

# Occupational Implications from Indiana's Green Economy

Matt Waldo

Director,  
Research and Information  
Indy Partnership

**LinkedIn:** Join “**Green Tech Manufacturing**” group

[www.indypartnership.com/energy](http://www.indypartnership.com/energy)



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Indy Partnership

EDO for the Indianapolis Region

Focused on marketing the Region's strengths in:

- Life Sciences
- Clean-Tech Energy
- Advanced Manufacturing
- Transportation, Distribution, Logistics
- Information Technology
- Motorsports



A top-ten economic development organization for 2008.  
(*Site Selection Magazine*)



**indy**PARTNERSHIP

[www.indypartnership.com](http://www.indypartnership.com)

The “greening” of occupations refers to the extent to which green economy activities and technologies:

Increase the demand for existing occupations,  
“*Green Increased Demand*” occupations

Shape the work and worker requirements needed for occupational performance, or  
“*Green Enhanced Skills*” occupations

Generate unique work and worker requirements  
“*New and Emerging*” (N&E) occupations

Source: National Center for O\*Net Development, 2009

[www.onetcenter.org/reports/Green.html](http://www.onetcenter.org/reports/Green.html)



indyPARTNERSHIP

[www.indypartnership.com](http://www.indypartnership.com)

# Green Economy Activities and Technologies

Renewable Energy  
Generation  
Transportation  
Energy Efficiency  
Green Construction  
Energy Trading  
Energy and Carbon  
Capture and Storage  
Research, Design, and  
Consulting Services

Environment Protection  
Agriculture and Forestry  
Manufacturing  
Recycling and Waste  
Reduction  
Governmental and  
Regulatory  
Administration

Source: National Center for O\*Net  
Development, 2009



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Indiana Existing Relative Strength

Renewable Energy  
Generation  
Transportation  
Energy Efficiency  
Green Construction  
Energy Trading  
Energy and Carbon  
Capture and Storage  
Research, Design, and  
Consulting Services

Environment Protection  
Agriculture and Forestry  
Manufacturing  
Recycling and Waste  
Reduction  
Governmental and  
Regulatory  
Administration

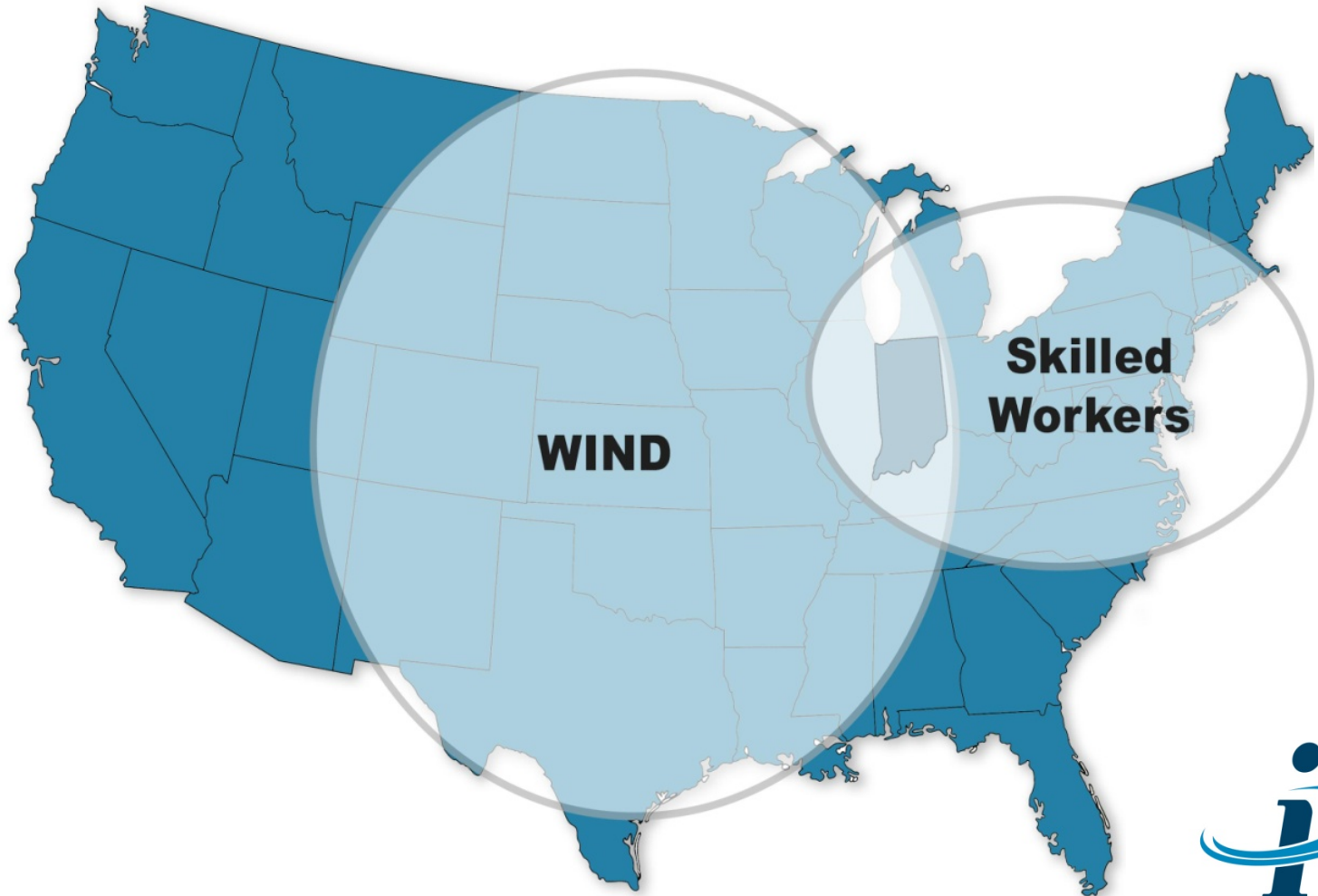
Sources: Bureau of Labor Statistics,  
Census Bureau, 2009.



