

Windfall from the Wind Farm Sherman County, Oregon



Brad Ouderkirk
Meghan Pedden

Renewable Northwest Project

917 SW Oak
Suite 303
Portland, OR 97205

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About the Renewable Northwest Project:

The Renewable Northwest Project (RNP) is a non-profit organization located in Portland, Oregon. In 1994, a broad coalition of public-interest organizations and energy companies created the Renewable Northwest Project to actively promote development of the region's untapped renewable resources. RNP has proven to be a forceful advocate for expanding solar, wind and geothermal energy in the Northwest.

Additional information, as well as this paper and corresponding presentation, can be found at: <http://www.rnp.org>

The authors would like to thank the entire staff at RNP for their guidance and input on this study. We are also grateful to Craig Cox for his work in Colorado, which motivated this study. In addition, contractors, Sherman County officials, local residents, the former leadership at Northwestern Wind Power, and PPM Energy all deserve our thanks for their assistance. Without their cooperation this project would not have been possible. Any remaining deficiencies are our own. Questions can be directed to 503.223.4544.

Objectives

The goal of this paper was to determine the economic impact to a rural community resulting from construction and operation of a wind farm. The 24 megawatt Klondike Wind Farm in Sherman County, Oregon was selected for this purpose. The economic impact is explained in terms of increased activity for local businesses, employment, landowner revenue, and tax revenue for the county. A secondary goal was to report on the planning and development process in order to highlight areas that may be educational for future wind development.

The authors gathered information on the impact through interviews and emails with local landowners, residents, businesses, technicians, county officials, the developer, and the owner. Additional support from relevant literature is provided where appropriate. While every effort was made to collect detailed information, some difficulties persisted due to the time span between project completion and research for this study.

I. INTRODUCTION

The 24 MW Klondike Wind Farm is one of five wind projects in the state of Oregon, which together produce 255 megawatts of capacity. Developed by Northwestern Wind Power, Klondike was operational in December 2001 after an expedited planning and development process. The 24 MW of capacity are produced by 16 variable speed, variable pitch General Electric turbines, each with a capacity of 1.5 MW, providing energy to power over 6,100 Northwest homes. Located on wheat farms, the turbines remove only 7 acres of land from production. While the physical footprint of the project is exceptionally small, the economic footprint is large. The project has had a positive impact on the economy in providing benefits to local and regional businesses, farmers and the tax base – important for a county that is experiencing economic decline.

II. SHERMAN COUNTY, OREGON

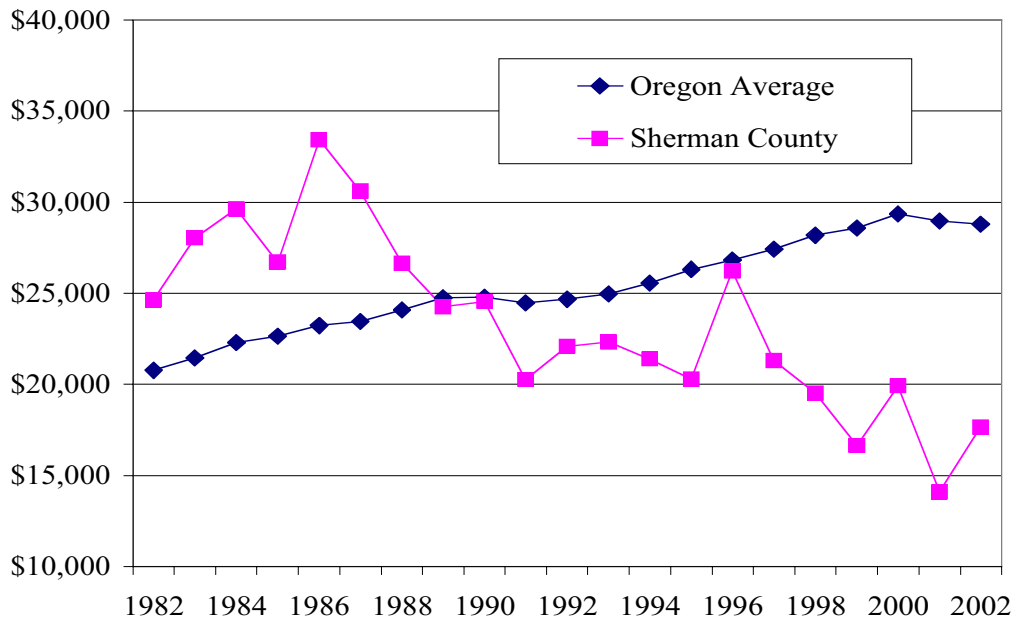
Sherman County sits in north central Oregon, bordering the Columbia River at its northern edge. Many of its 1,784 residents make their living off of the land, farming primarily winter wheat in this ‘one crop county.’ The wheat is produced without irrigation; this dryland method relies on annual rainfall to provide the necessary water, and the average of 11 inches per year is barely adequate for an annual wheat harvest. As a result, most farmers work half the land each year while the other half remains fallow to collect moisture for the following season.

