Joint Intervenors
Exhibit 3

BEFORE THE SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application by Otter Tail Power Company on behalf of the Big Stone II Co-owners for an Energy Conversion Facility Siting Permit for the Construction of the Big Stone II Project	))))	Case No EL05-022

Direct Testimony of
Marshall R. Goldberg of
MRG & Associates, Inc.

On Behalf of
Minnesotans for an Energy-Efficient Economy
Izaak Walton League of America – Midwest Office
Union of Concerned Scientists
Minnesota Center for Environmental Advocacy

May 19, 2006

2731

Q. Please state your name, business, and occupation.

A. My name is Marshall R. Goldberg. I am a resource planner and policy analyst employed by my own firm, MRG & Associates. My work includes the application of benefit-cost analytical techniques as they are applied in the energy and natural resource public policy arenas. It also includes the development of models to estimate energy consumption and usage patterns and the use of input-output analysis to evaluate energy programs and generation technologies for their income and employment impacts to support public policy analysis.

Q. What is your business address?

A. My address is MRG & Associates, 17798 Starduster Drive, Nevada City, California, 95959.

Q. Please describe your background and qualifications.

A. I founded MRG & Associates in 1991, a firm that specializes in two areas: 1) energy and resource management strategies; and 2) environmental, community and economic development policies. In 1992, I received a master's degree in Community and Regional Planning from the University of Oregon, Eugene. My degree focused on land use planning and resource management. My resume is attached as Exhibit JI-3-A.

Q. Please describe your experience in analyzing electricity generating technologies.

A. I have analyzed energy and utility related issues for almost 15 years. My most recent projects include developing input-output based models for the National Renewable Energy Laboratory (NREL). The models were designed to estimate the jobs and economic impacts associated with constructing and operating wind, coal and natural gas power plants in the United States. In addition to developing these technology specific models, I have completed more than two dozen studies analyzing the economic impacts associated with energy usage and generating technologies. Among others, I have authored or co-authored studies for the Wisconsin Department of Administration, Energy Division, the Mississippi Department of

Economic and Community Development, the Arizona Corporation Commission, the Illinois Department of Commerce and Community Affairs, the Virgin Islands Department of Planning and Natural Resources, the U.S. Department of Energy, the Arizona Department of Commerce, the National Renewable Energy Laboratory, the Virgin Islands Anti-Litter and Beautification Commission, the American Public Power Association, the American Council for an Energy-Efficient Economy (ACEEE), the Union of Concerned Scientists, the Tellus Institute, the Michigan Public Services Commission, and the Nevada Department of Business and Industry.

Additional biographical information is provided as Exhibit JI-3-A.

Q. What is the purpose of your testimony in this proceeding?

A. I was retained by the Union of Concerned Scientists (UCS) to describe the economic impacts of South Dakota wind power plant modeling that I recently completed for the National Renewable Energy Laboratory (NREL). I was also asked to review recent coal power plant economic development benefits analysis completed on behalf of the Big Stone Unit II Co-owners. My testimony is offered on behalf of the Joint Intervenors.

Q. Please provide an overview of your conclusions regarding the economic development benefits of wind power as modeled for NREL, as they compare to the economic development benefits quantified by the Big Stone II Co-owners for their proposed coal power plant.

A. I found that developing wind power plants in South Dakota, to provide an equivalent amount of electricity generation as the proposed Big Stone Unit II plant, provides substantially greater long-term economic benefits to the state as a whole.

Q. What documents and/or resources have you reviewed in preparing your testimony in this proceeding?

A. I have reviewed the South Dakota economic impact assessment of 1,320 MW of wind power completed in May, 2006, that I prepared for NREL's Wind Powering America Program (Exhibit JI-3-B). I have also reviewed the prepared Direct Testimony and Exhibits of Randall M. Stuefen; prepared Direct Testimony of Dick Edenstrom; and prepared Direct Testimony of Janelle Johnson; all of which Big Stone II Co-owners filed in this proceeding on March 15, 2006. In addition to the documents filed in this proceeding, I have reviewed a number of other news articles, press releases and other documents relating to wind and coal power plant development.

