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National Renewable Energy Laboratory

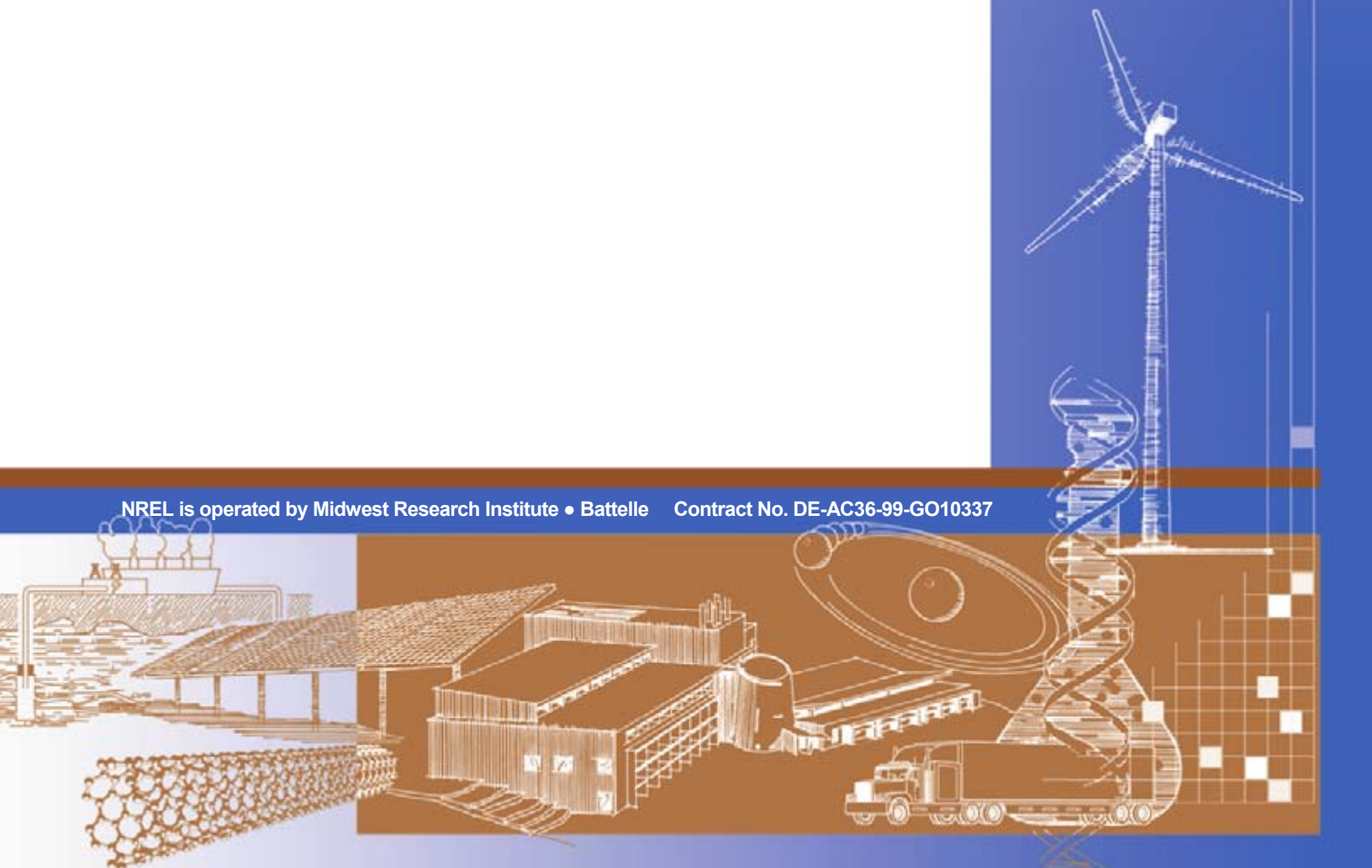
Innovation for Our Energy Future

Analysis: Economic Impacts of Wind Applications in Rural Communities

June 18, 2004 — January 31, 2005

M. Pedden
Eugene, Oregon

Subcontract Report
NREL/SR-500-39099
January 2006



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NREL Technical Monitor: L. Flowers

Prepared under Subcontract No(s). LEE-4-44834-01

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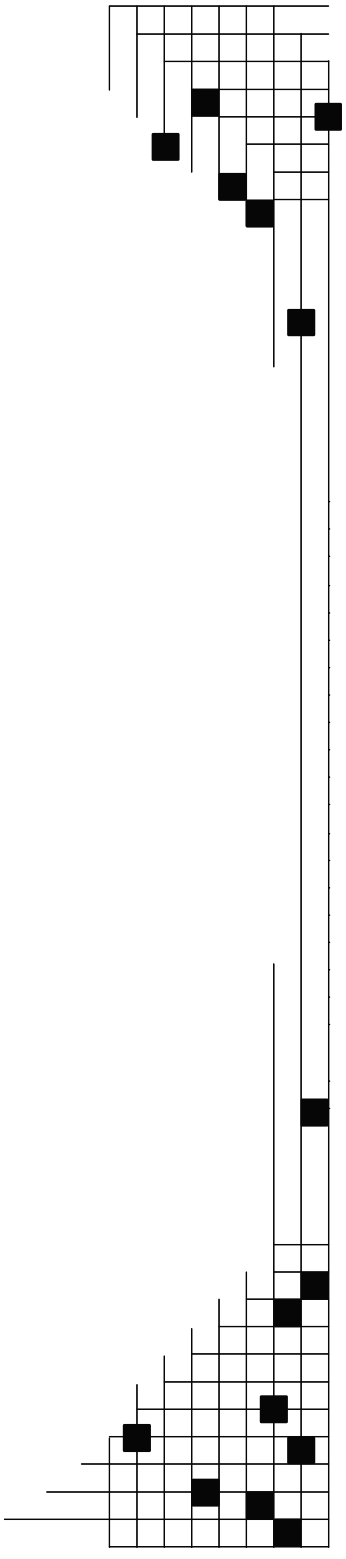

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PURPOSE

The purpose of this report is to compile completed studies on the economic impact of wind farms in rural communities and then to compare these studies. By summarizing the studies in an Excel spreadsheet, the raw data from a study is easily compared with the data from other studies. In this way, graphs can be made and conclusions drawn. Additionally, the creation of a database in which economic impact studies are summarized allows a greater understanding of the type of information gathered in an economic impact study, the type of information that is most helpful in using these studies to promote wind energy development in rural communities, and the limitations on collecting data for these studies.

These studies were conducted in many different fashions, so it was sometimes difficult to use the same template for all studies. For this reason, some of the categories on each spreadsheet may be slightly different from others.

METHODOLOGY

The majority of the studies in this report were compiled via Internet searches, although some were obtained from Steven Clemmer of the Union of Concerned Scientists. Twenty-one studies were collected; however, only 13 were included in this report (some of which have multiple parts) because some of the studies lacked actual numerical data that could be entered into the cover page spreadsheet. These individual cover pages are intended to serve as a cover page for the study or as a stand-alone for the purpose of comparison to other cover pages.

The studies included in this report were entered into a template spreadsheet consisting of a summary checklist, as well as the following categories:

Citation: the full title of the report, including author(s) and date completed
Online availability: the URL where the study can be located
Description: project size and number of turbines, if applicable
Location: geographic location of the project
Geographic scope of the study: the area of impact considered (local or state)
Turbine ownership: the company that owns the turbines, if applicable
Type of study: indicates whether the study is based on predictions for a prospective wind installation (pre-project), actual data for an existing wind installation (post-project), or the estimated impact of installing a set amount of wind energy (prospective)
Timeframe of data: the timeframe considered by the study
Methodology: includes the model and data sources, as well as any assumptions
Special considerations: any considerations that may impact conclusions drawn from the study
Jobs: the direct, indirect, induced, and total number of jobs created throughout the geographic scope of the study by the wind installation under consideration. Also includes jobs per megawatt, if applicable. The construction jobs are generally one-time jobs, while the operations jobs are generally annual jobs

Income: the amount of direct, indirect, induced, and total income created by the wind installation under consideration. Construction income is generally a one-time number, while operations income is generally an annual number
Taxes: the amount of local/state, income, property, sales, and total taxes accruing as a result of the wind installation under consideration
Developer incentives: incentives made available to the wind farm developer, if applicable
Lease payments: indicates the amount paid to landowners leasing their lands to the wind project developer. This is generally an averaged number, as the amount of most lease payment contracts is confidential
Other remuneration: lists remuneration other than lease payments to landowners
Conclusion: the conclusion drawn from the study.

Although none of the studies includes information for all the categories listed in the spreadsheet, these categories represent the wide range of information available in the many different studies compiled, and ideally, what elements would be included in future studies.

TYPES OF STUDIES COLLECTED

The studies collected for this report represent several different types of economic impact studies. Some of the studies were completed strictly to measure the actual economic impact of a particular wind installation in the county in which it is located. Others were completed to estimate the economic impact of investing in a set amount of wind power within a state or region. Still others compare a fixed investment in wind power to a similar investment in fossil fuels. Finally, some of the studies evaluate the economic impact of implementing a Renewable Portfolio Standard compared to the economic impact of continuing to invest in fossil fuel as a source of energy.

