
Economic Impacts of Wind Energy Projects in Southeast Washington

Economic Impacts of Wind Energy Projects in Southeast Washington

**Prepared for
Southeast Washington Economic Development Association**

**By
ENTRIX, Inc.
12009 N.E. 99th Street, Suite 1410
Vancouver, WA 98682-2497**

March 6, 2009

Table of Contents

Executive Summary	1
Economic Effects.....	3
Fiscal Effects	5
Property Values and Recreation	7
Impacts of Wind Development in Other Southeast Washington Counties.....	7
Chapter 1 Introduction	1
Purpose and Scope.....	2
Organization of Report.....	4
Chapter 2 Wind Power and Economic Development	5
Job and Income Creation	5
Landowner Revenues	6
Tax Effects	6
Chapter 3 Southeastern Washington Socioeconomic Overview	8
Population.....	9
Economic Base, Employment, and Income.....	11
Chapter 4 Regional Economic Impacts of Columbia County Wind Projects	17
Methodology	18
Results	22
Economic Impacts Outside Columbia County	29
Chapter 5 Fiscal Impacts of Existing Columbia County Projects	31
Fiscal Revenues (Taxes).....	31
Public Services Expenditures	37
Summary of Net Fiscal Impacts	39
Chapter 6 Other Impacts of Columbia County Projects	40
Property Values	40
Recreation and Tourism	46
Energy Price and Externalities	53
Charitable Donations.....	53

Chapter 7 Economic Implications for Future Wind Development in Other Southeastern Washington Counties	54
Asotin	57
Garfield.....	58
Whitman	58
References	60

List of Tables and Figures

Table ES-1 Summary of Projects.....	1
Figure ES-1 Southeastern Washington Region.....	2
Table ES-2 Summary of Estimated Net Economic Benefits of Columbia County Projects	5
Table ES-3 Columbia County Property Tax Changes Due to Projects.....	6
Figure 1 Southeastern Washington Region.....	3
Figure 2 Regional and County Population, 1970-2004	9
Figure 3 Regional and County Employment, 1970-2004	12
Figure 4 Employment in Primary Sectors by County	13
Table 1 Employment Impacts in Columbia County.....	25
Table 2 Household Income Impacts in Columbia County	27
Table 3 Summary of Net Economic Impacts of Project Construction and Operations.....	28
Table 4 Net Present Value of Income Impacts of Project Construction and Operations	29
Table 5 Columbia County Assessed Value and Property Tax Changes 2006 - 2008	33
Table 6 Recipients of 2008 Hopkins Ridge Property Tax Payments.....	33
Table 7 Sales and Use Tax Receipts from Operation Materials Purchases.....	35
Table 8 School Year Enrollment by Head Count and Full Time Enrollment ^{1 2}	39
Table 9 Annual Number of Visitors to Hopkins Ridge Wind Farm	49
Table 10 PSE Charitable Donations 2006- November 2008	53
Figure 5 2006 Economic Output in Southeastern Washington Counties (Millions \$)	55
Table 11 Multipliers for Selected Sectors Across the Southeastern Washington Counties.....	57

Executive Summary

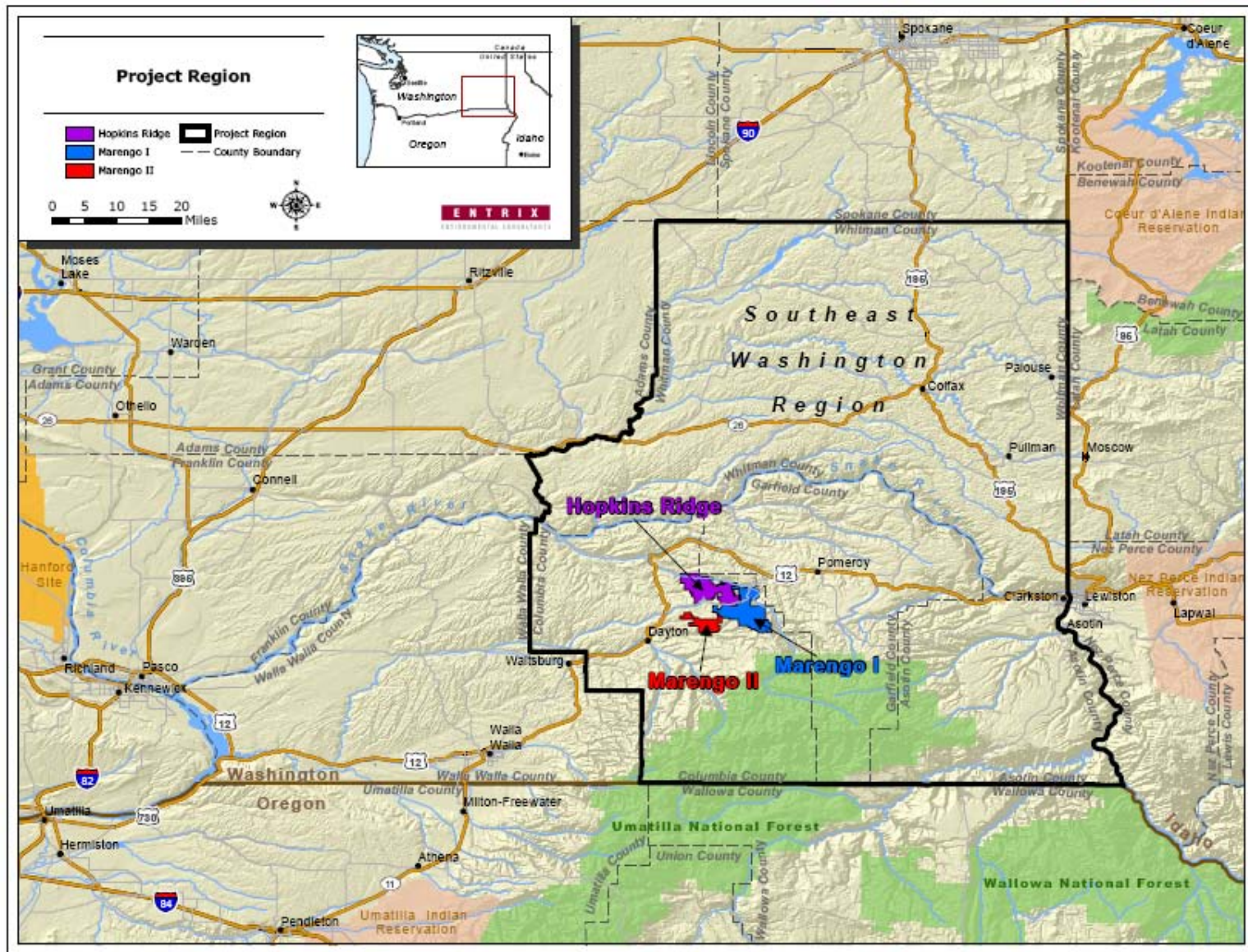
The southeast Washington region consisting of the four Counties of Columbia, Garfield, Asotin, and Whitman (the Region) has long been known for its fertile farmland and its wheat fields. Recently, the Region has also become known for its strong, reliable winds that are suitable for wind energy project development. Three wind energy projects have already been built and are operating near the town of Dayton in Columbia County. Additional projects are being considered elsewhere in the Region.

The three existing wind energy projects, Hopkins Ridge, Marengo I, and Marengo II (Projects), include 204 wind turbines. Hopkins Ridge, the first project constructed, has a capacity of 156.6 MW and became operational in November of 2005. It has 87 1.8 MW wind turbines, with a footprint of approximately 100 acres. It is owned by Puget Sound Energy (PSE), while the other two projects are owned by PacifiCorp. Marengo has a capacity of 140.4 MW and is comprised of 78 1.8 MW wind turbines. It became operational in September 2007. The Marengo II Project, which was completed in late 2008, is located directly southwest of the Marengo Project and generates 70.2 MW. Combined, the three projects have a capacity of 367 MW.

**Table ES-1
Summary of Projects**

Project Characteristic	Hopkins Ridge	Marengo I	Marengo II
MW Capacity	156.6	140.4	70.2
Number of Turbines	87	78	39
Developer	RES Americas	RES Americas	RES Americas
Utility Owner	Puget Sound Energy	PacifiCorp	PacifiCorp
Year Operational	2005	2007	2008

Figure ES-1
Southeastern Washington Region



Wind power development in rural areas such as Southeast Washington brings economic development potential in terms of increased employment opportunities, wages, land leases, and business profits. Wind power development also increases local tax revenue, in particular property tax revenues. However, questions are often raised regarding socioeconomic impacts on property values, recreation and tourism, and demand for public services. To gain a greater understanding of the economic impacts of wind energy projects in the Region, the Southeast Washington Economic Development Association (SEWEDA) commissioned ENTRIX to complete a study of the economic and social impacts of the Columbia County wind energy projects and the implications for additional wind energy projects in the Region.

This report analyzes the economic, fiscal, and social effects of the three existing wind energy projects (Projects) near Dayton in Columbia County, Washington. Construction effects are analyzed for the three primary years of construction, 2005 through 2007, while operation effects are estimated for 25 years of operation (2008-2033). The analysis assumes 25 years of project operation as this is the guaranteed life span of the wind turbines; however, the utilities operating the projects expect that the Projects will be operating longer. Based on the analysis of these three wind facilities and a comparison of the economic characteristics of each of the other Southeast Washington counties to Columbia County, the report also provides a brief examination of the potential relative impacts which may result from future wind energy development in Asotin, Garfield, and Whitman Counties.

Economic Effects

Positive economic effects addressed in the analysis include the direct generation of jobs and income by the Projects during both construction and operations phases, as well as the “ripple” effects of project-related spending (known as indirect and induced impacts) on other economic sectors. A potential reduction in agricultural production on the lands used for the Projects was also calculated to account for this “opportunity cost” of the land use.

Study results indicate that the Projects resulted in the net annual employment in Columbia County rising by 189 jobs during construction (of which approximately 20 jobs were to local workers), and by 53 jobs during operations. Net annual income in Columbia County is estimated to have risen by \$2.3 million during construction (including only income to local workers), and by \$3.5 million during operations. To calculate the total value over time of the Projects, the future annual impacts are summed over the 25-year life of the project after discounting. Discounting takes into account the greater value of money received in the near future compared to money that will be received farther into the future. To do this, a discount rate of three percent is used; so for every year that passes before money is received the value is reduced by three percent. For example, using a three percent discount rate \$100 dollars

received next year is equivalent to \$97 received this year. The discount rate was only applied to discount future income, but was not applied as an interest rate to past income.

Based on this process, in present value terms, the total net income generated by the Projects during construction and over their 25-year operation life is estimated to be \$67.2 million.¹ The projects are assumed to have a 25-year project life as this is the period that the manufacturer guarantees the turbine can operate. As the Projects are expected to operate beyond the assumed 25-year life, it is anticipated that the present value of income effects from the Projects may be even greater.

Jobs and income are generated directly by the Projects, as well as in other sectors of the Columbia County economy supplying goods and services to the Projects and to employees of the Projects. Industries providing services to the Projects and its workers include, but are not limited to, lodging, restaurants, grocery stores, gas stations, construction companies, and hardware stores. Table ES-2 summarizes annual and net present value economic benefits of the Projects to Columbia County. Over the development, construction, and assumed 25-year operation phase of the Projects, it is estimated that total income generated will be \$67.2 million in present value terms. Approximately 189 jobs were generated annually in the construction and development phase, and approximately 53 jobs are anticipated to be generated annually each year of the 25-year operations phase.

¹ Present value represents the current value of the future stream of output and income benefits. In economics (and in finance) the present value of a stream of future revenues or costs is the sum of all future dollars in terms of present year dollars. This is done by discounting future monetary values because society values money in the present more than the same amount of money at a future date. For this project a discount rate of 3 percent was used in the present value calculation.

Table ES-2
Summary of Estimated Net Economic Benefits of Columbia County Projects

Economic Impact	Development and Construction (Annually, 2005 - 2008)	Operations (Annually, 2008 - 2033)	Present Value (Total 2005 – 2033)
Labor Income (Columbia County Residents)			
Direct Effects	\$1,771,000	\$3,081,000	\$58,963,000
Indirect Effects	\$100,000	\$76,000	\$1,623,000
Induced Effects	\$411,000	\$308,000	\$6,596,000
Total Income Effects	\$2,282,000	\$3,465,000	\$67,183,000
Employment (Jobs – All Employees)			
Direct Effects	170	39	N/A
Indirect Effects	6	2	N/A
Induced Effects	12	12	N/A
Total Employment Effects	189	53	N/A

Note: May not add due to rounding

Fiscal Effects

In addition to creating jobs and income in the local community, the Projects have a fiscal effect on local government. Fiscal effects are assessed by examining tax revenues generated by the Projects, as well as potential increased local government expenditures if the Projects cause increased demand for local public services. Little to no demand for public services is anticipated to result from the Projects, so there are no estimated additional fiscal costs of the project.

The Projects increase the property tax base in Columbia County. The Hopkins Ridge Project paid \$807,000 in property taxes to the County in 2007, and \$907,000 in property taxes in 2008 (see Table ES-3). As the first Project constructed, Hopkins Ridge is the only Project currently paying property taxes, but Marengo I will begin paying taxes in 2009 and Marengo II will begin paying in 2010. Once all three projects are operational and paying property tax in 2010, annual property tax payments from the Projects may total approximately \$2.2

million if payments per wind turbine are similar and if property tax rates remain similar.² In reality, the average taxable value per wind turbine will likely differ by project, but this approach provides an approximate estimate of the property taxes that may be paid from all three Projects in 2010.

Columbia County receives 82 percent of property tax receipts, with the remainder going to the State of Washington. Property tax revenue from the Projects represents additional revenue to the county, unless tax rates are reduced. A reduction in property tax rates throughout the county would benefit all property owners, but would reduce the increased tax receipts due to the Projects.

**Table ES-3
Columbia County Property Tax Changes Due to Projects**

Year	Assessed County Property Value	Annual Property Taxes Paid	Annual Project Property Tax Paid	Annual Property Tax Increase Due to Project
2006	\$286,148,000	\$3,694,000		N/A
2007	\$389,870,000	\$4,519,000	\$807,000	\$807,000
2008	\$432,520,000	\$4,837,000	\$907,000	\$100,000

Source: Columbia County Tax Levy Sheets provided by Chris Miller at Columbia County Assessor Office.

Sales and use tax revenues are expected to slightly increase due to expenditures by the Projects during the operations phase, but not during the construction phase due to a sales and use tax exemption for equipment and services related to wind power generation. Annual sales tax revenues during the operations phase are estimated to have increased by \$14,000 for the state and \$3,000 for the County. The present value over 25 years of sales tax receipts generated by the Projects is estimated at \$341,000 for the state and \$73,000 for Columbia County.

² The annual property taxes paid by the Projects will fluctuate to some extent in the future, but are expected to be relatively stable due to the manner in which property taxes are assessed on large utilities with assets in multiple counties in Washington State. Future property tax payments will fluctuate based on two factors. First, as the tax base increases in Columbia County due to the Projects and other new construction, the levy rate is expected to decrease, which will reduce the total property tax payments from the Projects and all other property owners in the County. Second, the property tax payment from a utility is based on the total, depreciated value of assets owned by the utility in Washington State as well as the original value of the assets in Columbia County. As the total depreciated value of assets owned by PacifiCorp and PSE will likely change in the future, it is not possible to predict future property tax payments.

Property Values and Recreation

Based on the location of the Projects and a literature review of community effects of wind farms, it appears unlikely that there will be significant impacts of the Projects on property values, recreation, or community services. Overall, there are too many variables in real estate markets to be able to infer property value impacts based on other studies. However, data and analyses from these other locations do indicate that there is little to no correlation between property values and wind energy project development. This lack of correlation is borne out by the experience to date in Columbia County. Although there have been few property sales in the time period since the Projects were built that would aid in assessing the Projects' impact on property values, based on conversations with real estate professionals in Dayton, to date there have been no discernible negative impacts of the Projects on property values.³

Likewise, studies on recreation and tourism indicate no negative relationship between wind energy developments and recreational use. Hunting is the primary recreation activity conducted inside Projects boundaries. Due to an existing controlled access hunting program in the Hopkins Ridge Project area and an expected similar program for the Marengo Projects, it is expected that impacts on hunting recreation from the Projects is minimal. Tours of the Hopkins Ridge Project offered by PSE have provided increased tourism opportunities and resulted in approximately 600 to 800 visitors per year. These opportunities may be expanded by tours offered by PacifiCorp in the future.

Impacts of Wind Development in Other Southeast Washington Counties

It is expected that wind projects in other Southeast Washington counties will lead to the same *type* of economic effects as those realized in Columbia County; however the *size* of the economic effects in a county would depend on particular characteristics of the existing economy of each county. Generally, the greater the number and diversity of businesses within a county, the more the area economy can capture from a new business or development. With this in mind, the increase in jobs and income from a new wind development project is expected to be greater for Whitman and Asotin Counties than for Columbia County. This is because Whitman and Asotin Counties have much larger economies with businesses providing goods and services that may not be available in Columbia County. Similarly, the impacts of wind development in Garfield County may be smaller than in Columbia County since Garfield is a smaller county with fewer businesses. However, as a smaller county, the

³ Personal communication with Blaine Bickelhaupt, July 2008, Windermere Real Estate, Dayton Washington.

relative impacts of a project in Garfield County could be greater as a proportion of total county income or employment.