Q. What is the Wind Powering America Program?

A. The Wind Powering America Program is an initiative within the U.S. Department of Energy to enhance our nation's power generation options, protect the local environment, increase our energy and national security, and support regional economic development. The NREL National Wind Technology Center supports the Wind Powering America Program objectives in part by analyzing and comparing the economic development benefits of wind power and other generation resources.

Q. Please provide a summary of the South Dakota wind power economic impact assessment you completed for NREL?

A. Utilizing NREL's Jobs and Economic Development Impact (JEDI) Wind Model, my analysis indicates that constructing and operating 1,320 MW of wind power in South Dakota, which would provide the equivalent amount of electricity generation as a 600 megawatt coal-fired power plant, provides significant short-term and long-term benefits to the South Dakota economy and the residents of the state as a whole.

Q. Please explain what you mean by "short-term" and "long-term".

A. Short-term refers to those impacts which occur over a relatively short period of time. In this instance I am referring to construction related impacts that will only benefit the businesses and residents of South Dakota for a four year period. In contrast, long-term refers to impacts that are ongoing for the life of the plant. For power plants this is typically 20 to 30 years or more.

Q. Please provide more detail regarding the NREL economic assessment.

A. More specifically, I found that during the construction phase, wind plant construction related expenditures will create over 4,000 jobs, $100 million in wage and salary income, and over $345 million in economic output within the state of South Dakota (all dollar figures are 2005 dollars). More significantly, once the plants are up and running, they create 172 annual on-site plant jobs and $7.96 million in wage and salary income in South Dakota. When the total statewide impacts are accounted for, the ongoing operations create 483 jobs, $15.76 million in wage and salary earnings, and $34.98 million in economic output each year.

Additional detail is provided in Exhibit JI-3-B.

Q. Can you briefly describe the NREL JEDI model used to complete the economic impact assessment for wind power?

A. Yes, the JEDI model was developed in 2002 for NREL to demonstrate the economic development impacts associated with developing wind power plants in the United States. To evaluate these impacts, the spreadsheet-based model relies on input-output or multiplier analysis to trace supply linkages in the economy.

For example, the analysis shows how purchases of wind turbines not only benefit turbine manufacturers, but also the fabricated metal industries and others businesses supplying inputs to those manufacturers. The benefits that are ultimately generated by expenditures for wind plants depend upon the extent to which those expenditures are spent locally and the structure

of the local economy. Consistent with the spending pattern and the state-specific economic structure, different expenditures support a different level of employment, income, and economic activity (output).

The model analyzes the total effect of developing a wind power plant by evaluating three separate impacts for each expenditure. These include: direct effects, indirect effects and induced effects. The sum of these three effects yields a total effect that results from a single expenditure.

Q. What are direct effects?

A. Direct effects are the on-site or immediate effects created by an expenditure. In constructing a wind plant, it refers to the on-site jobs of the contractors and crews hired to construct the plant, among others.

Q. What are indirect effects?

A. Indirect effects refer to the increase in economic activity that occurs when a contractor, vendor or manufacturer receives payment for goods or services and in-turn is able to pay others who support their business. For instance, this includes the banker who finances the contractor, the accountant who keeps the contractor's books, and the steel mills and electrical manufacturers and other suppliers that provide the necessary materials, among others.

Q. What are induced effects?

A. Induced effects refer to the change in wealth that occurs or is "induced" by the spending of those persons directly and indirectly employed by the project.

Q. How does the JEDI model accomplish the analysis of total economic effect of an expenditure?

A. To accomplish this analysis, JEDI relies on state-specific multipliers and personal expenditure patterns. These state-by-state multipliers, for employment, wage and salary income and output, and personal expenditure patterns are adapted from the IMPLAN Professional model.[1] The changes in expenditures brought about by investments in developing and operating wind power plants are matched with their appropriate multipliers for each sector affected by the change in expenditure.

Q. Did the Big Stone II Co-owners also utilize multipliers in their analysis?

A. Yes, it appears they did. In Mr. Stuefen's testimony, on page 11, he references using the IMPLAN model to formulate the employment impacts related to construction of the Big Stone II plant.