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Skilled Workforce vs. Wind Resource Locations



*indy*PARTNERSHIP

[www.indypartnership.com](http://www.indypartnership.com)

# Manufacturing Sector

**Indiana ranks #1 in advanced manufacturing technology.** Ewing Marion Kauffman Foundation, 2007 New Economy)

**Most productive manufacturing workers in Midwestern U.S.**  
(Census of Manufacturers, 2006)

**Manufacturing employment = 13% of Indianapolis Region's workforce.**

More than 2x U.S. average  
(Bureau of Labor Statistics, May 2008 OES)

**The Indianapolis Region hosts >100,000 jobs in manufacturing.**  
(Bureau of Labor Statistics, May 2008 OES)

**The Indianapolis Region has over 375 manufacturing facilities with ≥ 50 employees.** (Dun & Bradstreet, 2009)

## Indianapolis Region

Occupation	Current Employment	Current Applicants
Machinists	25,130	882
Engineers*	8,120	2,430
Engineering Technicians*	2,040	801
Drafters	2,620	453

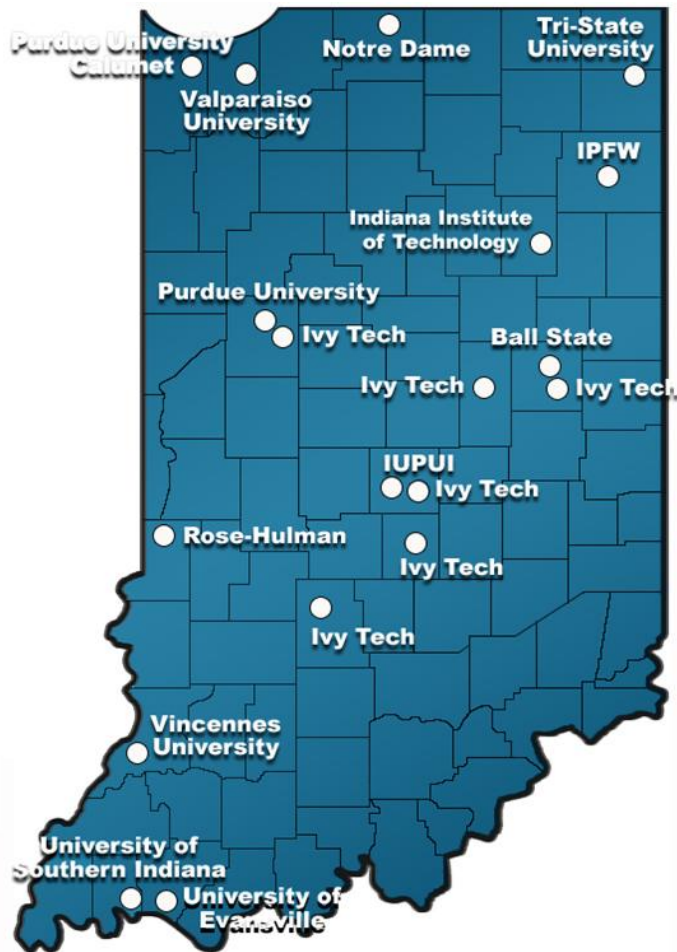
\* Does not include civil or health. Employment for some sub-occupations were not reported.



