

Wind Turbine Manufacturers in the U.S.: Locations and Local Impacts



**WINDPOWER 2010
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Suzanne Tegen

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Challenges to modeling Renewables

Renewables represent new industries

- Not isolated as an industry in conventional I/O codes

Requires detailed knowledge of project costs and industry specific expenditures

- Equipment, Engineering, Labor, Permitting, O&M, etc.

The Wind JEDI Model

- Provides a project basic project recipe for specific RE technologies
- Applies Industry Specific Multipliers derived from IMPLAN



Jobs and Economic Impacts from the JEDI Model

Wind Energy's Economic Impacts

Wind energy's economic "ripple effect"

Project Development & Onsite Labor Impacts



- Construction workers
- Management
- Administrative support
- Cement truck drivers
- Road crews
- Maintenance workers
- Legal and siting

Local Revenue, Turbine, & Supply Chain Impacts

- Blades, towers, gear boxes
- Boom truck & management, gas and gas station workers;
- Supporting businesses, such as bankers financing the construction, contractor, manufacturers and equipment suppliers;
- Utilities;
- Hardware store purchases and workers, spare parts and their suppliers

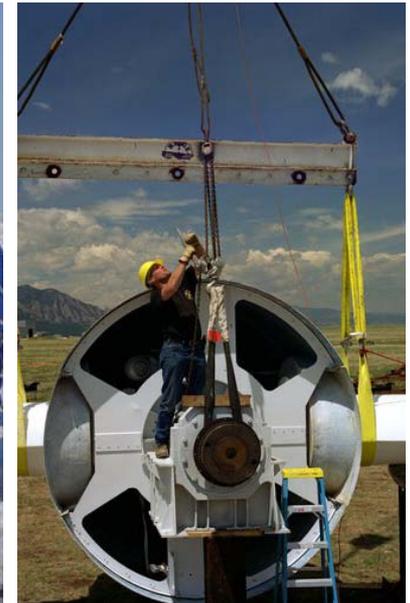
Induced Impacts

Jobs and earnings that result from the spending supported by the project, including benefits to grocery store clerks, retail salespeople, and child care providers

Project Development & Onsite Labor



Sample Jobs:
Truck Drivers
Crane Operators
Earth Moving
Cement Pouring
Management
Support



Turbine & Supply Chain Jobs and Equipment



Steel mill jobs, parts, services - Equipment manufacturing and sales - Blade and tower manufacturers



Property taxes - Financing, banking, accounting

Induced Impacts



Money spent on local area goods and services from increased revenue: *sandwich shops, child care, grocery stores, clothing, other retail, public transit, new cars, restaurants, medical services*