Q. You noted earlier that the impacts from wind plant operations provide the most significant and long-term benefit to the businesses and residents of South Dakota. Were you able to compare these benefits with the Big Stone II Co-owners' estimates for the proposed coal power plant?

A. Yes. In this instance, I found that 1,320 MW of wind power plants will create 172 new plant worker jobs in South Dakota. This is almost five times as many as those reported by Mr. Stuefen for the proposed Big Stone II coal plant (35). In addition to these on-site jobs, the direct expenditures on goods and services from the wind plant, combined with the spending by the plant workers, and the associated indirect and induced impacts from all the operating related spending, results in an additional 311 jobs, for a total of 483 statewide (172 plus 311)

[1] See, Minnesota IMPLAN Group (MIG, Inc), Stillwater, Minnesota, www.IMPLAN.com. IMPLAN (Impact Analysis for PLANning) Professional is a social accounting and impact analysis tool.

jobs. This compares with Mr. Stuefen's estimate of an additional 29 jobs for the coal plant, a total of 64 overall (35 and 29). Further, the total output (economic activity) related to the wind plant operations is projected to be approximately $34.9 million annually. See Exhibit JI-3-B. Mr. Stuefen estimates the coal plant will contribute approximately $6.8 million annually to the state economy. For consistency, all dollar values are adjusted to 2005 dollars.

Another important benefit to South Dakotans of wind plants, as opposed to the proposed coal plant, is the revenue individual property owners receive from leasing their land to site the wind turbines, as well as the property taxes paid to local jurisdictions. I estimated that land lease payments amount to just over $3.5 million dollars annually for the life of the wind plants. No similar annual benefit for the proposed coal plant was noted in any of the documents I reviewed.

I also estimated that local property taxes total just over $2 million annually for the 20-30 year life of the wind plants. According to testimony of Ms. Janelle Johnson, on page 3, the proposed coal plant will generate $4.7 million annually for the ten year period following the first date of commercial operation. It is not clear from her analysis if there will be any additional tax payment to the local jurisdiction after this period. It should also be noted that since the wind turbines will be sited in more than one county, the benefits of the associated tax payments will be spread over a larger area and in effect, benefit more residents and schools in South Dakota than the tax payments from the proposed coal plant.

Q. Were you able to make similar comparisons for the estimated economic impacts during the construction period?

A. In general, yes. Although most of the underlying assumptions inherent in the coal plant analysis were not stated in the Big Stone II Co-owner testimony I reviewed, I found that the Stuefen analysis estimates an annual average of 1,210 jobs per year during the four year construction period, while the wind analysis estimates an annual average of 1,002 jobs. This

estimate assumes the wind plants are also built over a four year period. However, as with any modeling, the comparisons must be interpreted with care since the assumptions play a key role in determining the results. Although it is not clear to me how the in-state share of coal plant expenditures (used in the coal plant analysis) were determined, the Stuefen analysis assumes over 50 percent of the construction expenditures are spent in South Dakota. In response to a question posed by the South Dakota PUC staff to explain the basis for the assumption that 50% of the induced impact of construction takes place in the local area, Mr. Stuefen states that "for lack of a good substantiated data estimate of what percentage of household income that will be spent locally and that outside the area, the midpoint estimate of 50% of induced spending was assumed." In other words, there is no credible empirical estimate for this assumption, so the results must be viewed with caution.

It is certainly arguable that the in-state expenditures and corresponding impacts for construction could be considerably lower for the Big Stone II Project, given that large coal plant projects like this typically involve very specialized equipment and labor that is often imported from outside the region. For example, MidAmerican Energy's new coal plant that was recently built in Council Bluffs, Iowa relied heavily on imported equipment and labor. According to a press release from MidAmerican, "Mitsui & Company is responsible for managing the Council Bluffs construction project, while Hitachi Ltd. is providing boilers, power turbines and other critical technology expertise. Both companies are based in Japan, a leader in the development of supercritical technology. The engineering firm of Sargent & Lundy, Chicago, is the design engineer. Kvaerner Songer from Washington, Pa., serves as the general work contractor." Babock and Wilcox of Ohio also provided emission control equipment for the project.[2]