The smaller, more concentrated studies, such as the ECONorthwest study completed for the wind installation planned for Kittitas County, predictably tend to have more specific information, while the larger, comparative studies, such as the Black & Veatch study on the economic impact of renewable energy in Pennsylvania, tend to focus more on the difference between investing in renewable energy versus investing in fossil fuels. Therefore, since the specific purpose of the studies was to discover the economic impacts of wind and is more narrowly defined, these studies generally contain more specific data and are more easily defined within the parameters of the template used in this report. The gaps in the data result from the generally proprietary nature of wind industry data, as well as the differing goals of the many different types of economic impact studies.

All of the studies indicate that investment in wind power creates a positive impact on rural economies in the form of an increase in jobs, income, and taxes.

OVERVIEW OF STUDIES

The following paragraphs summarize the purposes and general findings of the economic impact studies. For more information, please refer to the cover sheets for each study.

"Economic Impacts of Wind Power in Kittitas County: Final Report"

- Estimates the effect of the increase in jobs and local spending on property values, economic impacts, and tax revenues.
    - Surveyed tax assessors in other counties.
    - Reviewed available literature on property value effects.
    - Used input-output model with data from two companies proposing wind projects in Kittitas County.
- Findings:
    - Views of wind turbines will not negatively impact property values.
    - Wind plant construction will have significant economic benefits.
    - Wind plant operation will provide additional annual economic benefits.
    - Property tax revenues will increase.
    - Tax revenues to Kittitas County Government will increase.

"Renewable Resources: The New Texas Energy Powerhouse: A Report on the Economic Benefits of Renewable Energy in Texas and How to Keep Them Growing"

Part 1a

- Estimates the increase in the number of direct and indirect jobs, payroll value of direct jobs, amount of tax revenue, and amount of landowner royalty income stemming from 912 MW of wind energy installed in 2001 in response to the Texas Renewable Portfolio Standard and the 178 MW of wind energy installed before 2001.
- Explains the benefits of price stability, energy security, and fuel diversity, as well as the public health and environmental benefits associated with wind energy.

Part 1b

- Details the requirements and successes of the Texas Renewable Portfolio Standard.
- Estimates the positive impact of the Texas RPS between 2002 and 2009 in terms of direct and indirect jobs, payroll value of direct jobs, landowner royalties, and local taxes.

Part 1c

- Estimates the impact of requiring that 10% of Texas' energy needs be met by wind power by 2020.
- Includes estimates of the resulting increase in direct and indirect jobs, payroll value of direct jobs, increase in local taxes, and payments to landowners.
- Suggests renewable energy policies to help make Texas a global leader in wind energy.

"Economic Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project"

- Estimates the positive economic and fiscal impacts in mainland cities and towns in Barnstable County and in the Commonwealth of Massachusetts during the manufacturing/assembly (M/A), construction/installation (C/I), and operation phases of the Cape Wind Project.

- Estimates an increase in several sectors during the M/A and C/I phases, including:
    - Direct, indirect, and induced full-time jobs, total state economic impact, value added, labor income, personal income tax revenues, property income, and corporate income tax revenues.
    - Indicates that in the long run, there should be no appreciable increase in the demand for locally or state-provided government services.
- Estimates an increase in several sectors during the operation phase, including annual increases in:
    - Jobs, state economic output, labor income, personal income tax revenues, corporate income tax revenues, and Barnstable and Yarmouth County property tax revenues.
    - Estimates annual savings in wholesale power costs in New England, which would result in additional economic output and an increase in employment.

"Wind Energy: Powering Economic Development for Colorado"

- Estimates the economic impact of using wind power to meet one-half of Colorado's new energy demand from 2002 through 2012 (part 1a) and three-quarters of Colorado's new energy demand from 2002 through 2020 (part 1b). Compares economic impact of using wind to meet this demand as compared to natural gas.
- Estimates positive impact from wind installations on employment during manufacturing, installation and operation and maintenance phases, indirect employment, landowner revenue, local tax income, avoided water use from displaced conventional energy generation, and electricity pricing impacts.
- Summarizes other state policies supporting wind energy, including those in Texas, Iowa, and Minnesota.
- Suggests implementation of renewable policies, including renewable purchase obligations, tax incentives for renewable energy equipment, and service charges to fund renewable energy development.
- Details Colorado's wind energy potential and summarizes Colorado's renewable energy industry.

"The Economic Benefits of Wind Farm Development in Vermont"

- Estimates the economic impact of producing 10% of Vermont's electric energy from wind energy over a 10-year period.
- Estimates a capital expenditure and the resulting positive economic impact during the development, construction, and operations phases on jobs, earnings, landowner revenue, property tax, business tax, income tax, and sales tax. Includes direct, indirect, and induced impacts.
- Concludes that these wind installations would help spur rural economic development, provide stability in power costs, and possibly attract tourists.

"Strong Winds: Opportunities for Rural Economic Development Blow across Nebraska"

- Analyzes the potential economic benefits and costs of expanding wind power in Nebraska compared to developing coal and natural gas.
- Analysis is based on a policy goal of generating 10% of Nebraska's electricity from wind power by the year 2012 through the implementation of a renewable portfolio standard.

- Finds that developing wind power instead of coal and natural gas:
    - Benefits the state economy by $15 million per year over a 20-year period.
    - Creates more jobs.
    - Could produce an important source of rural economic development in Nebraska through landowner revenues and property tax revenues.

"Energy for Washington's Economy: Economic Development from Energy Efficiency and Wind Power in Washington"

- Compares the economic impacts of decreasing electricity consumption by 12% (or 1,700 MW) by 2020, as well as installing enough wind turbines to produce 1,700 MW of power by 2020 (or 14% of Washington's power needs), as compared to meeting growing electricity demand with 3,400 MW of natural gas.
- Finds that relying on energy efficiency and wind energy rather than natural gas would:
    - Create more jobs.
    - Increase landowner revenue.
    - Create a stronger tax base.
    - Use less water.
- Summarizes Washington's energy industry.
- Suggests specific policies that would help Washington realize its efficiency and wind potential, including:
    - Energy conservation standards.
    - Renewable energy standards.
    - Moratorium on issuance of fossil fuel-based power plant permits.
    - Tax incentives.

"Renewables Work: Job Growth from Renewable Energy Development in California"

- Considers the positive economic impacts of adding 5,900 MW (3,700 of which is assumed to be wind) of renewable energy capacity by 2010, which would allow the state to generate 20% of its electricity from renewables. Compares these impacts to those of an equal amount of natural gas installation.
- Finds that investing in renewable energy would create four times as many jobs as investing in natural gas.
- Uses California Energy Commission job creation study to determine specific employment rates for wind, geothermal, solar PV, solar thermal, landfill/digester gas, and natural gas and separates employment rates for the construction and operation phases. Compared projections from CEC study to other job creation studies, as well as real-life experience.
- Makes policy recommendations to encourage renewable energy, including establishment of tax equity, incentives for development and production, and incentives for consumers.

"Pecos County Wind Farms: Local Economic Impact"

- Estimates the positive impact of the wind farms in Pecos County on jobs, gross sales in the county during construction, increased tax base, increased tourism dollars, and development of an industrial park.
- Includes a detailed look at the impact of the wind farms on schools.

"Rural Economic Development Impacts of Wind Power: Foote Creek Rim Projects"

- Analysis of the Foote Creek Rim projects by SeaWest.
- Findings:
    - Wind power projects provide economic benefit to the local community through an increase in higher-than-average-wage jobs, employment diversification, increased property/sales tax revenues, low demand on local government services, and landowner benefits.
    - Gradual growth over time provides stabilizing effect on farming and ranching industries.

"Economic Impact of Renewable Energy in Pennsylvania"

- Estimates the economic impact of implementing a Renewable Portfolio Standard (RPS) requiring that renewable energy sources generate 10% of Pennsylvania's electricity by the year 2025, 65% of which is assumed to be wind power. The impact of the use of renewable energy is compared with the impact of a "business as usual" approach relying on the development of fossil fuel resources.
- Findings:
    - The RPS portfolio has a significantly larger impact on jobs, income, and economic output when compared to the fossil fuel development scenario. This impact more than makes up for the small increase in electricity bills from investment in the RPS.
    - The cost of the RPS is 36% higher than the cost of the development of fossil fuels; however, "taken in context," the increase in electricity costs would be small per household and more than recouped by the impact of the RPS on jobs, income, and economic output.
    - Renewable energy resources may lower fuel prices and could therefore save money by decreasing the demand for fossil fuels.

"Potential Economic Impacts of Commercial Wind Power Development in North Dakota"

- Analyzes the potential economic impact of the Griggs/Steele Wind Power project and the statewide impacts of developing 1,000 MW of wind energy over the next 10 years.
- Findings:
    - Wind energy development may provide substantial economic benefits to North Dakota's rural areas and larger communities through creation of jobs, lease/royalty payments for landowners, increased tax revenues, and increased revenue through local purchase of supplies, materials, and services.