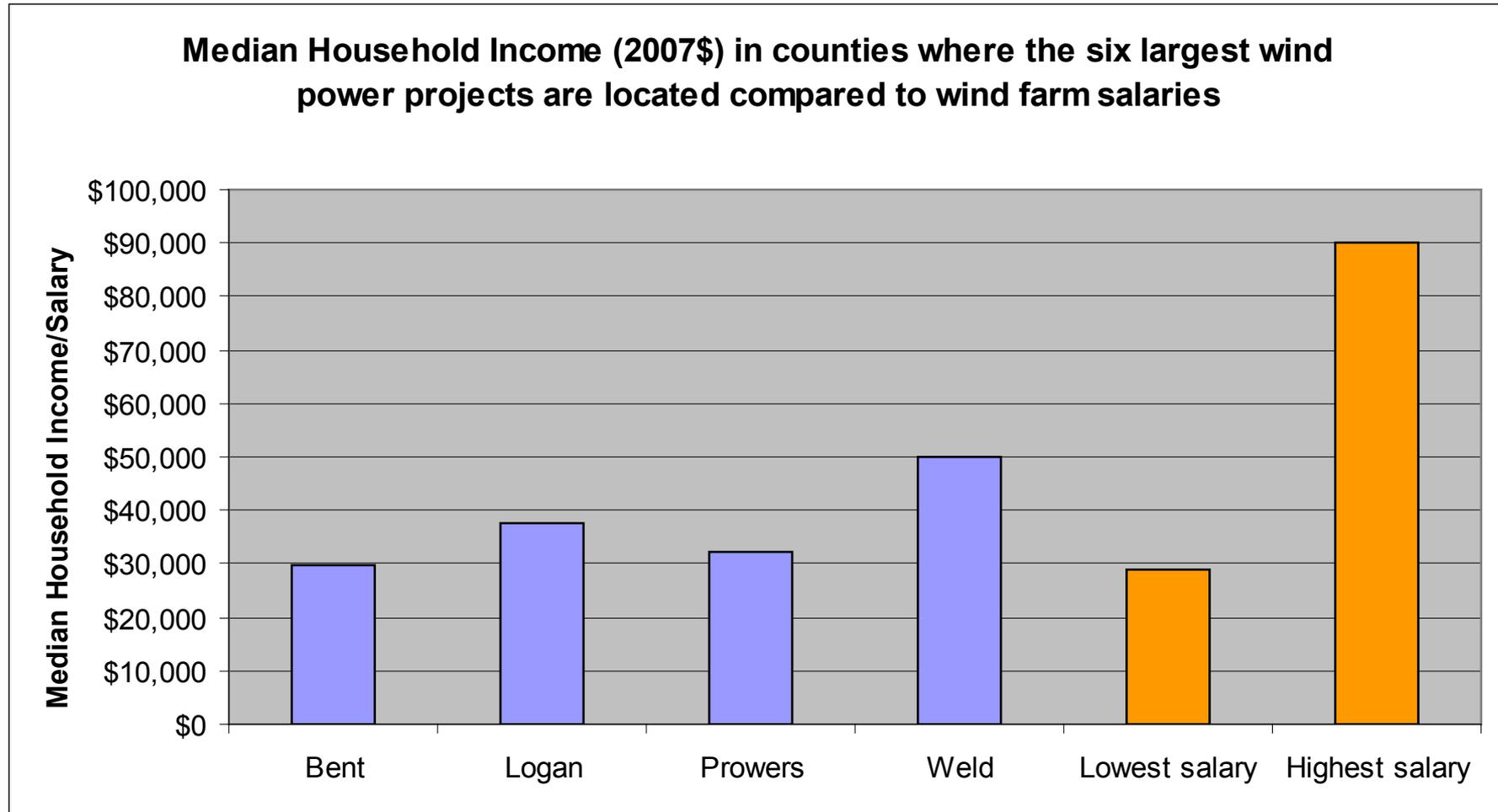
Case Study: Iowa

240-MW Iowa wind project

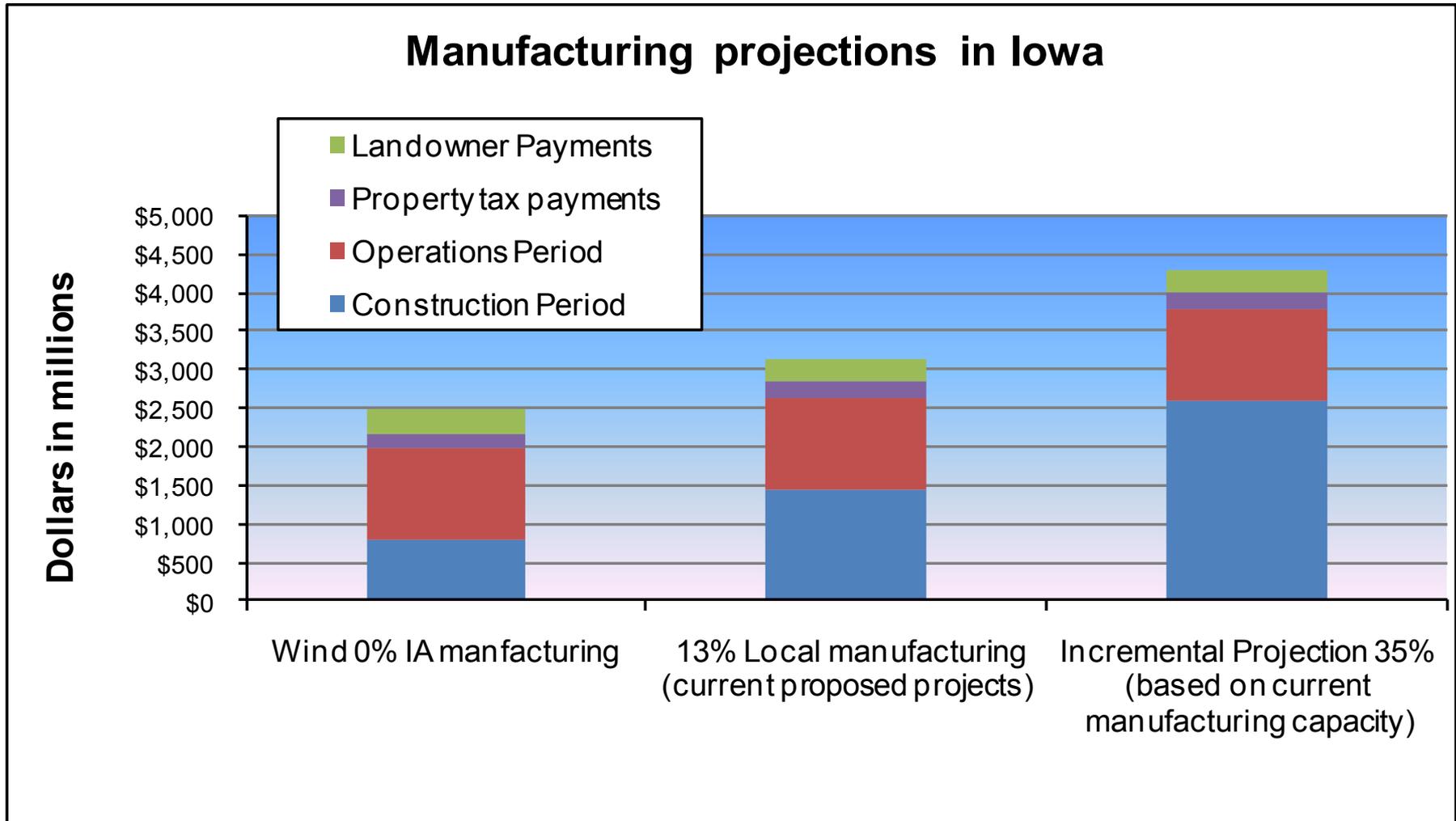
- \$640,000/yr in lease payments to farmers
- \$2M/yr in property taxes
- \$5.5M/yr in O&M income
- 40 long-term jobs
