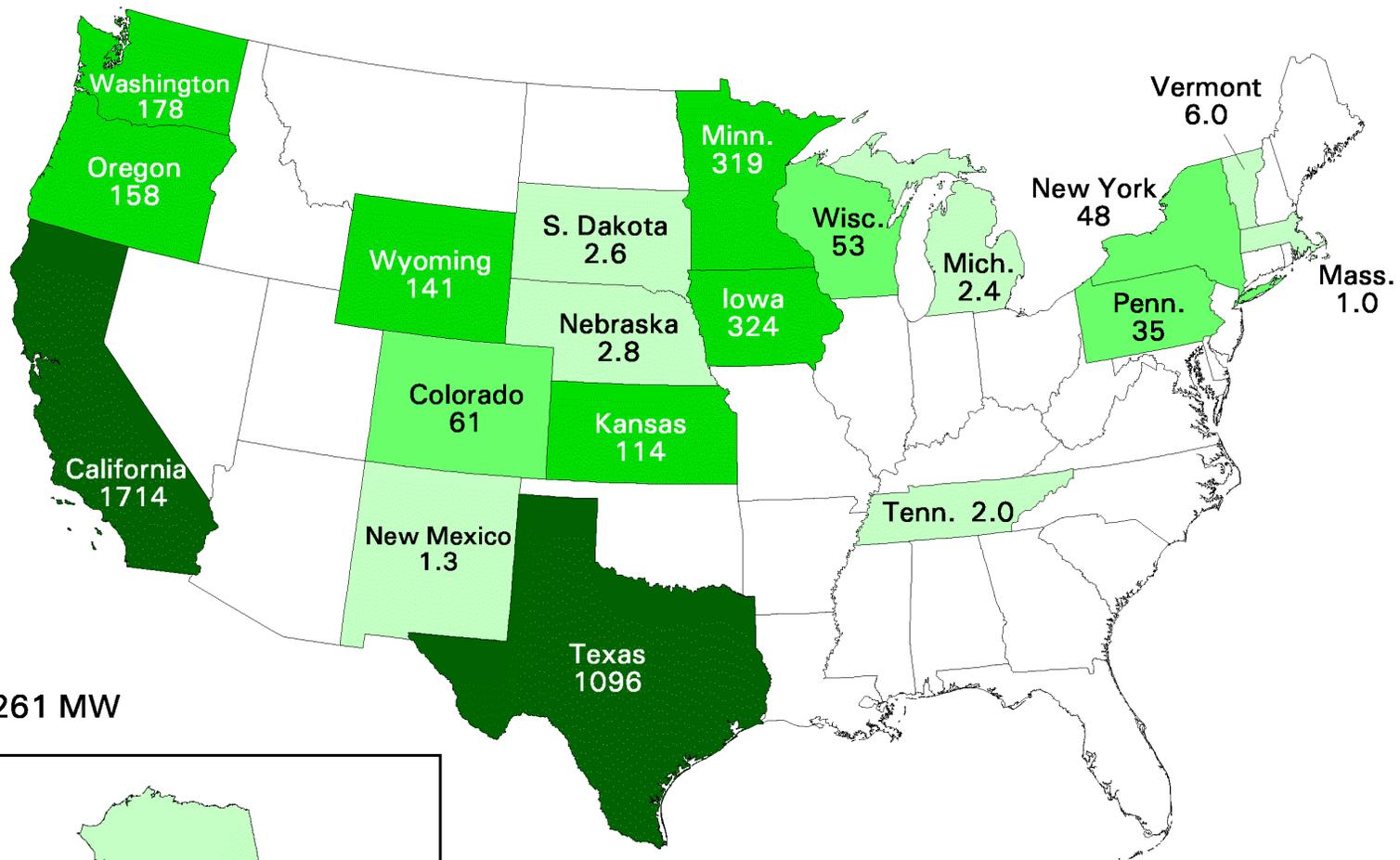
\*\*\*Starting in Dec. 2001, NREL started using a new Web site statistics package, which may explain a shift in results.



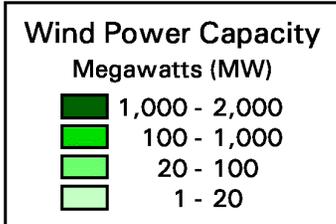
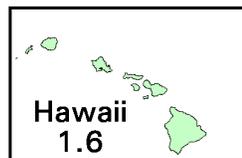
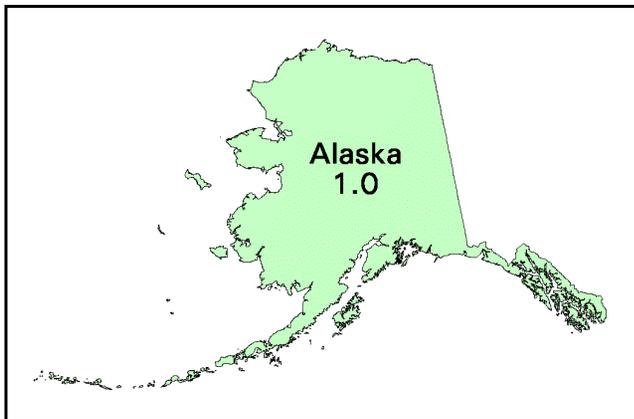
# WPA Activity Matrix