**indy**PARTNERSHIP

[www.indypartnership.com](http://www.indypartnership.com)

# Engineering Schools in Indiana



## 2007 Completions

Associates Degrees 992

Bachelors Degrees 3,128

Graduate Degrees 935

### 4-Year Schools

Ball State University  
 Indiana Institute of Technology  
 Indiana University- Purdue University, Fort Wayne  
 Indiana University- Purdue University, Indianapolis  
 Purdue University  
 Purdue University Calumet  
 Rose- Hulman Institute of Technology  
 Tri- State (Trine) University  
 University of Evansville  
 University of Notre Dame  
 University of Southern Indiana  
 Valparaiso University

### 2-Year Schools

Vincennes University  
 Ivy Tech Community College

(only the Ivy Tech locations  
 in central Indiana are shown  
 on the map)



indyPARTNERSHIP

www.indypartnership.com



# University Support

## Purdue University Renewable Energy Center

Research park at Ameriplex

- Research in turbine engines, including world-recognized success in noise reduction technologies
  - Vibration
  - Nanotech
- School of Mechanical Engineering - 7<sup>th</sup> for both undergraduate and graduate programs (U.S. News)
- Operates research wind farm near Lafayette campus



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# University Support

Sen. Richard G. Lugar Center for Renewable Energy –  
Indiana University Purdue University - Indianapolis

## *Areas of Current Research*

- Fuel cell technology
- Hydrogen (Solar, Reformers)
- Bio-fuels
- Advanced batteries
- Hybrid Electric Vehicles
- Plug-in Hybrid Electric Vehicles
- Policy and societal issues



[www.lugarenergycenter.iupui.edu](http://www.lugarenergycenter.iupui.edu)

**Collegiate Energy Summit**  
**9/18/09**



**indyPARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Other Indiana Opportunities

Renewable Energy  
Generation  
Transportation  
Energy Efficiency  
Green Construction  
Energy Trading  
Energy and Carbon  
Capture and Storage  
Research, Design, and  
Consulting Services

Environment Protection  
Agriculture and Forestry  
Manufacturing  
Recycling and Waste  
Reduction  
Governmental and  
Regulatory  
Administration

Sources: Bureau of Labor Statistics,  
Census Bureau, 2009.



*indy*PARTNERSHIP

[www.indypartnership.com](http://www.indypartnership.com)

# National Occupational Forecasts in Indiana's Strengths and Opportunities



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Renewable Energy Generation

Wind and solar offer more jobs per mW of power than most other energy regimes

(Source: Plunkett Research, 2009)

Developing dedicated energy crops could create more than 120,000 jobs by 2012 (Source: DOE, 2002)

Biomass currently employs roughly 66,000 people with a 200% growth capability related to developing dedicated “energy crops” used for fueling biopower generators (Source: Dierdorff et al., 2006)



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Transportation

Increased demand occupations include railroad conductors and locomotive engineers

Enhanced skills occupations include automotive specialty technicians, transportation managers, and electronics engineers

Examples of N&E occupations include fuel cell engineers & technicians, and automotive engineers & technicians

Source: National Center for O\*Net Development, 2009



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Agriculture and Forestry

Increased demand occupations include agricultural workers and inspectors

Enhanced skills occupations include farmers and ranchers, landscape architects, and agricultural technicians

N&E occupations in precision agriculture and biomass farming

Source: National Center for O\*Net Development, 2009



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Manufacturing

Occupational impact is most likely to be in the forms of increased demand and enhanced skills occupations.

Existing manufacturing occupations such as  
drilling and boring machine tools setters, operators and tenders  
separating, filtering, clarifying, precipitating and still machines setters,  
operators and tenders

Enhanced skills occupations may include occupations such as  
industrial engineering technicians  
electrical engineering technicians  
machinists  
occupational health and safety technicians

N&E occupations likely in manufacturing of products designed and developed by engineers in such fields as biochemistry, microsystems engineering, and photonics.

Source: National Center for O\*Net  
Development, 2009



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)



# Research, Design, and Consulting Services

Increased demand and green enhanced skills occupations through “indirect jobs” or occupations such as financial analysts, sales representatives, geoscientists, engineering managers, marketing managers, and public relations specialists

N&E possible in marketing green products or services, research and development engineers of green technology

Source: National Center for O\*Net Development, 2009



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Energy Efficiency

Increased demand occupations include  
electrical power line installers and  
repairers,  
stationary engineers and boiler operators,  
boilermakers

Enhanced skills needed in heating and air conditioning  
mechanics and installers, and mechanical engineers

N&E include weatherization or sealing of buildings to  
improve energy efficiency

Source: National Center for O\*Net  
Development, 2009



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)

# Questions?

Matt Waldo

Director,  
Research and Information  
Indy Partnership

[mwaldo@indypartnership.com](mailto:mwaldo@indypartnership.com)

**LinkedIn:** Join “**Green Tech Manufacturing**” group

[www.indypartnership.com/energy](http://www.indypartnership.com/energy)



*indy***PARTNERSHIP**

[www.indypartnership.com](http://www.indypartnership.com)