

2013

Winds of change in Klickitat County: the Harvest Wind Project

Michael Phillips

David Watson

William Barnes

University of Portland, barnesw@up.edu

Howard Feldman

University of Portland, feldman@up.edu

Follow this and additional works at: http://pilotscholars.up.edu/bus_facpubs

 Part of the [Business Commons](#), [Environmental Law Commons](#), [Government Contracts Commons](#), and the [Land Use Law Commons](#)

Citation: Pilot Scholars Version (Modified MLA Style)

Phillips, Michael; Watson, David; Barnes, William; and Feldman, Howard, "Winds of change in Klickitat County: the Harvest Wind Project" (2013). *Business Faculty Publications and Presentations*. 25.

http://pilotscholars.up.edu/bus_facpubs/25

This Journal Article is brought to you for free and open access by the Pamplin School of Business at Pilot Scholars. It has been accepted for inclusion in Business Faculty Publications and Presentations by an authorized administrator of Pilot Scholars. For more information, please contact library@up.edu.

INTRODUCTION

It was early April 2009, and Klickitat County planning director Curt Dreyer was weary but happy to be writing up his permitting decision. On a tight timeline, he had worked for months gathering information and vetting the Harvest Wind Project proposal that had been submitted by four Pacific Northwest consumer owned utilities: the Public Utility District No. 1 of Cowlitz County, the Eugene Water and Electric Board, Lakeview Green Energy, Inc., and Peninsula Light Company. The pressure had been high: hanging in the balance was a \$60.76 million U.S. Treasury Department grant which represented 30 percent of eligible construction costs, made available through the American Recovery and Reinvestment Act of 2009. To qualify for the full amount, the wind project had to be completed within the year 2009.

The proposed construction schedule was one of the most aggressive ever and in order to complete it on time approval had to come in April. Wind projects were complicated and required months of construction – typically half a year or more. If Curt approved the project, construction could commence by early May, concluding by December 2009 at the latest to qualify for the \$60.76 million grant.

Approving the permit was not a forgone conclusion. Although Klickitat County was often called the capital of wind energy in the Pacific Northwest due to its 14 operating wind farms and its prime location in the Columbia River Gorge, concerns about wind power among stakeholders – including negative economic, environmental, and health effects - were increasingly being voiced in the region and nationally. With imperfect information on health effects and environmental effects, the “true costs” of wind were uncertain. And yet each new wind proposal had to be evaluated given leading edge knowledge at the time, and every affected party and viewpoint had to be taken into consideration before approving or turning down the project’s permit application for the county. Given these concerns and the uncertainty, would the gains to project stakeholders justify signing off on the project? As he reflected on past few months, Curt felt he had done his best to collect as much information as possible and to weigh the concerns and needs of all stakeholders, not just direct investors in the project.

WIND POWER POLICY: A BRIEF HISTORY

Throughout much of the past century, wind power progress fluctuated with the price and availability of fossil fuels and the role of government policy in encouraging wind power development and diffusion. Research and development of wind technology continued through the 1950s and then was largely abandoned for cheaper and more reliable fossil fuels. It wasn’t until the OPEC oil crisis of 1973 and the subsequent rise in fuel prices that society seriously began to consider energy alternatives to reduce dependence on fossil fuels and political risk.¹ By the 1970s the appeal of renewables like wind and solar was obvious: in contrast to fossil fuels, renewable energy sources could reduce dependency on other countries and had the potential to sustainably and reliably provide energy for generations, and renewables offered to substantially reduce pollution associated with fossil fuels, including sulfur dioxide, nitrous oxide, and greenhouse gases.

In the 1970s and into the 1980s the federal government worked closely with industry to advance the technology for large-scale commercial wind turbines. Those efforts ultimately helped pave the path for the advanced technology in today’s large turbines. However, in the mid 1980s fossil

fuel prices declined dramatically, and the pressure for progress subsided. California, however, remained committed to the diffusion of wind power. It was the first state to create a variety of tax rebates for wind power generated electricity.

