

# Economic Development from Wind Power: Impacts and Policy Considerations



**Nebraska Wind Power  
Conference**

**Eric Lantz**

**Energy Analyst**

**National Renewable  
Energy Laboratory**

**November 10, 2009**

# Presentation Overview

**Purpose:** Discuss the potential economic development impacts of wind energy in Nebraska, highlight critical variables in shaping economic development impacts, discuss policy considerations.

## Relevant Questions:

- What is the potential economic development value to Nebraska?
- What factors influence the ultimate economic development outcome?
- How can policy enhance economic development?

## Outline:

- Defining economic development impacts
- The potential for economic development in Nebraska
- Economic development and local ownership
- Economic development and manufacturing
- Conclusions



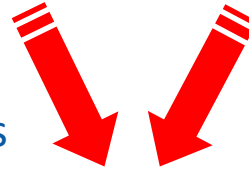
# Defining Economic Development Impacts



1. On-site Labor and Professional services



2. Equipment Production and Supply Chain Impacts



3. Induced Impacts  
(Household purchases due to injection of income)

All dollar values are millions of 2008 constant dollars			Low <sup>2</sup>	High <sup>3</sup>
<b>7,800 MW</b>	Average Employment Impact (40 year lifecycle)	<i>All Jobs</i>	1,600	2,925
		Wind Industry Jobs	840	1,580
	Financial Impacts (Averages based on 40 year lifecycle)	<i>Average Nebraska Equity Payments</i>	\$20	\$161
		Average Land-Lease Payments	\$14	\$16
		Average Property Tax Payments	\$14	
		<i>Total Economic Output</i>	\$7,800	\$14,100
<b>1,000 MW</b>	Average Employment Impacts (22 year lifecycle)	<i>All Jobs</i>	345	659
		Wind Industry Jobs	184	363
	Financial Impacts (Averages based on 22 year lifecycle)	<i>Average Nebraska Equity Payments</i>	\$5.6	\$45
		Average Land Lease Payments	\$3.2	\$3.7
		Average Property Tax Payments	\$3.3	
		<i>Total Economic Output</i>	\$870	\$1,640

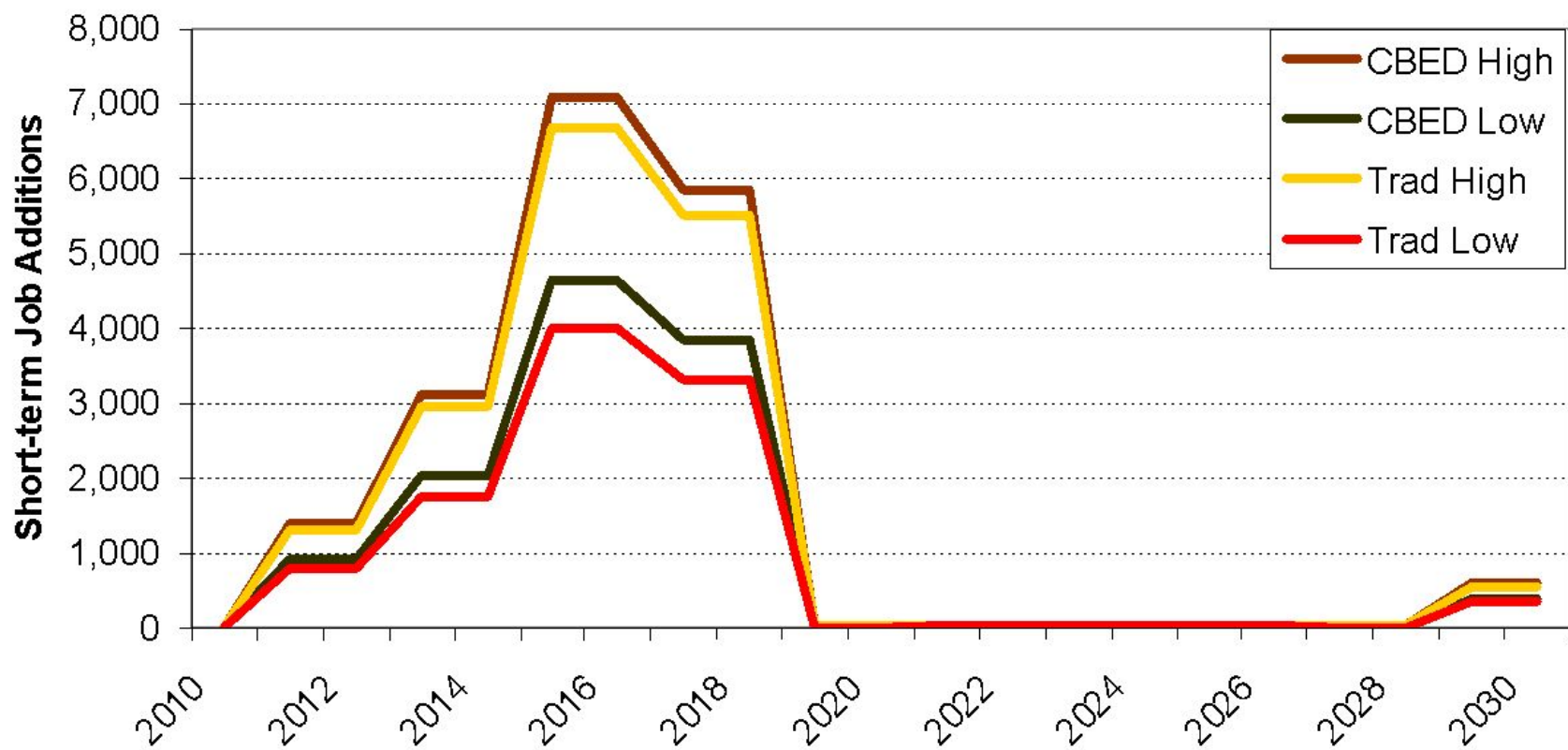
<sup>1</sup>Average annual impacts for 7,800 MW assume a 20-year construction period and 20 years of operations for a total lifetime impact spread over 40 years. Average annual impacts for 1,000 MW assume a 2-year construction period and 20 years of operations for a total impact spread over 22 years.