Such heavy reliance on a single source of revenue leaves the county highly vulnerable to external variables such as falling wheat prices and droughts. The current five year drought exposes the difficulty of lacking economic diversity. While lower wheat harvest places substantial pressure on the local economy, the wind resource provides another crop to harvest and adds texture to a historically single-engine economy. Former Sherman County Commissioner Tom Martin points out that outside of wheat farming, wind is “the only thing on the horizon for economic prosperity.” Simply put, not many industries can help diversify a rural economy such as this one. Capturing the

wind resource provides a complement to wheat production, as both can be harvested simultaneously. As County Judge Mike McArthur stated, the wind development “helped to diversify the economy. It’s another crop we can harvest, [and] it helps fill gaps in the county budget.”

Once boasting a strong local economy, Sherman now ranks last out of 36 Oregon counties in per capita income, according to the Northwest Area Foundation. A steady decline over time left the county average income at \$17,647 in 2002 compared to a statewide average of \$28,792. Population and employment rates have fallen recently as well, due to declining opportunities and advances in farm technology that reduce the quantity of labor needed to work each parcel of land. Unemployment in 2003 stood at 11.9%, compared to a state average of 8.2%. Graph 1 shows per capita income over the past 20 years, highlighting the differing paths of prosperity for the state as a whole compared to Sherman County.¹

Graph 1: Per Capita Income, 1982-2002



¹ Statistics in this paragraph from Northwest Area Foundation at <http://www.indicators.nwaf.org/>, last visited August 12, 2004.

III. THE WIND

“If the wind’s not blowing, it’s thinking about it.”

Lee Kaseberg, Sherman County farmer

While wind quality varies throughout the Northwest, certain regions in Oregon such as Sherman County possess commercial grade wind. Proximity to the Columbia River Gorge endows Sherman County with a high quality resource, as wind blows down the Gorge and south onto the Columbia Plateau. The northern region of the county where Klondike is situated possesses Class 4 Wind Power, which is categorized as a ‘Good’ potential resource by the Renewable Energy Atlas of the West.²

Another fortunate advantage for the county is its location with respect to the transmission grid. Situated between the congestion west of McNary and the load centers in the western part of the state, the power generated can be transmitted to areas with high demand while avoiding congested transmission lines in the eastern part of the state. Locally, line and substation upgrades allow for development of 100 MW of capacity through the Wasco Electric Co-op’s Klondike and BPA’s DeMoss substations. Proximity to the John Day switchyard and Big Eddy substation allows for possible future expansion beyond 100 MW.

IV. PLANNING AND DEVELOPMENT

Northwestern Wind Power developed the Klondike Wind Project in the wake of the energy crisis that began in the year 2000. It was in that year that the Bonneville Power Administration informed Brett Wilcox, President and Owner of Golden Northwest Aluminum, Inc., that it could not fulfill the electricity contract for his aluminum smelters. Instead, BPA paid the aluminum smelter to cease operations, and Brett Wilcox used this capital to start Northwestern Wind Power (NWWP) in an effort to provide stable power to the smelters. A team from NWWP began investigating the feasibility of the project in

² Wind Power Resource levels range from 1 (Poor), to 7 (Superb). Class 4 represents a wind speed between 15.7 and 16.8 mph at 50 meters. Information from the Renewable Energy Atlas of the West. See <http://www.windpowermaps.org/> for a wind resource map of Sherman County.