In contrast, the wind plant analysis, using the default assumptions in the JEDI model, conservatively assumes in-state construction related expenditures are approximately 12

[2] See, http://www.midamericanenergy.com/newsroom/aspx/newsdetails.aspx?id=219&type=archive.

percent of the total construction cost. This is in large part due to the high percentage of wind plant costs attributed to equipment such as wind turbines, towers, and blades. Currently, South Dakota does not have any manufacturers of this equipment so it must be purchased from out of state manufacturers. At the same time, a very high percentage of local businesses and labor are used during the actual construction. If the wind analysis assumed even a small portion of the major equipment (turbines, blades and towers) were manufactured in South Dakota (a distinct possibility if new wind industries located to the state or existing business retooled and ramped up to meet this demand) the "local" impacts would rise significantly.

Q. In terms of economic benefit to the state, how should these construction benefits be viewed?

A. First, it is important to recognize that while the 1,000 plus jobs created from the construction of either plant is certainly significant, this benefit must be tempered somewhat by the fact that these new jobs are short term. That is, to the extent that businesses and workers from South Dakota are involved in the construction of the plants, these benefits will only last during the construction period. This can create a significant boom-bust cycle on a local economy and can put a significant strain on the area's capacity to provide goods and services to meet the temporary demand. On the other hand, the benefits derived from the ongoing operations have more permanent long-lasting impacts and are truly the gauge for how best to support local and statewide economic development and future-oriented initiatives. As I found in my analysis, and noted earlier, the wind plants have the potential to create seven and a half times as many long term jobs as the coal plant. Another added benefit is the fact that the economic activity (both plant jobs and expenditures) from the wind plant operations will not be limited to one specific county, rather they could be dispersed throughout many counties where the plants are located and throughout the state as a whole. By contrast, the economic activity associated with the coal plant will largely be concentrated in a much smaller more localized area.

Q. Are there other economic benefits that should be considered?

A. Yes. If the state of South Dakota decided to build 1,320 MW of wind power, this level of development, given the relatively small and developing nature of the U.S. wind manufacturing industry, could certainly help stimulate a wind manufacturing industry in South Dakota. New industries might locate in South Dakota to meet the demand and existing businesses could expand, developing new products and services to meet industry demands. A new and/or expanded industry can serve both in-state and domestic needs, as well as the needs of the rapidly growing international market. Thus, encouraging existing or new electric service providers in the South Dakota market to install wind powered electric generating resources, instead of coal or natural gas plants, should be thought of as an important economic development strategy to boost local employment opportunities and economic activity throughout the state.

Q. Would this potentially be true for coal plants as well?

A. No. Unlike the wind manufacturing industry, coal plant equipment producers are part of a fairly small and well established industry that is less apt to build new manufacturing plants or relocate to take advantage of one plant being built.

Q. Are there any examples where wind development is stimulating local manufacturing growth and capabilities?

A. There certainly are. For instance, last summer California based Clipper Windpower decided to open a $22 million wind turbine manufacturing plant in Cedar Rapids, Iowa to take advantage of regional commitments to wind development. The plant is expected to employ up to 140 people. Most recently, Alliant Energy contracted with Clipper to build and develop 150 MW of wind power in Iowa.

Suzlon Rotor Corporation, a wind turbine manufacturer from India, is building a new wind turbine blade and nose cone manufacturing facility in Pipestone, Minnesota. Suzlon

chose this location due to the high cost of transporting materials from overseas. Representatives from Suzlon estimate that the 37-acre facility will create 100-200 jobs and bring $14 million in new investment to the area. Suzlon has supplied wind turbines to several locally owned wind projects in Southwest Minnesota.

Other communities that have benefited from regional wind commitments include Grand Forks, North Dakota, where LM Glasfiber, Inc. of Denmark responded to new wind initiatives in the Midwest and opened a wind turbine blade manufacturing plant. They recently completed a $3 million expansion of the facility that increased the number of employees to 200. West Fargo, North Dakota, home to DMI Industries, Inc., has also benefited. Originally a tool and die machine manufacturer, the company decided to make a business transition to capture a rapidly expanding and profitable wind market. Their main focus now is on manufacturing towers for wind turbines. DMI now employs over 200 workers and is growing.