<sup>2</sup>Low results represent the traditional development low scenario.

<sup>3</sup>High results represent the C-BED high scenario, equity payments assume a 33% equity investment in C-BED projects and a 9% ROE.

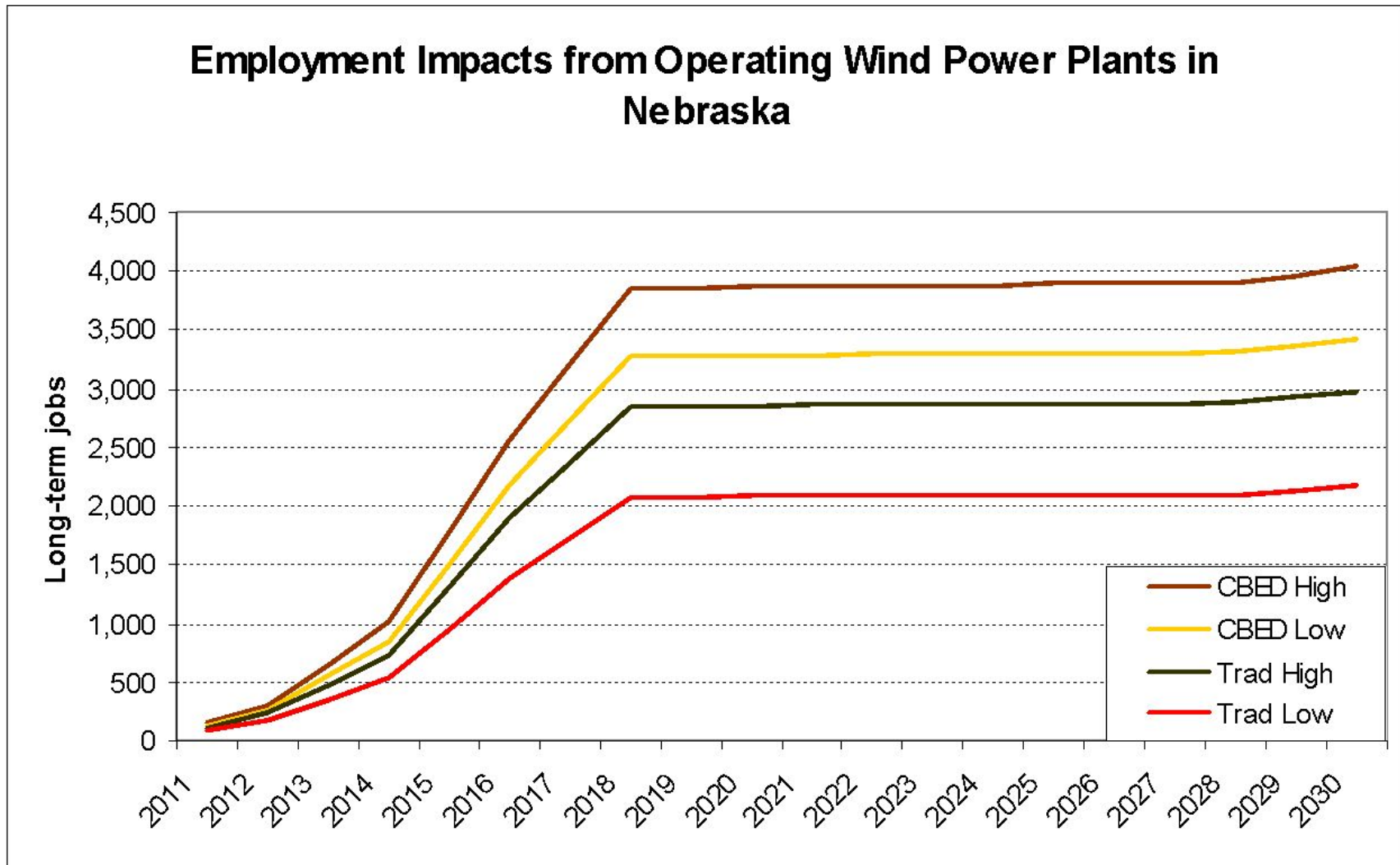
# Building 7,800 MW supports thousands of short-term jobs with a peak from 2015-2017