In the 1990s and the 2000s, several federal legislative measures helped boost the U.S. wind industry through incentives. Incentive based regulation included the Production Tax Credit (PTC), created under the Energy Policy Act of 1992. The PTC was subject to sporadic uncertainty every few years as Congress modified and typically re-extended the credit or occasionally delayed action. The latest approved PTC that was passed under the American Reinvestment and Recovery Act of 2009 (ARRA) provided a 2.1 cents/kilowatt-hour income tax credit for facilities placed in service before 2013. Other incentives advanced under the 2009 act included a 30 percent grant on construction costs for projects completed in 2009, which if utilized replaced the PTC.² Finally, the U.S. House and Senate was in the process of putting together a serious carbon “cap and trade” bill that, if passed, would be the first major step in the U.S. towards pricing carbon at a national level.

Mandates and targets for renewables had also become increasingly common by the late 00s, with a hodgepodge of activity at all levels. Renewable Electricity Standards (also often called Renewable Portfolio Standards) called for a certain percentage of electricity to come from renewable sources, and by 2009 they existed in 28 U.S. states but not at the federal level. At an international level since the early 1990s, the pressure to work cross nationally towards climate solutions had only increased. With Intergovernmental Panel on Climate Change findings becoming increasingly urgent in the call for collective effort to reduce emissions in both developed and developing countries, various legislative programs and worldwide climate change protocols had been devised, including the Kyoto Protocol, not ratified by the U.S. but ratified by virtually all other industrialized countries.

By 2009 wind had become the world’s fastest growing alternative energy source with a total capacity of 159.2 gigawatts (GW). It constituted about 2 percent of all electric energy consumed and usage was on par to double every three years.³ Many experts forecasted wind energy would continue to expand at near record growth as technologies advanced and costs declined for off-shore wind farms. The future of wind energy remained promising but it still was dependent on fickle legislative mandates and economic incentives to level the playing field. Fossil fuels had a big head start, benefiting from a variety of tax breaks and subsidies in many countries and more time to develop economies of scale.

PROJECT BACKGROUND

Location

The Columbia River Gorge was famous for its strong winds, appealing to kite boarders and wind farm developers alike. Essentially a canyon of the Columbia River, the Gorge cut through the Cascade Mountain range and formed a natural boundary between Washington and Oregon. The Gorge extended for over 90 miles along the Columbia River and was recognized for its rich and diverse natural areas. It held a federally protected status known as the Columbia Gorge National Scenic Area and tourists came from across the country to experience the natural beauty of the river and to hike, camp, fish, and wind surf. Waterfalls lined the Historic Columbia River High-

way, attracting photographers looking to capture the Gorge's rugged beauty.⁴ The Gorge formed a natural wind tunnel, accelerating the wind as it came down the river.

Harvest Wind was to be built on the Columbia River Plateau, which encompassed a large swath of northern Oregon, southern Washington, and southwestern Idaho, and included the nearby Columbia River Gorge. As of spring 2009, more than 600 big windmills were spinning in Klickitat County, generating enough energy to power over 300,000 homes. The county anticipated another 300 windmills would be built in the future. "That area has sort of become the epicenter of wind development in the Pacific Northwest," said Jeff King, senior resource analyst with Northwest Power and Conservation Council, an energy planning organization."⁵ The county had aggressively courted wind developers, aided in part by "existing transmission lines, compatible land use, receptive residents and local government."⁶

If construction of the Harvest Wind Project proceeded, it would join a host of other wind projects and flank the White Creek Wind Project in Klickitat County. Situated on 9500 acres of ranch land, the project would utilize forty-three 2.3 megawatt wind turbines built and installed by Siemens Power Generation. The plan was for Siemens to ship component parts up the Columbia River to the Ports of Longview and Vancouver, Washington and then truck them to their final site in the Gorge. If approved, the project was projected to produce 266,230 megawatt hours annually, enough electricity to power an estimated 14,000 typical households.