Q. What conclusions can you draw from your analysis?

A. Assuming economic development and new job creation are appropriate objectives of South Dakota decision-makers, then a significant commitment to developing wind resources in the state would provide much greater long-term economic benefits than increasing the state's reliance on coal. NREL's wind resource assessment for South Dakota shows that it has the best wind potential of any state in the country, yet the state lags way behind most of its neighbors and several others states around the country in terms of wind development. By encouraging substitution of wind power plants for conventional electricity supply options, the state can take advantage of an important and significant economic development opportunity and help ensure the state's future economic and environmental well-being.

Q. Do you have any other comments you would like to make?

A. No.

Q. Does this complete your testimony?

A. Yes, it does.

Marshall R. Goldberg
17798 Starduster Drive Nevada City, CA 95959 530. 432.9373

EDUCATION:

Master of Community and Regional Planning, University of Oregon, Eugene, OR. June 1992.

Bachelor of Arts - Political Science, California State University, Chico, CA. May 1990.

PROFESSIONAL EXPERIENCE:

Principal Consultant - MRG & Associates, 1991 to present.

Marshall Goldberg is a resource planner with a broad background in resource and land use policy and impact analysis. He has considerable experience designing, coordinating, and completing research and assessment projects, working with government agencies, managing projects, coordinating team efforts and conducting workshops.

Since 1991, Marshall has been involved in analyzing utility, government, and industry programs and policies as well as evaluating energy and marine resources, land use impacts, and the socio-economic impacts associated with them. These projects cover a broad spectrum, ranging from reviewing and analyzing the economic impacts associated with energy efficiency policies throughout the United States, to analyzing the socio-economic impacts of the US Virgin Islands Marine Protected Areas, to evaluating land use and economic issues associated with power plant development in the Midwest.

Marshall has completed projects for numerous clients, including the U.S.D.A. Forest Service, the Virgin Islands Department of Planning and Natural Resources, the U.S. Department of Energy, the Illinois Department of Commerce and Community Affairs, the National Renewable Energy Laboratory, the Virgin Islands Anti-Litter and Beautification Commission, the American Public Power Association, the American Council for an Energy-Efficient Economy (ACEEE), the Union of Concerned Scientists, the Tellus Institute, the Michigan Public Services Commission, and the Nevada Department of Business and Industry, among others.

During the last fifteen years Marshall has completed numerous resource policy studies, has evaluated the impacts of investments in energy efficiency and renewable resources throughout the U.S. and completed studies assessing the economic impacts of national transportation policies. He has provided testimony before several regulatory commissions; most recently providing testimony before the Indiana Utility Regulatory Commission on developing a framework for siting merchant power plants in Indiana. He has assisted the U.S. Virgin Islands Government in analyzing energy conservation and resource management strategies, provided public policy and community outreach support, and facilitated numerous

workshops, including a strategic planning initiative. Complementing this work, he helped develop the Virgin Islands Energy and Economic Management Information System (EEMIS); a series of electronic databases and analytical tools to support more comprehensive understanding and assessment of the economy, energy, environmental, and land use policies and impacts.

Prior to forming MRG & Associates Marshall worked as a Research Planner at the University of Oregon, Community Planning Workshop, specializing in resource and environmental research, developing and conducting surveys, and land use and transportation planning and analysis. He has taught Environmental Studies and Environmental Health Planning classes for undergraduate and graduate students. His background also includes providing litigation support services, director at a community legal information center, working with farmers, and coordinating research and public education efforts to assist policy makers in land use policy development and planning efforts. Marshall has also done extensive work in the solid and hazardous waste management field, helping develop and coordinate countywide management plans and public information and outreach efforts.

PROFESSIONAL and COMMUNITY ACTIVITIES:

Planning Commissioner, County of Nevada, California, January 2001 to December 2002.

Board of Directors, Willow Wood Waldorf School, Sebastopol, California, 1996 and 1997.

Committee Member, Lane County Resource Recovery Advisory Committee, Eugene, Oregon, 1991 through 1994.