## Construction Period Jobs Added to the Nebraska Labor Force from Building 7,800 MW of Wind Power



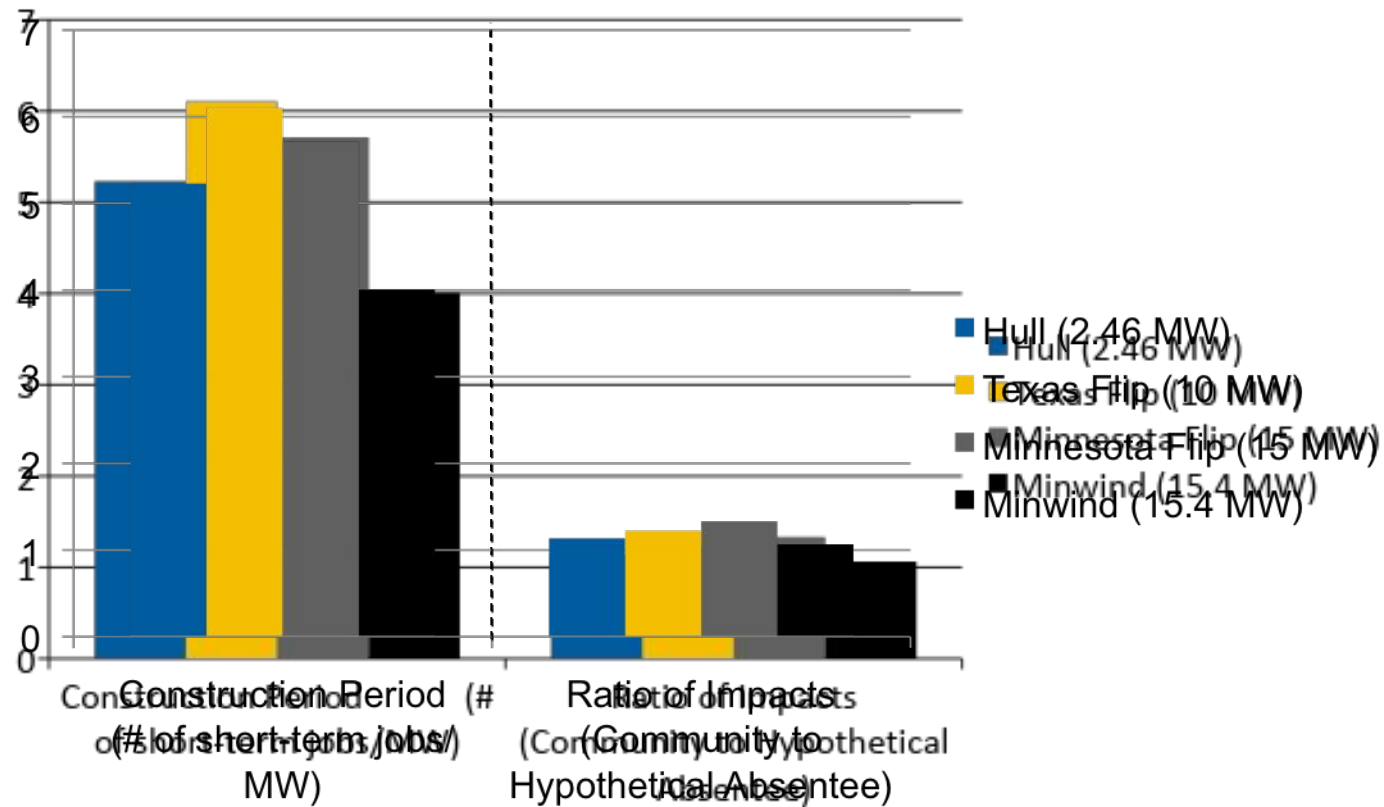
Total Economic Output: \$2.8 billion to \$5.2 billion