The Owners

Two basic types of utility companies existed in the United States: investor-owned and Public Utility Districts (PUDs). Investor-owned utility companies were profit-seeking entities subject to state regulation, whereas PUDs were either non-profit, chartered municipal companies owned by local governments or member-owned cooperatives with citizen elected board commissioners, who set the rates for these entities. Individual utilities could also petition for a rate increase by presenting formal rate cases to their respective state commission.⁷

The Harvest Wind project qualified for a U.S. treasury department grant for 30 percent of eligible construction costs through the American Recovery and Reinvestment Act of 2009 (ARRA). The grant was for \$60.76 million, which helped cover some of the estimated total net cost of the project of \$160 million. Four public utility districts (PUDs) would own and operate the wind farm. Cowlitz PUD and Lakeview Light & Power would both own 30 percent and Peninsula Light and Eugene (Oregon) Water & Electric Board would each own 20 percent. The four PUDs were all formed between 1911 and 1925 and served a total of 172,000 customers in Oregon and Washington. Lakeview Light & Power and Cowlitz PUD were also partners of the adjacent White Creek Wind Project. According to the Harvest Wind Project, the Eugene Water and Electric Board was the first public utility in the Northwest to own a wind farm, starting with its Wyoming wind farm project in 1999.

None of the four PUDs served customers in Klickitat County, and none of them needed the power generated by the Harvest Wind Farm. The Columbia Plateau, however, was prime wind-farm real estate. With limited area for development, there was currently a scramble to secure good land for sustainable energy development. For example, the Oregon Renewable Energy Act of 2007 required investor-owned utility companies to ensure they were integrating sustainable energy projects into their portfolio. In 2011, 5 percent of energy production had to be sustainable,

followed by 15 percent in 2015, 20 percent in 2020, and 25 percent in 2025.⁸ At the time of Harvest Wind’s planning, this act applied only to investor-owned utilities, which were regulated by the state. The PUDs, however, anticipated this standard would eventually be applied to all utilities, and by investing in sustainable energy sooner rather than later, they put themselves in the best possible position to comply with future regulations. Additionally, the PUDs could someday sell the excess energy produced by the project to cover operational expenses and drive energy costs down for their current customers.⁹

Bonneville Power Administration

No wind project in the region could proceed without taking into account the influence of the Bonneville Power Administration, which controlled the transmission of a large percentage of the power generated in the region. Created in 1937, the federally owned Bonneville Power Administration served 12,259,944 Pacific Northwest customers in Washington, Oregon, Idaho, Montana and parts of California, Nevada, Utah and Wyoming. BPA was responsible for marketing and transmitting power from 31 federally owned hydroelectric plants, several smaller hydroelectric dams, and a nuclear power plant, and also provided transmission service for many of the Columbia Plateau wind farms.¹⁰ BPA did not, itself, own power production plants but rather owned and operated approximately 70 percent of the lines on which electricity was transmitted. As such, BPA was not in direct competition with any of the region’s power plants.¹¹

BPA monitored the power-grid to ensure that power transmission across the region remained balanced and stable. Because electricity could not be stored in the lines yet it must be immediately available to customers at the flip of a switch, BPA had to carefully monitor the grid to provide consistent, reliable power. Unfortunately, wind-generated power was not consistent. Even on the Columbia Plateau, wind speed fluctuated wildly and unpredictably, especially at night. Power production had the potential to fluctuate as much as 1000 megawatts in a matter of minutes.¹² Additionally, demand for energy fluctuated throughout the day. Given the importance of keeping the grid balanced, BPA at times ordered power plants – including wind farms - to immediately reduce power generation levels, and reserved the right to fine them through transmission tariffs if the changes weren’t implemented within specified times.