December 2000 and development began in early 2001. The process was a cooperative one, the success of which can be attributed to a wide variety of factors.

The Oregon Solutions process was implemented in order to expedite development of the project. Oregon Solutions, a program started by Governor Kitzhaber, has been described as “a collaborative process in which government, private interests, and the local community could work as a team to address the issues and find a solution.”³ This process allowed the project to go from conception to construction in only 12 months, a necessity due to the expiration of the production tax credit on December 31, 2001.⁴ Environmental, aesthetic, and community issues were brought to the fore through public forums and stakeholder meetings, which also contributed to the ease and speed of the development process.

In addition to the collaboration achieved through the Oregon Solutions program, Jessie Casswell, an employee with NWWP during the development of Klondike, attributes the success of the project to communication and cooperation between the local community and the developer. Routine meetings with landowners and other members of the community, as well as circulation of *The Wind Farmer*, a publication designed to keep landowners and members of the community informed, were essential for education and communication. NWWP was “committed to keeping as much as possible in the local area [to achieve a] positive influence on the county.”

In 2002, NWWP negotiated a 20 year Power Purchase Agreement with the Bonneville Power Administration for the output of Klondike. After two years of operation, PPM Energy, a power marketing company located in Portland, OR, purchased Klondike in January 2003 for \$16.8 million. Due to the quality wind resource and supportive local community, PPM announced in December 2004 that they will expand the project by an additional 75 MW. Portland General Electric will purchase the power that the new turbines produce.

³ “Case Study: State County Collaboration Leads to Successful Wind Farm Siting,” http://www.policyconsensus.org/casestudies/pdfs/OR_wind.pdf, last visited August 12, 2004.

⁴ The Production Tax Credit, or PTC, offered a \$0.018 per kWh credit for generation of electricity from renewable energy sources. Projects operating prior to December 31, 2001 were eligible for the tax credit. There is a current proposal in Congress to extend the PTC for an additional 3 years, which has many developers in a holding pattern for new renewable projects.

As with all wind farms, environmental concerns at Klondike were at the forefront of the planning process. An Environmental Site Assessment performed by WEST, Inc., revealed minimal impacts resulting from the wind farm. The land had been previously disturbed, as the location for the access road and foundations was tilled farmland. Lacking trees and water sources, the local environment is not well suited to avian life, and the immediate area is not home to raptor nests or migrating birds. A post construction operations study conducted for one full year reported minimal avian mortality (Johnson et al, 2003). In addition, the turbines do not have an effect on local deer and antelope populations.

While the environmental impact of the Klondike project is negligible, its benefits are not. In addition to economic benefits the wind farm produces clean energy, therefore offsetting pollution from conventional resources. Air pollution represents a hidden cost of coal and gas generation, which the public pays for in the form of environmental and health issues. Chart 1 shows the pollution that is typically emitted from conventional energy sources. Estimates from the U.S. EPA are based on the average fuel mix from national utility generation.

Chart 1: Estimated Pollution Offset from 2.5 Years of Klondike Operations⁵

Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides	Mercury
90,000 tons	390 tons	192 tons	3,600 pounds

V. ECONOMIC IMPACTS

Northwestern Wind Power invested approximately \$26 million on the Klondike Project, an all inclusive amount that includes siting, permitting, development, tower construction, and electrical work. This equals \$1.083 million per installed megawatt, which is in line with other projects, as reported by studies showing an average of \$1 million per installed megawatt of wind power (Clemmer 2001, Leistriz 2001). Larger projects typically experience some economies of scale, which explains the slightly above

average cost for the 24 MW Klondike project. Also, extra costs were incurred as line and substation work was intentionally designed to accommodate future expansion of the project.