Board of Directors, Grower' s Market, Eugene, Oregon, 1993 and 1994

Committee Member, Butte County Solid/Hazardous Waste Advisory Committee, Oroville, California, 1987 through 1990, Vice-chair 1987 through 1989.

Supervisor, Butte County Hazardous Materials Education Program, Butte County Planning Department, Oroville, California, 1989.

Co-Director, Environmental Program, Community Legal Information Center, California State University, Chico, Chico, California, 1988 and 1989.

Marshall has authored or co-authored more than 30 papers and studies on energy, resource policy, land use issues and associated economic and environmental impacts. A listing of his publications and testimony is available upon request.

Jobs and Economic Development Impact (JEDI) Coal Model. An economic development impact model developed for the National Renewable Energy Laboratory (NREL) to assess impacts from constructing and operating coal power plants. January 2006.

Jobs and Economic Development Impact (JEDI) *Natural Gas Model.* An economic development impact model developed for the National Renewable Energy Laboratory (NREL) to assess impacts from constructing and operating natural gas power plants. January 2006.

A Study of Wind Energy Development in Wisconsin. A collaborative report co-authored with Seventh Generation Energy Systems, Inc., Northwest SEED, Wind Utility Consulting, and the Energy Center of Wisconsin. The report was prepared for the Wisconsin Division of Energy. July 2004.

Jobs and Economic Development Impact (JEDI) *Wind Model.* An economic development impact model developed for the National Renewable Energy Laboratory (NREL) to assess impacts from constructing and operating wind power plants. January 2003.

Socio-Economic Assessment of Marine Resource Utilization in the U.S. Virgin Islands. A report co-authored with Claudette Hinds (Hinds Unltd.). Prepared for the U.S. Virgin Islands Department of Planning and Natural Resources as part of the V.I. Marine Park Project, an initiative of the Government of the Virgin Islands, implemented as part of the U.S. National Action Plan to Conserve Coral Reefs. January 2003.

The New Motherlode: The Potential for More Efficient Electricity Use in the Southwest. A report co-authored with members of the Southwest Energy-Efficiency Project (SWEEP), the American Council for an Energy Efficient Economy (ACEEE), the Tellus Institute and Robert Mowris (Robert Mowris & Associates). Prepared for the Southwest Energy Efficiency Project. November 2002.

The Bottom Line on Kyoto: Economic Benefits of Canadian Action. A report co-authored with Bailie, A, Bernow, S, Dougherty, W, Runkle, B., A report prepared by the Tellus Institute for the David Suziki Foundation. April 2002.

Clean Energy: Jobs For America's Future. A report co-authored with Bailie, A., Bernow, S., Dougherty, W., Lazarus, M., Kartha, members of the Tellus Institute for the World Wildlife Foundation. October 2001.

Macroeconomic Impacts for the UCS Utopia Transportation Scenario. A report prepared for the Union of Concerned Scientists providing background data and analysis for *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles.* June 2001.

Assessing the Impacts of Electric Retail Competition on Mississippi's Residents and Businesses. A report co-authored with Skip Laitner. Prepared for the Mississippi Department of Economic and Community Development Energy Division. November 2000.

Federal Energy Subsidies: Not All Technologies Are Created Equal. A report prepared for the Renewable Energy Policy Project, Washington, DC, for the U.S. Department of Energy. July 2000.

Prefiled and Direct Testimony of Marshall R. Goldberg in the Matter of the Petition by State Line Energy, LLC., for Certain Determinations by the Commission with Respect to its Jurisdiction over Petitioner's Activities as an Exempt Wholesale Generator Under Federal Law, State of Indiana, Indian Utility Regulatory Commission, Cause No. 41590. Prepared for the Citizens Action Coalition of Indiana, Inc. July 2000.

Texas' Global Warming Solutions. A study co-authored with Steve Bernow, William Dougherty, and Jane Dunbar of the Tellus Institute. The study was prepared for the World Wildlife Fund under the direction of the Tellus Institute, Cambridge, MA. February 2000.

Prefiled and Direct Testimony of Marshall R. Goldberg on behalf of the Arizona Corporation Commission. State of Arizona, Arizona Corporation Commission, Cause No. 41590. Prepared for the Citizens Action Coalition of Indiana, Inc. July 2000.