In order to further ensure the grid was balanced and because of wind power’s inconsistent and unpredictable rates of production, BPA had to keep a hydroelectric backup turbine spinning. If wind energy decreased drastically, BPA could quickly put the turbine online to make up for the loss. Since the turbine served to level out fluctuations in wind energy, its potential energy was wasted when it remained idly spinning.¹³

Despite the difficulties of adding wind power to the grid, BPA strongly supported wind power development in the Northwest and anticipated having up to 6000 Megawatts by 2013. BPA had committed to facilitating the increase by “building and financing wind-integration transmission, revamping grid operation to handle large amounts of variable generation and creating new wind power-friendly business practices.”¹⁴

POTENTIAL IMPACTS ON STAKEHOLDERS

The impact on landowners

Before wind came to town, Goldendale, Washington, located in Klickitat County, was a city in decline. Much of the industrial sector had left town; in 2001, the aluminum smelter closed, eliminating 600 jobs and the local forestry industry had been in decline for several years. Landowners typically scraped by through farming hay, wheat and raising cattle. The 2008 annual per capita income for Goldendale was just \$32,550 a year,¹⁵ well below the 2008 national and Washington state per capita personal incomes of \$40,673 and \$43,732 respectively.¹⁶ Many other residents relied on low-paying jobs for the bulk of their annual income.

Wind power represented new economic hope for some families in the county. The Harvest Wind Project was anticipated to bring significant income to those in Klickitat County whose land would be used for the wind farm. A good example of this was the Davenport family. Various members of the family had combined plots to create a large swath of land, and the Davenports stood to earn an anticipated \$200,000 annually by leasing their combined property to the developers. At the same time, the wind turbines had a relatively small footprint, hence, owners like the Davenports would be able to continue to farm their land or raise cattle. With the wind blowing briskly and glancing at the nearby turbines of another wind project, the Davenports commented to a New York Times reporter that it was a “T and E day” – the acronym for “turn and earn” familiar to Klickitat locals.¹⁷ For the Davenports, the benefits were clear: wind power would ensure they were not completely dependent on farming. At the same time, because they had so much acreage, a few turbines could go mostly unnoticed.

However, not all landowners welcomed the turbines. Although owners of large plots of land could earn substantial sums, smaller landowners had less to offer developers, and even the turbines’ small footprints could substantially impact their properties. As reported by the New York Times, Daniel Parke made his position clear in a local meeting,

“the large land owners are going to make money. The windmill companies are going to make money. The county is going to make money...[but] the small land owners when they go to sell, they’re going to find out that their land is not worth much because of the windmills.”¹⁸

Individuals such as Parke, who owned their land as investments or as sites to build their dream homes, were worried they would be severely impacted by the project.

The development was especially controversial for those with properties located very near the currently operating or proposed turbines. In addition to anticipated declines in property values, some were concerned the county and developers were not giving enough information to the landowners they approached. According to the Times,

“Parke said there is a lack of education to land owners and pressure not to speak out against the wind developments. He plans to sue ...to force wind developers and governments to notify people that their property will lose value because of the windmills. He said he has had real estate agents tell him that having the windmills all around has sharply cut the value of his land”.¹⁹

Developers who approached landowners promised huge profits, but according to the owners, neglected to always inform them of the negative impacts the wind farms may have on neighbors.

When confronted with these concerns, wind developers rejected the claim that wind farms hurt property values.²⁰

Environmental Impacts

Wind was generally considered a clean, renewable energy and recently a cash crop for many rural farming communities. In 2004, Klickitat County commissioners had agreed to adopt a fast-track zoning program called the energy overlay zone (EOZ), which they hoped would attract enough wind farms to generate 1,000 megawatts of power over a 20-year period. Instead, the county reached its goal in three years.²¹

The EOZ became final after the county reached an agreement with environmentalists to re-evaluate the zoning in seven years or after the construction of 1,000 megawatts of wind power. The environmental group Friends of the Columbia Gorge, a nonprofit organization dedicated to the protection of the scenic, natural, cultural, and recreational resources of the Columbia River Gorge challenged the zoning permit. In an interview in the Vancouver, Washington paper *The Columbian*, the group argued the zoning was no longer a valid gauge of the cumulative impact of wind energy in Klickitat County and that wind energy facilities had been developed in Klickitat at a rate seven times as fast as projected.²²

Rick Till, Conservation Legal Advocate with Friends of the Columbia Gorge, had voiced his concerns over this issue to Curt Dreyer. He pointed out that Klickitat County had permitted nearly 2,000 MW of wind energy altogether in the last 5 years. He told Curt he was worried the pace and scale of development had outpaced what was analyzed a few years earlier which he believed could lead to potential cumulative detrimental impacts. He believed there had not yet been a reputable cumulative impact analysis of wind energy development on the Columbia Plateau and the zoning ordinance was out of date.²³