# Operating 7,800 MW of Nebraska wind power supports thousands of local, long-term jobs



Annual Economic Output by 2018: \$245 million to \$450 million

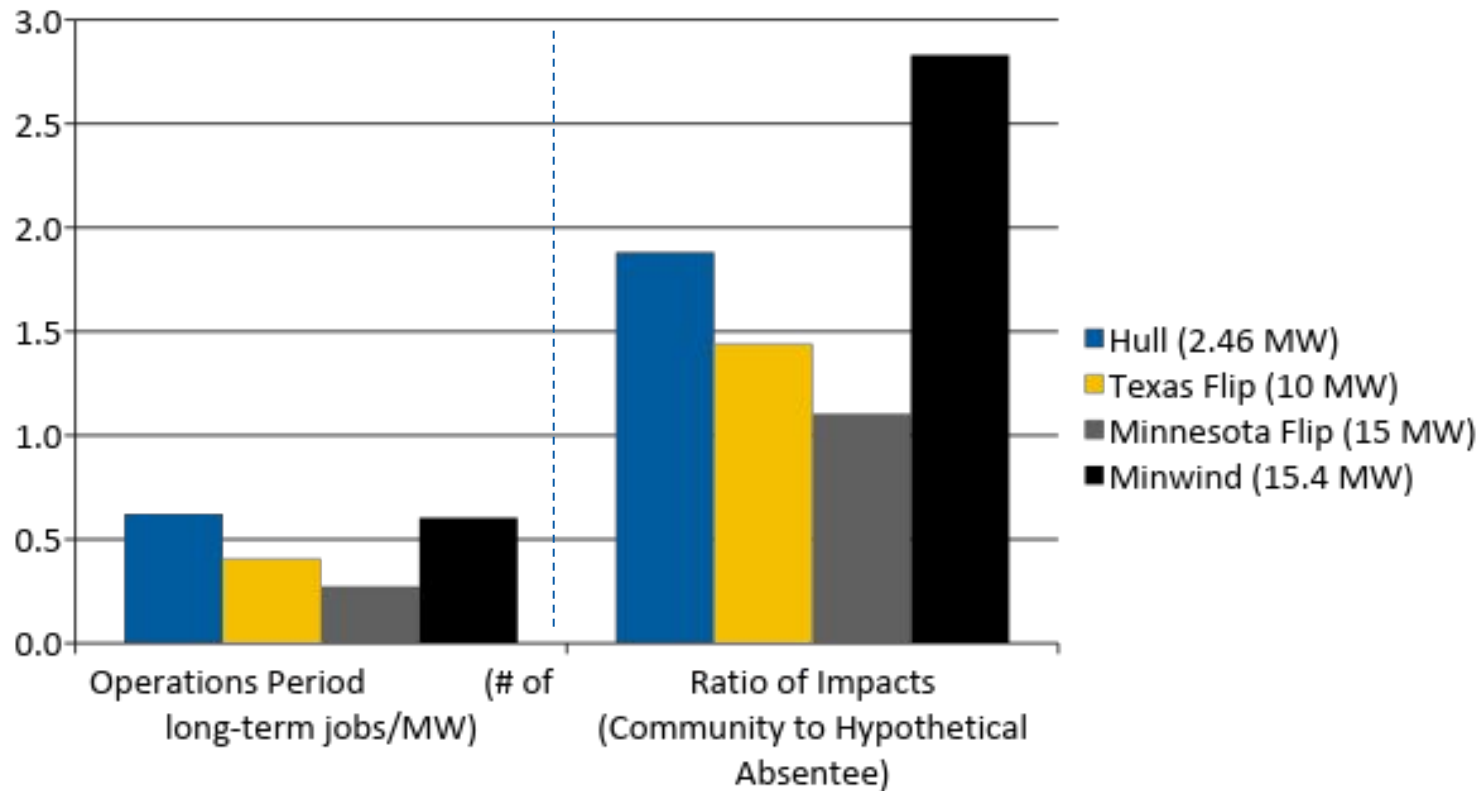
# Critical Project Level Variables: Local Ownership and the Construction Period



Note: Ratio of impacts is interpreted as the value shown to one (e.g., 1.1 : 1).

- When compared with similar, hypothetical, “average” projects, construction period impacts may only be moderately higher for community wind projects; 1.1 – 1.3 times that of absentee projects
- *The hypothetical average project is based on what is reasonable not necessarily what will happen.*