"Assessing the Economic Development Impacts of Wind Power: Final Report"

- Provides examples of thorough and consistent analysis and documentation of economic impacts from wind power development. Considers three case studies as examples, including Lake Benton I (Lincoln County, MN), Vansycle Ridge (Morrow and Umatilla Counties, OR), and Delaware Mountain (Culberson County, TX).
- Analyzes the economic impact of each of the wind energy projects on employment, income, taxes, and provision of community services.
- Findings:

- The projects contributed to significant increases in employment, personal income, tax income, and landowner net revenues.
- Tax effects, particularly property taxes, were important.
- Non-market benefits may be important: wind power is a non-polluting, low impact, and non-extractive form of energy that provides large positive benefits to local economies but has a relatively light impact on communities and their infrastructure (schools, roads, and social services).
- Wind energy development does not involve the "boom and bust" economic and social conditions associated with other energy development.
- Considered possible negative impacts of wind energy development, such as bird kills, damages to roads, and impact on land values.

CONCLUSION

Due to the nature of this report and the broad cross-section of data available from each study summarized here, it is difficult to draw specific conclusions about the positive impact of wind installations on local and state economies. However, it is possible to draw several general conclusions:

- Wind installations create a large direct impact on the economies of rural communities, especially those with few supporting industries. For example, in communities in which farming is the only large industry, the installation of wind farms creates another industry that becomes a large percentage of the local tax base and contributes to local businesses.
- Small communities with few large industries see greater leakage of revenue into nearby towns that provide more services. These small communities therefore experience less indirect and induced impact of a wind installation than a larger community with the ability to provide a greater number of services.
- The number of local construction and operations jobs created by a wind installation depends upon the skills available in the local community. Many developers try to hire local construction companies and local operators; however, when this is not possible, developers bring in construction companies and operators from outside the county or even outside the state.
- Some local governments offer incentives to developers in return for the developer agreeing to hire local labor.
- Local and state taxes may support sectors of the economy such as schools, hospitals, fire and rescue, or road improvement.
- When compared to fossil fuel development, the development of renewable energy creates a larger impact on the economy. According to the Pennsylvania study, this is largely because of the additional income earned by Pennsylvanians working in the renewable energy industry, which more than makes up for the cost increase required to invest in renewable energy.

The wind industry continues to grow, and economic impact studies like those summarized here are continually published on the Internet and elsewhere. Therefore, it is possible to continue building on these initial 13 studies to gain greater access to the information on the positive economic impacts of wind installations on rural communities throughout the United States.

COLLECTED STUDIES

Studies Included in Report

Assessing the Economic Development Impacts of Wind Power: Final Report, Northwest Economic Associates, for the National Wind Coordinating Committee, 2003.

The Economic Benefits of Wind Farm Development in Vermont, Doug Hoffer for Renewable Energy Vermont, 2002.

Economic Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project, Global Insight for Cape Wind Associates, 2003.

Economic Impact of Renewable Energy in Pennsylvania, prepared for the Heinz Endowments and Community Foundation of the Alleghenies by Black & Veatch, 2004.

Economic Impacts of Wind Power in Kittitas County: Final Report: A Report for the Phoenix Economic Development Group, ECONorthwest, 2002.

Energy for Washington's Economy: Economic Development from Energy Efficiency and Wind Power in Washington, Brad Heavner, Robert Pregulman, Travis Madsen for WashPIRG Foundation, 2003.

Pecos County Wind Farms: Local Economic Impact.

Potential Economic Impacts of Commercial Wind Power Development in North Dakota, F. Larry Leistritz for Griggs/Steele Wind Power Development Group LLC, 2001.

Renewable Resources: The New Texas Energy Powerhouse: A report on the economic benefits of renewable energy in Texas and how to keep them growing, SEED Coalition and Public Citizen's Texas Office and Virtus Energy Research Associates, 2002.

Renewables Work: Job Growth from Renewable Energy Development in California, Brad Heavner and Susannah Churchill for CALPIRG Charitable Trust, 2002.

Rural Economic Development Impacts of Wind Power: Foote Creek Rim Projects (PowerPoint presentation), Mike Azeka for SeaWest WindPower.

Strong Winds: Opportunities for rural economic development blow across Nebraska, Steven Clemmer, Union of Concerned Scientists, 2001.

Wind Energy: Powering Economic Development for Colorado, Travis Madsen, Stephanie Bonin, Matt Baker (Colorado Public Interest Research Foundation), 2002.

Studies Not Included in Report

A Brief Analysis of the Economic Benefits of Wind Power in Washington State, Washington State Office of Trade & Economic Development, 2003.

The Economic Impacts of Wind Energy Use in Wisconsin, Steven L. Clemmer, Wisconsin Department of Administration, Energy Bureau.

Fueling Wisconsin's Economy with Renewable Energy, Steve Clemmer, Wisconsin Department of Administration, Energy Bureau, 1995.

Job Jolt: The Economic Impacts of Repowering the Midwest: the Clean Energy Development Plan for the Heartland, Regional Economics Applications Laboratory for the Environmental Law & Policy Center.

Montana Power Announces Agreement with Montana Wind Harness, LLC, Press Release, 2001.

Top of Iowa Wind Farm Case Study, Iowa Department of Natural Resources.

Utility Scale Wind on Islands: An economic feasibility study of Ilio Point, Hawaii, Keith M. Stockton, Environmental Energy Policy Program, University of Colorado at Boulder, July/August 2003 Refocus, www.re-focus.net

Wind Force 12: A blueprint to achieve 12% of the world's electricity from wind power by 2020, EWEA and Greenpeace.

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☑ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Assessing the Economic Development Impacts of Wind Power: Final Report		
Author(s)	Northwest Economic Associates, for the National Wind Coordinating Committee		
Date of Report	February 2003		
Available Online?	http://www.nationalwind.org/pubs/economic/econ_final_report.pdf		
Description	Project Size: **107 MW** Number of Turbines: **143**		
Location	Lincoln County, Minnesota		
Geographic Scope	Lincoln County, Minnesota		
Turbine Ownership	GE Wind (previously Enron Wind)		
Type of Study	Post-project		
Timeframe of Data	N/A		
Methodology			
Model	IMPLAN		
Data Sources	Much of the information came from interviewing local officials or through other interviews.		
Assumptions	Community services in place adequate to meet the needs arising from the project because of its relatively small impact. Property tax: from 2001; property tax fluxated between **$71,800** and **$352,600** between the years 1999 and 2002.		
Special Considerations	Purpose of study is provide examples of thorough and consistent analysis and documentation of economic impacts from wind power development. Study provides three separate case studies as examples, including Lake Benton I (Lincoln County, MN), Vansycle Ridge (Morrow and Umatilla Counties, OR), and Delaware Mountain (Culberson County, TX).		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**8**	**31**	**39**
Jobs/MW	**0.07**	**0.3**	**0.36**
Income	Construction	Operations (annual)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$98,000**	**$909,000**	**$1,007,000**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	N/A	**$621,000**
Sales	N/A	N/A	N/A
Total	N/A	N/A	N/A
Developer Incentives	Federal production tax credit.		
Lease Payments	**$508,125**/year		
Other Remuneration	N/A		

Conclusion	Wind power provided a modest to moderate source of new economic activity and new family wage jobs. Additionally, leasing of land has an important economic effect on local areas, assuming the revenue goes to local families. This economic development is more important to the counties in economic decline than it is to those with a stable economy.

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☑ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Assessing the Economic Development Impacts of Wind Power: Final Report		
Author(s)	Northwest Economic Associates, for the National Wind Coordinating Committee		
Date of Report	February 2003		
Available Online?	http://www.nationalwind.org/pubs/economic/econ_final_report.pdf		
Description	Project Size: **24.9 MW** Number of Turbines: **38**		
Location	Morrow and Umatilla Counties, Oregon		
Geographic Scope	Morrow and Umatilla Counties, Oregon		
Turbine Ownership	FPL Energy		
Type of Study	Post-project		
Timeframe of Data	N/A		
Methodology			
Model	IMPLAN		
Data Sources	N/A		
Assumptions	Community services in place adequate to meet the needs arising from the project because of its relatively small impact. Taxes fluctuated between **$243,580** in 1999 and **$229,680** in 2001. Landowner revenues based on **$2,000** per turbine.		
Special Considerations	Purpose of study is provide examples of thorough and consistent analysis and documentation of economic impacts from wind power development. Study provides three separate case studies as examples, including Lake Benton I (Lincoln County, MN), Vansycle Ridge (Morrow and Umatilla Counties, OR), and Delaware Mountain (Culberson County, TX).		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**4**	**6**	**10**
Jobs/MW	**0.16**	**0.24**	**0.4**
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$105,000**	**$103,000**	**$208**
Taxes	Direct	Indirect	Total (in 2001)
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$229,680**
Developer Incentives	Federal production tax credit.		
Lease Payments	**$76,000**/year		
Other Remuneration	N/A		

Conclusion	Wind power provided a modest to moderate source of new economic activity and new family wage jobs. Additionally, leasing of land has an important economic effect on local areas, assuming the revenue goes to local families. This economic development is more important to the counties in economic decline than it is to those with a stable economy.

