Wind Energy for Rural Economic Development

Suzanne Tegen, NREL
Indiana Wind Working Group
April 18, 2007
Overview

• Case studies from rural America
• Jobs and Economic Development Impacts (JEDI)
• Indiana wind power benefits
• Wind vs. coal
• 20% wind scenario
The Ag Opportunity

Economic security and prosperity for rural America through local production of energy
Rural Economic Challenges

• Low commodity prices
• Fuel price uncertainty
• High fertilizer prices
• Migration to cities
• Eroding local tax bases
• Water shortages
Drivers for Wind Power

- Declining wind costs
- Fuel price uncertainty
- Federal and state policies
- Economic development
- Environmental issues
- Energy security
Case Study: Texas

912-MW in Pecos County, TX resulted in:

• 2,500 quality jobs with a payroll of $75M
• $13.3M in tax revenues for schools and counties
• $2.5M in 2002 royalty income to landowners
• Another 2,900 indirect jobs as a result of the multiplier effect
• $4.6M increase in Pecos County property tax revenue in 2002
Case Study: Minnesota

107-MW Minnesota wind project

- $500,000/yr in lease payments to farmers
- $611,000 in property taxes in 2000 = 13% of total county taxes
- 31 long-term local jobs
- $909,000 in income from O&M (includes multiplier effect)
Case Study: Iowa

240-MW Iowa wind project

- $640,000/yr in lease payments to farmers ($2,000/turbine/yr)
- $2M/yr in property taxes
- $5.5M/yr in O&M income
- 40 long-term O&M jobs
- 200 short-term construction jobs
- Doesn’t include multiplier effect
Case Study: New Mexico

204-MW wind project built in 2003 in DeBaca and Quay counties for PNM

• 150 construction jobs
• 12 permanent jobs and $550,000/yr in salaries for operation and maintenance
• $550,000/year in lease payments to landowners
• $450,000/year in payments in lieu of taxes to county and school districts
• Over $40M in economic benefits for area over 25 years

Source: PNM, New Mexico Wind Energy Center Quick Facts, 2003
Case Study: Hyde County, South Dakota

40-MW wind project in South Dakota creates $400,000 - $450,000/yr for Hyde County, including:

- More than $100,000/yr in annual lease payments to farmers ($3,000 - $4,000/turbine/yr)
- $250,000/yr in property taxes (25% of Highmore’s education budget)
- 75 - 100 construction jobs for 6 months
- 5 permanent O&M jobs
- Doesn’t include multiplier effect
Case Study: Prowers County, Colorado

162-MW Colorado Green Wind Farm $200M+ investment

- 400 construction workers
- 14-20 full-time jobs
- Land lease payments $3000-$6000 per turbine
- Prowers County 2002 assessed value $94M; 2004 assessed value +33% (+$32M)
- Local district will receive tax reduction

“Converting the wind into a much-needed commodity while providing good jobs, the Colorado Green Wind Farm is a boost to our local economy and tax base.”

John Stulp, County Commissioner, Prowers County, Colorado
Major Rural Economic Impacts

- Job creation
- Landowner revenues
- Property taxes (schools, roads, county services)
The JEDI model

Jobs and Economic Development Impacts

• Necessary inputs:
  – Year and location of project construction
  – Construction cost ($/kW)
  – O&M cost ($/kW)

The better the inputs, the better the outputs!

• More information:
  www.windpoweringamerica.gov
Wind Energy’s Economic impacts
On-site direct, off-site direct, Indirect, Induced

Direct Impacts
- On-site
  - Construction workers
  - Management
  - Administrative support
- Off-site
  - Boom truck & management, gas and gas station workers, blades and towers & workers
  - Hardware store purchases and workers, spare parts and their suppliers

Indirect Impacts
These are jobs in and payments made to supporting businesses, such as bankers financing the construction, contractor, manufacturers and equipment suppliers.

Induced Impacts
These jobs and earnings result from the spending by people directly and indirectly supported by the project, including benefits to grocery store clerks, retail salespeople and child care providers.