To assess the full impact of Klondike capital investment, ripple effects must be considered alongside initial expenditures. Typically, the effects of the expenditures fall into three categories: direct, indirect, and induced impacts. Direct effects are the immediate payments to primary firms such as consultants, contractors, and the labor employed to develop and build the project. The indirect effects result from firms linked to the primary firms to complete their contract, which would accrue to firms such as fuel suppliers, equipment rental companies, accountants, and lending banks. The final category, induced effects, encompasses the dollars spent by the firms and employees involved in the project as a result of the increased income. Examples are every day purchases from increased income such as groceries or an additional employee hired. Aggregated together, this ripple through the economy is known as the multiplier effect. The size of the effect varies depending on the size and diversity of the economy.

Sherman County, Oregon is likely to have a fairly small economic multiplier. The small population and lack of economic diversity would cause a large portion of any capital investment to leak outside the local economy rather quickly. For Klondike, this meant that significant benefits from the project were generated for people in the region more than in the county (as with the development and construction contractors). Most impact studies of wind projects employ input-output data to estimate the indirect and induced benefits.⁶ No external data was acquired for this project, due to the size of Sherman County and a focus on interview-based research. For purposes of comparison, reasonable assumptions can be made as to the size of the local multiplier. A study of the Vansycle Ridge Wind Farm in Umatilla and Morrow Counties in Eastern Oregon reported a multiplier of 1.48 (NEA, 2003). These counties are far larger in both population (over 80,000 compared to 1,740) and in economic diversity. The lower bound of the multiplier is 1.0, meaning that none of the dollars spent remained in the local

⁵ Pollution quantity per megawatt per year from the U.S. Environmental Protection Agency website, at <http://www.epa.gov/cleanenergy/egrid>. Assumes 8 average MW of production from Klondike.

⁶ Input-Output databases such as IMPLAN, REMI, and RIMS II are economic databases that contain information used to generate economic multiplier for specified regions.

economy. Therefore, the multiplier for Sherman County is estimated to be in the range of 1.1 to 1.3.

In general, renewable energy projects also appear to have higher multipliers than conventional energy projects. Work done by Steve Clemmer in Nebraska (Clemmer, 2001) shows a multiplier of 2.82 for renewable projects compared to 1.42 for conventional energy projects. The New York State Energy Research and Development Authority reports that wind creates more jobs per kilowatt-hour than coal and natural gas generation. These studies imply that renewable energy projects use local resources more often and increase employment more than conventional projects, resulting in more money circulating in the local economy.

A. Project Employment

The entire development process discussed above generated significant regional employment throughout 2001 during siting, permitting, environmental assessments, and design work. Chart 2 shows a list of companies employed prior to the construction phase of the project.

Chart 2: Planning and Development Contractors

Northwestern Wind Power	Goldendale, WA	Management
Stoel Rives	Portland, OR	Legal work on project siting
CH2M Hill	Portland, OR	Consulting
PBS Environmental	Portland, OR	Environmental assessments
NW Wildlife Consultants	Pendleton, OR	Environmental assessments
WEST, Inc.	Cheyenne, WY	Environmental assessments
TriAxis Engineering	Corvallis, OR	Transmission design
Tenneson Engineering	The Dalles, OR	Surveying, engineering, drafting
Donald Keef & Associates	Redding, CA	Substation engineering
Patrick & Henderson	Bakersfield, CA	Foundation design

Construction began in October 2001 as equipment arrived on site and local contractor KC Construction worked on the access road. Many of the contractors

employed by the project are from locations in Oregon: Sherman County, The Dalles, Portland, Canby, Corvallis, and Hood River. Most contractors hiring outside labor did so from the local union house, with one contractor employing Labor-Ready help.⁷ The major phases of construction included roads and grading, excavation and foundations, electrical systems, and erection of the towers. Construction efforts totaled an estimated 32,000 labor hours, not including manufacturing, fabrication, and transportation of the turbines. Direct benefits that accrued to the contractors are shown in Chart 3.⁸