- 200 short-term construction jobs
- Manufacturing?



Examples of JEDI at Work: Wind projects offer competitive salaries



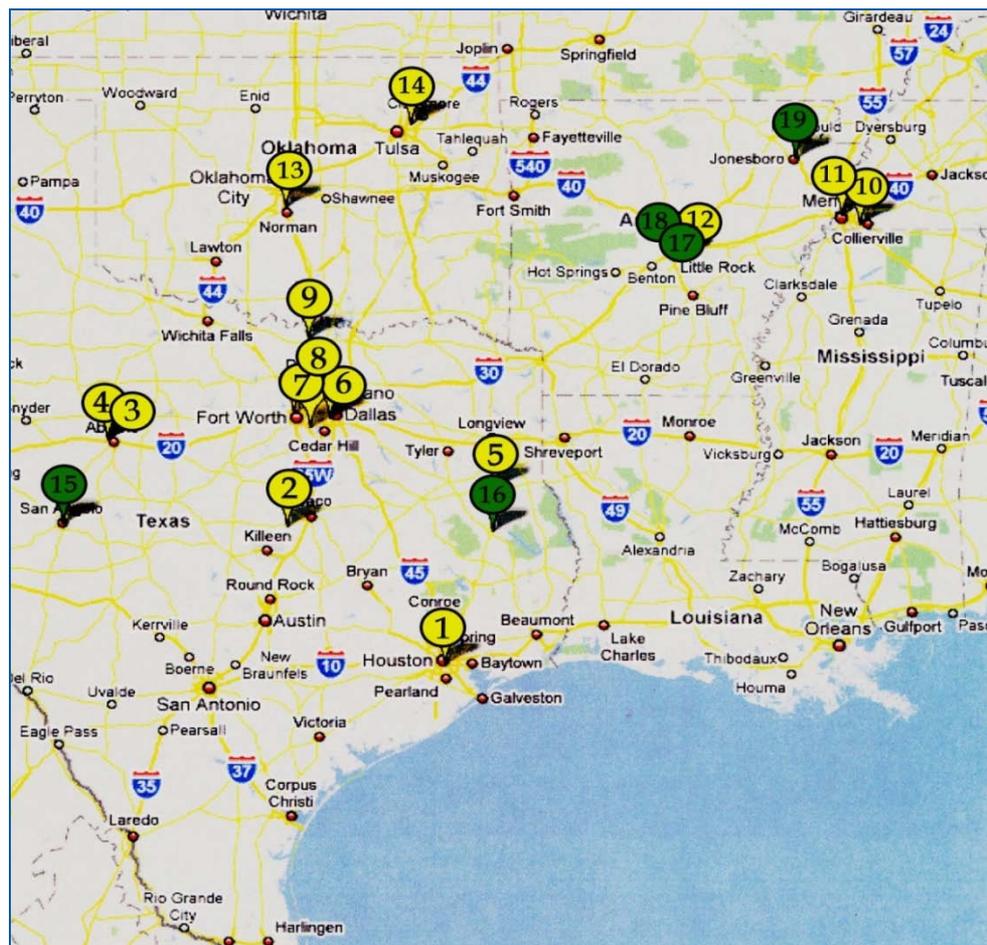
Jobs Impacts From Construction With and Without In-state Manufacturing