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☑ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Assessing the Economic Development Impacts of Wind Power: Final Report		
Author(s)	Northwest Economic Associates, for the National Wind Coordinating Committee		
Date of Report	February 2003		
Available Online?	http://www.nationalwind.org/pubs/economic/econ_final_report.pdf		
Description	Project Size: **30 MW**	Number of Turbines: **40**	
Location	Culberson County Texas		
Geographic Scope	Culberson County Texas		
Turbine Ownership	National Wind Power Partners		
Type of Study	Post-project		
Timeframe of Data	N/A		
Methodology			
Model	IMPLAN		
Data Sources	N/A		
Assumptions	Community services in place adequate to meet the needs arising from the project because of its relatively small impact. Texas does not assess income tax, but it does assess franchise and sale taxes on businesses. Additional taxes assessed: school taxes of $239,000 in 2000, Groundwater taxes of $6,962 in 1999 and $5,324 in 2000.		
Special Considerations	Purpose of study is provide examples of thorough and consistent analysis and documentation of economic impacts from wind power development. Study provides three separate case studies as examples, including Lake Benton I (Lincoln County, MN), Vansycle Ridge (Morrow and Umatilla Counties, OR), and Delaware Mountain (Culberson County, TX).		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**26**	**11**	**37**
Jobs/MW	**0.87**	**0.36**	**1.23**
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$391,000**	**$346,000**	**$737,000**
Taxes	Direct	Indirect	Total (per year)
Local/State	N/A	N/A	**$143,000**
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	N/A
Developer Incentives	Federal production tax credit.		
Lease Payments	**$60,000**/year		
Other Remuneration	N/A		

Conclusion	Wind power provided a modest to moderate source of new economic activity and new family wage jobs. Additionally, leasing of land has an important economic effect on local areas, assuming the revenue goes to local families. This economic development is more important to the counties in economic decline than it is to those with a stable economy.

The Economic Benefits of Wind Farm Development in Vermont

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☐ Conclusion

Citation	The Economic Benefits of Wind Farm Development in Vermont		
Author(s)	Prepared by: Doug Hoffer for Renewable Energy Vermont		
Date of Report	Ocotber 2002		
Available Online?	http://www.revermont.org/windfarm_benefits.pdf		
Description	Project Size: **228 MW** Number of Turbines: **152**		
Location	6 locations to be determined, but may include Searsburg, Mount Equinox in Manchester, East Haven in the Northeast Kingdom		
Geographic Scope	Vermont		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	10 Years		
Methodology			
Model	RIMS II		
Data Sources	U.S. Commerce Department multipliers for Vermont were applied to the relevant industries to determine the expected changes in job creation and earnings; net state taxes calculated using data from the state Tax Department, the average annual wage for each FTE job, and a program created for the Joint Fiscal Office.		
Assumptions	Net state taxes: assumed for joint returns that both adults work, have a total income of **$60,000** and have 2 children. Sales tax data: the Consumer Expenditure Study used to calculate data. Cost of installed turbine (including raodways, power lines and development costs): **$2.25 million** per turbine. Aggregate cost of project: **$342 million** (2002 dollars). Development/permitting phase: **5** years. Installation phase: **7** years. Professional services and much of the electrical and mechanical equipment can be purchased in Vermont; ideally local lenders. Expenditures inflated annually at **2.5%**. Sales tax data from year one. Annual sale of **600,000 MW** at **5.6 cents/kWh** is assumed. Lease payments are assumed to be **8%** of gross revenues. Property taxes calculated as **6.5%** of gross revenues. Tax profit of **9%** assumed for annual state tax payments.		
Special Considerations	Report analyzes the economic benefits of meeting **10%** of Vermont's electric needs from wind power with a 10-year development period. Construction jobs and income include development phase and therefore the number of jobs is an average of the number of jobs created each year over the 10 year development period.		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	**40**	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	**20**	N/A
Total	**440**	N/A	N/A
Jobs/MW	**1.93**	N/A	N/A
Income	Construction	Operations (per year)	Total
Direct	N/A	**$1,900,000**	N/A
Indirect	N/A	**$1,300,000**	N/A
Induced	N/A	**$3,300,000**	N/A
Total	N/A	**$6,500,000**	N/A
Taxes	Direct	Indirect	Total (per year)
Local/State	N/A	N/A	**$500,000**

Income	N/A	N/A	**$107,000 - $245,000**
Property	N/A	N/A	**$2,000,000**
Sales	N/A	N/A	**$80,000**
Total	N/A	N/A	**$2,687,000 - $2,825,000**
Developer Incentives	N/A		
Lease Payments	**$2,700,000**/year		
Other Remuneration	N/A		
Conclusion	N/A		

Economic Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project (1a)

Part 1 of 2

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☐ Lease Payments
☐ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Economic Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project		
Author(s)	Prepared by: Global Insight for Cape Wind Associates		
Date of Report	April 2003		
Available Online?	http://www.capewind.org/downloads/Economic_Impact.pdf		
Description	Project Size: N/A	Number of Turbines: N/A	
Location	Horseshoe Shoal, off the coast of MA		
Geographic Scope	Barnstable County, MA		
Turbine Ownership	N/A		
Type of Study	Pre-project		
Timeframe of Data	N/A		
Methodology			
Model	IMPLAN input/output model for Massachusetts (used with year 2000 structural matrices)		
Data Sources	Annual labor rates from Global Insight's Pricing and Purchasing Service.		
Assumptions	Construction/Installation period assumed to be **27** months; "construction" jobs includes full time jobs in manufacturing, assembly, construction and installation; most of the direct M/A and C/I and operation impacts will be concentrated in Barnstable County; impacts are stated in 2002 dollars; **90%** of O&M workers would be MA residents; scheduled reduction of MA personal income tax rate to **5%** in 2003.		
Special Considerations	N/A		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**391** (**880** person-years)	**50**	**441**
Jobs/MW	N/A	N/A	N/A
Income	Construction ($/year)	Operations	Total ($/year)
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$17,158,000**	N/A	**$2,640,000**
Taxes	Direct	Indirect	Total $/year)
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	N/A	**$279,678**
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$279,678**
Developer Incentives	N/A		
Lease Payments	N/A		
Other Remuneration	N/A		

Conclusion	There will be a number of positive economic and fiscal impacts during the manufacturing/assembly and construction/installation phase of the project; these positive impacts will extend beyond the M/A and C/I phase. In the long run, there should be no appreciable increase in the demand for locally or state provided government services. Overall, the study forecasts that the operation and maintenance of Cape Wind Farm would have a positive effect on the economy of both Barnstable County and Massachusetts.

Economic Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project (1b)

Part 2 of 2

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☐ Description	☑ Type of Study	☑ Income	☑ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Economic Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project		
Author(s)	Prepared for: Cape Wind Associates; Prepared by: Global Insight		
Date of Report	April 2003		
Available Online?	http://www.capewind.org/downloads/Economic_Impact.pdf		
Description	Project Size: N/A	Number of Turbines: N/A	
Location	Horseshoe Shoal, off the coast of MA		
Geographic Scope	Barnstable County, MA		
Turbine Ownership	N/A		
Type of Study	Pre-project		
Timeframe of Data	N/A		
Methodology			
Model	IMPLAN input/output model for Massachusetts (used with year 2000 structural matrices)		
Data Sources	Annual labor rates from Global Insight's Pricing and Purchasing Service;		
Assumptions	Construction/Installation period assumed to be 27 months; "construction" jobs includes full time jobs in manufacturing, assembly, construction and installation; most of the direct M/A and C/I and operation impacts will be concentrated in Barnstable County; impacts are stated in 2002 dollars; **90%** of O&M workers would be MA residents; scheduled reduction of MA personal income tax rate to **5%** in 2003.		
Special Considerations	State income taxes would increase moderately, based on the share of the O&M purchases made in MA and the extent to which project related expenditures would be subject to the sales and use tax since virtually all of the project is located outside state waters.		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	N/A	**597 - 1,013**	**597 - 1,013**
Jobs/MW	N/A	N/A	N/A
Income	Construction	Operations ($/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$32,100,000 - $52,000,000**	**$6,900,000**	**$39,000,000 - $58,900,000**
Taxes	Direct	Indirect	Total ($/year)
Local/State	N/A	N/A	N/A
Income	N/A	N/A	**$4,800,000 - $7,800,000**
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$4,800,000 - $7,800,000**
Developer Incentives	N/A		
Lease Payments	see "Other Remuneration"		

Other Remuneration	Project will produce annual savings in wholesale electric power costs in New England of **$25 million** (**$7.5 million** residential; **$15 million** commercial; **$2.5 million** industrial); other property income (including rent, dividends and interest, and corporate profits): **$9.2 million - $14.8 million**/year.
Conclusion	There will be a number of positive economic and fiscal impacts during the manufacturing/assembly and construction/installation phase of the project; these positive impacts will extend beyond the M/A and C/I phase. In the long run, there should be no appreciable increase in the demand for locally or state provided government services. Overall, the study forecasts that the operation and maintenance of Cape Wind Farm would have a positive effect on the economy of both Barnstable County and Massachusetts.