# Critical Project Level Variables: Local Ownership and the Operations Period

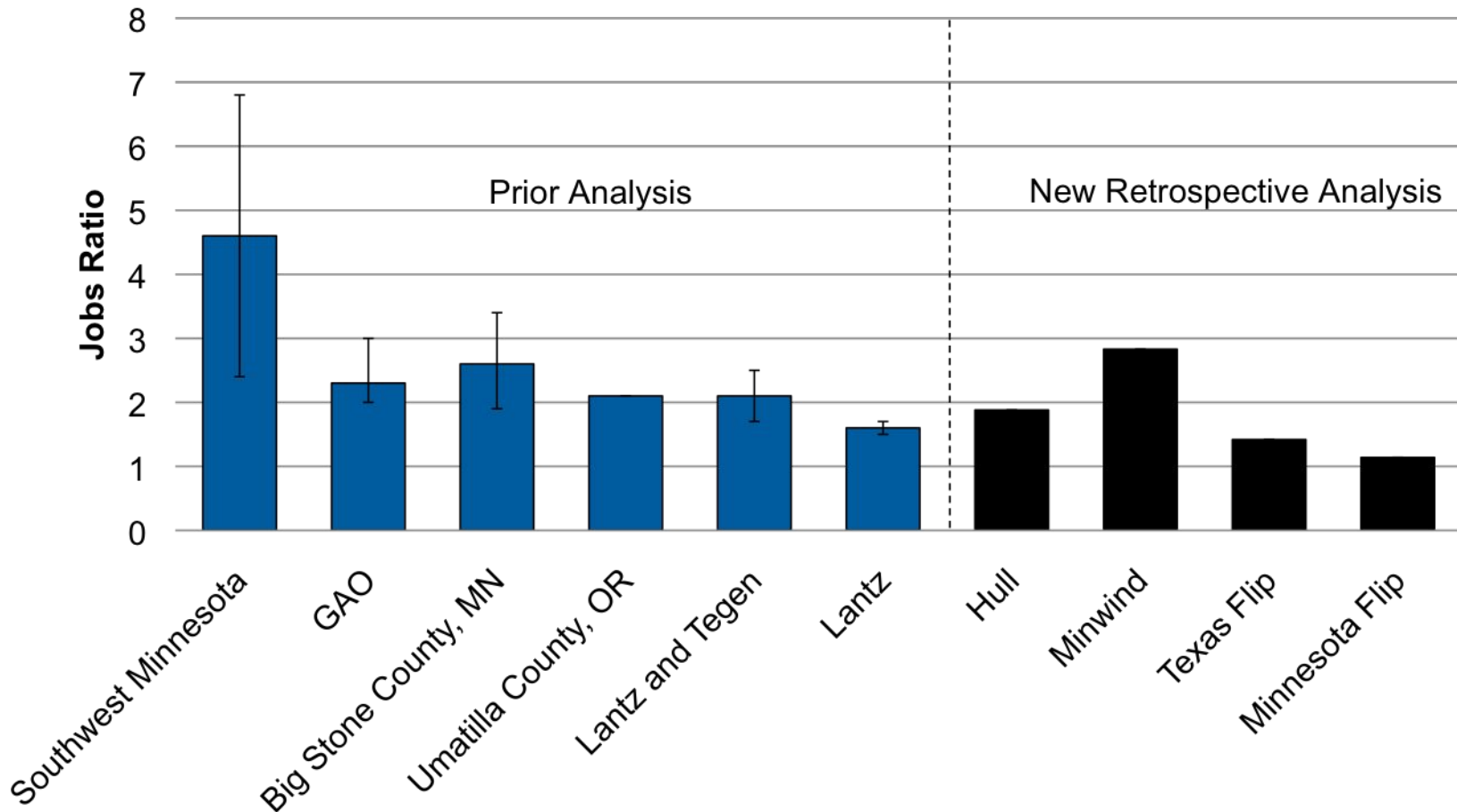


*Note: Ratio of impacts is interpreted as the value shown to one (e.g., 2.8 : 1).*

- Revenue streams to local investors during operations period impacts increase operations period economic impacts by 1.1 to 2.8 times relative to absentee owned projects.