S. Reategui, NREL, 2009

Arkansas Wind Manufacturing Success Stories

In recent years, Arkansas has successfully attracted wind turbine component manufacturers. With four companies having announced/opened major facilities, approximately 2,500 jobs will be supporting the wind industry in the near future.



Opened and Announced Wind Turbine Component Manufacturers Located In Arkansas and Surrounding States

- 1) RBC Bearings
- 2) RTLC Wind Towers
- 3) Zoltek
- 4) Tower Tech
- 5) CAB Inc
- 6) Diab Inc
- 7) Trinity Structural Towers
- 8) All-Pro Fasteners
- 9) Molded Fiber Glass
- 10) Thomas & Betts
- 11) GE Parts Operation Center
- 12) LM Wind Power (formerly LM Glasfiber)
- 13) Bergey Wind
- 14) DMI
- 15) Martifier
- 16) Lufkin Industries
- 17) Polymarín
- 18) Wind Water Technology
- 19) Nordex

LM Wind Power

Little Rock, AR

Blades



- At the end of 2008 and two new plant launches, LM Wind Power Little Rock employed ~ 600 people and were ahead of pace in their hiring of 1,000 workers by 2014.
- In January, 2009 LM Wind Power announced that they were laying off 150 workers at Little Rock due to the national credit crisis.
- In June, 2009 the company announced that they will be laying off an additional 80 workers, again as a result of the economic credit crisis.



- The company still employs ~ 300 workers
- Wages at the plant range from \$12.15/hr - \$15.50/hr.

Prior to starting production of a new blade model, LM Glasfiber tries out a prototype in a test bed. The blade is subjected to a strain corresponding to 20 years of operation. Photo courtesy of LM Wind Power

Other Wind Manufacturing Success Stories

Brevini Wind Muncie, IN Gear Boxes



According to Brevini Wind contacts,

- Announced 8 October 2008, and is now under construction
- Will employ ~455 workers
- Average will be ~ \$46,000 per year
- The plant is expected to be fully staffed and operational in the third quarter of 2010
- Annual payroll when fully operating will be \$20.9 million
- Incentive package for Brevini includes:
 - \$1.4 million in local EDIT (Economic Development Income Tax) funds
 - \$1.6 million in local TIF (Tax Increment Financing) funds
 - \$1.9 million in infrastructure improvements for a rail extension
 - \$3.9 million in state funds in Hoosier Business investment tax credits
 - \$300,000 in job training assistance funds

Sample 2010 Announcements

Company	Location	Component	Jobs
Alstom Power Inc	Amarillo, TX	Nacelle	275
Ingeteam	Milwaukee, WI	Generators	275
Ingersoll Machine Tools	Rockford, IL	Various	87
Schuff Steel	Bismark, ND	Towers	275-300
Aluwind	Castle Rock, CO	Various	80-105
WindStream Technologies Inc	New Albany, IN	Small scale turbines	260

Siting Manufacturing Facilities: How can a state attract manufacturing?