Economic Impact of Renewable Energy in Pennsylvania

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☐ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☐ Taxes	☑ Conclusion

Citation	Economic Impact of Renewable Energy in Pennsylvania		
Author(s)	Prepared for the Heinz Endowments and Community Foundation of the Alleghenies by Black & Veatch		
Date of Report	March 2004		
Available Online?	http://www.bv.com/energy/eec/studies/PA_RPS_Final_Report.pdf		
Description	Project Size: **3,640 MW** Number of Turbines: N/A		
Location	Pennsylvania		
Geographic Scope	Pennsylvania		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	20 years (2006-2025)		
Methodology			
Model	RIMS II Regional input-output model developed by the US Bureau of Economic Analysis		
Data Sources	N/A		
Assumptions	**1%** of energy consumption would be met by new renewable energy generation each year until the **10%** goal is reached. Only small amount of costs of manufacturing would stay in Pennsylvania, since there are no wind turbine manufacturing facilities there, but there are a few component suppliers.		
Special Considerations	Study estimates the economic impact of using renewable energy sources to generate **10%** of Pennsylvania's electricity by the year **2025**, **65%** of which is assumed to be wind power. The impact of the use of renewable energy is compared with the impact of a "business as usual" approach relying on the development of fossil fuel resources; however, only the impacts of wind power are shown here. Dollars deflated to **1999 d**ollars. Construction and Operations jobs anda income are shown over the 20-year period.		
Jobs	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**28,523**	**30,431**	**58,954**
Jobs/MW	**7.84**	**0.6**	**16.19**
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$1,088,411,368**	**$1,115,598,406**	**$2,204,009,774**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	N/A
Developer Incentives	N/A		
Lease Payments	N/A		

Other Remuneration	N/A
Conclusion	Using renewable energy to provide electricity for Pennsylvania creates a significantly larger impact on the economy than does relying on fossil fuels. The additional income earned by Pennsylvanians working in the renewable energy industry more than makes up for the increase in cost required to invest in renewable energy. Additionally, renewable resources could potentially save consumers millions of dollars per year.

Economic Impacts of Wind Power in Kittitas County: Final Report

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☑ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☑ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Economic Impacts of Wind Power in Kittitas County: Final Report: A Report for the Phoenix Economic Development Group		
Author(s)	ECONorthwest		
Date of Report	November 2002		
Available Online?	http://www.econw.com/pdf/kittitas.pdf or http://www.kvalley.com/phoenix/Kittitas%20Wind,%20final.pdf		
Description	Project Size: **390 MW** potential Number of Turbines: **260**		
Location	Kittitas County, WA		
Geographic Scope	Kittitas County, WA		
Turbine Ownership	Zilkha Renewable Energy (**110** turbines) and enXco (**150** turbines)		
Type of Study	Pre-project		
Timeframe of Data	N/A		
Methodology			
Model	Input-Output and IMPLAN (Impact Analysis for PLANning)		
Data Sources	Surveyed tax assessors in other counties and reviewed available literature to determine potential effects of wind farms on property values; estimated local economic impacts using an input-output model based on construction and operations data obtained from the two companies proposing projects in Kittitas Co.; estimated tax revenues using input-output model results based on tax rate and spending information obtained from Kittitas Co.		
Assumptions	Assumed tax rates remained constant when estimating tax revenue; assumed value of each turbine as **$765,000**; property tax rate used is **1.35%**; construction period predicted to last approximately one year.		
Special Considerations	Did not consider the increases in costs or the provision of county services that the wind power plant might require; local/state taxes collected by State and distributed to County.		
Jobs	Construction	Operations (jobs/year)	Total
Direct	**95.2**	**22**	**117.2**
Indirect	**30.3**	**3.1**	**33.4**
Induced	**60**	**28.2**	**88.2**
Total	**185.5**	**53.3**	**238.8**
Jobs/MW	**0.48**	**0.14**	**0.61**
Income	Construction	Operations ($/year)	Total
Direct	**$9,835,000**	**$3,200,000**	**$13,035,000**
Indirect	**$1,113,000**	**$129,000**	**$1,242,000**
Induced	**$1,509,000**	**$938,000**	**$2,447,000**
Total	**$12,457,000**	**$4,267,000**	**$16,724,000**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	**$17,244**
Income	N/A	N/A	N/A
Property	**$2,683,125**	**$201,971**	**$2,885,096**
Sales	N/A	N/A	**$7,103**
Total	N/A	N/A	**$2,909,443**
Developer Incentives	N/A		

Lease Payments	30% of the turbines will be built on land managed by the Washington Department of Natural Resources, for which a rental fee will be paid to the State, then returned to schools throughout the State. Annual rental rate: **$4,500**/turbine. Total amount: **$351,000**/year
Other Remuneration	**$2,927** in all other taxes not mentioned above; **$2,094** licenses and permits; **$8,509** charges for services; **$2,138** fines and forfeits.
Conclusion	The survey of tax assessors and literature shows that views of wind turbines will not negatively impact property values.

Energy for Washington's Economy: Economic Development from Energy Efficiency and Wind Power in Washington

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Energy for Washington's Economy: Economic Development from Energy Efficiency and Wind Power in Washington		
Author(s)	Brad Heavner, Robert Pregulman, Travis Madsen for WashPIRG Foundation		
Date of Report	June 2003		
Available Online?	http://www.washpirg.org/reports/WAenergyJune03.pdf		
Description	Project Size: **1,700 MW** Number of Turbines: N/A		
Location	Washington		
Geographic Scope	Washington		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	through 2020		
Methodology			
Model	N/A		
Data Sources	U.S. Bureau of Labor Statistics, EPRI, Texas Comptroller's Office		
Assumptions	Manufacturing: **20%** of manufacturing assumed in-state. Construction jobs and income include manufacturing. Construction jobs are the cumulative total for the time period, while operations jobs are the number of jobs in the end year. Landowner revenues: **2.5%** of gross revenue from the electricity produced by the wind farm. Contract price: 3 cents/kWh. Average plant lifetime: **30** years. Avergae Washington property tax rate: 1.25%. Future dollar values do not include inflation. Capacity factor: **33%** through 2010, **35%** through 2015, and **37%** thereafter.		
Special Considerations	Study considers the economic impacts of decreasing electricity consumption by **12%** (or **1,700** MW) by 2020, as well as installing enough wind turbines to produce **1,700 aMW** of power by 2020 (or **14%** of Washington's power needs). The study also considers an alternative plan to meet growing electricity demand with **3,400 aMW** of natural gas. Only the impacts of the wind installations are considered here.		
Jobs	Construction	Operations (jobs in 2020)	Total
Direct	**4,050**	**280**	**4,330**
Indirect	**4,650**	**320**	**4,970**
Induced	N/A	N/A	N/A
Total	**8,700**	**600**	**9,300**
Jobs/MW	**5.12**	**0.35**	**5.47**
Income	Construction	Operations	Total
Direct	**$144,112,500**	**$12,367,600**	**$156,480,100**
Indirect	**$165,459,000**	**$14,134,400**	**$179,593,400**
Induced	N/A	N/A	N/A
Total	**$309,571,500**	**$26,502,000**	**$336,073,500**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	**$371,000,000** through 2020
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A

Total	N/A	N/A	**$371,000,000** through 2020
Developer Incentives	N/A		
Lease Payments	**$103,000,000** by 2020 or **$11,000,000**/year		
Other Remuneration	N/A		
Conclusion	Energy efficiency and wind power would provide economic development benefits for Washington and would also ensure a reliable and affordable energy supply. Relying on energy efficiency and wind power would create jobs, generate landowner revenue, increase local tax revenues, and save water.		

Pecos County Wind Farms: Local Economic Impact

Summary Checklist:

☑ Citation	☑ Geographic Scope	☐ Methodology	☑ Developer Incentives
☐ Available Online?	☑ Turbine Ownership	☑ Jobs	☐ Lease Payments
☑ Description	☑ Type of Study	☐ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☐ Conclusion

Citation	Pecos County Wind Farms: Local Economic Impact		
Author(s)	N/A		
Date of Report	N/A		
Available Online?	No.		
Description	Project Size: **403 MW**	Number of Turbines: **474**	
Location	Pecos County, TX		
Geographic Scope	Pecos County, TX		
Turbine Ownership	Various		
Type of Study	Post-Project		
Timeframe of Data	N/A		
Methodology			
Model	N/A		
Data Sources	Texas Workforce Commission		
Assumptions	N/A		
Special Considerations	N/A		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	**30-35**	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**80 - 100**	N/A	N/A
Jobs/MW	N/A	N/A	N/A
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	N/A	N/A	N/A
Taxes	Direct	Indirect	Total (2002)
Local/State	N/A	N/A	**$4,702,191.50**
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	N/A
Developer Incentives	5 year property tax abatement: 100% abatement, 10% of abated taxes will be donated to Midland College's Williams Regional Rechnical Training Center, developers must follow local spending and hiring policy guidelines.		
Lease Payments	N/A		
Other Remuneration	N/A		
Conclusion	N/A		