The extent to which a particular wind project would boost economic development throughout the Region, as opposed to the county in which it is located, largely depends on the location of the nearest urban centers with the necessary goods and services for the Project. If the closest urban centers are located in the Region, the greater the economic impact will be in the Region; whereas if the closest urban centers are located outside the Region, the smaller the economic impact in the Region.

Chapter 1 Introduction

The Southeastern Washington Region includes the four counties of Asotin, Garfield, Columbia, and Whitman (see Figure 1). Much of the Region is characterized by rural towns and rolling hills of farmland cultivated in wheat and other crops. In addition to its rich agricultural land, the Region also has tremendous wind energy assets. Wind development in the Region began in March, 2005 in Columbia County. To date, there are three wind energy projects in the Region, all located near the town of Dayton in Columbia County. Additional development is expected elsewhere in the Region in Asotin, Garfield, and/or Whitman Counties.

The three existing wind energy projects, Hopkins Ridge, Marengo I, and Marengo II (Projects), include 204 wind turbines. Hopkins Ridge, the first project constructed, has a capacity of 156.6 MW and became operational in November of 2005. It has 87 1.8 MW wind turbines, with a footprint of approximately 100 acres. It is owned by Puget Sound Energy (PSE), while the other two projects are owned by PacifiCorp. Marengo has a capacity of 140.4 MW and is comprised of 78 1.8 MW wind turbines. It became operational in September 2007. The Marengo II Project, which became operational in late 2008, is located directly southwest of the Marengo Project and generates 70.2 MW. Combined, the three projects will have a capacity of 367 MW.

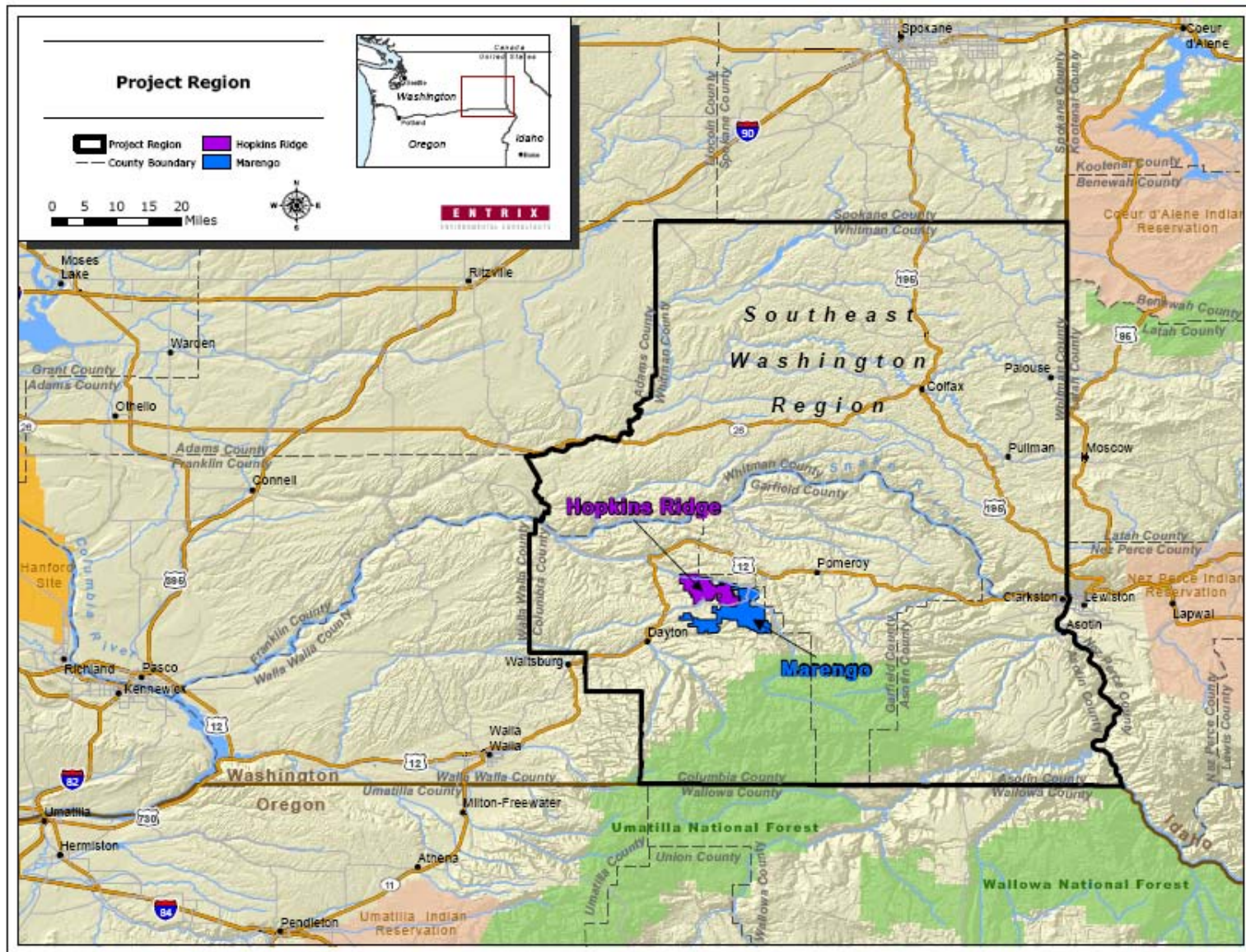
To gain a greater understanding of the economic impacts of wind energy projects in the Region, the Southeast Washington Economic Development Association (SEWEDA) commissioned ENTRIX to complete a study of the economic and social impacts of the Columbia County wind energy projects and the implications for additional wind energy projects in the Region.

Purpose and Scope

The purpose of this study, as commissioned by the Southeast Washington Economic Development Association (SEWEDA), is to assess the economic and fiscal impacts of wind energy project development in the Region. SEWEDA is interested in determining the impacts that have been experienced in Columbia County due to development of wind energy projects, and in understanding how these impacts may differ if wind energy projects are developed in the other three counties in the Region, as anticipated due to local support, good wind speeds, accessible power transmission, and compatible lands for wind energy development. The primary goal of this study is to assess the past and future anticipated economic impacts of the three existing Projects in Columbia County, and secondarily to project how impacts may differ if wind energy projects are developed in Garfield, Asotin, or Whitman Counties.

Economic effects addressed include the direct generation of jobs and income by the wind developments during the construction and operations phases, as well as the “ripple” effects on other economic sectors as expenditures on goods and services throughout the local economy increase to meet project-related demands. Fiscal effects are assessed by examining both tax revenues generated by the project and potential increased local government expenditures if the project causes increased demand for local public services. Finally, socioeconomic effects in terms of potential changes in property values and recreation / tourism in the Region are addressed.

Figure 1
Southeastern Washington Region



The scope of the project is to provide a detailed assessment of the local impacts of the three wind energy projects currently built in Columbia County. The purpose of this assessment is not only to estimate the magnitude of the socioeconomic impacts of the Projects in Columbia County, but also to understand what the potential impacts would be in the other, similar Southeast Washington Counties. The scope of this report thus also includes a brief summary of how socioeconomic impacts of wind development in other Southeast Washington counties may compare to those experienced in Columbia County.

Organization of Report

There are seven chapters of the report. Chapter 1 is the introduction of the study. Chapter 2 provides an overview of how wind energy project development stimulates economic activity and local economic development. As the size and structure of an economy determines the extent that wind energy projects lead to economic development, Chapter 3 summarizes and compares the socioeconomic conditions in the Region, and details each of the four Southeast Washington county economies. Chapter 4 presents the methodology and results of the economic impact analysis in terms of net change in Columbia County jobs and income. Chapter 5 provides a quantitative estimate of the fiscal impacts (tax revenues and government expenditures) of the Projects, respectively. Chapter 6 discusses the potential socioeconomic impacts to recreation and property values. Finally, based on the findings of the economic impact analysis in Columbia County as well as a review of the structure of the economies in the three other Southeast Washington Counties, Chapter 7 discusses the relative economic impacts that could be expected due to wind project development in Asotin, Garfield, and Whitman Counties.

Chapter 2 Wind Power and Economic Development

There are four primary sources of economic effects of commercial wind energy development. First, wind energy projects often directly bring family wage jobs, during construction and operations, to rural areas. Rural areas, especially with agricultural based economies, often struggle to provide jobs to keep people in the communities. Wind energy development is one way to supplement income and ensure jobs for rural communities. Second, as with any new business, a new wind energy project may lead to additional jobs and income at existing local businesses by expanding their local market and increasing local economic activity. Third, wind energy projects may provide new rents and/or dividends to landowners who provide easements and leases to the developers. Fourth, wind energy projects may also add to the property tax base, which can result in a redistribution of the tax burden, or an increase in total tax revenues. Wind power may also have other economic effects, such as impacts to property values, recreation, and public service expenditures. This section provides an overview of each of these types of economic effects of wind energy projects.

Job and Income Creation

Communities are interested in the creation of new jobs because new jobs increase business and household income, which in turn create more jobs which further increase business and household income, and so on. A problem faced by some rural counties is that this process is in reverse, with jobs leaving and the economy contracting. To stem or reverse this process in counties where it is occurring, ways must be found to bring in new jobs or new income or both.

Natural resources have typically played an important role in the economic life of rural areas in the past and it is not unusual for local governments to continue to recognize the potential value of these resources in terms of building economic stability. For those areas with suitable wind resources and links to electric power transmission facilities, wind energy projects may

offer an opportunity to create some long-term jobs and long-term income from wind energy project leases and easements.

Landowner Revenues

Wind developments can be a source of supplemental revenue for landowners in rural areas. Wind developers tend to lease land from landowners rather than purchase the land outright (as is the case with the existing wind projects in Columbia County), although in some instances easements are purchased. Each lease contract with each developer can be different and is usually negotiated individually. However, there are some generalities that can be made about these lease contracts.

Turbines and associated infrastructure (roads, transmission lines, etc) have a footprint that supplants existing land uses. During the development and construction phases, landowners are generally paid on a dollar-per-acre lease agreement. Once the project is operational, payments to landowners are usually a percentage of the gross revenues or are paid based on the production of the wind project in dollars per megawatt generated (\$/MW). The landowner is typically still able to farm or allow grazing on all areas surrounding the turbines. Landowners who sell easements for wind energy projects typically receive a one-time, upfront payment.

Tax Effects

Taxes are a redistribution of benefits from wind energy project production to the federal, state, and local government jurisdictions in which the wind energy project production and sales occur. Thus, determining the impact of taxes on a specific community depends entirely on the tax make-up of that jurisdiction. The following paragraphs outline some general concepts regarding state and local taxation of wind energy projects in Washington State.

State taxes related to wind energy projects include sales and income (business and personal) taxes. Washington applies personal and real property taxes to businesses and utilities. Washington also has sales and use taxes.

Counties generally charge real estate and/or personal property taxes. In most cases, taxes collected by the counties are distributed to various levels of local government and district services, such as town governments, water and sanitation districts, emergency response districts, hospitals, and school districts, to pay for these services as well as other infrastructure.

Further, in addition to any taxes collected by counties on behalf of cities and towns, smaller localities often are able to charge sales and income taxes. As the tax make-ups of each of the case study localities are divergent, they will be discussed below on a case-by-case basis.

Real estate taxes are paid by landowners, and since the land that wind energy projects stand on is generally leased, the landowners pay these taxes. Tax impacts depend on any changes in the assessed value of the land or the real estate tax rate.

Personal property tax payments for wind energy projects are based on the installed capital cost of the wind plants. Personal property tax payments tend to be a greater source of tax revenues than other types of generation, per installed megawatt, because they require greater capital investment. Generally speaking, the tax payments on wind energy plants may range between one and three percent of the plant equipment (primarily the wind turbines), depending on the state and jurisdiction. The taxable property value in wind power projects also increases the availability of funding for local levy funds. For example, the wind energy projects contribute significant funding for the voter-approved levy for schools in Columbia County. Although the total funds raised by the levy remains the same, the levy funding provided by the wind energy projects results in lower taxes paid by residents of the County.

The impact on sales tax is a potential indirect effect, stemming from two sources. In most states, the primary source of sales taxes is the construction and operation and maintenance crews' local purchases of equipment and supplies, including hardware and convenience items. However, through June 2009, Washington State law exempts sales and use tax on capital equipment and services used to install energy facilities with a generation capacity of 200 watts or more electricity, which is a very small amount of electricity.⁴ The equipment and services utilized in the construction phase of the Projects therefore does not generate sales and use taxes. Sales and use taxes are generated, however, in the operations phase. Another potential source of sales taxes is the potential increase in local disposable income for both landowners and project employees, which could be used for local expenditures.

⁴ Revenue Code of Washington § 82.08.02567. "The tax levied by RCW 82.08.020 shall not apply to sales of machinery and equipment used directly in generating electricity using fuel cells, wind, sun or landfill gas as the principal source of power, or to sales of or charges made for labor and services rendered in respect to installing such machinery or equipment, but only if the purchaser develops with such machinery, equipment, and labor a facility capable of generating not less than two hundred watts of energy and provides the seller with an exemption certificate in a form and manner prescribed by the Department." For periods prior to July 1, 2001, the exemption applies to facilities capable of generating at least 200 kilowatts of electricity. This was amended so that for periods after July 1, 2001, the exemption applies to facilities capable of generating 200 watts of electricity.

Chapter 3 Southeastern Washington Socioeconomic Overview

This section presents a socioeconomic overview of Columbia County and the surrounding counties (Whitman, Garfield, and Asotin), highlighting the demographic and economic characteristics of the Region. Socioeconomic information for the town of Dayton, which is the nearest town to the Projects, is also presented to the extent that data are available. This socioeconomic overview is intended to provide insight into the local population and economy, as well to provide context to the economic, fiscal and other impacts discussed in more detail later in this report. Additionally, information about the size and structure of Columbia County relative to each of the other Southeast Washington counties aids in assessing how socioeconomic impacts of wind development may differ in the other counties compared to the impacts experienced in Columbia County. This section presents data for the pre-project conditions in 2004 as well data from 2007 which is the most recent available, post-project year data.

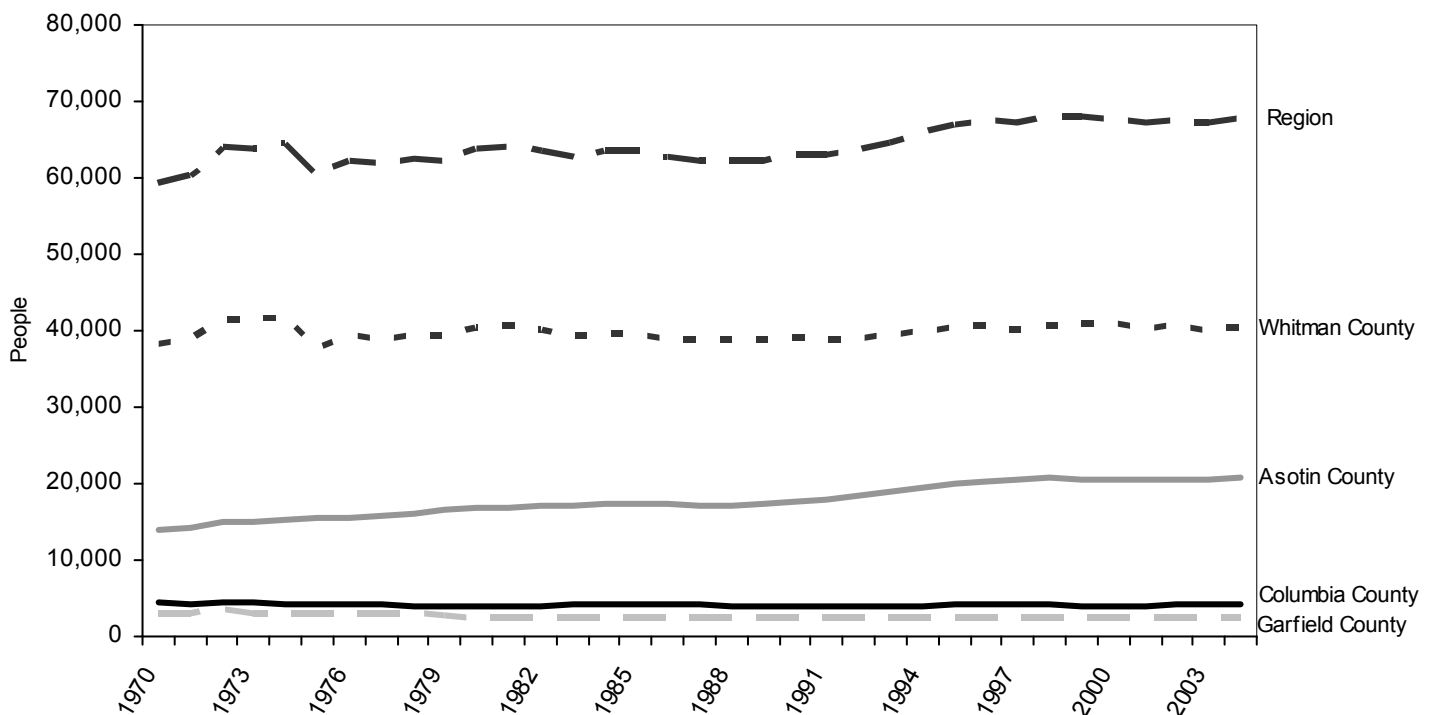
The Region encompasses the four counties of Asotin, Columbia, Garfield, and Whitman, an area of 4,300 square miles. While differing in certain characteristics, the similarities between the four counties allow them to be discussed as a Region. The land in the Region is generally agricultural in purpose, with wheat and barley the primary crops. Peas and lentils are also grown, as well as livestock grazed. The Snake River is an integral part of the transportation system in the Region, with river ports at Clarkston, Columbia, and Garfield, as well as the Port of Whitman sites: Almota, Central Ferry, and Wilma.