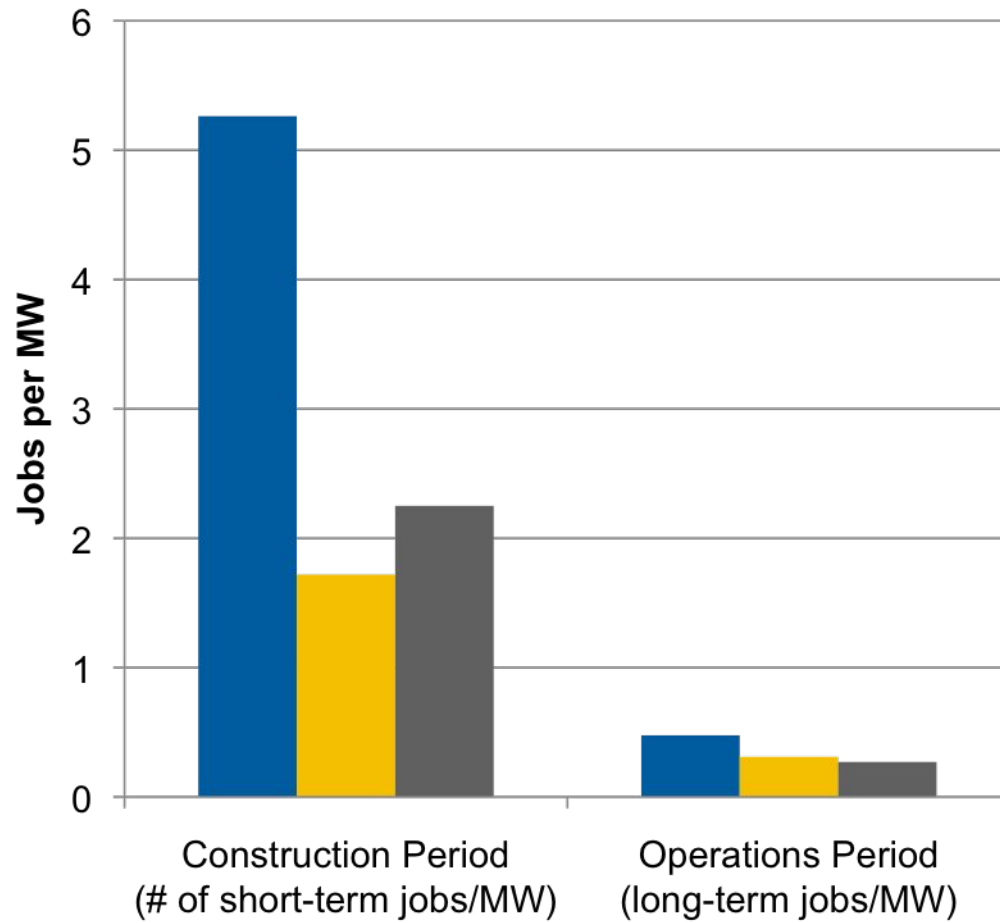


# Local Ownership: Comparing Analyses of Operations Period Impacts



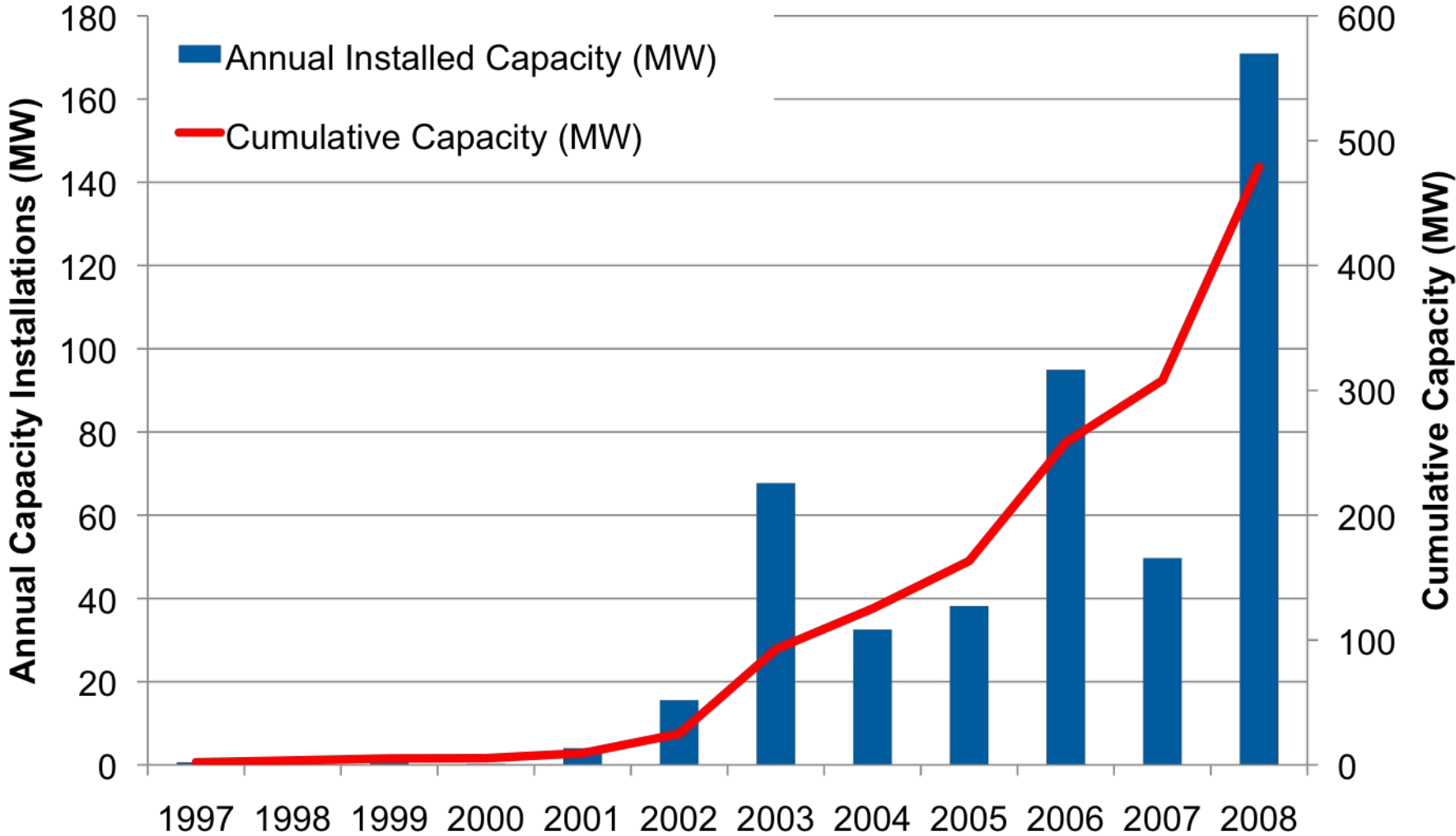
*Note: Values shown here represent the ratio of community wind to a hypothetical “average” absentee wind project. The ratio of impacts is interpreted as the value shown to one (e.g., 2.8 : 1).*

# Local Ownership: Completed Community and Completed Absentee Wind



Ratio of Construction Period Impacts                      2.3 – 3.1 : 1  
Ratio of Operations Period Impacts                      1.5 – 1.8 : 1