# United States - 2001 Year End Wind Power Capacity (MW)



Total: 4,261 MW

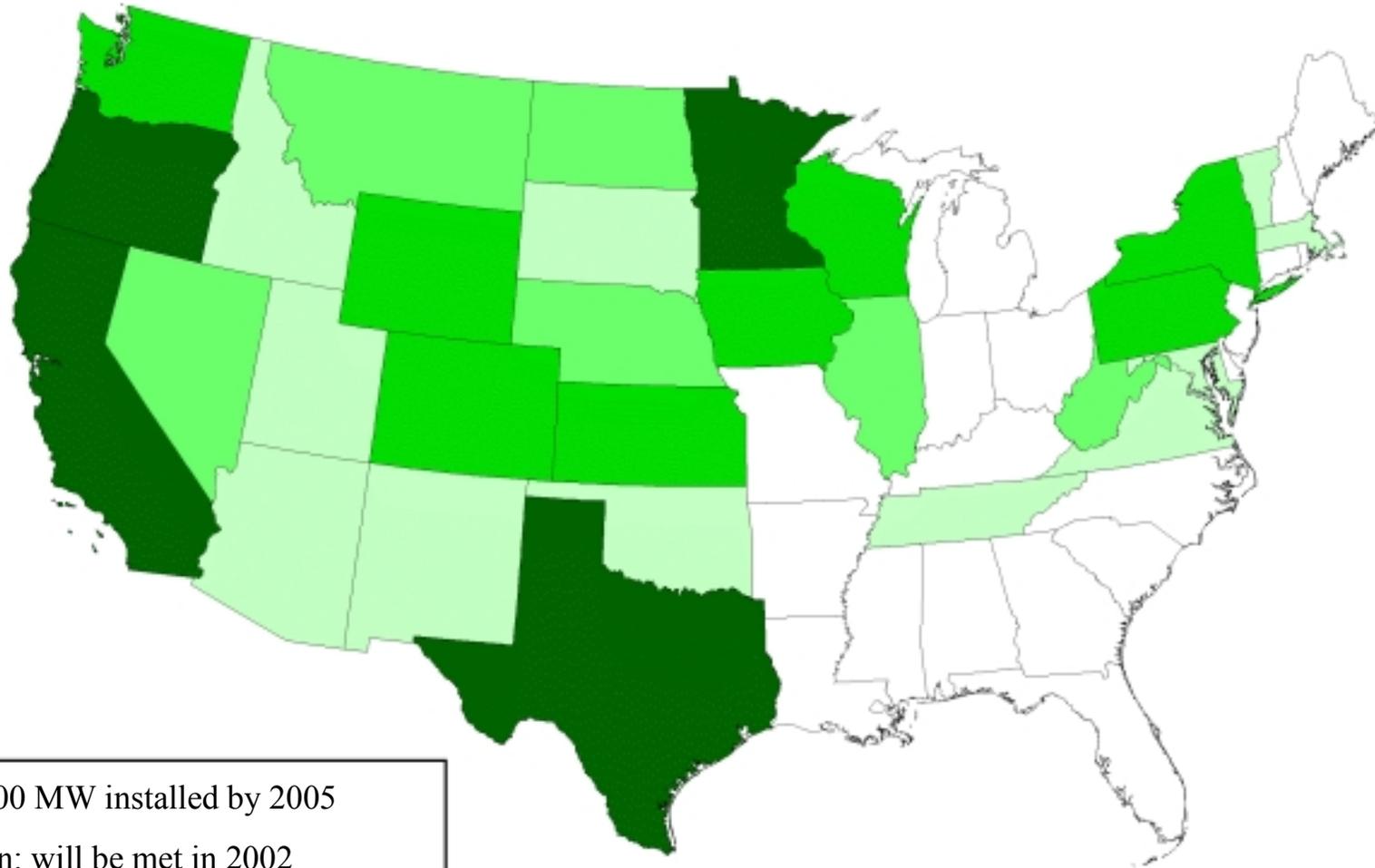


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28-JAN-2002 1.1.11

## States with at Least 20 MW of Installed Capacity by 2005



Goal: 5000 MW installed by 2005

Projection: will be met in 2002

Goal: 16 states with >20 MW installed by 2005; 24 states by 2010

Projection: 18 states by 2003; 30 states by 2005



### Year Reached or Projected to Reach

- 1998
- 2001
- 2002 - 2003
- 2004 - 2005

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01-MAY-2002 1.1.12



*Carpe Ventem*