Income in the Region has been historically lower than the average across the rest of the state. Per capita income in the Region in 2004 was \$23,975, lower than both Washington State (\$35,041) and the nation (\$33,050). Also, the proportion of people in poverty for all age groups in these four counties recently (between 1989 and 2004) was greater than the proportion for Washington State.

Population

The 2007 population estimate for all four counties is 70,450, with over half of that in Whitman County.⁵ The primary population centers in the Region are Pullman (Whitman County, population 26,860) and Clarkston (Asotin County, population 7,280), which comprise nearly 50 percent of the Region’s population. Between 1970 and 2004, population in the Region increased at an average annual rate of 0.4 percent per year, while population in Washington and the U.S. has increased annually by 1.8 percent and 1.1 percent, respectively. Figure 2 displays the population growth in the Region since 1970.

Figure 2
Regional and County Population, 1970-2004



Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, CA30.

⁵ Unless otherwise noted all population estimates in the following text are from Washington Office of Financial Management, “April 1 Population of Cities, Towns, and Counties Used for Allocation of Selected State Revenues, State of Washington.” Olympia, Washington. June 2008.

Columbia County

The 2007 population of Columbia County was 4,100, of which 64 percent of the population (2,720 people) lives in the incorporated City of Dayton. Starbuck is the only other incorporated town in the county, with 130 people. The rest of the county population lives in rural, unincorporated areas of the county. Between 1970 and 2004, population in the County has declined at an average annual rate of 0.2 percent per year. Population in Columbia County is anticipated to decline slightly to 4,088 by 2030.⁶

Asotin County

Asotin County is significantly larger than Columbia County, with a 2007 population of 21,300. Clarkston is the largest population center within the county, making up over one-third of the county's population (7,280 people). At the community level, recent growth in the county has been primarily in the unincorporated areas, with little to no growth in the cities of Clarkston and Asotin. Between 1970 and 2004, population in the county has increased at an average annual rate of 1.2 percent per year. Projected population in the county indicates significant growth, growing to 26,222 by 2030.

Garfield County

The 2007 population of Garfield County was 2,350. Pomeroy is the only incorporated population center, home to nearly two-thirds of the county's population (1,520 people). Between 1970 and 2004, population in the county decreased at an average annual rate of 0.7 percent per year. In recent years, growth in the county has only occurred in Pomeroy, which has increased only slightly since 2000. Projected population in the county indicates minimal growth, growing to 2,683 by 2030.

Whitman County

The 2007 population of Whitman County was 42,700. As with Columbia County, Whitman County is primarily rural in nature; however, it also houses one of the largest universities in Washington, Washington State University in Pullman. Pullman is the largest population center in the county, with over one-half of the county population (26,860 people). Colfax is the next largest, with a 2007 population of 2,905. Between 1970 and 2004, population in the county has increased at an average annual rate of 0.2 percent per year. Recent growth in the county has been primarily in the incorporated areas, with the cities of Colfax and Pullman

⁶ Unless otherwise noted all population projections are from Washington Office of Financial Management, "Final Projections of the Total Resident Population for Growth Management Medium Series: 2000-2030." Olympia, Washington. October 2007.

incurring the greatest growth. Projected population in the county indicates slight annual future growth, with forecasted population of 47,743 by 2030 (0.5 percent annual growth rate).

Outside the Region

Three population centers are located just outside the Region, and are commercial centers that draw Regional residents for shopping and services. These are Moscow, Idaho (population 23,223) which is located less than 10 miles east of Pullman; Walla Walla, Washington (population 30,794) which is located approximately 30 miles southwest of Dayton; and Lewiston, Idaho (population 31,794) which is located just across the Snake River from Clarkston.⁷ The presence of these urban areas located very close to the Region is an important factor in determining the magnitude of economic impacts of wind energy development in the Region. The nearby presence of these cities may result in the wind energy projects sourcing materials and services from these areas rather than from within the Region, similarly project employees may reside in these areas rather than living in the Region. Both of these effects can lessen the economic development potential of wind energy projects in the Region by reducing project-related demand for goods and services produced in the Region.

Economic Base, Employment, and Income

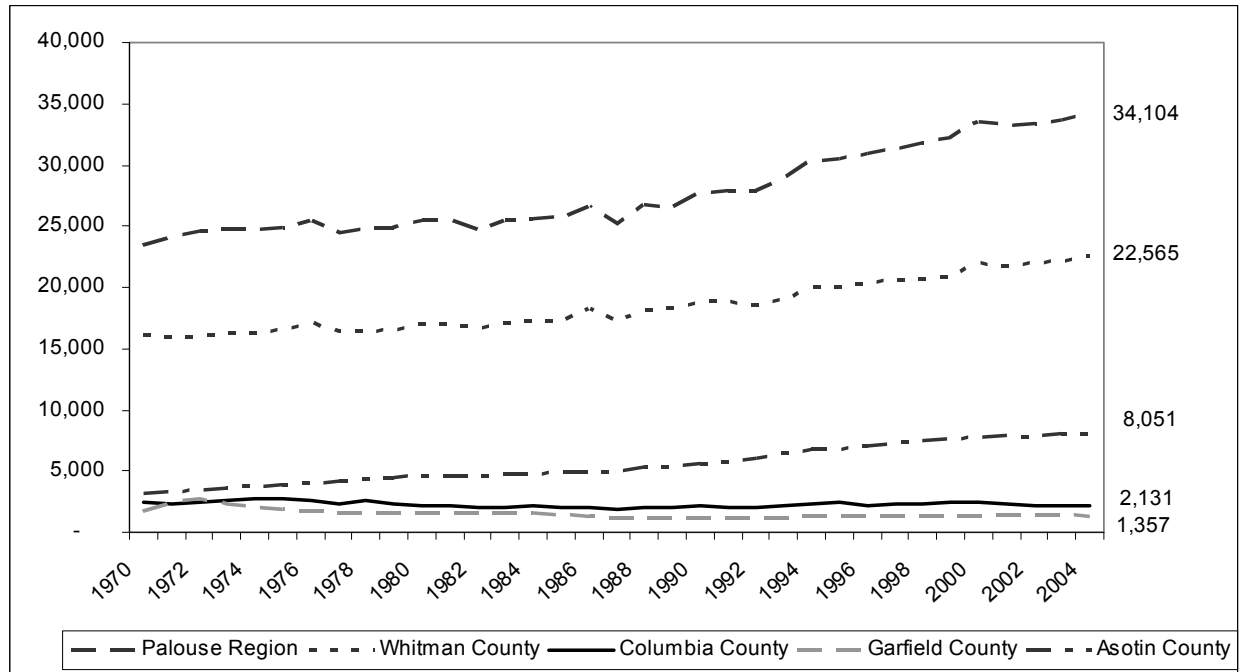
The economic base of the Region is not unusual for other rural areas in the United States. Employment has followed along with population increases, and even increased slightly faster than population since 1970 (see Figure 3). The government sector and the service sector are the two largest industries as measured by employment in 2006. The primary employers in the Region include Washington State University (Whitman County), Schweitzer Engineering (Whitman County), Clarkston School District (Asotin County), Tri-State Memorial Hospital (Asotin County), Federal Government (all four counties), Pullman Hospital (Whitman County), McGregor's (Agricultural Services in Whitman County), and Asotin County (Asotin County). Figure 4 shows the relative size of the economic sectors in each County, and illustrates the extent that Whitman and Asotin Counties dominate the Regional economy.

There are several key sectors that provide significant inputs to wind power projects and project workers. These include construction, retail, and service industries. The size of these industries in each county indicates the degree that project-related demands for goods and services can be met locally, and therefore the degree to which commercial wind energy development will spur economic growth in the county. In general, the larger these industries

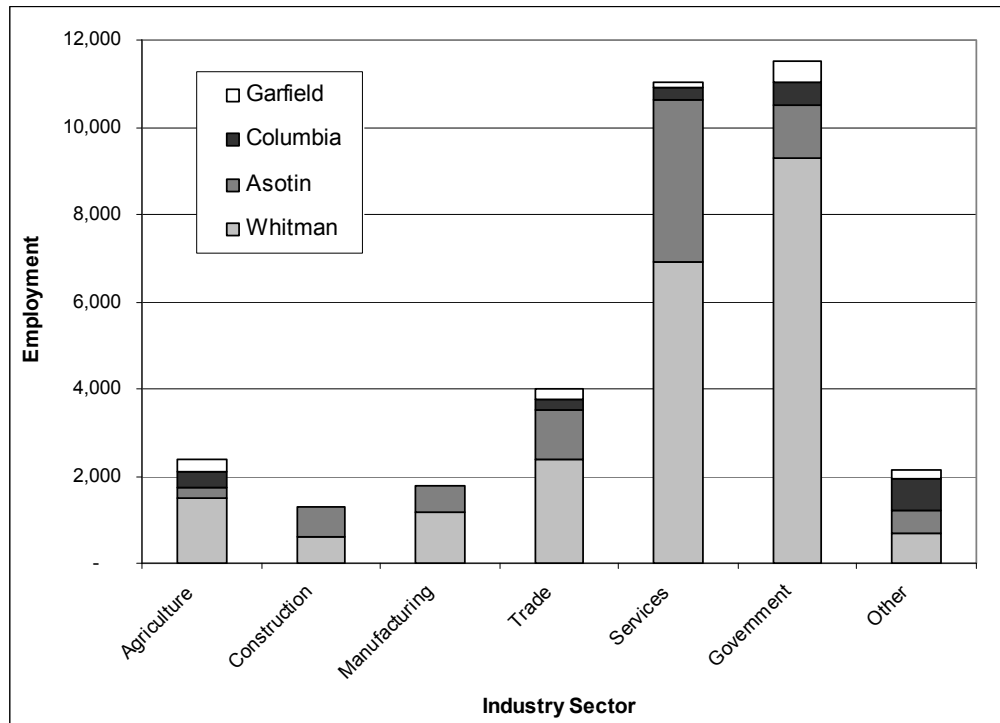
⁷ US Census Bureau, 2007 Population Projections, 2000 Census.

are in a county, the more economic growth will be stimulated in the county. As indicated in Figure 4, several key sectors most affected by wind energy projects, including construction, retail, and service industries, are relatively small in Columbia and Garfield Counties. This indicates a smaller potential impact to the economy of these two counties by any new wind energy project.

Figure 3
Regional and County Employment, 1970-2004



**Figure 4
Employment in Primary Sectors by County**



Overall unemployment in the Region in 2005 was 5.0 percent, compared to 5.5 percent in Washington State, and 5.1 percent in the nation. Total personal income in the Region in 2004 was over \$1.6 billion. Of this total, labor income was \$1.0 billion (62 percent). The remaining non-labor personal income was comprised of \$291,000 (18 percent) in dividends, interest, and rent, and \$327,000 (20 percent) in personal current transfer receipts (which includes retirement and disability insurance benefits, medical payments such as Medicare and Medicaid, income maintenance benefits, and unemployment insurance benefits). The annualized growth rate in personal income between 1970 and 2004 was 1.2 percent per year. However, growth of total personal income has historically been slower in the Region than both Washington State and the nation. Per capita income in the Region in 2004 was \$23,975, lower than both Washington State (\$35,041) and the nation (\$33,050).

With some variation between counties, the Region is generally homogenous in its agricultural commodities. The primary agricultural products in the Region are wheat and barley, with some cattle, peas, lentils, and forage crops as well. In 2002, the total market value of crops and livestock in the Region was \$218 million, representing over 13 percent of total economic

output in the Region. The value of crop production totaled approximately \$200 million and livestock products had a value of \$18.6 million.⁸

The four counties forming the Region rank within the top 13 counties in Washington State for the value of sales of grains, oilseeds, dry beans, and dry peas, as well as the number of acres of wheat for grain. These four counties also fall within the top seven counties ranked for acres of barley. The Region includes the top ranked county for all three of these items.⁹

Columbia County

Employment in Columbia County was 2,131 jobs in 2004.¹⁰ Since 1970, 296 jobs have been lost. The primary industries in the county are retail trade and local government, which combined account for about 26 percent of total employment. Further, most of the employment is wage and salary jobs (73 percent) compared to proprietor employment (27 percent), although the proportion of proprietor employment relative to the total employment base has increased over the past three decades. A proprietor is an owner of a business establishment, such as a store or a farm or ranch.

At the industry level, Columbia County has more employees in other services except public administration and government and government enterprises than the U.S. as a whole. In addition, there is a much larger percentage of farm proprietors (12 percent) and farm employment (17 percent), in Columbia County than the U.S. as a whole. Conversely, manufacturing industries in Columbia County are proportionately about half that of the U.S. Over three-quarters of the firms in the county have less than five employees and approximately 90 percent of firms have fewer than 20 employees.

Historically, the unemployment rate in Columbia County has been measurably greater than for the Region, Washington, and the U.S. In 2005, the rate was 7.1 percent, compared to 5.0 to 5.5 for these three areas (as discussed above).

Total personal income in Columbia County was \$117 million in 2004, making up about 7.5 percent of the Regional income. Of this total, labor income was \$67 million (57 percent). The annualized growth rate in personal income was 0.1 percent between 1970 and 2004. On a per-capita basis, income levels were \$28,069 in 2004, lower than Washington State and the nation, but higher than the Region.

⁸ United States Department of Agriculture, National Agricultural Statistics Service, “2002 Census of Agriculture County Profile”, Columbia, Whitman, Asotin, and Garfield Counties.

⁹ Ibid.

¹⁰ Unless otherwise specified socioeconomic data presented in the remainder of this chapter is all from, Headwater Economics, 2007, “A Socioeconomic Profile, Columbia County,” produced by the Economic Profile System, Internet website <http://www.headwaterseconomics.org>.

Asotin County

Employment in Asotin County was 8,051 jobs in 2004. Since 1970, 4,822 jobs have been created. The primary industries in the county are retail trade, health care and social assistance, and local government, which combined account for about 37 percent of total employment. As with Columbia County, most of the employment in Asotin County is wage and salary jobs (73 percent) compared to proprietor employment (27 percent).

Historically, the unemployment rate in Asotin County has been measurably lower than for Washington and the U.S. However, since 2000, Asotin County unemployment has been greater than the national rate, and since 2002 it has been higher than Washington State. It remains below Columbia County. In 2005, the rate was 6.2 percent.

Total personal income in Asotin County was \$567 million in 2004, accounting for 35 percent of the Regional total. Of this total, labor income was \$333 million (59 percent). The annualized growth rate in personal income was 2.6 percent between 1970 and 2004. On a per-capita basis, income levels were \$27,128 in 2004, lower than Columbia County, Washington State, and the nation, but higher than the Region.

Garfield County

Employment in Garfield County was 1,357 jobs in 2004. Since 1970, 347 jobs have been lost. The primary industries in the county are agriculture, wholesale trade, retail trade, and state and local government, which combined account for about 82 percent of total employment. Agriculture alone (both proprietors and private employment) account for over 36 percent of total employment. As with Columbia County, most of the employment in Garfield County is wage and salary jobs (67 percent) compared to proprietor employment (33 percent).

Historically, the unemployment rate in Garfield County has been measurably lower than for Washington State, as well as for the nation until 2000. Since 2000 Garfield County's unemployment rate has been greater than the national rate. It remains below Columbia County. In 2005, the rate was 5.5 percent relative to the 2005 unemployment rates for these areas (previously discussed above).

Total personal income in Garfield County was \$57 million in 2004, which totals about 2.5 percent of the Region. Of this total, labor income was \$28 million (49 percent). The annualized growth rate in personal income was negative 1.0 percent between 1970 and 2004. On a per-capita basis, income levels were \$24,541 in 2004, lower than Columbia County, Washington State, and the nation, but higher than the Region.

Whitman County

Employment in Whitman County was 22,565 jobs in 2004. Since 1970, 6,479 jobs have been created. The primary industries in the county are agriculture, retail trade, health care and social assistance, accommodations and food services, and state and local government, which combined account for about 71 percent of total employment. Agriculture alone (both proprietors and private employment) account for over 11 percent of total employment. As with Columbia County, most of the employment in Garfield County is wage and salary jobs (81 percent) compared to proprietor employment (19 percent).

Historically, the unemployment rate in Whitman County has been measurably lower than for the Region, Washington State, and the nation. It remains below Columbia County. In 2005, the rate was 4.2 percent relative to the 2005 unemployment rates for these areas (previously discussed above).

Total personal income in Whitman County was \$879 million or 55 percent of the Region in 2004. Of this total, labor income was \$572 million (65 percent). The annualized growth rate in personal income was 0.8 percent between 1970 and 2004. On a per-capita basis, income levels were \$21,878 in 2004, lower than Columbia County, the Region, Washington State, and the nation.

Chapter 4 Regional Economic Impacts of Columbia County Wind Projects

This section presents the methods and results of the Regional economic impact analysis of the impact of the Projects on Columbia County jobs and income. The economic effects of wind energy projects are akin to other developments that have a construction phase as well as ongoing operations. These types of projects typically provide an initial, short-term boost to the local economy during project construction as goods and services are purchased locally and local labor is used. However, a wind project is unique in the sense that the type of capital equipment used (wind turbines) is very specialized, and often is imported from outside the local economy. Once construction is completed, project operations provide extended local economic benefits over the long-term through spending on goods, services, lease payments, and labor that support operations.