# Local Ownership: Policy and Context

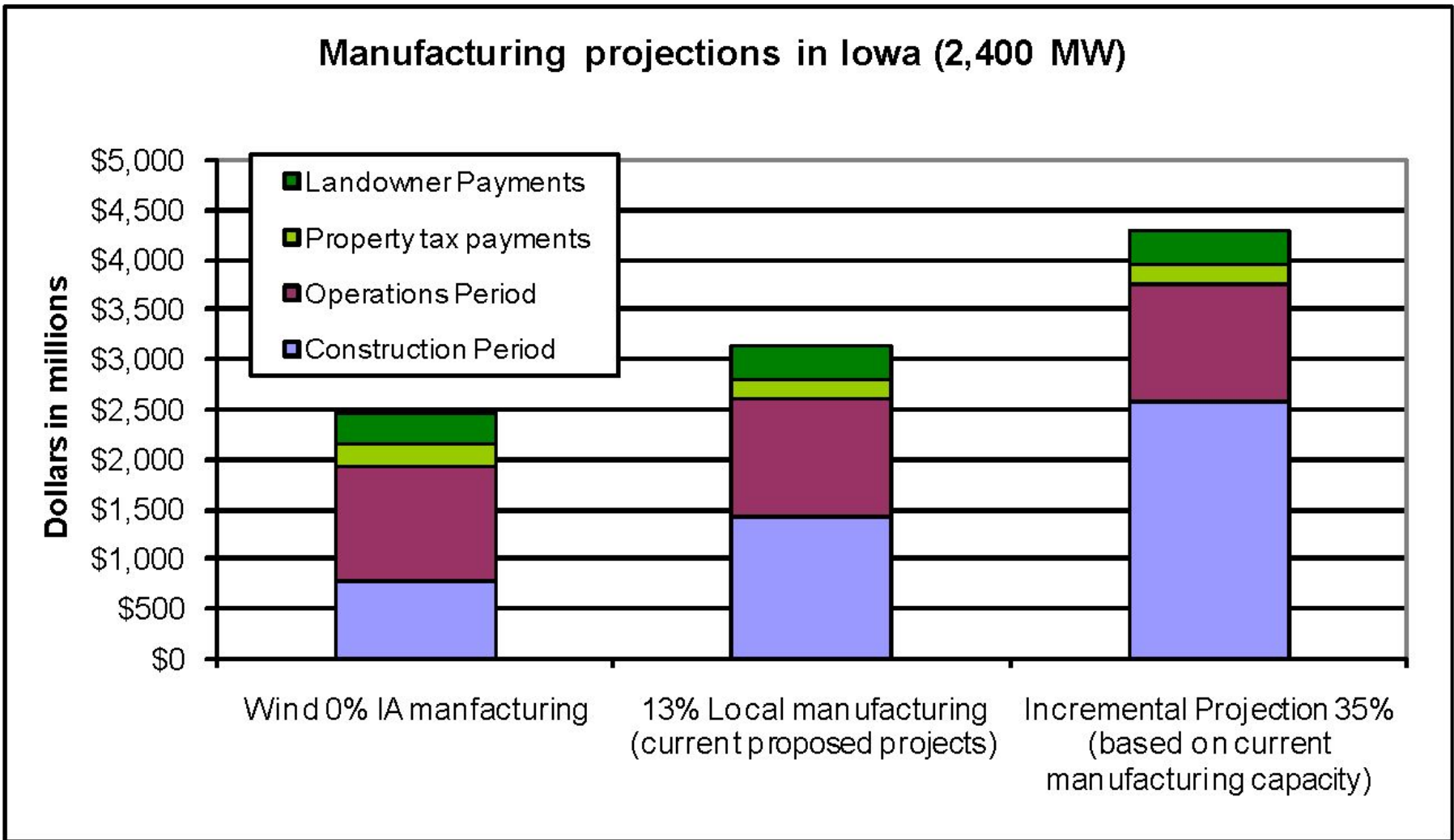


Source: LBNL 2009

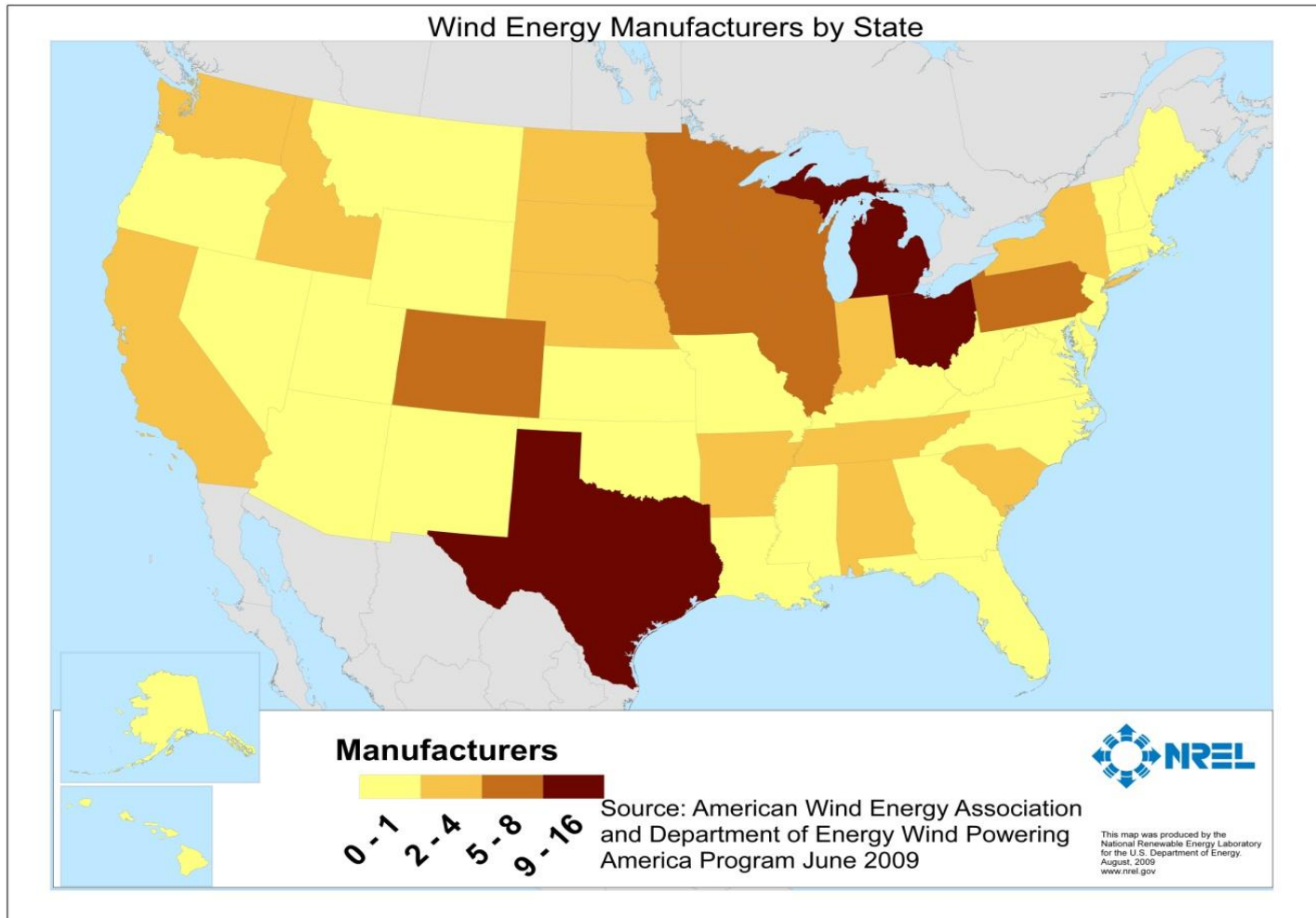
# Local Ownership: Policy Considerations