Wind energy’s economic “ripple effect”
Direct on-site jobs and parts during construction

Truck drivers, crane operators

Earth moving, cement pouring

Management and support

Construction
Direct wind project jobs during operations

Operations and maintenance, management

Parts and materials purchased

Utility services and subcontractors

Landowner royalties
Wind Energy’s Economic impacts
On-site direct, off-site direct, Indirect, Induced

Wind energy’s economic “ripple effect”

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Indirect jobs, services, materials

Property taxes

Financing, banking, accounting

Steel mill jobs, parts, services
Photos: E.C.Levy, Inc, Detroit, MI

Equipment manufacturing and sales
Wind Energy’s Economic impacts
On-site direct, off-site direct, Indirect, Induced

**Direct Impacts**

- On-site
  - Construction workers
  - Management
  - Administrative support

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**Induced Impacts**

These jobs and earnings result from the spending by people directly and indirectly supported by the project, including benefits to grocery store clerks, retail salespeople and child care providers.
Induced jobs, services, materials

Child care, grocery store, clothing, other retail, public transit, new cars, restaurants, medical services
Indiana wind resource map

"Our state energy plan calls for maximizing Indiana's wind power potential, so news that Indiana Michigan Power is pursuing this clean source of energy is a welcome development."

- Governor Mitch Daniels
## Jobs from new wind in Indiana

### Local Economic Impacts – Job creation from 100 MW of new wind

<table>
<thead>
<tr>
<th>Category</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>During construction period</strong></td>
<td></td>
</tr>
<tr>
<td>On- and off-site direct jobs</td>
<td>156</td>
</tr>
<tr>
<td>Construction workers, management and support only</td>
<td>151</td>
</tr>
<tr>
<td>Indirect jobs</td>
<td>64</td>
</tr>
<tr>
<td>Induced jobs</td>
<td>84</td>
</tr>
<tr>
<td><strong>Total Jobs (Direct, Indirect, Induced)</strong></td>
<td>304</td>
</tr>
</tbody>
</table>

### During operating years (*annual*): Permanent jobs for the life of the plant

<table>
<thead>
<tr>
<th>Category</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-site Plant Workers Only</strong></td>
<td>9</td>
</tr>
<tr>
<td>Indirect Impacts</td>
<td>6</td>
</tr>
<tr>
<td>Induced Impacts</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total Impacts (Direct, Indirect, Induced)</strong></td>
<td>47</td>
</tr>
</tbody>
</table>
Wind Energy’s Economic impacts in Indiana from 100 MW of new wind development (50 2MW turbines)

**Direct Impacts**
- Landowner Payments: $400,000/yr
- Construction Phase: 150 construction jobs, $18.5M to local economies
- Operational Phase: 9 O&M jobs/yr, $2.3M/yr to local economies

**Indirect Impacts**
- Local Property Tax Benefits: $450,000/yr
- Construction Phase: 64 jobs, $5.3M to local economies
- Operational Phase: 6 jobs/yr, $610,000/yr to local economies

**Induced Impacts**
- Construction Phase: 84 jobs, $7.4M to local economies
- Operational Phase: 13 jobs/yr, $1.2M/yr to local economies

**Totals**
- Over 220 jobs during construction
- 25-30 permanent jobs
- $113+ million over 20-yr life of plant

Wind energy’s economic “ripple effect”

Construction Phase = 1-2 years
Operational Phase = 20+ years
Wind vs. Coal
Indiana coal

Pennsylvanian system coal – green
Underground coal mines – blue
Surface coal mines – brown

• Indiana uses ~45-49% Indiana coal
• Bituminous coal
• Out-of-state coal used for emissions concerns
• Some state agencies (universities) must burn Indiana coal
Job creation in Colorado

Direct jobs for Coloradoans from new wind vs new coal

- Wind (600 MW):
  - Construction jobs: 800
  - O&M jobs (20 yrs): 500

- Coal (250 MW):
  - Construction jobs: 700
  - O&M jobs (20 yrs): 450
Economic benefits to Colorado

Economic impacts of wind vs. coal in Colorado (construction + 20 yrs of operation)

- Wind (607 MW)
  - Landowner revenue: $700
  - Property taxes: $100
  - Coal mining & transport: $100
  - Operations: $300
  - Construction: $300

- Coal (250 MW from PRB)
  - Landowner revenue: $300
  - Property taxes: $100
  - Coal mining & transport: $100
  - Operations: $100
  - Construction: $100

