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

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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

**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

Construction Phase = 1-2 years
Operational Phase = 20+ years
Project Development & Onsite Labor

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

National Renewable Energy Laboratory
Innovation for Our Energy Future
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

Median Household Income (2007$) in counties where the six largest wind power projects are located compared to wind farm salaries

Reategui, NREL
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) Polymarin
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
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
Opened and Announced Wind Turbine Component Manufacturers Located Near or In the Great Lakes Region

1. K & M Machine-Fabricating Inc
2. Great Lakes Gear Tech Inc
3. Merrill Fabrication
4. Dowding Industries
5. Danotek Motion Technologies
6. Creative Foam Corp
7. Genzink Steel
8. Citation Corp
9. Three M Tool & Machine Inc
10. E-T-M Enterprises
11. ATI Casting Service
12. Global Wind Systems
13. Great Lakes Towers
14. Prestolite Wire LLC
15. Akebono Corporation
16. Johnson Systems Inc
17. Rotek Inc
18. Avon Bearings Corp
19. Kalt Manufacturing
20. Magna Machine Co
21. Cast-Fab Technologies Inc
22. Cardinal Fastener & Specialty Co
23. Federal Gear Corp
24. Canton Drop Forge
25. Michael Byrne Manufacturing Co Inc
26. Advanced Manufacturing Corp
27. Dyson Corp
28. Wecore Technology Inc
29. Horsburgh & Scott Co
30. Hamby Young
31. Owens Corning Composites
32. Minster Machine Co
33. Hyundai Ideal Electric Co
34. Eaton Corp
35. Swiger Coil Systems LLC
36. Connector Manufacturing Co
37. EGC Enterprises Inc
38. HPM America
39. Tuf-Tug Products
40. Benjamin Co
41. LAH Development
42. Parker Hannifin
43. ATI Casting Service
44. Fairfield Manufacturing Co Inc
45. Brevini
46. Bedford Machine and Tool Inc
47. Finkl & Sons
48. Trinity Structural Towers
49. Centa Corp
50. Winergy
51. Winergy/Siemens
52. Brad Foote Gear Works Inc
53. GE Energy
54. Hodge Foundry Inc
55. Gamesa
56. Wausaukee Composites Inc
57. Plexus Corp
58. Merit Gear Corp
59. Tower Tech Systems Inc
60. Bassett Mechanical
61. Milwaukee Gear Co
62. Energy Composites Corp
63. Wausaukee Composites Inc
64. VEC Technology LLC
65. Milacron Inc
66. American Tank & Fabricating
67. MasTech
68. Vela Gear
69. McSwain Manufacturing
70. Edco Inc
71. Graco
72. Michigan Tool
73. Ashland Performance Materials

Over 70 companies manufacturing components in Great Lakes region (2009)
## Sample 2010 Announcements

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

- 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

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. RLC 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.
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

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