Following an overview of the methodology, this section presents the estimated economic impacts of the project, focusing on the increased income and employment impacts that are expected to have accrued within Columbia County during Project construction as well as expected ongoing impacts occurring annually during operations. Employment and income generated by the Projects are first discussed, followed by a section presenting net employment and income effects after taking into account the small costs to employment and income associated with displacing land from agricultural production.

The time period of the analysis includes the development, construction, and operations phases of the Projects. Development started in approximately 2000 and continued through 2007. Construction began in 2005 and continued through 2008. As the bulk of the development and construction impacts were felt during the period 2005 to 2007, total development and construction impacts are summed from the period 2000 to 2007 and then averaged across these three years to provide an indication of the annual impacts for this time period. Although the three Projects began operating in different years, all three are assumed to have an operating life of 25 years as this is the period that the manufacturer guarantees the turbine can operate. Operations impacts are therefore projected for the years 2008 through 2033. As the Projects are expected to be maintained and operated beyond the assumed 25-year life, it is

anticipated that Projects' effects may extend beyond 25 years, increasing the total value of the Projects over time.

This analysis provides an estimate of the total number of jobs and the income supported by the Projects. Due to other, concurrent changes occurring in the Columbia County economy, the estimate of jobs supported does not necessarily represent new employment. In 2004, just prior to construction beginning on the Projects, a food processing plant closed in Dayton. It is expected that some of the employment and income that was previously supported by this plant is now supported by the Projects. In other words, the economic activity generated by the Projects creates new jobs and supports jobs that previously existed that otherwise may have been lost.

In addition to the net economic benefits that are realized in Columbia County and concentrated in the community of Dayton, the Projects serve as a reliable source of clean and renewable power serving households and industries in Washington. These and other economic impacts outside the Region are addressed qualitatively. The section concludes with a discussion of economic benefits that are expected to be generated outside Columbia County. Increased local tax revenue impacts are discussed separately in Chapter 5.

Methodology

To understand how an economy is affected by a new business or industry, such as wind energy projects, we develop a snapshot of the economy at a particular point in time. This snapshot shows us how some parts or "sectors" in the economy are linked to each other. Using forest industries as an example, the sawmill industry buys logs from the logging industry, which buys trees from the forest owners, who in turn then buy seedlings from the nursery industry and the forest services sector to reforest their lands. These are referred to as backward linkages. If there were further processing beyond the sawmill industry, such as making lumber into doors and windows, it would be called a forward linkage.

Typically, most economic sectors also need to make purchases of goods and materials from outside of the local economy. Purchases made from outside the local economy are called "imports." Money spent on imports is said to be a "leakage" from the local economy. Likewise, businesses typically do not sell all of their production to businesses in the local area, but sell some or all of their production to businesses outside the local area. Products sold outside the local area are "exports," and money received for exports brings "new" money into the area and increases the size of the local economy through a multiplier effect.

The extent to which "new" money, generated by exports or by a new project are able to expand the local economy is greatly dependent on how much of the money received *remains* in the local economy. As money is received as part of project-related expenditures, the local

suppliers then spend that money. To the extent that there are plenty of other local businesses on which the local suppliers can depend, less of this money leaves the local economy to buy imports. If there are few local businesses from which needed purchases can be made, much of the money will leave, or “leak” from, the local economy.

As other local businesses receive a portion of the money from the first supplier, they too can spend the money either within or outside the local economy. The more money spent within the local economy, the larger the local impact from the initial money received for the project related expense. This round by round pattern of spending associated with a new project is called the multiplier effect. The size of this multiplier effect depends on how local businesses are linked together and how much leakage there is to outside areas for imports. If the economy has numerous sectors that are linked, multipliers will be higher than if there are few linkages between sectors.

The household sector is linked to all sectors as it provides the labor and management needed by all sectors. In turn, changes that affect the incomes of the household sector typically have more significant impacts on a local economy compared to a change in the sales of other sectors. This does not mean that the effect on an individual sector, such as retail trade, will be insignificant as it will also indirectly affect the household sector.

We use an economic model, called IMPLAN to develop this picture of a local economy. This picture shows us the sectors that exist in a local area at a particular point in time, the links between them, and the level of economic activity that occurred at that time. This section describes the approach used to measure the total impacts of Project related spending as it ripples through the economy.

Economic Model

The Regional economic impacts of the Projects were estimated using IMPLAN (Impact Analysis for Planning), an economic input-output (I-O) model.¹¹ I-O models are constructed based on the concept that all industries within an economy are linked together; the output of one industry becomes the input of another industry until all final goods and services are produced. I-O models can be used both to analyze the structure of a regional economy and to estimate the total economic impact of projects or policies. For this analysis, a 2007 economic model for Columbia County was constructed by ENTRIX using IMPLAN software and data, and used to estimate economic impacts of the Project.

¹¹ The IMPLAN model consists of commercial software and region-specific economic data, which is maintained and distributed by the Minnesota IMPLAN Group, Inc.

IMPLAN I-O models provide three economic measures that describe the economy: output, labor income, and employment. Output is the total value of the goods and services produced by businesses in the county. Labor income is the sum of employee compensation (including all payroll costs and benefits) and proprietor income (profits). Employment represents the annual average number of employees, whether full or part-time, of the businesses producing output. Income and employment represent the net economic benefits that accrue to the Region as a result of increased economic output.

Total economic effects include direct effects attributed to the activity being analyzed, as well as the additional indirect and induced effects resulting from money circulating throughout the economy. Because the businesses within a local economy are linked together through the purchase and sales patterns of goods and services produced in the local area, an action which has a direct impact on one or more local industries is likely to have an indirect impact on many other businesses in the Region. For example, an increase in construction will lead to increased spending in the local area. Firms providing production inputs and support services to the construction industry would see a rise in their industry outputs as the demand for their products increases. These additional effects are known as the indirect economic impacts. As household income is affected by the changes in regional economic activity, additional impacts occur. The additional effects generated by changes in household spending are known as induced economic impacts.

Data Collection

This section describes the data collection effort used to assess the economic impacts of the existing three Columbia County Projects. This section also describes the data collected to consider how economic impacts of potential wind energy projects in the three other Southeastern Washington counties of Asotin, Garfield, and Whitman might compare with impacts realized in Columbia County.

To measure the effect of the wind energy projects on a local economy, it is necessary to identify the mix of goods and services purchased locally to construct and operate the projects. This mix of goods and services is like a recipe, with the ingredients measured in dollars; so many dollars for turbines, so many dollars for towers, so many dollars for wiring, so many dollars for various labor and management skills. Ideally, this list of inputs is composed of the items that will actually be used in constructing and operating the project. However, even with projects that have already been constructed, as in Columbia County, the dollar expenditures on local goods and materials for the Projects are often not known with certainty.

Although the Projects have been constructed, the total dollar expenditures (by the project developer, project employees, and the operating utilities) on local goods and materials related to the Projects are not known with certainty. The project developer for all three projects, RES Americas Inc (RES), provided estimates for the development and construction phases,

while the utilities owning the three projects, PacifiCorp and Puget Sound Energy (PSE), provided estimates regarding the operations phase. Additional information was compiled from extensive interviews with local organizations and businesses.

Project data was provided by RES and PSE. For the development phase prior to construction, RES provided the payments to landowners for testing on their property for wind energy potential, as well as estimates of local expenditures for goods and services during the planning phase. For the construction phase, RES estimated the number of construction employees and the number of employees that were local hires.¹² RES also provided total equipment costs and labor cost estimates, as well as an estimated proportion that was sourced locally. The estimates of materials purchased locally were utilized in the analysis to the extent that local businesses verified that their business provided goods and services to the Projects. An estimate of total annual lease payments to landowners in the area was also provided by RES. PSE, the utility that owns the Hopkins Ridge Project, provided estimates of the number of employees that were hired during the construction phase of the project, as well as their total compensation.

In addition to these figures, it is necessary to estimate the expenditures by non-local construction workers. The money that non-local construction workers spent while in Columbia County represents 'new' money to the local economy and contributes significantly to impacts due to the Projects. These non-local worker expenditures were based on the number of employees and the length of the construction period, combined with interviews with local RV parks, motels, restaurants, grocery stores, and assorted businesses and the chamber of commerce.

For the operations phase, PSE and Vestas (which maintains the turbines for the utilities) provided the number of staff employed locally, as well as employee wages. PSE, which has an office in Dayton, also estimated their annual expenditures on local goods and services. It is expected that there are additional economic benefits of the operations phase of the wind energy projects that are not captured in this analysis, including spending by project visitors/service providers and non-local Vestas and utility employees. Additionally, little data were provided on local expenditures by PacifiCorp, so with the exception of the one operations employee currently in Dayton, any expenditure by PacifiCorp in the local area during operations is not captured in this analysis.

¹² Personal communication with Jacob Davis, RES, August 4, 2008; Personal communication with Nicole Hughes, RES, October 9, 2008.

Results

This section presents the estimated past and future income and employment generated in Columbia County due to the Projects. Benefits due to the project are first presented for employment, then for income. Opportunity costs, which result from displacement of agriculture on the land that is now being used for wind energy production, are also estimated in terms of the small amount of income and jobs that were previously supported by agricultural production in the Projects' footprints. Finally, the last section presents the *net* income and employment benefits of the project (found by subtracting the opportunity costs from the benefits) on an annual and project lifetime basis.

Employment Benefits

Employment impacts are described below for the development/construction and operations phases of the Projects. Employment estimates include the jobs that are directly created by the Project, as well as the estimated additional jobs created in other sectors due to the overall economic stimulus caused by the Project. Estimates below report total job numbers, counting both full and part-time jobs.

Development and Construction Phase

The primary employment effects during the development phase (which occurs prior to construction) are due to services hired by the developer for permitting, real estate work, and community relations. During construction, the estimated employment effect on Columbia County of the three wind energy projects primarily stem from labor hired to construct the Projects. The projects' developer, RES Americas, estimates that during the main construction period between 2005 and 2007 there were typically 150 to 200 construction employees working on the Projects, with an average of approximately 165 workers employed throughout each year.¹³ Of these workers, approximately 20 employees were local residents of Columbia County. The remaining construction workers were temporary residents that relocated for the duration of the construction phase in either Columbia County or in nearby Walla Walla County. There were another four employees hired during the construction phase by the utility operating the Hopkins Ridge Project.¹⁴ Total direct employment impact during construction was therefore approximately 170 jobs (both part-time and full-time).

¹³ Personal communication with Jacob Davis, RES, August 4, 2008, and Personal communication with Nicole Hughes, RES, October 9, 2008.

¹⁴ Personal communication with Anne Walsh, PSE, October, 2008.

In addition to these jobs directly generated by the Projects, employment was generated in other sectors through the induced effects created by construction employees spending their wages in the local community. Non-resident construction workers spent money in Columbia County on such goods and services as lodging (hotels, RV parks, and private rentals), food (restaurants and grocery stores), and gas, which resulted in small employment increases in these sectors. Increased spending by local construction worker households also generated some additional employment in Columbia County. Based on 2006 economic data regarding the relationships between output and employment in Columbia County, the IMPLAN analysis indicates that the increased spending by construction workers supported 22 jobs, of which 10 jobs were in the hotel industry. However, interviews with local hotel owners indicated that they did not hire additional staff due to the increased demand for their services, so it is estimated that the total induced employment generated by construction worker spending was likely closer to 12 jobs.

Data from the local community also indicates that some local jobs were supported through the indirect effect of Project-related expenditures on goods and materials used as inputs for the Projects. Local businesses in Dayton as well as the project developer reported expenditures on local goods and services that were used as inputs to the construction process, including professional services, vehicle fuel and maintenance purchases, hardware store purchases, and miscellaneous construction and maintenance materials and labor. Based on interviews with local businesses as well as economic data regarding the relationship between Columbia County output and employment, it is estimated that this spending on Project inputs supported seven jobs, primarily in the construction industry. Considering the size and cost of the Projects, expenditures for Project inputs resulted in relatively few additional jobs. Although expenditures on capital equipment for the Projects were over several hundred million, much of the equipment was specialized and was purchased from sources outside Columbia County and the Region, and therefore had little to no local or Regional impact.

In summary, Project-related economic activity during the construction phase had three impacts on employment. First of all, there was a direct impact of the labor working for the Projects, estimated at approximately 170 workers annually. The induced economic activity generated by construction employees spending their wages in the local economy supported an additional 12 jobs. Finally, Project-related spending on local materials and services resulted in indirect employment impacts of six jobs. Therefore, the total construction employment impact is estimated at 189 jobs in Columbia County during the construction phase of the Projects.

The ratio of total jobs created (189 jobs) to direct jobs created (170 jobs) gives us an employment multiplier of 1.1. The multiplier indicates that for every direct job created in the construction of the wind energy projects, an additional 0.1 job was created elsewhere in Columbia County. The size of the multiplier provides an indication of the strength of economic linkages in the local area; the greater the multiplier, the greater total economic effect resulting from the direct impact.

Operations Phase

During the operations phase of the Projects, jobs are primarily being generated to meet the need for maintenance and operation of the wind turbines. In the case of the Columbia County Projects, the utilities that own the Projects have a contract with the turbine manufacturer, Vestas, to maintain and operate the turbines. Vestas has hired 31 employees, many of whom were local Columbia County residents that were trained by Vestas in Portland, Oregon.¹⁵ Puget Sound Energy, which owns and operates the Hopkins Ridge Project, is employing seven full-time staff in the Dayton area.¹⁶ PacifiCorp, which owns and operates the Marengo I and II Projects, currently employs one full-time person in Dayton.¹⁷ Thus, Project employment in Columbia County is approximately 39 jobs during operations.

In addition to jobs directly generated by Project operations, the purchase of Project-related materials and services is also indirectly generating some local employment. Although limited, some employment is being supported by demand for such ongoing services as vehicle maintenance and repair, miscellaneous repair and maintenance activities, office rent and cleaning services, office supplies, and hotel accommodations and restaurant services for temporary workers hired by the Projects. Known expenditure on such items is estimated at approximately \$211,000 per year, which is likely a conservative estimate. This expenditure is estimated to support two jobs in Columbia County.

Finally, ongoing expenditures during operations by Project employees of their wages in the local economy also support local employment. Most Project employees live in Columbia County, and by retaining this population in the local area and providing these individuals with family wage jobs, it is expected that through their expenditures they support an additional 12 jobs, primarily in the trade and service sectors. Thus, total employment supported by the project, including direct, indirect and induced employment, is estimated at 53 jobs: 39 employed directly, two indirectly, and 12 due to the induced effect. The ratio of total jobs created (53 jobs) to direct jobs created (39 jobs) gives us an employment multiplier of 1.4.

Employment Benefits Summary

The total employment effects for both construction and operations phases are shown in Table 1. A total of 189 jobs were created in Columbia County during construction, of which approximately 40 to 45 were filled by local residents. During the ongoing operations phase,

¹⁵ Personal communication with Dan Ortega, Vestas, August 2008.

¹⁶ Personal communication with Anne Walsh, PSE, October, 2008.

¹⁷ Personal communication with Doug Mollet, PacifiCorp, August, 2008.

it is estimated that approximately 53 jobs are being created or supported by the economic activity generated by the Projects.

**Table 1
Employment Impacts in Columbia County**

Economic Impact	Development / Construction (Annually 2005-2007) ¹	Operations (Annually 2008-2033)
Employment (Jobs)		
Direct Effects	170	39
Indirect Effects	6	2
Induced Effects	12	12
Total Employment Effects	189	53
Employment Multiplier	1.1	1.4

¹ Note that there were slight employment effects during 2004 during development due to demand for community relations and project permitting. These impacts are included in the average impacts from 2005 to 2007.

Income Benefits

Income impacts are described below for the development/construction and operations phases of the Projects. Income figures represent total labor income, which includes both profits to business owners and wages to employees.

Development and Construction Phase

During construction, approximately 90 percent of Project workers temporarily located in the region during construction; this analysis does not include the income received by these relocated construction workers.

Just like employment, income generated during development and construction is a temporary benefit for the local economy that comes in the form of additional wages and profits. Local income increased from the development phase through payments for permitting and planning services as well as payments to landowners for testing of wind energy potential. Prior to constructing the Projects, approximately \$25,000 was paid by the developer to landowners for anemometer leases to test the wind on their lands.

In the construction phase, income is increased not only through the direct spending by the Projects on wages to local individuals, but also by the profits and wages to the local owners

and workers employed at businesses supplying the project with goods and services. This indirect income effect is felt in the businesses noted above that supply goods and services to the Projects, notably businesses providing construction and maintenance services, hardware stores, and vehicle maintenance and fuel operations. Income is also generated in sectors that supply goods and services to the workers employed by the Projects, which primarily includes such businesses as hotels and RV parks, grocery stores, restaurants, and gas stations.

During construction, direct income benefits in terms of project wages and profits to local workers are estimated to have been at \$1,771,000 annually. The indirect wages and profits generated in other sectors was an additional \$100,000. Finally, wages and profits induced by Project employee spending during the construction phase was approximately \$411,000. Total estimated annual income generated during the three-year construction phase was \$2,282,000.

Operations Phase

The operations phase of the Project increases income not only for the employees maintaining and operating the Project, but also for the landowners who are leasing their lands to the Projects. This income is estimated at approximately \$3,110,000 annually.¹⁸ Additional profits and wages are generated in the economy as this income is re-spent in the local area; it is estimated that this induced effect adds approximately \$311,000 annually to local household income. Finally, expenditures at local businesses supplying goods and services to the Projects (indirect effect) are anticipated to result in \$76,000 in additional profits and wages to local households. Total household income is expected to rise annually by \$3,497,000 in Columbia County during the 25 years of Project operations due to increased profits and wages generated by the Projects.