Potential Economic Impacts of Commercial Wind Power Development in North Dakota

Part 1 of 2

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☐ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Potential Economic Impacts of Commercial Wind Power Development in North Dakota		
Author(s)	F. Larry Leistritz for Griggs/Steele Wind Power Development Group LLC		
Date of Report	2001		
Available Online?	No.		
Description	Project Size: **100 MW** Number of Turbines: **71**		
Location	Griggs and Steele Counties, North Dakota		
Geographic Scope	North Dakota		
Turbine Ownership	N/A		
Type of Study	Pre-project		
Timeframe of Data	N/A		
Methodology			
Model	North Dakota Input-Output Model (developed based on survey data from North Dakota firms and households; households are not included in the model). Model adjusted using community pull factors, which account for the types of goods and services available locally, thereby avoiding an overstatement of the secondary impacts.		
Data Sources	Direct effects of wind power development estimated based on attributes of the North Dakota development scenarios compared with those reported in recent studies of wind development in Iowa, Minnesota, Nebraska and New Mexico.		
Assumptions	**1/2** of the **$74,000,000** in expenditures for equipment estimated to accrue to North Dakota firms. **63%** of the **$100,000,000** construction expenditures expected to accrue to North Dakota firms and households. All lease payments and operations/maintenance salaries expected to accrue locally. **60%** of the **$262,000** other operations/maintenance costs expected to be spent locally. **626** of the indirect jobs during construction would occur locally. **26** of the indirect jobs during operations would occur locally. Income and sales taxes collected during construction period; additional **$85,000** expected to accrue each year of operation from these two taxes. Property tax accrues annually. Construction occurs in 2002 or 2003. **1.2** of turbines, towers, and related components to be purchased within North Dakota. Royalties: **$4,00/year/1.5 MW** tower.		
Special Considerations	N/A		
Jobs	Construction	Operations (jobs/year)	Total
Direct	**125**	N/A	N/A
Indirect	N/A	**44**	N/A
Induced	N/A	N/A	N/A
Total	**2,270**	N/A	N/A
Jobs/MW	**22.7**	N/A	N/A
Income	Construction	Operations (income/year)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	N/A	**$926,000**	N/A
Taxes	Construction	Operations (annually)	Total
Local/State	N/A	N/A	N/A

Income	**$926,000**	**$32,000**	**$958,000**
Property	N/A	**$555,000**	N/A
Sales	**$1,350,000**	**$53,000**	**$14,004,000**
Total	**$2,276,000**	**$640,000**	**$2,916,000**
Developer Incentives	N/A		
Lease Payments	**$285,000**/year		
Other Remuneration	N/A		
Conclusion	Benefits from the development of wind power would continue to accrue locally and throughout the state for the life of the facility.		

Potential Economic Impacts of Commercial Wind Power Development in North Dakota

Part 2 of 2

Summary Checklist:

☑ Citation	☑ Geographic Scope	☐ Methodology	☐ Developer Incentives
☐ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Potential Economic Impacts of Commercial Wind Power Development in North Dakota		
Author(s)	F. Larry Leistritz for Griggs/Steele Wind Power Development Group LLC		
Date of Report	2001		
Available Online?	No.		
Description	Project Size: **1,000 MW**	Number of Turbines: N/A	
Location	North Dakota		
Geographic Scope	North Dakota		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	From 2002 - 2011		
Methodology			
Model	North Dakota Input-Output Model (developed based on survey data from North Dakota firms and households; households are not included in the model).		
Data Sources	Direct effects of wind power development estimated based on attributes of the North Dakota development scenarios compared with those reported in recent studies of wind development in Iowa, Minnesota, Nebraska and New Mexico.		
Assumptions	Costs of development expected to decline over next decade. Transmission upgrades will be necessary after development of first **150 MW**, assumed to cost **$120,000** per MW		
Considerations	Study based on development of **1,000 MW** of wind energy over the next **10** years.		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	**58 - 77**	**58 - 77**
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**20,986**	**386**	**21,372**
Jobs/MW	**21**	**0.386**	**21.37**
Income	Construction	Operations (annually)	Total
Direct	N/A	**$5,928,000**	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$397,000,000**	**$13,600,000**	**$410,600,000**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	N/A
Income	**$8,918,000**	**$221,000**	**$9,139,000**
Property	N/A	**$5,339,100**	**$5,339,100**
Sales	**$12,979**	**$350,000**	**$363,979**
Total	**$8,930,979**	**$5,910,100**	**$14,842,079**
Developer Incentives	N/A		
Lease Payments	**$2,280,000** (over 10 years)		
Other Remuneration	N/A		
Conclusion	Benefits from the development of wind power would continue to accrue locally and throughout the state for the life of the facility.		

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☐ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Renewable Resources: The New Texas Energy Powerhouse: A report on the economic benefits of renewable energy in Texas and how to keep them growing
Author(s)	SEED Coalition and Public Citizen's Texas office; Virtus Energy Research Associates
Date of Report	September 2002
Available Online?	http://www.citizen.org/documents/Tx%20Energy%20Powerhouse.pdf
Description	Project Size: **1,102.6 MW** Number of Turbines: N/A
Location	Texas
Geographic Scope	Pecos (**412.7 MW**), Upton (**292.3 MW**), Crockett (**61 MW**), Taylor (**100.5 MW**), Nolan (**49.5 MW**), Carson (**80 MW**), Culberson (**65 MW**), Howard (**34.3 MW**), Jeff Davis (**6 MW**), and Hudspeth (**1.3 MW**) Counties.
Turbine Ownership	N/A
Type of Study	Post-project; based on 2002 statistics (for a prospective study based on the effect of implementation of a Renewable Portfolio Standard between 2002 and 2009 see "Renewable Resources: The New Texas Energy Powerhouse" Part 1b; for a prospective study based on wind energy in Texas supplying 10% of the energy needs in Texas by the year 2020, "Renewable Resources: The New Texas Energy Powerhouse" Part 1c).
Timeframe of Data	N/A
Methodology	
Model	N/A
Data Sources	Information reported by public authorities and industry experts as well as estimates derived from current industry trends.
Assumptions	Job figures based on: construction job intensity (**1.3 man-years/MW**) from FPLE detailed labor data for King Mountain and Woodward Mountain wind projects; operations & maintenance labor intensity (**0.06 jobs/MW**) based on: average value from survey of Texas projects; manufacturing job data based on: interview with major Texas companies; indirect wind-related job data based on: "first-cut" estimates made by Texas Comptroller for indirect impact of wind-related manufacturing and construction (**1.15** indirect jobs for every direct wind job); all other wind-related jobs based on: interview and estimates by Virtus Energy of Texas Renewable Energy Industries Association members. Income figures based on: assumed value of **$30,000** per year average annual wage (rooted in U.S. Department of Labor statistics for Texas construction trades and structural metal and fiberglass related manufacturing). Landowner royalties based on: **2.5%** royalty, **35%** capacity factor and **3 cent/kWh** contract price. Taxes based on: data obtained from county tax offices and other supplemental sources. Assumed capacity factors: **35%** in 2002; **3 cents/kWh** contract price.
Special Considerations	N/A

Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	**2,500**
Indirect	N/A	N/A	**2,900**
Induced	N/A	N/A	N/A
Total	N/A	N/A	**5,400**
Jobs/MW	**1.3**	**0.06**	**1.36**
Income	Construction	Operations	Total
Direct	N/A	N/A	**$75,000,000**
Indirect	N/A	N/A	N/A

Induced	N/A	N/A	N/A
Total	N/A	N/A	**$75,000,000**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	**$13,300,000**
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$13,300,000**
Developer Incentives	Partial tax abatements during the first 5 to 10 years.		
Lease Payments	**$2,500,000**/year		
Other Remuneration	N/A		
Conclusion	Renewable energy is providing great economic value for Texans. With clear and deliberate goals, renewable energy can grow to a multi-billion dollar industry that puts Texans all over the state to work.		

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	"Renewable Resources: The New Texas Energy Powerhouse: A report on the economic benefits of renewable energy in Texas and how to keep them growing"		
Author(s)	SEED Coalition and Public Citizen's Texas office; Virtus Energy Research Associates		
Date of Report	September 2002		
Available Online?	http://www.citizen.org/documents/Tx%20Energy%20Powerhouse.pdf		
Description	Project Size: **2,000 MW** Number of Turbines:		
Location	Texas		
Geographic Scope	Pecos (**412.7 MW**), Upton (**292.3 MW**), Crockett (**61 MW**), Taylor (**100.5 MW**), Nolan (**49.5 MW**), Carson (**80 MW**), Culberson (**65 MW**), Howard (**34.3 MW**), Jeff Davis (**6 MW**), and Hudspeth (**1.3 MW**) Counties.		
Turbine Ownership	N/A		
Type of Study	Post-project; based on 2002 statistics (For post-project study based on 2002 statistics see "Renewable Resources: The New Texas Energy Powerhouse" Part 1a; for a prospective study based on wind energy in Texas supplying 10% of the energy needs in Texas by the year 2020, "Renewable Resources: The New Texas Energy Powerhouse" Part 1c).		
Timeframe of Data	1999 through 2009		
Methodology			
Model	N/A		
Data Sources	Information reported by public authorities and industry experts as well as estimates derived from current industry trends.		
Assumptions	Landowner royalties assume: **2.5%** royalty, **35%** capacity factor and **3 cent/kWh** contract price. Local taxes assume: total rate of **2.51%**; no abatements; declining balance method; inflation equal to **2%**. indirect wind-related jobs based on "first-cut" estimates made by Texas Comptroller for indirect impact of wind-related manufacturing and construction (1.15 indirect jobs for every direct wind job). Tax figures based on: future tax values represent what are considered to be upper values and are based on the following assumptions: total tax rate of **2.51%** with no abatements, **25** year asset declining balance schedule with inflation rate of **2%** (approach taken to roughly mimic observed pattern of valuation of wind assets in several Texas counties), new wind installations assume a maximum sustained level of **1200 MW** per year by 2020.		
Special Considerations			
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	**3,200**
Indirect	N/A	N/A	**3,700**
Induced	N/A	N/A	N/A
Total	N/A	N/A	**6,900**
Jobs/MW	N/A	N/A	N/A
Income	Construction	Operations	Total
Direct	N/A	N/A	**$96,000,000**
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	N/A	N/A	**$96,000,000**
Taxes	Direct	Indirect	Total

Local/State	N/A	N/A	**$26,400,000**/year
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$26,400,000**/year
Developer Incentives	Partial tax abatements during the first 5 to 10 years.		
Lease Payments	**$4,600,000**/year		
Other Remuneration	N/A		
Conclusion	Renewable energy is providing great economic value for Texans. With clear and deliberate goals, renewable energy can grow to a multi-billion dollar industry that puts Texans all over the state to work.		