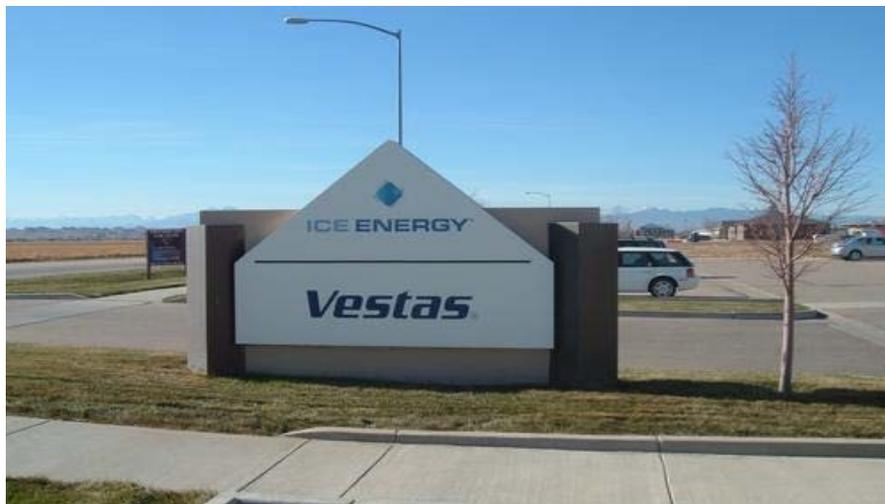
High Level Business Strategy (states have minimal influence)

- Reduced operating costs
- Improved access to high potential markets
- Clustering Efficiencies
- Regional Infrastructure
- Workforce characteristics

Specific attributes associated with individual sites (states have some influence)

(states have some influence)

- Immediate Local infrastructure
- Business and Government Relations
- Local incentives (fiscal or financial)
- Potential competitors or suppliers
- Quality of life variables
- Public investment in the broader community
- Community enthusiasm/support



From NREL Technical report by Eric Lantz (2010)