Income Benefits Summary

Table 2 summarizes total household income impacts (profits and wages) in Columbia County during the construction and operations phases.

¹⁸ For some but not all of the direct project employment, this figure includes benefits, which are a form of compensation. Personal communication with Dan Ortega, Vestas, August 2008; Nicole Hughes, RES Americas, October 2008; and Anne Walsh, PSE, October, 2008.

Table 2
Household Income Impacts in Columbia County

Economic Impact	Construction (Annually 2005-2007)	Operations (Annually 2008-2033)
Household Income (Profits and Wages)		
Direct Effects	\$1,771,000	\$3,110,000
Indirect Effects	\$100,000	\$76,000
Induced Effects	\$411,000	\$311,000
Total Income Effects	\$2,282,000	\$3,497,000
Total Income Multiplier	1.3	1.1

¹ Note that there were some income effects during 2004 during development due to demand for community relations and project permitting. These impacts are included in the average annual impacts form 2005 to 2007.

²Note: May not add due to rounding.

Net Income and Employment Benefits

In addition to generating employment and income, the Projects also displace some agricultural production, resulting in small income and employment losses. These losses must be taken into account to estimate the net economic benefits of the Projects.

The three Columbia County Projects have a footprint of approximately 235 acres, and would displace this acreage of agricultural land. The value of using this land in its next best use (agriculture) is called the opportunity costs of using the land for wind energy projects. The opportunity cost is a real economic cost and must be subtracted from the Projects' benefits presented above to estimate net economic impacts. This section summarizes the opportunity costs and estimates the associated net economic benefits.

Crops grown in the Region typically include wheat (winter, soft white spring, and hard red spring), spring barley, peas, lentils, garbanzos, spring canola, and pushed spring canola, grown in various rotations. Current crop enterprise budgets for these crops, various crop rotations, and current pricing information results in an average gross return per acre of \$504,¹⁹ which over 235 acres results in a gross opportunity cost of \$118,187. Net returns after total and variable costs average \$123 per acre,²⁰ resulting in a net opportunity cost of

¹⁹ Painter, Kathleen, PhD, 2008 Crop Rotation Budgets, Over 18" Precipitation Zone Under Conventional Tillage, Whitman County, Washington.

²⁰ Ibid.

\$28,840. However it should be noted that these figures are for Whitman County, which generally realizes greater productivity than the other three counties, so the results may be a high estimate for Columbia County and the other two Southeast Washington counties of Garfield and Asotin.

As the reduction in farmed cropland is divided among several operations, it is unlikely that any of the operations with wind turbines would decrease the number of farm employees. Additionally, the direct foregone income of \$29,000 leads to approximately \$3,000 in induced income effects. Therefore, the total opportunity cost of changing the use of land away from farming grain and toward producing wind energy is approximately \$32,000 income annually for all Columbia County projects. Landowners are compensated for lost agricultural production during the construction phase, so this \$32,000 in reduced grain farming income is only experienced during the operations phase when it is more than offset by the gain in wind energy payments, as indicated in Table 3.

By subtracting the opportunity cost of \$32,000 from the beneficial income impact estimate during operations, the net effect on income of the Projects during operations is a positive impact of \$3,465,000 (see Table 3). As there are no anticipated opportunity costs of the Project on employment or on construction income, these estimates are the same as presented in Tables 1 and 2.

Table 3
Summary of Net Economic Impacts of Project Construction and Operations

Economic Impact	Construction (Annual, 2005-2007)	Operations (Annual, 2008-2033)
Labor Income (Columbia County Residents)		
Direct Effects	\$1,771,000	\$3,081,000
Indirect Effects	\$100,000	\$76,000
Induced Effects	\$411,000	\$308,000
Total Income Effects*	\$2,282,000	\$3,465,000
Employment (Jobs – All Employees)		
Direct Effects	170	39
Indirect Effects	6	2
Induced Effects	12	12
Total Employment Effects*	189	53

Net Present Value of Income Effects

Over the assumed 25-year life of the Projects, the total net economic income benefit may be calculated by considering the net present value (NPV) of income impacts from the Projects. The NPV of any project is the net gain or loss estimated in each year in the future added up in 2008 dollars. The value is net, because it is based on the total benefits less the opportunity costs discussed above. To calculate the NPV of any project, the time value of money is considered, which takes into account the greater value of money received in the near future compared to money that will be received farther into the future. To do this, a discount rate of three percent is used; so for every year that passes before money is received the value is reduced by three percent. For example, using a three percent discount rate \$100 dollars received next year is equivalent to \$97 received this year. The discount rate was only applied to discount future income, but was not applied as an interest rate to past income.

This NPV estimate assumes that the Projects continue operating through 2033; to the extent that the Projects continue operating past 2035 this estimate understates the long-term net income benefits of the Projects. Based on these assumptions and the annual net income estimates provided in the previous section, the total NPV of income in Columbia County due to the Projects is estimated at \$67.2 million (Table 4).

Table 4
Net Present Value of Income Impacts of
Project Construction and Operations

Economic Impact	Total Present Value Income
Labor Income (millions \$)	
Direct Effects	\$58,963,000
Indirect Effects	\$1,623,000
Induced Effects	\$6,596,000
Total Income Effects	\$67,183,000

Economic Impacts Outside Columbia County

Economic benefits of the Projects have, and will continue to extend outside Columbia County. During construction, these out-of-county benefits were driven primarily by expenditures for large equipment and other goods and services that are not produced locally. Items that were imported from outside the county include major equipment such as wind turbines, blades and towers and other specialized electrical equipment, as well as standard construction materials that might have been sold locally, but manufactured elsewhere. Additionally, during construction numerous services were provided to the Projects by

businesses located outside of the county and the Region. These services include permitting, truck transportation of capital equipment, engineering costs, and site investigations. Based on information provided by RES Americas (Projects' developer) and Puget Sound Energy (utility owning Hopkins Ridge Project), few of these goods and services procured outside Columbia County were provided by businesses located elsewhere in the Region.

These out-of-county construction expenditures resulted in direct and indirect economic benefits (income and employment) in the economies where these items were produced. In addition, the extent to which that local labor was not available in Columbia County and/or specialized labor was needed, workers were drawn in from surrounding counties and/or states with larger and more diverse construction work forces. It is estimated that 90 percent of the construction workforce, or approximately 145 workers on average, were drawn into the Region from other areas. This resulted in employment benefits and wage earnings that were leaked outside the county, thereby benefiting other regional economies.

Operation of these wind energy projects also generates positive economic effects outside of Columbia County. These effects include: (1) economic benefits (jobs and income) in areas where operations-related goods/services are purchased and manufactured, including replacement parts; (2) benefits associated with renewable energy development; and (3) power reliability- and cost-related benefits in areas where the wind energy projects are used to facilitate economic growth and production.

Chapter 5 Fiscal Impacts of Existing Columbia County Projects

The fiscal impacts from wind energy projects can include changes to both government costs and revenues. The cost impacts are attributable to any Project-related requirements for public services. The most commonly required public services during construction and operations are road maintenance, water, fire, and police protection. None of these are typically large for wind projects.²¹ Typical revenue impacts are sales/use taxes during construction and property and sales taxes during Project operations. Taxes are a redistribution of benefits from wind energy production to the federal, state, and local government jurisdictions in which the wind energy production and sales occur. Thus, determining the impact of taxes on a specific community depends entirely on the tax structure of that jurisdiction.

The fiscal impacts from the Project evident thus far are beneficial to Columbia County. The impacts differ significantly during the construction and operational phases of the Project. During construction, tax revenue impacts directly generated by the Projects are expected to be very small due to a state sales and use tax exemption on capital equipment and services used to install energy facilities with a generation capacity of 200 watts or more electricity. During the operations phase, however, both property taxes and sales taxes are being generated from the Projects.

Fiscal Revenues (Taxes)

Project impacts on property tax and local sales/use tax revenues are analyzed in this section. Property tax benefits represent a long-term source of tax revenues for Columbia County,

²¹ Bureau of Land Management, North Palm Springs Field Office, September 24, 2006, "Economic and Fiscal Report, Alternative A, Mountain View IV Wind Project, Palm Springs, CA," prepared by AES Sea West, San Diego.

which would accrue over the approximate 25-year life of the Project. There will also be a small increase in sales and use taxes due to spending during the operations phase. The sales tax analysis presented here is based on the direct effects of project spending.

Property Tax

Property taxes have been paid on the Hopkins Ridge project for the past two years (2007 and 2008). The amount and distribution of these past payments are first described. Approximate projections of future property tax payments once all projects are operational are then discussed.

Past Property Taxes

Property taxes have been generated from the Hopkins Ridge project since 2007. The Marengo I and Marengo II projects will begin paying property taxes in 2009 and 2010, respectively, once the projects are fully operational. In 2008, the Washington Department of Revenue assessed the total taxable value of the Hopkins Ridge project at \$81.2 million. The applicable property tax levy rate in Columbia County (Levy Code 2-3) is \$11.17 per \$1,000 of the property value, which is a 1.12 percent tax rate. Based on this rate, property taxes from the Hopkins Ridge Project in 2007 were \$807,000 and will be \$907,000 in 2008, which represents 18.8 percent of the total 2008 county property tax collections.²²

²² The property taxes from Hopkins Ridge in 2007 and 2008 were assessed based on 84 wind turbines. An additional three wind turbines were installed in 2008 and will be included in property tax assessments in future years.

Table 5
Columbia County Assessed Value and Property Tax Changes 2006 - 2008

Year	Assessed County Property Value	Annual Property Taxes Paid	Annual Project Property Tax Paid
2006	\$286,148,000	\$3,694,000	
2007	\$389,870,000	\$4,519,000	\$807,000
2008	\$432,520,000	\$4,837,000	\$907,000

Source: Columbia County Tax Levy Sheets provided by Chris Miller at Columbia County Assessor Office.

The primary recipients of Hopkins Ridge property tax payments were schools with \$174,537 (#2 School M&O), the state with \$164,714, and the county road fund with \$158,011 (see Table 6). The school levy, indicated in Table 5 as #2 School M&O, is structured to raise a set amount of funds for the Columbia County schools. Due to the significant taxable value of the wind power projects, a large proportion of the M&O fund is being paid for by the wind power projects. As the total amount raised by the levy remains the same, the significant payments by the Projects (\$174,500 in 2008 by the Hopkins Ridge project) result in an equivalent reduction in the amount paid by the residents of Columbia County. According to the Columbia County tax assessor, it is projected that in 2009 the Projects will pay 35 percent of the hospital levy and 39 percent of the school levy.²³

Table 6
Recipients of 2008 Hopkins Ridge Property Tax Payments²⁴

Recipient	Levy	Rate	Amount
#2 School M&O	\$2.1488	0.21%	\$174,537
State Tax	\$2.0278	0.20%	\$164,714
County Road Fund	\$1.9453	0.19%	\$158,011
County Current Expense	\$1.6155	0.16%	\$131,223
Fire District #3	\$0.8807	0.09%	\$71,539
Hospital Bond 2003	\$0.8409	0.08%	\$68,300
Hospital District	\$0.6263	0.06%	\$50,872
Col. Co. Rural Library	\$0.4561	0.05%	\$37,051
Port of Columbia	\$0.4110	0.04%	\$33,384
Road – Diverted	\$0.1927	0.02%	\$15,655

²³ Personal communication with Chris Miller, March 5, 2009.

²⁴ Personal Property Tax Statement, 2008, Columbia County Treasurer, Parcel Number 4-000-00-570-0060.

Recipient	Levy	Rate	Amount
Mental Health	\$0.0250	0.00%	\$2,031
Soldier Relief	\$0.0035	0.00%	\$282
Total	\$11.1737	1.12%	\$907,598
Total Columbia County Receipts (Less State Tax Receipts)			\$742,884

Future Property Taxes

All three Projects will pay property taxes starting in 2010. If the taxable value per wind turbine is similar in the Marengo I and II projects to the taxable value per turbine in the Hopkins Ridge Project²⁵, and if county property tax rates remain the same, the annual total property tax payments in 2010 will be approximately \$2.2 million. In reality, the average taxable value per wind turbine will likely differ by project, but this approach provides an approximate estimate of the property taxes that may be paid from all three Projects in 2010.

The annual property taxes paid by the Projects will fluctuate to some extent in the future, but are expected to be relatively stable due to the manner in which property taxes are assessed on large utilities with assets in multiple counties in Washington State. Future property tax payments will fluctuate based on two factors. First, as the tax base increases in Columbia County due to the Projects and other new construction, the levy rate is expected to decrease, which will reduce the total property tax payments from the Projects and all other property owners in the County. Second, the property tax payment from a utility is based on the total, depreciated value of assets owned by the utility in Washington State as well as the original value of the assets in Columbia County. As the total depreciated value of assets owned by PacifiCorp and PSE will likely change in the future, it is not possible to predict future property tax payments.

Sales and Use Tax

Sales and use tax receipts also increase during the construction period. Increased sales tax receipts at the local level arise from project spending in Columbia County on construction materials for the Projects. Similarly, use tax revenues are generated on goods and equipment purchased outside Washington, but used on the project. The applicable sales and use tax rate

²⁵ The per turbine property tax value in 2008 from the Hopkins Ridge Project was approximately \$10,900 per wind turbine. Property tax payments in 2008 are based on the 83 turbines that were installed in the Hopkins Ridge Project by early January 2008. Four additional turbines were installed in the Hopkins Ridge Project later in 2008.

in Columbia County is 7.9 percent.²⁶ Of that amount, the State of Washington receives 6.5 percent and the remaining 1.4 percent is distributed locally.²⁷ However, in 2006 Washington State exempted equipment used to generate electricity from wind (and other renewable sources) from sales and use tax.²⁸ The tax exemption also applies to labor and services related to installation of the equipment. Therefore, no sales and use tax are calculated for the development or construction phases of the Project. However, as it is likely that some purchases of goods and services during the development and construction phases were not tax-exempt, this analysis likely results in an underestimate of total sales and use taxes generated by the Projects.

Annual operations spending is not exempt and will generate sales tax revenues. Reported operations-related spending on local goods and services (apart from wages for Project employees) is estimated at approximately \$211,000 annually.²⁹ This is expected to result in annual sales and use tax receipts from operations of approximately \$14,000 for the State and \$3,000 locally. Over the life of the project, these sources of sales tax revenue will total \$341,000 in state and \$73,000 in local sales tax revenue. Discounting these annual payments to 2008 dollars, the net present value over 25 years of sales tax receipts from operations totals \$238,000 for the state and \$51,000 for the county.

Table 7 summarizes total sales and use tax receipts from the operations phase. The total present value of construction and operations sales and use tax receipts to the state is \$238,000 while the total present value to the county is \$51,000.

**Table 7
Sales and Use Tax Receipts from
Operation Materials Purchases**

Type and Time Period of Receipt	State Revenue	County Revenue
Operation Receipts		

²⁶ The sales and use tax rate are the same in the State of Washington. Generally, the same types of items that are subject to sales tax are subject to use tax. Sales and use tax applies to the sale or use of tangible personal property in Washington.

²⁷ Washington State Department of Revenue, "Sales and Use Tax Rates," Web page: <http://dor.wa.gov/content/findtaxesandrates/salesandusetaxrates/lookupataxrate>, accessed: August 26, 2008.

²⁸ Revenue Code of Washington § 82.08.02567. "The tax levied by RCW 82.08.020 shall not apply to sales of machinery and equipment used directly in generating electricity using fuel cells, wind, sun or landfill gas as the principal source of power, or to sales of or charges made for labor and services rendered in respect to installing such machinery or equipment, but only if the purchaser develops with such machinery, equipment, and labor a facility capable of generating not less than two hundred watts of energy and provides the seller with an exemption certificate in a form and manner prescribed by the Department."

²⁹ This value is based on reported expenditures from PSE and Vestas and does not include potential expenditures by PacifiCorp, which were not available at the time of analysis.

Annual Receipts	\$14,000	\$3,000
Total Present Value over 25 Years	\$238,000	\$51,000

This estimate of local and state sales tax receipts is expected to underestimate the total increased tax revenue due to the Projects as it does not include any sales tax revenues generated from construction or operation employee spending. During the construction phase, many non-local workers spent a portion of their wages at local hotels and restaurants, which would have generated sales tax receipts in Columbia County. Additionally, the increased income of local residents may have increased their spending on consumer goods and services in the local area, thereby also increasing sales tax receipts.

Tax Summary

Property tax receipts from the Projects constitute the primary fiscal effect of the Projects. In 2008, the Hopkins Ridge Project generated \$907,000 in property tax payments. Marengo I and II will begin paying property taxes in 2009 and 2010, respectively. Annual property tax payments from the Projects in 2010 may total approximately \$2.2 million if payments per wind turbine are similar across Projects and if property tax rates remain similar.³⁰ The annual property tax rates are expected to fluctuate in future years due to changes in county property tax rates and due to changes in the assessed value of the Projects.

Columbia County receives 82 percent of property tax receipts, with the remainder going to the State of Washington. Property tax payments from the Projects benefit Columbia County by increasing tax revenues for the County and by decreasing property tax rates for all property owners in the County.

Sales and use taxes during the construction phase of the Project are estimated to be minimal as the Projects are exempt from most use and sales taxes. During the operations phase, sales tax receipts are estimated to increase by \$17,000 annually, of which \$3,000 accrues to local jurisdictions.