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Renewable Resources: The New Texas Energy Powerhouse: A report on the economic benefits of renewable energy in Texas and how to keep them growing		
Author(s)	SEED Coalition and Public Citizen's Texas office; Virtus Energy Research Associates		
Date of Report	September 2002		
Available Online?	http://www.citizen.org/documents/Tx%20Energy%20Powerhouse.pdf		
Description	Project Size: **13,400 MW** Number of Turbines: N/A		
Location	Texas		
Geographic Scope	Pecos (**412.7 MW**), Upton (**292.3 MW**), Crockett (**61 MW**), Taylor (**100.5 MW**), Nolan (**49.5 MW**), Carson (**80 MW**), Culberson (**65 MW**), Howard (**34.3 MW**), Jeff Davis (**6 MW**), and Hudspeth (**1.3 MW**) Counties.		
Turbine Ownership	N/A		
Type of Study	Pre-project; based on Texas wind energy supplying 10% of Texas' energy needs by the year 2020 (For post-project study based on 2002 statistics see "Renewable Resources: The New Texas Energy Powerhouse" Part 1a; for a prospective study based on the effect of implementation of a Renewable Portfolio Standard between 2002 and 2009 see "Renewable Resources: The New Texas Energy Powerhouse" Part 1b).		
Timeframe of Data	2002 through 2020		
Methodology			
Model	N/A		
Data Sources	Information reported by public authorities and industry experts as well as estimates derived from current industry trends.		
Assumptions	Job figures based on: assumption of robust, diversified in-state manufacturing; job intensity for Denmark; indirect jobs based on Texas Comptroller estimates; indirect wind-related jobs based on "first-cut" estimates made by Texas Comptroller for indirect impact of wind-related manufacturing and construction (**1.15** indirect jobs for every direct wind job). Landowner royalties assume: **2.5%** royalty, **35%** capacity factor and **3 cent/kWh** contract price. Local taxes assume: total rate of **2.51%**; no abatements; declining balance method; inflation equal to **2%**. Tax figures based on: future tax values represent what are considered to be upper values and are based on the following assumptions: total tax rate of **2.51%** with no abatements, 25 year asset declining balance schedule with inflation rate of **2%** (approach taken to roughly mimic observed pattern of valuation of wind assets in several Texas counties), new wind installations assume a maximum sustained level of **1200 MW** per year by 2020.		
Special Considerations	N/A		
Jobs	Construction	Operations (jobs/year)	Total
Direct	N/A	N/A	**8,500**
Indirect	N/A	N/A	**9,800**
Induced	N/A	N/A	N/A
Total	N/A	N/A	**18,300**
Jobs/MW	N/A	N/A	N/A
Income	Construction	Operations	Total
Direct	N/A	N/A	**$255,000,000**
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A

Total	N/A	N/A	**$255,000,000**
Taxes	Direct	Indirect	Total (per year)
Local/State	N/A	N/A	**$216,000,000**
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$216,000,000**
Developer Incentives	Partial tax abatements during the first 5 to 10 years.		
Lease Payments	**$30,800,000**/year		
Other Remuneration	N/A		
Conclusion	Renewable energy is providing great economic value for Texans. With clear and deliberate goals, renewable energy can grow to a multi-billion dollar industry that puts Texans all over the state to work.		

Renewables Work: Job Growth from Renewable Energy Development in California

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☐ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☐ Lease Payments
☑ Description	☑ Type of Study	☐ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☐ Taxes	☑ Conclusion

Citation	Renewables Work: Job Growth from Renewable Energy Development in California		
Author(s)	Brad Heavner ans Susannah Churchill for CALPIRG Charitable Trust		
Date of Report	June 2002		
Available Online?	http://www.calpirg.org/reports/renewableswork.pdf		
Description	Project Size: **3,700 MW** Number of Turbines: N/A		
Location	California		
Geographic Scope	California		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	30 years		
Methodology			
Model	Renewable Energy Office of the California Energy Commission input-output model		
Data Sources	California Energy Commission		
Assumptions	Employment rate: steadily decreasing over the next decade due to increased economies of scale and increasing experience of renewable energy companies (10% per year in construction employment rates and 5% per year in operation/maintenance employment rates).		
Special Considerations	The study looks at the economic impacts of adding 5,900 MW of renewable energy capacity by 2010, which would allow the state to generate 20% of its electricity from renewables. 3,700 MW of the 5,900 MW is assumed to be wind. The study compares these impacts to installed the same amount of natural gas; however, only the economic impact of wind power is shown here.		
Jobs	Construction	Operations (jobs/year)	Total (over 30 years)
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**21,574**	**740**	**43,774**
Jobs/MW	**5.88**	**0.2**	**11.83**
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	N/A	N/A	N/A
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	N/A
Developer Incentives	N/A		
Lease Payments	N/A		
Other Remuneration	N/A		

Conclusion	Siginificant employment benefits result from new renewable energy development.

Rural Economic Development Impacts of Wind Power: Foote Creek Rim Projects

Summary Checklist:

☑ Citation	☑ Geographic Scope	☐ Methodology	☐ Developer Incentives
☑ Available Online?	☑ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☐ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☐ Conclusion

Citation	Rural Economic Development Impacts of Wind Power: Foote Creek Rim Projects (Power Point presentation)		
Author(s)	Mike Azeka for SeaWest WindPower		
Date of Report	2002		
Available Online?	http://www.state.co.us/oemc/events/cwade/2002/presentations/Azeka,%20Mike.pdf		
Description	Project Size: **84.8 MW** Number of Turbines: **133**		
Location	Carbon County, WY		
Geographic Scope	Carbon County, WY		
Turbine Ownership	SeaWest WindPower		
Type of Study	Post-project		
Timeframe of Data	1997-2000?		
Methodology			
Model	N/A		
Data Sources	N/A		
Assumptions	N/A		
Special Considerations	**85%** of the development on private land, **15%** on Bureau of Land Management land. **5%** sales tax on turbines. Real property tax revenues increase slightly over time.		
Jobs	Construction	Operations (jobs/year)	Total (full-time)
Direct	N/A	N/A	**18**
Indirect	N/A	N/A	**9**
Induced	N/A	N/A	N/A
Total	N/A	N/A	N/A
Jobs/MW	N/A	N/A	N/A
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	N/A	N/A	N/A
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	N/A	**$9,433,000** (over 20 years)
Sales	N/A	N/A	**$4,130,000**
Total	N/A	N/A	**$13,563,000**
Developer Incentives	N/A		
Lease Payments	**$5,400,000** over 20 years		
Other Remuneration	N/A		
Conclusion	N/A		

Strong Winds: Opportunities for rural economic development blow across Nebraska

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☐ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☐ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Strong Winds: Opportunities for rural economic development blow across Nebraska		
Author(s)	Steven Clemmer, Union of Concerned Scientists		
Date of Report	February 2001		
Available Online?	No.		
Description	Project Size: **800 MW**	Number of Turbines: N/A	
Location	Nebraska		
Geographic Scope	Nebraska		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	2012		
Methodology			
Model	IMPLAN input-output model.		
Data Sources	EPRI; DOE		
Assumptions	Typical project size of **50 MW**. Capacity factor: **37%** for the year 2000, which would increase over time. Half of new wind facilities financed by public power entities, half financed by private developers. All equipment, except half of towers, manufactured outside Nebraska.		
Special Considerations	Analysis based on a policy goal of generating **10%** of Nebraska's electricity from wind power by the year 2012, which is achieved through the implementation of a renewable portfolio standard. The study compares the economic benefits of developing wind rather than coal or natural gas (though only the numbers for wind are shown here). The study uses three cost scenarios; however, these scenarios do not affect the number of jobs or amount of income induced by the wind installations. If half of the turbines and all of the towers manufactured in Nebraska, an additional **250** jobs, **$15 million** in earnings, and **$44 million** in gross state product would be produced each year of the 10 year period.		
Jobs	Construction (in 2012)	Operations (in 2012)	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**410**	**360**	**770**
Jobs/MW	**0.51**	**0.45**	**0.96**
Income	Construction	Operations	Total
Direct	N/A	N/A	N/A
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$20,000**	**$16,000**	**$36,000**
Taxes	Direct	Indirect (by 2012)	Total
Local/State	N/A	N/A	N/A
Income	N/A	N/A	N/A
Property	N/A	**$5,200,000**	**$5,200,000**
Sales	N/A	N/A	N/A
Total	N/A	N/A	N/A

Developer Incentives	Assumed that the Production Tax Credit and Renewable Energy Production Incentive extended through 2006.
Lease Payments	**$2,200,000** total by 2012; **$2,000** per year per turbine
Other Remuneration	N/A
Conclusion	Economic impact of developing wind power instead of coal or natural gas would have a large impact on farmers and rural communities.