- Coal (40% in-state)
  - Landowner revenue: $500
  - Property taxes: $100
  - Coal mining & transport: $100
  - Operations: $200
  - Construction: $200

Dollars in Millions

Landowner revenue
Property taxes
Coal mining & transport
Operations
Construction

National Renewable Energy Laboratory
Economic Development Impacts

- Construction
- O&M
- Property tax revenues
- Landowner revenues
- Manufacturing
- Multiplier effect
- Net economic development impacts of wind vs. fossil fuels
It’s not just our idea…

The 20% scenario from DOE and industry has the goal of **producing 20% of the nation’s energy from wind by 2030**.
Economic impacts by 2030

20% by 2030 - Economic Impacts by NERC Region

WECC
- Monetary Impact: $76.8 B
- Jobs (JC): 226,100
- Jobs (JO): 584,100

MRO
- Monetary Impact: $58.4 B
- Jobs (JC): 192,000
- Jobs (JO): 464,000

SPP
- Monetary Impact: $35.0 B
- Jobs (JC): 122,200
- Jobs (JO): 272,700

ERCOT
- Monetary Impact: $26.0 B
- Jobs (JC): 70,400
- Jobs (JO): 181,400

NPCC
- Monetary Impact: $10.0 B
- Jobs (JC): 35,700
- Jobs (JO): 63,600

RFC
- Monetary Impact: $55.6 B
- Jobs (JC): 169,800
- Jobs (JO): 395,400

SERC
- Monetary Impact: $51.1 B
- Jobs (JC): 151,800
- Jobs (JO): 363,200

U.S. Total
- Monetary Impact: $313.1 B
- Jobs (JC): 968,900
- Jobs (JO): 2,326,000

Optimistic case = 323 GW of wind capacity. All job values rounded to the nearest 100.
20% Scenario for Indiana

- 15,000 MW by 2030
- Over 45,000 new construction jobs
- Over 6,000 permanent jobs (20+yrs)
- $4.8 billion in economic output during construction
- $10 billion in economic output over 20 years
20% Scenario for Indiana
(20 years of operation)

• Over $1.4 billion in property tax payments to counties (for roads, schools, county services)

• $8 million in landowner royalties

• Manufacturing in Indiana??
“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*
Thank you

Suzanne_Tegen@nrel.gov
Wind Powering America
www.windpoweringamerica.gov
Water rights, air quality, emissions, domestic production
“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
Wind Cost of Energy

Graph showing the cost of energy (COE) over time for wind and natural gas. The graph highlights the cost decline for both low wind speed sites and high wind speed sites. Key points include:

- Low wind speed sites have a lower COE compared to high wind speed sites.
- New Bulk Power Competitive Price Band is marked in 2006, indicating a significant cost reduction for new wind projects.
- Natural Gas (fuel only) shows a steady decrease in COE over time.

The graph also indicates the cost of energy for depreciated coal and wind, with a notable decrease in cost from 2005 onwards.
Summary: Economic Development Impacts

- Land Lease Revenue: 2-3% of gross revenue or $4,000 - $5,000/turbine/year
- Local property tax revenue
- 150 jobs per 100 MW during construction
- 8-10 permanent O&M jobs per 100 MW
- Local industry: concrete, roads, electrical services, construction management
- Manufacturing and Assembly plants expanding in U.S. (e.g., IL, SD, ND, PA, CO, Indiana?)
Direct, Indirect, and Induced Activity

1. Examples of **direct** jobs include construction and others who work on construction, such as cement truck operators and road crews.

2. **Indirect** refers to the increase in economic activity that occurs when a contractor, vendor or manufacturer receives payment for goods or services and is able to pay others who support their business, e.g., a banker financing the construction contractor, the manufacturers and other suppliers that meet their material and equipment needs.

3. **Induced** jobs and earnings result from the spending by people directly and indirectly supported by the project, including benefits to grocery store clerks, retail salespeople and child care providers.
The JEDI model

Jobs and Economic Development Impacts

• Traces linkages in the economy: what are economic impacts from dollars spent on the wind project?

• Economic development impacts include jobs created, wages and salaries earned, and increases in overall economic activity.

• JEDI uses data from MIG’s IMPLAN (Impact Analysis for Planning) based on state spending patterns.