³⁰ The annual property taxes paid by the Projects will fluctuate to some extent in the future, but are expected to be relatively stable due to the manner in which property taxes are assessed on large utilities with assets in multiple counties in Washington State. Future property tax payments will fluctuate based on two factors. First, as the tax base increases in Columbia County due to the Projects and other new construction, the levy rate is expected to decrease, which will reduce the total property tax payments from the Projects and all other property owners in the County. Second, the property tax payment from a utility is based on the total, depreciated value of assets owned by the utility in Washington State as well as the original value of the assets in Columbia County. As the total depreciated value of assets owned by PacifiCorp and PSE will likely change in the future, it is not possible to predict future property tax payments.

Public Services Expenditures

The previous section outlined the total expected fiscal gains from the Projects. In order to estimate the true fiscal impacts, however, potential costs to local governments arising from the Projects must also be considered. This section provides a brief evaluation of public service impacts and associated changes in government expenditures. A final section subtracts any losses from the gains to provide an estimate of the net fiscal impacts.

A range of community services could potentially be affected by the construction and operation of the proposed project. Potential impacts during construction arise primarily from the presence of the construction workforce in the Region; and transport and use of heavy machinery and equipment. During operations, community service effects are based on the size of the operations workforce and indirect employment in the Region, as well as the operating requirements of the wind farm. The analysis of community service effects is organized by service type.

- **Road Maintenance.** The primary access route to the site is through county roads that provide regional access to the area. During project construction, some damage to county roads did occur as the result of traffic from heavy commercial vehicles. However, all road reconstruction was paid for by project developers as per stipulations in the project permits and therefore did not place any additional demands on the county. The rural county roads providing access to the project areas, under normal circumstances, are not plowed for snow removal during the winter months. During the construction phase of the project, developers requested the county provide snow removal services to provide uninterrupted access to the project areas.³¹ Any such additional services, such as snow removal, provided by the county were paid for by the developer.
- **Water and Wastewater Service.** The Projects did require water supplies for dust abatement and wastewater disposal during construction and for continued operations. Water sources were negotiated between the project developer and private land owners. During construction the wastewater disposal needs of the project were provided by developers via portable toilets. None of these services were provided via public or community systems.³²
- **Law Enforcement and Security.** No additional law enforcement demands were generated by the Projects during construction. All security measures were paid for by project developers. Security for ongoing operations is accomplished through fences,

³¹ Personal communication with Drew Woods, Columbia County Public Works Engineer, July 28, 2008.

³² Ibid.

electronic security systems, and contracted security guards. Projects require additional on-site security during the hunting season to protect against vandalism. The service demands on law enforcement services are expected to be minimal.

- **Fire Protection.** The net effects of the Projects on fire protection are immaterial. To date, there have been approximately three dispatches to project areas since construction began; one was a construction accident and the other two were false alarms triggered by a faulty alarm system. There may be a slight increase in the risk of fire events and accidents, and therefore need for emergency services and medical aid provided by the Columbia Fire District #3. To negate the increased demands on fire protection personnel and equipments, PSE donated a Technical Rescue vehicle and paid for Rope Rescue/Rappel training for eight Columbia County emergency responders. Current emergency services are minor and are generally expected to be minor for operations of modern wind generation projects.
- **Schools and Education.** The impact of the Projects on education and school services has been negligible. For the last decade enrollment numbers have been declining annually. On average, 20 students exit the Dayton school district each year (see Table 8). The non-local construction workforce for the project did not re-locate with their families, so the number of school-aged children in the area did not increase. However, the operations workforce of local employees has allowed more families to stay in the county, thus slowing the number of students exiting the school district.³³ For example, in 2008, there were 21 students enrolled in the Dayton School District that are children of employees working at the Projects.³⁴

³³ Personal communication with Mona Himmelberger, Business Manager, Dayton School District #2 July 30, 2008.

³⁴ Personal communication with Anne Walsh, Puget Sound Energy, February 13, 2009.

Table 8
School Year Enrollment by Head Count and Full Time Enrollment^{1 2}

School Year	Average Head Count	Average Full Time Enrollment
2004-05	556	525
2005-06	550	511
2006-07	538	497
2007-08	497	467

Source: Personal communication with Mona Himmelberger, Business Manager, Dayton School District #2 July 30, 2008

1/ Average of monthly counts on grades Kindergarten through 12

2/ Numbers in table do not include the 15 students in Starbuck, WA enrolled in grades K through 7.

- **Waste Disposal.** Trash and waste generated during construction and operations were hauled off the site directly to a landfill/transfer station or disposed by a licensed waste disposal company outside of the county.
- **Parks and Public Recreation.** The effects of project construction and operations on parks and other recreation venues have been minimal. The effects are discussed in depth in the previous section.
- **Utilities.³⁵** Electric and telephone utility services have been extended to the project areas for operations. All of the utility services and installations have been paid for by project developers.

Overall, the effect of the projects on community services is negligible to minor depending on the type of service considered. In general, the increase in service demands has either been funded directly by project developers or is being met locally by public service providers paid by the Projects.

Summary of Net Fiscal Impacts

As noted in the previous section, additional fiscal expenditures for public services related to the Project are anticipated to be negligible. Therefore the net fiscal impacts of the Projects are expected to equal the additional tax revenues generated by the Projects.

³⁵ Data from PSE only.

Chapter 6 Other Impacts of Columbia County Projects

This chapter addresses the potential impacts of the Project on property values, recreation, energy prices, and charitable contributions. For both property values and recreation, the visual or audio impact of the Project may affect scenic vistas or the rural undeveloped nature of the area. This section describes these potential impacts, as well as the potential impact on energy prices. The chapter ends with an overview of the charitable contributions of the Projects to local organizations.

Property Values

This section provides an overview of the potential impacts on property values in Columbia County due to the Projects. The discussion is based on the key issues and theory related to wind developments and property values, in addition to a detailed literature review of studies and reports that have analyzed the issue in other parts of the country and internationally.

Generally, changes in land use have the potential to affect the value of property experiencing the changing land use, as well as nearby properties through externality effects.³⁶ The property on which the Projects are sited is private property, currently used for grain production. The change in the value of these lands was reduced based on the potential reduction in cultivated land but increased by the long-term lease revenues. The net effect of these offsetting factors is overwhelmingly positive as very little land is taken out of grain production, and the wind leases provide significant income.

To assess potential property value impacts on nearby properties, it is important to understand the spatial context within which the Projects have been developed. The Projects are located

³⁶ In economics, an externality is a cost or benefit resulting from an economic transaction that is borne or received by parties not directly involved in the transaction.

in a rural portion of southern Columbia County, near Dayton. In general, the Projects are visible from locations which have a direct and unobstructed “line-of-sight” to the Projects. For the general population this primarily includes highways and roads in the southern part of the county, but does not include the town of Dayton.

The potential impact of wind energy projects on land values is related to the land use of the surrounding area. In Columbia County, a little less than half of the land area is publicly owned (federal, state, and county). Of that, the federal government (U.S. National Forest) owns the most, with about one-third of the county land. The Washington State Departments of Natural Resources and Fish and Wildlife, Washington State Parks and Recreation Commission, and the Umatilla Tribe also manage lands within Columbia County. The remainder of county land is in private ownership and mainly consists of agricultural lands. Agricultural land values in Columbia County have experienced significant increases over the past 5 years, according to the Columbia County Assessors Office.³⁷ No changes have been specifically attributed to the wind energy projects.

Turning to private land, property values are based on many factors, one of which is demand. Demand for property is associated with local population and employment. Other factors relevant to these Projects on which property values are based include aesthetic effects, and the potential speculation for additional wind turbines.

For private properties located in proximity to the wind energy developments, the two key issues are visual and noise impacts. Noise impacts have been cited as a concern with wind projects, but noise effects are generally limited to properties with turbines, whose property values typically increase because of long-term revenue streams from leases. In the context of visual impacts, assuming scenic values are incorporated or “internalized” into the existing value of properties in the Project area, there is the potential for downward pressure on property values if wind facilities are perceived to adversely affect the quality of viewshed, although it is also recognized that some find the view of wind turbines to be appealing. There is likely greater internalization of scenic values on residential properties compared to undeveloped land in agricultural uses, such as grazing. Therefore, the key questions that would need to be answered in order to understand the effect of wind energy projects on property values are:

- To what degree have scenic values been internalized in local residential property values?
- How would the Project affect the scenic quality of the area?

³⁷ Personal communication with Chris Miller, Columbia County Assessor, January 12, 2009.

Conversely, there are also sources of potential upward pressures on nearby property values emanating from wind energy developments. First, these projects offer both short- and long-term economic benefits in the Region, including job and income creation, as well as future economic development opportunities associated with expanded infrastructure and a new power source. Second, wind developments may boost tourism to the area, thereby promoting Regional economic development. Finally, the Projects would provide long-term revenue streams as lease payments to property owners on whose land the Project facilities would be located. In summary, there appear to be conflicting pressures on property values from wind energy developments.

The manner in which these pressures interact for the Columbia County Projects is unknown, and data are not sufficient to quantify the property value effects of the Projects. Additional insight on the potential effects of the Projects can be gained from empirical studies that have attempted to measure the effect that wind energy developments have on property values. Literature reviews concerning the effect of wind energy projects on the value of surrounding properties have generally indicated a lack of negative linkage between the two; in fact some indicate the possibility of a positive value effect.

Literature Review – Property Values

The environmental and economic effects of wind energy projects have been well documented. Several studies that have evaluated potential property value impacts are highlighted below (organized chronologically). No clear inference can be drawn from these studies and available research as the analyses vary in terms of rigor; methodology (e.g., survey sampling, statistical analysis, and expert opinion); size, location and site character of projects analyzed; and results and conclusions. However, the preponderance of research on this issue suggests that there is no negative relationship between wind energy developments and property values.

- **Economic Impacts of Wind Power in Kittitas County – Final Report. Prepared by ECONorthwest for the Phoenix Economic Development Group. November 2002.**

This comprehensive economic study analyzes three types of economic impacts, including project effects on property values. The property valuation section includes two separate analyses: (1) interviews of tax assessors in jurisdictions where wind farms had been constructed within the ten previous years, and (2) literature review. The study sample for the tax assessor interviews included 22 wind farms located in 13 counties. Six of the counties had residential properties with views of turbines while in the seven other counties there were no residential properties with views of the wind farm. Assessors in all six of the counties with residential views stated that they had not determined that wind projects had any negative impact on property values.

- **The Effect of Wind Development of Local Property Values. Prepared by the Renewable Energy Policy Project (REPP). Contributing Authors: G. Sterzinger, Beck F., and Kostiuk, D. May 2003**

This study represents the most comprehensive study on wind energy impacts on property values. The study is based on a review of market data on property sales within the viewshed and comparable areas associated with 10 wind projects located in California, New York, Texas, Vermont, Wisconsin, Pennsylvania, and Iowa. The viewshed was generally defined as a five-mile radius from the outermost turbine. Comparable areas (used as control communities) were defined as reasonably close communities with similar demographic, economic, and geographic characteristics and trends compared to properties within the viewshed, but located outside of the wind turbine viewshed area. The study used statistical analysis to determine whether and to what extent the visual presence of turbines influenced selling prices of nearby properties. The study evaluated the rate of change in property values inside and outside the viewshed of the turbines relative to comparable areas. Three different case examinations (or approaches) were utilized: (1) an analysis of how prices changed over the entire period of the study for the viewshed and comparable region; (2) an analysis of how prices changed within the viewshed before and after the projects came on-line; and (3) an analysis of how prices changed for both the viewshed and the comparable region, but only for the period after the projects came on-line. The study used simple regression analysis to estimate how rate of property value change was affected in each of the cases.

The study found no significant empirical support that property values were diminished in any of 10 case studies from around the country. Conversely, the study found that for most projects property values rose more quickly in the viewshed than they did in the comparable community. Further, values increased faster in the viewshed after the projects came on line than they did before, and after projects came on line, values increased faster in the viewshed than they did in the comparable community. In sum, in 26 of the 30 individual scenarios analyzed, property values in the affected viewshed rose more than in comparable communities.

- **A Real Estate Study of the Proposed Forward Wind Energy Center, Dodge and Fond Du Lac Counties, Wisconsin. Prepared for Invenergy Wind LLC. Prepared by Poletti and Associates. May 2005**

The purpose of this report is to determine if the proposed Forward Wind Energy Center is located so as to minimize any adverse effect on the character of the surrounding area and on surrounding property values. The analysis was based on expert opinion and relied on a detailed review of the subject property and plans for the proposed wind energy center; on-site inspection of the subject property and surrounding area; inspection of other wind development sites; a review of uses and property values of surrounding tracts of land, including data on real estate transactions; and discussion with various assessors. Specifically, the project was reviewed in the context of its compatibility with the established and historic

land uses in the project area and its impact on those uses, as well as marketability and value of other property in the vicinity. The study concludes that the proposed wind energy project is located such that it would have minimal effects on the value of the surrounding property.

- **Impact of Wind Farms on the Value of Residential Property and Agricultural Land. Prepared by the Royal Institution of Chartered Surveyors (RICS). 2005**

This survey study was implemented by the Royal Institution of Chartered Surveyors in the United Kingdom in an effort to gauge professional opinion about the role wind energy development has on both residential and agricultural property values. The study found that:

- 60 percent of the sample suggested that wind farms decrease the value of residential properties where the development is within view.
 - 67 percent of the sample indicated that the negative impact on property prices starts when a planning application to erect a wind farm is made.
 - The main factors cited for the negative impact on property values are: visual impact of wind farm after completion; fear of blight; and the proximity of a property to a wind farm.
 - Once a wind farm is completed, the negative impact on property values continues but becomes less severe after about two years.
 - A significant minority of surveyors with experience in residential sales affected by wind farm developments (40 percent) indicated that there is no negative price impact.
 - Only 28 percent suggested wind farm development negatively influences the value of agricultural land, while 63 percent suggested there is no impact at all (either positive or negative). The remaining 9% suggest a positive impact.
 - The survey suggests that wind farms do not impact residential property values in a uniform way. The circumstances of each development can be different.
- **Impacts of Windmill Visibility on Property Values in Madison County, New York. Project report prepared by Ben Hoen. Submitted to: Faculty of the Bard Center for Environmental Policy. Prepared in partial fulfillment of the requirements for the degree of Master of Science in Environmental Policy, Bard College. April 30, 2006**

This study represents the most current and statistically-rigorous analysis of property value effects from wind energy projects. In fact, most of the weaknesses in the REPP study (2003) were addressed and corrected in this study that focused on the property value impacts of the Fenner wind energy project in Madison County, New York. This study analyzed 280 arms-length single-family residential sales in the vicinity of the proposed wind development using a hedonic regression model. The sales occurred between 1996 and 2005 (140 transactions

occurred after facility construction began in 2001) and were within 5 miles of the 20 turbines/30 megawatt (MW) wind development. None of the home sales were on properties that contained turbines, and none of the properties were compensated for the operation of the turbines. This study is unique in that all properties in the database were visited to “ground-truth” the actual level of turbine visibility.

The hedonic model focuses on two key characteristics, view of and distance from turbines, and combines them with a number of house and neighborhood characteristics, to estimate the specific effect on home sales prices of the view of and distance from turbines. Although the model provides a strong statistical explanation of home values, the analysis concludes that there are no statistically-measurable effects of wind farm visibility on property values, even for those properties located within one mile of the facility and those that sold immediately following the announcement and construction of the wind farm

- **Evaluating Impacts of Wind Power Projects on Local Property Values. Prepared by: P. Barton DeLacy, (Cushman & Wakefield, Inc.). Prepared for: UPC Wind Management, LLC. Technical memorandum submitted to the Cohocton Planning Board for the Cohocton Wind Power Project. November 15, 2006.**

The purpose of this technical memorandum is to summarize the findings of an analysis that evaluated whether the proposed Cohocton and Dutch Hill Wind Power Projects might affect property values in the vicinity of the wind turbine generators. The analysis was conducted by a Certified General Real Estate Appraiser who has experience in evaluating property value impacts from wind energy projects. The methodology consisted of site inspections of comparable projects, a comprehensive literature review, examining demographic profiles in affected jurisdictions, and reliance on professional experience. The researcher concluded that the project should have negligible impacts upon property values for undeveloped properties or existing farms, while premium-priced homes located in the project area or viewshed, which would derive a premium from scenic values, may be adversely affected. However, in these cases, isolated impacts from wind projects would not necessarily diminish property values because of the more important influences of local economic conditions and the national housing market. Further, to the extent that the wind project creates jobs, reduces local property taxes, and generates tax revenues that benefit local schools and infrastructure, then property values should be supported in affected jurisdictions.

Discussion

As described above, the studies generally support the notion that wind energy developments do not adversely affect property values. However, the applicability of the studies referenced above to the Projects is difficult to ascertain. As such, it is worthwhile to review these studies in the context of the Projects.

The Projects can be seen from highways and roads in the county, but not from Dayton. In the Washington counties reviewed by ECONorthwest, 2002, the Projects could be seen from nearby towns. However, even in that study, none of the county assessors interviewed believed that the wind projects adversely affected property values, which was supported by an increasing tax and employment base (in Walla Walla County, Washington) and empirical research conducted by the assessor (in Lincoln, Wisconsin). Sterzinger, et al (2003) is based on a case-study approach that covers the entire country. The similarities between the Projects and these case studies are unknown. However, in some cases, the data indicate that property values had increased after the projects were constructed and were higher relative to comparable communities. In other studies, the results suggested that property value appreciation was slower in areas near wind projects.