Energy Efficiency and Renewable Energy Technologies as an Economic Development Strategy for Texas. Co-authored with Skip Laitner for the State of Texas Department of Economic Development. December 1998.

Energy Efficiency and Economic Development in Illinois. A report co-authored with Martin Kushler, Steven Nadel, Skip Laitner, Neal Elliott, Martin Thomas of ACEEE. Prepared for the Illinois Department of Commerce and Community Affairs. December 1998.

Arizona Energy Outlook 2010: Energy Efficiency and Renewable Energy Technologies as an Economic Development Strategy. A report co-authored with Skip Laitner for the National Renewable Energy Laboratory, the Land and Water Fund of the Rockies, and the Arizona State Energy Office, a Division of the Arizona Department of Commerce. July 1998.

Quantifying Benefits of U.S. Department of Energy Programs, Study Area: Albuquerque/Bernalillo County, New Mexico. A report co-authored with Skip Laitner for the U.S. Department of Energy, Denver Regional Support Office. Golden, CO. August 1997.

Energy: A Major Economic Development Strategy for Nevada, The Case for Aggressively Pursuing Energy Efficiency and Development of Renewable Energy Industries in Nevada. A report co-authored with Skip Laitner for the Nevada State Energy Office, a Division of the Department of Business and Industry, the Corporation for Solar Technology and Renewable Resources, and the National Renewable Energy Laboratory. June 1997.

Assessing the U.S. Employment Benefits from Increased Production of U.S. Renewable Energy Technologies, Part 1: Review of Renewable Energy Employment Impact Studies and *Part 2: Multipliers for Exported Products.* Two companion reports co-authored with Skip Laitner and Anne Polansky (Solar Energy Industries Association). Prepared for the Solar Energy Industries Association. Washington, DC. December 1996.

Regional Energy and Economic Self-Sufficiency Indicators in the Southeastern United States. A report co-authored with Skip Laitner for the Southeastern Regional Biomass Energy Program, Tennessee Valley Authority. Muscle Shoals, AL. May 1996.

Planning For Success: An Economic Development Guide for Small Communities. A guidebook for electric utilities, co-authored with Skip Laitner. Prepared for the American Public Power Association. Washington, DC. March 1996.

Environment and Jobs: The Employment Impact of Federal Environmental Investments. A report co-authored with Skip Laitner and Michael Sheehan. Prepared for the National Commission for Employment Policy. Washington, DC. April 1995.

U.S. Virgin Islands Energy Profile. A report co-authored with Skip Laitner and Gregory Holmes. This report represents a compilation of eight individual reports written on energy use, production, policies and economics, for the U.S. Virgin Islands Energy Office. Frederiksted, USVI. December 1994.

Assessment of Small Scale Biomass Cogeneration in the State of Michigan. A report co-authored with Skip Laitner and Gregory Holmes. Prepared for the Michigan Biomass Energy Program, Public Service Commission, Michigan Department of Commerce. Lansing, MI. July 1994.

Energy Choices Revisited: An Examination of the Costs and Benefits of Maine's Energy Policy. A report co-authored with Steve Bernow (Tellus Institute), Skip Laitner (Economic Research Associates), and Jeff Hall and Marc Breslow (Tellus Institute). Prepared for the Mainewatch Institute. Hallowell, ME. February 1994.

Energy and Economic Indicators: A Manual for the U.S. Virgin Islands Energy Office. A guidebook developed for the U.S. Virgin Islands Energy Office staff. Christiansted, USVI. November 1993.

Expanding Energy Savings by Accelerating Market Diffusion of Efficient Technologies: Three Case Studies. A report co-authored with the Center for Applied Research and Economic Research Associates, for the U.S. Department of Energy. Washington, DC. February 1992.