- Community wind projects have greater economic development impacts on a per MW basis than absentee owned projects
- To date community wind has been on the margins of the broader wind industry
  - It remains to be seen how new Community Wind development models will impact the industry
- Recent policy changes have effectively removed a significant (market access) incentive for community wind in the state.
- Remaining sales tax exemption is valuable but may not be sufficient to drive widespread community wind deployment
  
- Comprehensive Community Wind Policy will be most successful in driving development. Such policy may include provisions that address:
  - Market Access*
  - Financial Support*
  - Streamlined Regulatory Procedures*
  - Technical/Development Support*

# Critical Project Variables: Local Manufacturing



# Wind Energy Manufacturing Trends (2008)



*Note: This non-exhaustive figure is representative of the number of firms engaged in wind energy manufacturing. It does not distinguish between firms for the number of individuals or employees that are supported by wind energy manufacturing; it also does not distinguish between tiers in the market supply chain.*

# Manufacturing: Policy and Context

Industry or Sector	Average Annual Value of Goods Produced (Billions of 2008\$)
Wind Energy (DOE 20% Wind Energy by 2030 Scenario)	\$19
Renewable Energy (Proposed National RPS Scenarios)	\$14-\$20
Construction Machinery	\$25
Farm Machinery	\$17.5
Household Appliances	\$23
<p>Note: Existing Industry data is from 2007 and includes primary production (i.e. production of new equipment) as well as production of repair and replacement parts. Renewable industry estimates are based solely on domestic demand. A robust export market for renewable energy equipment could dramatically increase the scale of renewable energy equipment production.</p>	

# Manufacturing: Policy Considerations

## Wind energy specific considerations:

- Proximity to market
- Local infrastructure
- Existing assets
- *Note: Component suppliers have a more diverse set of factors to consider.*

## Broad-based recommendations from economics research:

- Think broadly about economy wide competitiveness
- Invest in durable assets
- Reduce barriers to entry

## Policy variables within the domain of state and local government:

- **Local infrastructure**
- **Business and Government Relations**
- Potential competitors or suppliers
- Quality of life variables
- **Education and workforce development**
- Public investment in the broader community
- Community enthusiasm/support
- **Local Demand/State Markets**
- *Local incentives (fiscal or financial)*





# Conclusions

Economic development impacts of wind energy are notable but, local manufacturing and local ownership can dramatically increase the economic development impacts

- A 70% increase in lifetime economic development impacts is estimated from a 35% increase in the share of local manufacturing
- Construction period impacts from completed community wind projects are estimated at 2.3 to 3.1 times that of completed absentee owned projects
- Operations period impacts from completed projects are estimated at 1.5 to 1.8 times that of completed absentee owned projects

Successful development of locally owned projects has typically required specific policy provisions that ensure project viability. Comprehensive local ownership policy will consider:

- Market Access
- Financial Support
- Streamlined Regulatory Procedures
- Technical/Development Support

Over the next 20 years, the investment in renewable energy equipment from domestic demand is estimated to be on the order of \$14 billion to \$20 billion. Manufacturing policy developed with this in mind will include:

- Broad based infrastructure development
- Industry specific worker training
- Progressive renewable energy deployment policies
- A stable regulatory environment
- Investment in public education and community development



# *Thank You*

**Eric Lantz**

Markets and Policy Analyst  
Strategic Energy Analysis Center  
National Renewable Energy Laboratory  
<http://www.nrel.gov/analysis/>  
<http://www.windpoweringamerica.gov/>

1617 Cole Blvd.  
Golden, CO 80401-3393  
P: (303) 384-7418  
email: [Eric.Lantz@nrel.gov](mailto:Eric.Lantz@nrel.gov)