The applicant-sponsored studies conducted by Poletti and Associates (2005) and Cushman and Wakefield (2006) concludes that wind projects would have minimal, if any, effects on property values in Wisconsin and New York, respectively. Again, due to differences in site characteristics and the surrounding region, it would be difficult to infer potential property value impacts in the vicinity of the Columbia County Projects. Finally, the study prepared by Hoen (2006) appears to be the most statistically rigorous and empirically defensible piece of research on this topic. Although the results are for Madison County, New York, and a smaller wind project (20 turbines), data on actual home sales do not support the notion that wind projects have a negative impact on property values.

Overall, there are simply too many variables to infer property value impacts from other studies; however, data and analyses from these other locations do indicate that there is a weak relationship between property values and wind energy development. Furthermore, interviews with a local real estate agent indicate that changes in land values in Columbia County have mirrored national trends. Although there have been few property sales in the time period since the Projects were built that would aid in assessing the Projects' impact on property values, to date there have been no discernible negative impacts of the Projects on property values.³⁸

Recreation and Tourism

This section provides an overview of the potential impacts of Columbia County wind development on tourism and recreation. The analysis is based on interviews, data collection, and analysis of post-construction trends in recreation and tourism in the county. Additionally, results from other studies of the impacts of wind development on recreation are presented and discussed in the context of Columbia County.

³⁸ Personal communication with Blaine Bickelhaupt, July 2008, Windermere Real Estate, Dayton Washington.

Many people are drawn to the Region for its scenic beauty, cultural, and historical sites, and recreational opportunities. Both locals and visitors to Columbia County enjoy outdoor recreation such as hunting, fishing, skiing, boating, camping, picnicking, and golfing. Columbia County contains part of the 1.4 million acre Umatilla National Forest, located in the Blue Mountains. This area offers commercial skiing at the Bluewood Ski Resort, located 21 miles from Dayton. In addition to skiing, Bluewood manages the Jubilee Campgrounds, the largest and most popular campground on the Umatilla National Forest. Many people go to the Jubilee Campgrounds to fish, boat, swim, hike, and mountain bike.³⁹ Other activities in the Umatilla National Forest include camping and cabin rentals; many miles of trail accessible by foot, horseback, or bicycle; off-highway vehicle (OHV) trails; and ample hunting and fishing opportunities.⁴⁰ The wind farms are not visible from the Bluewood Ski Resort area and the number of annual visitors has been consistent over the last five years.⁴¹

There are two state parks in Columbia County; the Camp Wooten Environmental Learning Center (ELC) and the Lewis and Clark Trail State Park. Camp Wooten ELC is located on the Tucannon River in the Blue Mountains and offers hiking, canoeing, swimming, and fishing from a stocked pond. The Lewis and Clark Trail State Park is a 37-acre camping park with 1,333 feet of freshwater shoreline on the Touchet River. The park is open year-round for camping and day use. Summer activities include hiking, swimming, wildlife viewing, and fishing for rainbow and brown trout. Winter activities include cross-country skiing and snowshoeing.⁴² The wind farms are not visible from the either park and no adverse effects from the projects have been observed.⁴³

The Lyons Ferry Park and Marina (Lyons Ferry) is located on the northern edge of Columbia County on the banks of the Snake River near Starbuck. Lyons Ferry is located half in Columbia County and half in Franklin County. Activities at Lyons Ferry include boating, camping, RV's, fishing, swimming, canoeing, kayaking and day use. An estimated 60,000 to 80,000 vehicles visit annually and demand is increasing. The wind farms are not visible from Lyons Ferry; however, during construction of the projects many Lyons Ferry RV spaces were

³⁹ Bluewood Ski Resort, Recreation Management Campgrounds, Jubilee Lake <http://www.bluewood.com/camp.htm>, accessed July 30, 2008.

⁴⁰ U.S. Forest Service, Umatilla National Forest, Walla Walla Ranger District, <http://www.fs.fed.us/r6/uma/walla2/index.shtml>, accessed July 30, 2008.

⁴¹ Personal Communication with Bruce Goodell, Bluewood General Manager, July 23, 2008.

⁴² Washington State Parks, Lewis and Clark Trail, <http://www.parks.wa.gov/parkpage.asp?selectedpark=Lewis%20%26%20Clark%20Trail>, (accessed July 30, 2008).

⁴³ Washington State Parks, Camp Wooten ELC, <http://www.parks.wa.gov/elcs.asp>, accessed July 30, 2008.

rented for extended periods by wind farm employees. Additionally, during construction many project employees and their families recreated there on the weekends.⁴⁴

In the winter months locals and visitors to Columbia County enjoy snowmobiling at Eckler Mountain and Hatley Gulch, located east of Dayton, and Touchet Corral, located southeast of Dayton.⁴⁵ Winter recreation does not occur on project areas or within site of turbines, and so it is not expected to be affected.

A large number of tourists travel State Highway 12 and stop in Dayton. Wind farms are visible to tourists / scenic drivers on Hwy 12 just east and west of town. There is no evidence to suggest that the Projects have discouraged tourists from traveling that route, though there is some evidence that the wind turbines have attracted new tourists as many people are interested in viewing wind turbines. Wind energy has shown to be a tourist attraction at other locations. For example, the PSE Wild Horse Renewable Energy Center near Ellensburg, Washington had over 17,000 visitors in 2008.⁴⁶ The center is not comparable to the PSE tours offered in Dayton, as it offers formal exhibits providing information on wind and solar power generation. Visitation at Wild Horse Renewable Energy Center, however, does indicate the level of interest from the public in learning about renewable energy.

The Dayton Chamber of Commerce has begun marketing the area using themes of wind energy projects and alternative energy. Furthermore, PSE operates free tours of the Hopkins Ridge Project. People interested in viewing the project can schedule tours through the Dayton office of PSE. Tours have been given to visitors passing through Dayton, as well as numerous organized groups including classes from local schools and colleges, class reunions, church groups, and senior citizen groups. Visitors are from Dayton, as well as Pullman, Walla Walla, and Lewiston. PSE is promoting that people visit for a tour and then stay for lunch at a local restaurant. The Weinhard Hotel in Dayton has partnered with PSE to market a wine and wind tour as a tourist attraction for its guests.

PacifiCorp anticipates starting a similar program at their Marengo I and II facilities. Data provided by PSE indicates that the annual number of people visiting the Hopkins Ridge Project is approximately 600 to 800 (see Table 9).

⁴⁴ Port of Columbia, Lyons Ferry Park and Marina, http://portofcolumbia.org/index.php?option=com_content&task=view&id=19&Itemid=40, accessed July 30, 2008, and Personal communication with Ed Merritt, Lyons Ferry Concessionaire, July 22, 2008.

⁴⁵ Washington State Parks, State Snowmobile Sno-Parks, <http://www.parks.wa.gov/winter/parks/motorparks.asp?Region=6>, accessed July 30, 2008.

⁴⁶ Puget Sound Energy, 2008, "PSE Renewable Energy Center at Wild Horse Marks Successful First Season of Operation, Press Release from Bellevue Washington, November 19.

Table 9
Annual Number of Visitors to Hopkins Ridge Wind Farm

Year	Tour Numbers
2005	224 (In construction this year)
2006	701
2007	650
2008 – January to June, 2008	440

Source: Personal communication with Joanie Hudson, July 15, 2008

Hunting is the only recreational activity conducted within wind project boundaries and the primary recreational activity conducted within sight of the Projects. As such, it is expected that it is the recreational activity most affected by the wind farms. The section below describes hunting in the project area, and potential impacts of the wind development on hunting recreation and tourism.

Potential Impacts on Hunting

Columbia County has three operating wind farms, Hopkins Ridge and Marengo (I and II). Both project areas are considered prime hunting areas.⁴⁷ Some of the public and private lands that are now leased by PSE and PacifiCorp were formerly available for hunting through a state managed “Feel-Free-to-Hunt” Program (Program) whereby private land owners allowed hunting access in return for state assistance in planning or implementing practices for enhancing wildlife habitat. The Program posts signs on properties that define the boundaries and establish safety zones in which no shooting is allowed. The state also provides extra enforcement against violations.⁴⁸

Often, once wind farm construction begins, the entire leased project area is closed to the public due to theft and liability concerns. However, closing access to large tracts of hunting areas can cause unanticipated problems for lease-holding farmers. Without regulated hunting in these areas, wildlife populations can increase, causing potential damage to crops.⁴⁹

⁴⁷ Personal communication with Scott Rasley, Wildlife Biologist with the Washington Department of Fish and Game, July 31, 2008.

⁴⁸ Personal communication with Kurt Merg, Private Lands Biologist, Washington Department of Fish and Wildlife, August 1, 2008.

⁴⁹ Personal communication with Kurt Merg, Private Lands Biologist, Washington Department of Fish and Wildlife, August 1, 2008.

Additionally, if area access is prohibited, poachers and other violators can find refuge from law abiding hunters and enforcement agencies.⁵⁰

Both PacifiCorp and PSE have hunting programs to allow access to the wind project lands. The PacifiCorp program was implemented just before the 2008 hunting season, and therefore little information was available on the program at the time of analysis. More information is available on the PSE program at Hopkins Ridge, which has been implemented since 2006.

Prior to wind project construction at Hopkins Ridge, approximately 7,000 acres of the 11,500 acre project area were available for hunting through the state-managed Program. During the construction phase the entire project area was closed to the public. In 2006, PSE began the “Access-With-Written-Permission” program (AWWP) for the Hopkins project area. Under the AWWP program the number of acres available for hunting increased to approximately 8,000 acres, a net gain of 1,000 acres.⁵¹ In the first year, PSE granted 838 permits to hunters and fishermen from five different states. In 2007 that number increased to 876 permits. Over 600 permits had already been granted for 2008 by late July and many more were expected.⁵² The permitting process is free and involves providing photo identification, a vehicle description including license plate number, and a fishing and/or hunting license number. Once the appropriate paperwork has been filed and the applicant has watched a three minute video provided by PSE outlining safety in the wind farm area, access is granted.⁵³ Permit holders are provided a map of the available hunting areas and the permit is valid until March 31st the following year.⁵⁴ Hunters are primarily seeking elk, deer, and upland game birds⁵⁵ in

⁵⁰ Personal communication with Scott Rasley, Wildlife Biologist with the Washington Department of Fish and Game, July 31, 2008.

⁵¹ Ibid.

⁵² Personal communication with Scott Rasley, Wildlife Biologist with the Washington Department of Fish and Game, whom presided over the hunting access program, July 31, 2008, and PSE has not placed any restrictions on the maximum number of permits granted.

⁵³ Granted access to Hopkins leased land comes with several access rules. Violation of the rules results in the violator’s total loss of access privileges. The rules include no hunting during turbine maintenance or construction; no access of any kind within 300 feet of the turbines or substations; no pointing or shooting of any weapon at the turbines, people, overhead power lines, maintenance vehicles, etc.; no vehicle traffic on wind farm property except on normally traveled county roads; no blocking access to gates or entrances; no violating of Washington State game rules; no overnight camping, parking, or fires unless previously authorized; and a copy of the access permission agreement must be carried at all times while within the Hopkins boundaries. As of July 2008 there have been no reported violations of the access rules.

⁵⁴ The Last Resort Camp Store & Blue Mountains KOA Campgrounds, July 2008, “Fishing and Hunting Report” http://www.thelastresortrv.com/fishing_hunting_report.htm, accessed July 29, 2008.

⁵⁵ Upland birds are non-water fowl game birds such as Quail, Pheasant, Grouse, and Turkey.

the project areas and fishermen are primarily seeking steelhead. There have been no reported violations of the AWWP program.⁵⁶

The Marengo I and II projects, operated by PacifiCorp, also contains prime hunting land, and has been working on allowing a similar hunting access program but has not yet finalized the permitting details. Currently, access for hunters is not allowed.⁵⁷

In summary, the data from the “Feel-Free-to-Hunt” program and the Hopkins Ridge “Access with Written Permission” program suggest that individuals are continuing to access the hunting lands in the controlled access Hopkins Ridge Project areas. Due to this program and the expected implementation of similar programs in the Marengo Projects, as well as the availability of alternative hunting lands elsewhere in the vicinity, it is expected that the Projects’ impacts on hunting recreation in the area is limited.

Other recreation or tourism effects are difficult to quantify due to insufficient data. However, insight on the direction (positive or negative) and magnitude of potential effects can be gained from empirical studies that have attempted to measure the effect that wind energy developments have on recreational use and tourism. Some of these studies are reviewed below. The studies seem to suggest a weak link between recreation and wind farm developments, and some even indicate that wind developments increase tourism.

Previous Studies Related to Recreation and Tourism Impacts

This section provides a summary of potentially relevant studies addressing how wind development has affected tourism and recreation.

- **Tourist Attitudes towards Wind Farms. Research Study Conducted for Scottish Renewables Forum & the British Wind Energy Association. Summary Report. September 2002.**

This study depicts the results of a survey of tourists visiting Argyll & Bute, an area of Scotland with the greatest concentration of wind projects (three large commercial wind farms in operation). The area also has an economy with a high dependence on the tourism industry, which is based on the landscape value of its scenery and natural environment. The purpose of the survey was to assess the awareness and perception of wind farms of 307 tourists in order to answer questions about how wind farm development might affect tourism within

⁵⁶ Personal communication with Jim MacArthur, host of the Last Resort Camp Store, July 28, 2008 and with Scott Rasley, Wildlife Biologist with the Washington Department of Fish and Wildlife, July 31, 2008.

⁵⁷ The Last Resort Camp Store & Blue Mountains KOA Campgrounds, July 2008, “Fishing and Hunting Report” http://www.thelastresortrv.com/fishing_hunting_report.htm, accessed July 29, 2008.

Scotland. The results indicate that tourists are able to appreciate the natural beauty of an area, while also reacting positively to the presence of wind farms. The study found that the presence of wind farms actually encouraged more people to return than to stay away. It also determined that there are opportunities for wind developers to develop wind site visitor centers to encourage more tourists to the area.

- **Kittitas Valley Wind Power Project, Washington, Tourism and Benefits to the Local Economy.** Horizon Wind Energy. Available at: www.horizonwind.com, accessed September 18, 2007.

This report discusses and quantifies many benefits of the proposed Kittitas Valley Wind Power Project, including impacts to tourism. The report states that a wind farm in the nearby community of Walla Walla, Washington had over 1,600 recorded visitors and more unrecorded visitors in less than three months. It also sites European sources indicating that some wind projects are tourist attractions and continue to attract attention, and other tourist destinations that are near wind energy projects continue to attract a large number of visitors.

- **The Case Against Wind ‘Farms’.** Country Guardian. May 2000. Available at: www.countryguardian.net/case.htm, accessed September 20, 2007.

This study makes the case for the negative aspects of wind energy projects. As related to tourism and recreation, the report sites older studies with anecdotal evidence (letters from local residents to the press) that tourism slows with the development of wind energy project sites. It also cites a survey stating people like to go to the countryside for its own sake and seek nothing further (but does not mention anything about wind energy projects), and a survey from 1980, when the wind technology was much different than it is today.

- **Proposed Arecleoch Windfarm – Assessment of Recreation, Sports, and Tourism Opportunities, Executive Summary.** Peter Scott Planning Services Ltd. November 2005.

This study assesses potential opportunities for, and impacts to recreation and tourism related to the proposed wind farm development at Arecleoch Forest, in Scotland. It states that although there may be decreased use by walkers and horseback riders, “the potential to enhance recreational and tourism opportunities in the vicinity of the proposed windfarm and to increase visitors to nearby settlements is likely to exceed the scale of potential impacts of the development on such activities.” It also suggests some tourism promotion and development at the project, including providing parking spaces, a viewpoint, information (board and leaflets), and self-guided walking tours, as a way to increase visitor numbers.

Energy Price and Externalities

Several utilities provide electricity to customers in the Region. These include PacifiCorp and Avista for most of the urban areas. Inland Power & Light provides service to portions of Whitman County, and Columbia Rural Electric Association serves areas of Columbia County.

The power produced at the Columbia County Wind Projects is available to the owner utilities (PacifiCorp and PSE) for inclusion in their energy portfolios, and enters their transmission and distribution systems from the Projects. The costs of the power from the Columbia County Projects are blended into their total electricity costs. This blending of costs indicates the likelihood that these Projects neither increase nor decrease the cost of power to consumers within Columbia County or the Region.

Charitable Donations

The addition of new local businesses can increase funds for local organizations and events. This has been the case for Dayton and surrounding areas with the added presence of PSE and PacifiCorp. Both utilities have provided charitable contributions to communities in Columbia County and adjacent areas. PSE, which has an office in Dayton, provided estimates of its local charitable giving through 2008 (see Table 10); similar estimates were not available from PacifiCorp at the time of analysis. Since 2006, PSE has donated nearly \$37,000 to local Columbia County organizations, and has also donated approximately \$6,000 to Garfield County and slightly over \$2000 to Walla Walla County.⁵⁸ PacifiCorp and other businesses associated with the Projects may also have contributed charitable donations, but this information was not available.

Table 10
PSE Charitable Donations 2006- November 2008

Year	County of Recipient		
	Walla Walla	Columbia	Garfield
2006	\$325	\$17,101	\$5,000
2007	\$1605	\$7,375	
2008	\$250	\$12,500	\$1,041
Total	\$2180.00	\$36,976.00	\$6,041

⁵⁸ Personal communication with Anne Walsh, PSE, November 12, 2008.