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☑ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Wind Energy: Powering Economic Development for Colorado		
Author(s)	Travis Madsen, Stephanie Bonin, Matt Baker (Colorado Public Interest Research Foundation)		
Date of Report	November 2002		
Available Online?	http://www.environmentcolorado.org/reports/windenergy11_02.pdf		
Description	Project Size: **1,800** MW Number of Turbines: N/A		
Location	Colorado		
Geographic Scope	Colorado		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	2002 - 2012		
Methodology			
Model	N/A		
Data Sources	Electric Power Research Institute;		
Assumptions	Wind turbines will be able to operate more efficiently over the next 20 years; capacity factors are assumed to increase one percent every two years, average capacity in 2002: **30%**. Building cost/MW: **$900,000**. Manufacturing and installation: every MW of wind energy capacity installed creates **2.06** year-long manufacturing jobs; **10%** of manufacturing will happen in-state; every MW of wind energy capacity installed creates **0.5** year-long local installation jobs; direct "construction" jobs are one-year jobs; **20%** of these jobs are estimated to be installation and **80%** to be manufacturing. Operations & Maintenance: "operations" jobs are long-term and include operation and maintenance; every **6.9** MW of capacity requirers one full-time employee to operate, monitor and service it. Indirect jobs: **1.15** indirect jobs are created for every direct wind energy job. Landowner income: estimated at **2.5%** of the yearly sale of electricity at **3 cents/kWh**, escalating with projected growth in wind power use. Future dollar values do not include inflation or discount estimates. Property tax: uses the average Colorado county property tax rate of **1.59%**.		
Special Considerations	Report is based on a conservative scenario in which Colorado wind power meets half of new demand through the next ten years (5,110 GWh or 10% of Colorado's total electricity needs) and then three-quarters of new demand in the following decade (12,600 GWh/year by 2020 or 20% of Colorado's total electricity needs; see "Wind Energy: Powering Economic Development for Colorado" 1b).		
Jobs	Construction (1 year jobs)	Operations (jobs/year)	Total
Direct	**1,290**	**260**	**1,550**
Indirect	**1,500**	**300**	**1,800**
Induced	N/A	N/A	N/A
Total	**2,790**	**560**	**3,350**
Jobs/MW	**0.717**	**0.144**	**0.861**
Income	Construction	Operations ($/year)	Total
Direct	**$48,000,000**	**$10,000,000**	**$58,000,000**
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$48,000,000**	**$10,000,000**	**$58,000,000**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	**$74,000,000**

Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$74,000,000**
Developer Incentives	Varying tax rate for renewables (not yet implemented).		
Lease Payments	**$20,000,000**		
Other Remuneration	Conservation of **6.8 billion** gallons of water (when compared with natural gas), with water rights worth more than **$47 million** at current Front Range prices; in-state manufacturing for wind farms could create **840** person-years of manufacturing employment through 2020 (payroll value of these jobs would be **$33 million**).		
Conclusion	Meeting new electricity demand with wind power instead of natural gas would result in roughly twice the total economic benefit to Colorado over the next two decades. Wind power could provide 70% more one-year jobs and more than three times as many permanent jobs as natural gas. Wind power could also provide property tax payments to local governments distributed across a wider area of the state, conserve water that natural gas plants would otherwise consume, and pay royalties to farmers, ranchers and other rural landowners.		

Summary Checklist:

☑ Citation	☑ Geographic Scope	☑ Methodology	☑ Developer Incentives
☑ Available Online?	☐ Turbine Ownership	☑ Jobs	☑ Lease Payments
☑ Description	☑ Type of Study	☑ Income	☑ Other Remuneration
☑ Location	☑ Timeframe of Data	☑ Taxes	☑ Conclusion

Citation	Wind Energy: Powering Economic Development for Colorado		
Author(s)	Travis Madsen, Stephanie Bonin, Matt Baker (Colorado Public Interest Research Foundation)		
Date of Report	November 2002		
Available Online?	http://www.environmentcolorado.org/reports/windenergy11_02.pdf		
Description	Project Size: **4,100** MW Number of Turbines: N/A		
Location	Colorado		
Geographic Scope	Colorado		
Turbine Ownership	N/A		
Type of Study	Prospective		
Timeframe of Data	2002 - 2020		
Methodology			
Model	N/A		
Data Sources	Electric Power Research Institute; Texas Comptroller's office;		
Assumptions	Wind turbines will be able to operate more efficiently over the next 20 years; capacity factors are assumed to increase one percent every two years, average capacity in 2002: **30%**. Building cost/MW: **$900,000**. Manufacturing and installation: every MW of wind energy capacity installed creates **2.06** year-long manufacturing jobs; **10%** of manufacturing will happen in-state; every MW of wind energy capacity installed creates **0.5** year-long local installation jobs; direct "construction" jobs are one-year jobs; **20%** of these jobs are estimated to be installation and **80%** to be manufacturing. Operations & Maintenance: "operations" jobs are long-term and include operation and maintenance; every **6.9** MW of capacity requirers **one** full-time employee to operate, monitor and service it. Indirect jobs: **1.15** indirect jobs are created for every direct wind energy job. Landowner income: estimated at **2.5%** of the yearly sale of electricity at **3 cents/kWh**, escalating with projected growth in wind power use. Future dollar values do not include inflation or discount estimates. Property tax: uses the average Colorado county property tax rate of **1.59%**.		
Special Considerations	Report is based on a conservative scenario in which Colorado wind power meets half of new demand through the next ten years (**5,110** GWh or 10% of Colorado's total electricity needs; see "Wind Energy: Powering Economic Development for Colorado" 1a) and then three-quarters of new demand in the following decade (**12,600** GWh/year by 2020 or 20% of Colorado's total electricity needs).		
Jobs	Construction (1-year jobs)	Operations (jobs/year)	Total
Direct	**2,940**	**590**	**3,530**
Indirect	**3,400**	**680**	**4,080**
Induced	N/A	N/A	N/A
Total	**6,430**	**1,270**	**7,700**
Jobs/MW	**1.57**	**0.31**	**1.88**
Income	Construction ($/year)	Operations ($/year)	Total ($/year)
Direct	**$108,000,000**	**$24,000,000**	**$132,000,000**
Indirect	N/A	N/A	N/A
Induced	N/A	N/A	N/A
Total	**$108,000,000**	**$24,000,000**	**$132,000,000**
Taxes	Direct	Indirect	Total
Local/State	N/A	N/A	**$230,000,000**

Income	N/A	N/A	N/A
Property	N/A	N/A	N/A
Sales	N/A	N/A	N/A
Total	N/A	N/A	**$230,000,000**
Developer Incentives	Varying tax rate for renewables (not yet implemented).		
Lease Payments	**$76,000,000** (or **$9,400,000**/year)		
Other Remuneration	Conservation of more than **25 billion** gallons of water (when compared with natural gas), with water rights worth more than **$120 million** at current Front Range prices.		
Conclusion	Meeting new electricity demand with wind power instead of natural gas would result in roughly twice the total economic benefit to Colorado over the next two decades. Wind power could provide 70% more one-year jobs and more than three times as many permanent jobs as natural gas. Wind power could also provide property tax payments to local governments distributed across a wider area of the state, conserve water that natural gas plants would otherwise consume, and pay royalties to farmers, ranchers and other rural landowners.		

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5285 Port Royal Road
Springfield, VA 22161

13. SUPPLEMENTARY NOTES
NREL Technical Monitor: L. Flowers

14. ABSTRACT *(Maximum 200 Words)*

The purpose of this report is to compile completed studies on the economic impact of wind farms in rural communities and then to compare these studies. By summarizing the studies in an Excel spreadsheet, the raw data from a study is easily compared with the data from other studies. In this way, graphs can be made and conclusions drawn. Additionally, the creation of a database in which economic impact studies are summarized allows a greater understanding of the type of information gathered in an economic impact study, the type of information that is most helpful in using these studies to promote wind energy development in rural communities, and the limitations on collecting data for these studies. These studies were conducted in many different fashions, so it was sometimes difficult to use the same template for all studies. For this reason, some of the categories on each spreadsheet may be slightly different from others.

15. SUBJECT TERMS
wind energy; wind turbines; wind farms; rural; rural economic development; case studies; Kittitas County; Washington; Texas; Cape Wind; Massachusetts; Colorado; Vermont; Nebraska; California; Pecos County; Foote Creek Rim; Wyoming; Pennsylvania; North Dakota; Griggs County; Steele County; Lincoln County; Minnesota; Oregon; Umatilla County; Morrow County; Culberson County

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
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