The Campus Strategy

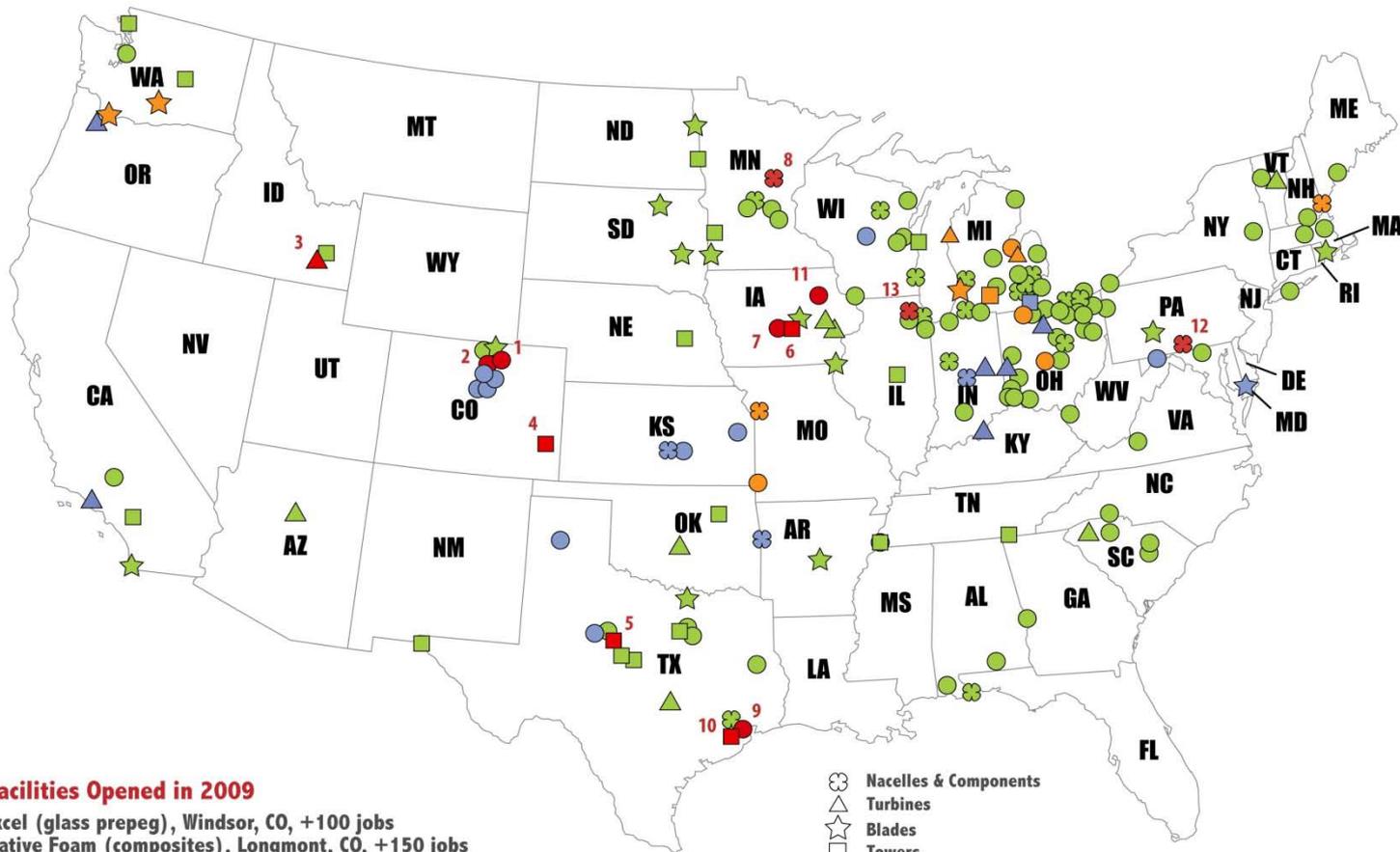
Vestas in Colorado



Photo: Vestas Wind Systems A/S

Wind Component Manufacturing in the U.S.

a non-exhaustive list of major suppliers (*draft*)



New Facilities Opened in 2009

1. Hexcel (glass prepeg), Windsor, CO, +100 jobs
2. Creative Foam (composites), Longmont, CO, +150 jobs
3. Nordic Windpower (turbines), Pocatello, ID, +160 jobs
4. Dragon Wind (towers), Lamar, CO, +60-80 jobs
5. Towers Tech (towers), Abilene, TX, +150 jobs
6. Trinity Structural Towers (towers), Newton, IA, +140 jobs
7. Goain North America (elevation systems), Ankeny, IA, +12 jobs
8. Mille Lacs Band of Ojibwe (generators), Mille Lacs Reservation, MN, +7 jobs
9. RLTC Wind Towers (towers), MacGregor, TX, +75-250 jobs
10. RBC Bearings (bearings), Houston, TX
11. Sector 5 Technologies (components), Oelwein, IA, +99 jobs
12. Vacon Inc (AC drives), Chambersburg, PA, +94 jobs
13. Winergy (gear drives), Elgin, IL, + jobs

Figure includes wind turbine and component manufacturing facilities, as well as other supply chain facilities, but excludes corporate headquarters and service-oriented facilities. The facilities shown here are not intended to be exhaustive. Those facilities designated as "Turbines" may include turbine assembly and/or turbine component manufacturing, in some cases also including towers, nacelles and blades.



This map was created by
The National Renewable Energy Laboratory
for the U.S. Department of Energy,
April 22, 2010

U.S. Treasury Grant 1603 Funding

From a preliminary evaluation by LBNL, April, 2010

- **The Section 1603 cash grant program has been heavily used by renewable project developers.**
- **The grant program may have helped directly motivate as much as 2,400 MW of wind power capacity to be built that would not otherwise have come online in 2009.**
- **The 2,400 MW of wind power capacity that may have been enabled by the grant are estimated to have supported approximately 51,600 short-term full-time-equivalent (FTE) gross job-years during the construction phase, and 3,860 gross long-term FTE jobs during the operational phase.**



Thank you

The Team

Manufacturing:

Frank Oteri

Billy Roberts

Jobs and Economic Impacts team:

Eric Lantz

Sandra Reategui

Stephen Hendrickson

Funding:

Larry Flowers, Wind Powering America

Suzanne Tegen, NREL

Suzanne.Tegen@nrel.gov