Chapter 7 Economic Implications for Future Wind Development in Other Southeastern Washington Counties

This section compares and contrasts the potential effects of wind energy projects in each of the other three Southeastern Washington Counties (Garfield, Asotin, and Whitman) to the effects experienced in Columbia County. The expected size of economic effects for each of the counties is discussed. The property and sales/use tax rates are similar in each of the Southeastern Washington counties, so tax impacts are expected to be comparable across counties for similarly sized projects. However, if the Washington State sales and use tax exemption on equipment and services used for installing wind energy projects is allowed to expire in 2009, the sales and use taxes generated by projects in other counties would be greater. Potential recreational and property value impacts that might be experienced in the other counties are not addressed as these largely depend on the specific location of a project.

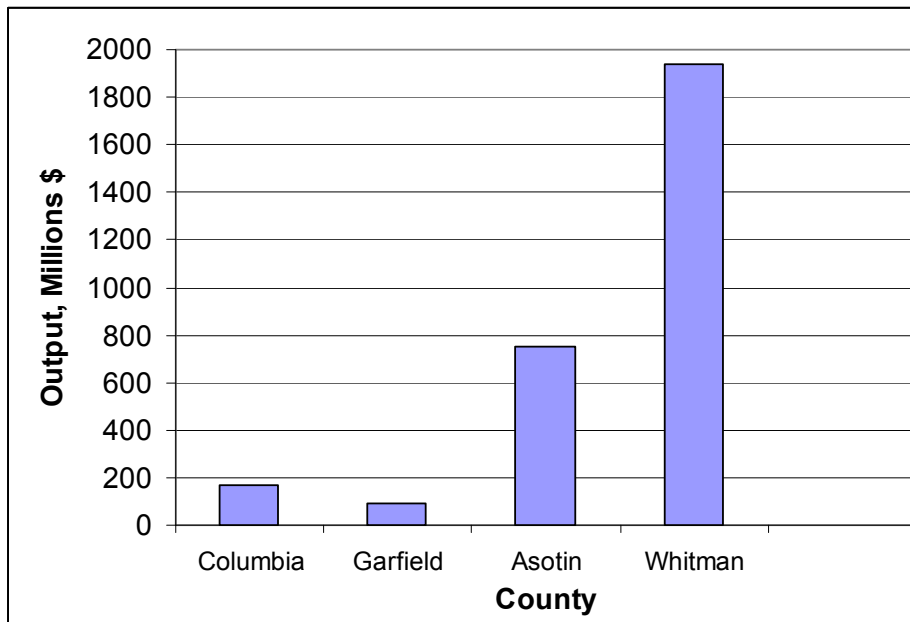
To qualitatively assess how impacts of wind development in other Southeastern Washington counties would compare with the impacts experienced in Columbia County, three types of information were considered. First, data were analyzed on the structure of the local economy and in particular, the size of potential linkages between sectors that would supply inputs and services for wind energy projects. Second, data were collected regarding the Regional retail commerce patterns in terms of where people go to purchase goods and services. Finally, in each of the counties interviews were conducted with local chamber of commerce and business owners to verify data from published sources, and to get a feel for the size and type of businesses that could benefit from wind energy projects.

As seen in previous sections, wind energy projects can boost an economy through several mechanisms; direct effects come through lease payments to landowners and increased employment and wages during construction and operations, while indirect and induced effects increase economic activity through increased purchases of local goods and services by the project and by project workers. The magnitude of this indirect and induced effect depends on the capacity of local businesses and residents to provide the goods and services

required by the project and its workers, as well as the presence of nearby larger urban areas that can provide goods and services that aren't available locally. Based on the analysis of economic impacts in Columbia County and a comparative review of the structure of the economies in the other three Southeastern Washington counties, this section summarizes how the potential economic impacts of future wind energy projects in Asotin, Garfield, and Whitman Counties may compare with the economic impacts experienced in Columbia County.

Wind projects in other Southeastern Washington counties will lead to the same *type* of economic effects; the *size* of the economic effects, however, will depend on particular characteristics of the economy in each of the other counties. Generally, the greater the number and diversity of businesses within an economy, the more the area economy can capture from a new business or development. With this in mind, the increase in jobs and income from a new wind development will likely be greater for Whitman County than for Columbia County since Whitman is a much larger county with businesses that provide goods and services that may not be available in Columbia County. Likewise, the impacts of wind development in Garfield County may be smaller than in Columbia County since Garfield is a smaller county with fewer businesses. However, as a smaller county, the relative impacts of a project in Garfield County may be greater as a proportion of total county income or employment. Figure 5 summarizes the total output levels in each of the Southeastern Washington counties in millions of dollars; the figure highlights the much larger size of the economies in Whitman and Asotin Counties compared to the economies of Garfield or Columbia Counties.

Figure 5
2006 Economic Output in Southeastern Washington Counties (Millions \$)



Insight on the relative impacts of wind energy projects in the different Southeastern Washington counties may be gained through an examination of economic multipliers for each of the economic sectors most affected by these types of projects. As indicated in Chapter 4, not all businesses will be directly affected by a new development. The businesses that would first experience a noticeable change in revenue are typically businesses serving construction workers and providing inputs to the wind projects. Such businesses include hotels and other accommodations, food and drink establishments, gas stations, grocery stores, and construction firms. The size of total economic impacts resulting from a particular wind project is determined by the presence of these key industries as well as their industry-specific multipliers for a particular county.

Industry-specific multipliers for each of the Southeastern Washington counties indicate the strength of the linkages of that industry to other industries in a county, and the potential for increased demand in that industry to generate increased demand in other industries. Specifically, an industry income multiplier indicates the total increase in income throughout the county that results from a dollar increase in income in that industry. Similarly, an employment multiplier indicates the total increase in employment resulting from an increase in one job in an industry.

Table 11 provides multipliers for income and employment for some of the industries typically affected by wind energy projects. These multipliers are from the IMPLAN model constructed for each of the counties. If multipliers for the affected economic sectors are similar in neighboring counties to the multipliers for Columbia County, then the magnitude of expected effect is likely to also be similar. If the multipliers are smaller or greater than those in Columbia County, the total economic effects are expected to be smaller or greater, respectively. The industry multipliers for income and employment across the Columbia, Whitman, and Asotin counties are similar, which suggests that the economic impacts may be similar across the Southeastern Washington counties. The exception is Garfield County, which has smaller multipliers in all industries and which actually lacks businesses in key industries. The 2006 data for Garfield County indicates that the gasoline and service station sector does not exist, although there is one gas station located in Pomeroy. The next section describes potential economic effects in more detail for each county.

Table 11
Multipliers for Selected Sectors
Across the Southeastern Washington Counties

County	Food and Beverage Stores	Gasoline Stations	Hotels and Motels	Restaurants	Construction	Retail
Income Multiplier						
Columbia	1.2	1.1	1.2	1.1	1.1	1.1
Asotin	1.3	1.3	1.3	1.2	1.2	1.2
Garfield	1.2	N/A ²	1.1 ¹	1.0	1.0	1.0
Whitman	1.4	1.1	1.3	1.2	1.2	1.2
Employment Multiplier						
Columbia	1.1	1.1	1.1	1.1	1.2	1.1
Asotin	1.2	1.3	1.2	1.2	1.4	1.3
Garfield	1.0	N/A ²	1.0 ¹	1.0	1.0	1.0
Whitman	1.2	1.2	1.1	1.1	1.3	1.2

¹ This multiplier is for the “other accommodations” sector, rather than for the “hotels and motels” sector.

² There is no IMPLAN data for this sector as the data indicated that in 2006 there were no gasoline stations in Garfield County. However that are currently two fueling stations in Pomeroy.

Asotin

As indicated in Table 12, Asotin generally has higher multipliers than Columbia County, indicating that economic impacts of wind energy projects may be larger. The Asotin County economy is larger, with more businesses and more diversity in goods and services provided than in Columbia County. Asotin County, and in particular the City of Clarkston, has more lodging options, retail outlets (including department stores), restaurants, construction, and other businesses that would be able to supply services to a wind energy project and its workers. However, Clarkston is located just over the state border from Lewiston, Idaho, and has strong economic ties with Lewiston. Economic impacts in Asotin County from wind energy projects may be lessened due to the nearby presence of the larger urban area of Lewiston. For example, Clarkson has approximately six hotels and motels while Lewiston has 20 motels and hotels. Additionally, Pullman, in Whitman County, is located just 30 miles north of Clarkston, and also has businesses that may provide goods and services to the Project, thereby potentially reducing the impact in Asotin County. In general, however, it is expected that the economic impact of comparable wind energy projects in Asotin County would be at least as great as the economic impact experienced in Columbia County.

Garfield

All of the multipliers in Table 12 are smaller for Garfield County than for Columbia County, indicating that economic impacts may be smaller (although fiscal, or tax impacts, will likely be similar). Garfield County is a small county with fewer and less diverse businesses than Columbia County. Businesses in Garfield County can be classified in 56 sectors, considerably fewer than the 87 sectors present in Columbia County. Given the absence of some industries, wind energy projects in Garfield County may rely heavily on surrounding counties for goods and services. In particular, there is some construction occurring in the county but the relatively low amount of construction output (including the lack of concrete manufacturing or rock quarries) and the relatively few options for housing, eating, and shopping may decrease economic impacts. There are two RV parks in Garfield County, and another located approximately 12 miles from downtown Pomeroy in Columbia County. Similarly, there is only one motel and grocery store in Pomeroy. There are multiple hotel and grocery options in Asotin County (Clarkston), which is located approximately 30 miles away from downtown Pomeroy.

Due to the close proximity of larger urban areas with more services, construction workers, and potentially even operations workers, may choose to reside in these other urban areas and not spend their wages in Garfield County, thereby decreasing the economic development potential of wind energy projects specifically to Garfield County. The proximity of Clarkston and Lewiston indicates that these cities may likely gain from wind development in Garfield County if wind project workers live in these cities or if Project inputs are procured from businesses in these cities.

A key factor for increasing the economic impact of wind energy projects in Garfield County is ensuring that construction workers and others visiting a wind energy project have adequate lodging and services within Garfield County. Lodging options could include a motel, RV park, or short-term apartment rentals. Important services to offer include drinking and eating establishments, laundromats, grocery stores, and general retail.

Whitman

Whitman County is by far the largest of the Southeastern Washington counties in terms of population and economic output, which indicates that economic impacts of comparable wind development may be larger than those experienced in Columbia County. It also has the most diverse economy in terms of types of businesses present. Much like Clarkston and Lewiston, the proximity of the town of Pullman in Whitman County to the town of Moscow, Idaho results in a fair amount of inter-regional and inter-state trade. Whitman County has many if not all of the industries typically providing locally services for the development of turbines.

For example, there are approximately ten hotels or motels in Pullman and two in Colfax as well as a number of RV parks within the county. There are also many retail and restaurant options in Whitman County. Additionally, the size of the population will likely result in more construction workers being from the local area, thereby increasing retention of Project wages. Despite this, the inter-regional ties with Moscow, Idaho may reduce some of the economic benefit to Whitman County.

References

- Bluewood Ski Resort, Recreation Management Campgrounds, Jubilee Lake <http://www.bluewood.com/camp.htm>, accessed July 30, 2008.
- Bureau of Land Management, North Palm Springs Field Office, September 24, 2006, “Economic and Fiscal Report, Alternative A, Mountain View IV Wind Project, Palm Springs, CA,” prepared by AES Sea West, San Diego.
- Development Research Partners, 2006, “The Economic and Fiscal Impact of the Peetz Wind Farm.”
- ECONorthwest, November, 2002, “Economic Impacts of Wind Power in Kittitas County – Final Report.”
- ENTRIX, November 5, 2007, “Economic Effects of the Hatchet Ridge Wind Project.”
- Haughton, J., D. Giuffre, et al., Beacon Hill Institute at Suffolk University, May 2004, “An Economic Analysis of a Wind Farm in Nantucket Sound.”
- Haynes, Ha, Washington Department of Revenue, Property Tax Division, July 30, 2008.
- Headwater Economics, 2007, “A Socioeconomic Profile, Columbia County,” produced by the Economic Profile System, Internet website <http://www.headwaterseconomics.org>.
- Hoen, Ben, April 30, 2006, “Impacts of Windmill Visibility on Property Values in Madison County, New York.” Prepared in partial fulfillment of the requirements for the degree of Master of Science in Environmental Policy, Bard College.
- Horizon Wind Energy, September 18, 2007, “Kittitas Valley Wind Power Project, Washington, Tourism and Benefits to the Local Economy.”
- Nevada Commission on Economic Development, May 31, 2005, “A Study of Five Year Expected Impacts from Wind Powered Electrical Production Facilities in White Pine County Nevada,” Carson City.

P. Barton DeLacy, (Cushman & Wakefield, Inc), Evaluating Impacts of Wind Power Projects on Local Property Values. Technical memorandum submitted to the Cohocton Planning Board for the Cohocton Wind Power Project.

Personal communication with Anne Walsh, PSE, October 2008 and November 12, 2008.

Personal communication with Blaine Bickelhaupt, Windermere Real Estate in Dayton Washington, July 2008.

Personal Communication with Bruce Goodell, Bluewood General Manager, July 23, 2008.

Personal communication with Dan Ortega, Vestas, August 2008.

Personal communication with Doug Mollet, Pacificorp, August, 2008.

Personal communication with Drew Woods, Columbia County Public Works Engineer, July 28, 2008

Personal communication with Ed Merritt, Lyons Ferry Concessionaire, July 22, 2008.

Personal communication with Jacob Davis, RES Americas, August 4, 2008.

Personal communication with Jim MacArthur, Last Resort Camp Store, July 28, 2008.

Personal communication with Joanie Hudson, PSE, July 15, 2008.

Personal communication with Kurt Merg, Private Lands Biologist, Washington Department of Fish and Wildlife, August 1, 2008.

Personal communication with Mona Himmelberger, Business Manager, Dayton School District #2, July 30, 2008.

Personal communication with Neil Cook, MAI, Utility Valuation, Advisory, and GIS Program Manager, Washington Department of Revenue, Property Tax Division, December 10, 2008.

Personal communication with Nicole Hughes, RES Americas, October 9, 2008.

Personal communication with Randy Barton, Columbia County Assessor's Office, August 11, 2008.

Personal communication with Scott Rasley, Wildlife Biologist with the Washington Department of Fish and Game, July 31, 2008.

Personal Property Tax Statement, 2008, Columbia County Treasurer, Parcel Number 4-000-00-570-0060.

- Peter Scott Planning Services Ltd, November 2005, “Proposed Arecleoch Windfarm – Assessment of Recreation, Sports, and Tourism Opportunities, Executive Summary.”
- Poletti and Associates, May 2005, “A Real Estate Study of the Proposed Forward Wind Energy Center, Dodge and Fond Du Lac Counties, Wisconsin.”
- Port of Columbia, Lyons Ferry Park and Marina, http://portofcolumbia.org/index.php?option=com_content&task=view&id=19&Itemid=40 (accessed July 30, 2008).
- Puget Sound Energy, Wind Assets, Hopkins Ridge Wind Facility, 2007-2008, “Facts at a Glance” http://www.pse.com/energyEnvironment/energysupply/pages/EnergySupply_ElectricityWind.aspx?tab=2&chapter=5, accessed July 28, 2008.
- Renewable Energy Policy Project (REPP), May 2003, “The Effect of Wind Development of Local Property Values.”
- Revised Codes of Washington, 84.55.010, 2006, “Limitations Prescribed.”
- Royal Institution of Chartered Surveyors (RICS), 2005, “Impact of Wind Farms on the Value of Residential Property and Agricultural Land.”
- Scottish Renewables Forum & the British Wind Energy Association, September 2002, “Tourist Attitudes towards Wind Farms.”
- The Case Against Wind ‘Farms’, Country Guardian, May 2000, available at: www.countryguardian.net/case.htm, accessed September 20, 2007.
- The Last Resort Camp Store & Blue Mountains KOA Campgrounds, July 2008, “Fishing and Hunting Report”, http://www.thelastresortrv.com/fishing_hunting_report.htm, accessed July 29, 2008.
- U.S. Forest Service, Umatilla National Forest, Walla Walla Ranger District, <http://www.fs.fed.us/r6/uma/walla2/index.shtml>, accessed July 30, 2008.
- United States Department of Agriculture, National Agricultural Statistics Service, 2002, “2002 Census of Agriculture County Profile”, collected for Asotin County, Garfield County, Columbia County, and Whitman County.
- United States Department of Agriculture, National Agricultural Statistics Service, “2002 Census of Agriculture County Profile”, collected for Asotin County, Garfield County, Columbia County, and Whitman County.
- US Census Bureau, 2007 Population Projections, 2000 Census.
- Washington Office of Financial Management, June 2008, “April 1 Population of Cities, Towns, and Counties Used for Allocation of Selected State Revenues, State of Washington,” Olympia, Washington.

_____, October 2007, "Final Projections of the Total Resident Population for Growth Management Medium Series: 2000-2030," Olympia, Washington.

Washington State Department of Revenue, "Sales and Use Tax Rates," Web page: <http://dor.wa.gov/content/findtaxesandrates/salesandusetaxrates/lookupataxrate/>, accessed August 26, 2008.

Washington State Parks, Camp Wooten ELC, <http://www.parks.wa.gov/elcs.asp>, accessed July 20, 2008.

Washington State Parks, Lewis and Clark Trail, <http://www.parks.wa.gov/parkpage.asp?selectedpark=Lewis%20%26%20Clark%20Trail>, accessed July 30, 2008.

Washington State Parks, State Snowmobile Sno-Parks, <http://www.parks.wa.gov/winter/parks/motorparks.asp?Region=6>, accessed July 30, 2008.