Wind Plant - Project Data Summary	
Year of Construction	2007
Project Location	SOUTH DAKOTA
Project Size - Nameplate Capacity (MW)	1320
Turbine Size (KW)	1500
Number of Turbines	880
Construction Cost ($/KW)	$1,372
Annual Direct O&M Cost ($/KW)	$14.02
Money Value (Dollar Year)	2005
Project Construction Cost	$1,811,040,000
Local Spending	$211,758,706
Total Annual Operational Expenses	$296,476,576
Direct Operating and Maintenance Costs	$18,506,400
Local Spending	$11,605,636
Other Annual Costs	$277,970,176
Local Spending	$5,589,760
Debt and Equity Payments	$0
Property Taxes	$2,069,760
Land Lease	$3,520,000

Local Economic Impacts - Summary Results

	Jobs	Earnings	Output
During construction period			
Direct Impacts	2,061	$52.86	$206.95
Construction Sector Only	1,928	$49.16	$194.00
Indirect Impacts	899	$22.87	$65.90
Induced Impacts	1,050	$24.26	$81.28
Total Impacts (Direct, Indirect, Induced)	**4,010**	**$100.00**	**$354.14**
During operating years (annual)			
Direct Impacts	291	$11.09	$19.36
Plant Workers Only	172	$7.96	
Indirect Impacts	73	$1.92	$6.30
Induced Impacts	119	$2.75	$9.23
Total Impacts (Direct, Indirect, Induced)	**483**	**$15.76**	**$34.88**

Notes: Earnings and Output values are millions of dollars in year 2005 dollars. Jobs are full-time equivalent for one year.
Plant workers includes field technicians, administration and management.
Economic impacts "During operating years" represent impacts that occur from plant operations/expenditures.
The analysis does not include impacts associated with spending of plant "profits" and assumes no tax abatement.
Totals may not add up due to independent rounding.

Detailed Wind Plant Project Data Costs **SOUTH DAKOTA**

Construction Costs	Cost	Local Share
Materials		
Construction (concrete rebar, equip, roads and site prep)	$95,145,562	90%
Transformer	$24,035,029	0%
Electrical (drop cable, wire,)	$11,271,600	100%
HV line extension	$20,719,852	100%
Materials Subtotal	$151,172,042	
Labor		
Foundation	$8,287,941	100%
Erection	$8,287,941	75%
Electrical	$9,116,735	75%
Management/supervision	$4,972,765	0%
Labor Subtotal	$30,665,381	
Construction Subtotal	$181,837,424	
Equipment Costs		
Turbines	$994,804,272	0%
Blades	$331,601,424	0%
Towers	$208,269,600	0%
Equipment Subtotal	$1,534,675,296	
Other Costs		
HV Sub/Interconnection	$66,303,527	100%
Engineering	$21,732,480	0%
Legal Services	$1,684,267	100%
Land Easements	$0	100%
Site Certificate	$4,807,006	100%
Other Subtotal	$94,527,280	
Total Project Costs	$1,811,040,000	

Wind Plant Annual Operating and Maintenance Costs

	Cost	Local Share
Personnel		
Field Salaries	$6,549,130	100%
Adminstrative	$783,363	100%
Manangement	$2,350,496	100%
Personnel Subtotal	$9,682,988	
Materials and Services		
Vehicles	$617,639	100%
Misc. Services	$1,764,682	80%
Fees, Permits, Licenses	$617,639	100%
Misc. Materials	$1,764,682	100%
Insurance	$2,647,024	0%
Fuel (gals)	$441,171	100%
Tools and Misc. Supplies	$705,873	100%
Spare Parts Inventory	$264,702	2%
Materials and Services Subtotal	$8,823,412	
Debt Payment (average annual)	$210,080,640	0%

3757

Other Parameters

			Local Share
Financial Parameters			
Debt Financing			
Percentage financed		80%	0%
Years financed (term)		10	
Interest rate		10%	
Equity Financing			
Percentage equity		20%	
Individual Investors (percent of total equity)		0%	100%
Corporate Investors (percent of total equity)		100%	0%
Return on equity (annual interest rate)		16%	
Repayment term (years)		10	
Tax Parameters			
Local Property/Other Tax Rate ($ per MW)		$1,568	
Local Taxes		$2,069,760	100%
Land Lease Parameters			
Land Lease Cost (per tubine)		$4,000	
Land Lease (total cost)		$3,520,000	
Lease Payment recipient (F = farmer/household, O = Other)	F		100%