Chart 3: Construction Contractors

COMPANY	LOCATION	JOB DESCRIPTION	EST. LABOR HOURS
KC Construction	Wasco, OR	Roads, crane pads	1,200
Hood River Sand & Gravel	Hood River, OR	Concrete and slurry	1,000
Dressel Enterprises	Bakersfield, CA	Foundation and grading contractor	4,800
Christenson Power Services	Portland, OR	Complete electrical services (except transmission)	10,000
Wilson Construction Co.	Canby, OR	Transmission construction	6,500
General Electric	California	Tower erection	8,400

Indirect benefits resulted from those firms linked to the above contractors. Equipment rental companies such as Modern Machinery (Portland, OR) and Mullen Crane (Soda Springs, ID) received income from the primary contractors. Local oil and gas supplier Wallace Oil⁹ (Wasco, OR) provided on site tanks of gas and off-road diesel for machinery operations. Additional income and employment includes manufacturing and transportation of parts and equipment to the site. Manufacturing occurred in numerous locations both within and outside the United States, while fabrication took place in Tehachapi, CA.

⁷ Labor-Ready is a company that provides on-demand, temporary labor

⁸ The number of labor hours was derived through conversations with company employees, and as such represents an estimate. With a few exceptions, the total hours are simply a summation of stated number of employees, length of service, and hours per week.

⁹ Now Devon Oil

B. Local Benefits

The cooperation of the community has paid off handsomely for Sherman County. In addition to the direct and indirect benefits to regional companies from construction, induced benefits accrued locally, as workers patronized local establishments and dollars flowed through the economy. The local motels, RV/Trailer parks, cafes, and grocers experienced a boost in business during construction. Gas and supplies were purchased from the local Hardware Co-op. The Wasco RV park, Tall Winds Motel in Moro, and motels in The Dalles and Biggs Junction all saw increased activity during construction, and the Lean-to Café is still experiencing increased business from ongoing operations. According to Jenny McAllister, manager of the Tall Winds Motel and former co-owner of Café Moro, the increased activity and the general impact of the wind project on the local community was very positive.

The Lean-to Café in Wasco is one of the few restaurants located in close proximity to the Klondike Wind Project. It has benefited from both the construction and operations phases, which has increased sales beyond the steady, local customer base by bringing in wind developer and construction employees, as well as tourists, into the café. On occasion, co-owners Mike Gutfleisch and Kathy Neihart catered to the construction site, and hope to purchase a mobile kitchen for this purpose with the extra revenue from the wind farm. Additionally, they hope to use this extra revenue to build a new motel. Mike indicated that the outside revenue has helped acquisition of funds for the motel significantly from the project.

C. Landowner Benefits

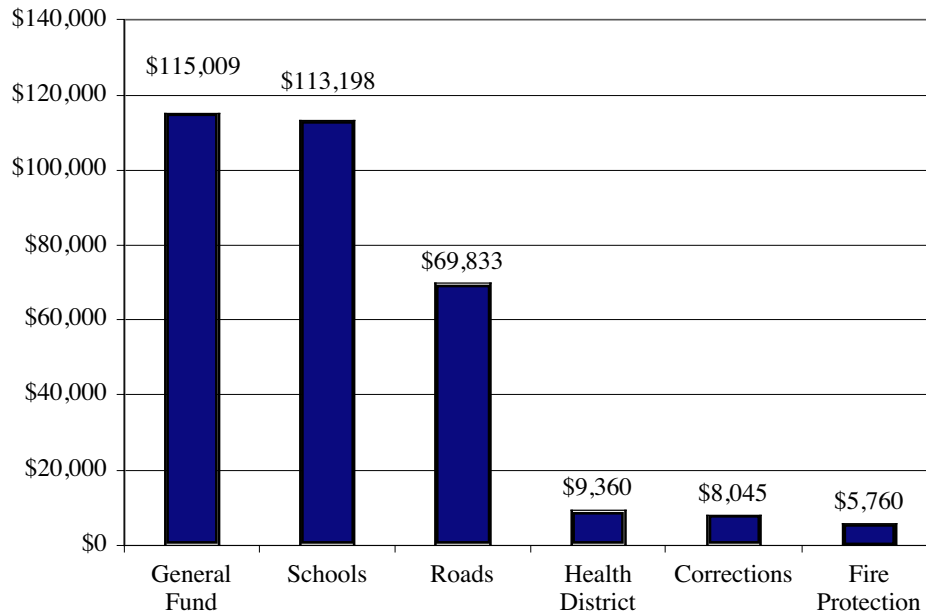
Local landowners also indicated that their experience in dealing with the development of the project has been positive, and that the physical impact of the project on their property has been negligible. According to the farmers interviewed for this report, the turbines themselves have a minimal impact on wheat production: the footprint, including foundations and the access road is approximately 1/2 acre per turbine, on an average farm size of 2,500 acres. The average wheat yield from a half acre is 25 bushels,

and at \$5 per bushel the revenue loss for wheat production totals \$125. Royalty payments to landowners vary depending on the negotiated contract, but typically range from \$2,000 to \$4,000 per turbine, per year. With three landowners at the Klondike project, each one is receiving an estimated \$15,000 per year. Wind is therefore an excellent complement to wheat farming and is drought resistant, which is an important attribute in Sherman County. As wind and wheat farmer Lee Kaseberg says, “put them up, we can farm around them easily.” Neighbor John Hilderbrand adds that “the roads allow easier access to my fields, and the turbines make money in the winter when I can’t work my land.”

D. Tax Revenues

Tax revenues represent an important lasting benefit to the local community, as well as a rare opportunity for growth. The Klondike project is the first major capital investment in Sherman County. In the first year of operations, property tax revenues totaled \$321,206 from the wind turbines, or slightly over \$20,000 per turbine. This amount, from a modestly sized wind farm, increased tax revenues in the county by 10% over the previous year, adding valuable dollars to the struggling county. Graph 2 shows the dollar allocation of Klondike tax revenue in the 2002-2003 fiscal year:

Graph 2: Tax Revenue Contribution from Klondike Turbines 2002-2003



Over the life of the project, the assessed value of the turbines may fluctuate due to depreciation and assessment variance, but it is reasonable to assume that the tax contribution will remain near \$250,000 over the next 20-30 years. This revenue is a long term, stable source of income that is not subject to external shocks.

VI. FUTURE WIND OPPORTUNITIES

In December 2004, PPM Energy announced that it is expanding the project in Phase II by an additional 75 MW and that Portland General Electric will purchase the power that the new turbines generate. This additional 75 MW is expected to further benefit the county in a number of ways. Phase II would include 6-8 new landowners receiving royalties, 4-6 additional full-time employees, and construction of a new operations facility. And, according to Paul Koehler, Director of Business Development at PPM Energy, PPM would like to train local technicians for the maintenance jobs created by expansion. Extrapolating the current tax revenues from 24 MW to 100 MW, Phase II would bring an incremental \$930,000 per year to the county, representing 35% of the county tax base.

The Klondike Wind Project has also inspired local officials to consider a community project, consisting of a single 1.5 MW turbine. The China Hollow County Wind Project would greatly impact the local economy by keeping project revenue local. The project is stalled until the federal production tax credit is reinstated and Oregon's PURPA law is amended. Currently, the law surrounding qualifying facilities limits the capacity to 1 MW and limits the length of the purchasing contracts. These restrictions need to be amended for the project to be economically viable. Until then, Sherman County will continue to reap the benefits of the commercial Klondike Project and its expansions.

VII. CONCLUSION

The benefits of the Klondike Wind Project have proven widespread in Sherman County and the surrounding region. Employment from development, construction, and operations stimulated regional businesses and continue to provide personal income in the county. Sherman County as a whole receives substantial tax revenues, while individual farmers receive additional income from royalty payments while continuing farming operations. All of these benefits will drastically increase as the Klondike project is expanded in the coming years. In a county where farming is a way of life, wind has provided value and stability to the economy.

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