Mike Canon, the county's Economic Development Director, disagreed with Till's assessment. Canon said the zoning ordinance had been amended after each major wind project, and that its analysis of impacts — on birds, bats, and wildlife and Native American cultural sites — looked not only at Klickitat County but at the entire Columbia Plateau.²⁴

Scenic Impacts

A main driver for the creation of many national parks was the need to protect scenic resources. For example, the Columbia River Gorge National Scenic Area Act, with its protections for scenic vistas, had so far kept wind turbines out of Skamania County, located just west of Klickitat County. The Harvest Wind Project, however, was to be developed in Klickitat County, far outside the Scenic Area's boundaries.²⁵ The developer of Harvest Wind claimed it would have minimal visual impact due to it being on ranch land. In addition, other supporters of the project argued that scenic impacts were subjective.

However, Rick Till said the project could still create a negative visual impact on the surrounding community. He pointed to decades of well-established scenic resource assessment methodologies. He cited both the USDA Forest Service and the Bureau of Land Management, which had visual resource management manuals that provided objective methodologies for evaluating the integrity of scenic landscapes and the degree that development would contrast with those landscapes. Till said that Curt Dreyer could analyze whether the developer of Harvest Wind responsibly predicted scenic impacts based on these methodologies, including visual simulations. Till

noted there were numerous ways to distort pre-construction simulations with lens sizes and computer renderings that could dramatically alter the perceived distance to turbines.²⁶

Wildlife Impacts

Bird mortality as a result of wind turbines was an issue important to both tourists and local bird-watchers. Two issues were alleged to be a result of wind turbine affects: (1) changes in birds' nesting habits, and (2) controversy over how wind farms accounted for bird kills.²⁷ Many wind advocates argued domestic cats killed more birds than wind turbines. However, Rick Till contended that domestic cats did not kill the same species of birds as wind turbines. Raptors, burrowing owls, and shrub-steppe dependent species, were particularly susceptible. He said particular focus should be paid to raptors and other sensitive species and that the impacts to wildlife had yet to be adequately analyzed. Till said the county had recently commissioned a cumulative impacts wildlife study which included comments from a leading expert on the impact of wind development on wildlife. The expert had concluded the report did not accurately depict the impact of wind development projects on avian species— negative impacts were greater than commonly expected.²⁸

Effects on Health

The health effects on humans residing in close proximity to wind farms had been debated for a number of years without a definitive conclusion. In Klickitat County, the debate continued, and Dreyer had to take it into account in his decision. Significant concerns were expressed by residents and workers of the county living near operating wind farms as well as others concerned with possible health issues related to wind farm operations. At the same time, Oregon residents just across the Columbia River and living close to their own wind farms, added fuel to the fire by raising health-related complaints to the Oregon Public Health office in the hopes of garnering enough attention to stimulate a public health assessment of wind farms.²⁹ Their concerns, as well as others, primarily focused on the noise and vibrations generated by the turbine's spinning blades. In an interview in the *Oregonian*, Portland's largest newspaper, Sujata Joshi, an epidemiologist in Oregon's environmental public health office said: "With any development, you start learning more about potential concerns as more people start experiencing them. Our goal now is to hear what people have to say, and see if we can find solutions that work for communities and for the state's goals."³⁰

Nationally, studies by physician Nina Pierpont³¹ had attempted to associate low frequency vibrations and noise to a new phenomenon called Wind Turbine Syndrome. She argued that six core symptoms were commonly experienced by people near wind farms: sleep problems, headaches, dizziness, exhaustion, lack of concentration and tinnitus.³² Her research sought to link the noise and vibration created by wind turbines to increased visual disturbance and inner ear disruptions, resulting in increased health ailments.

Bjorn Hedges, Plant Manager-to-be of Harvest Wind, had a different stance on the issue. He claimed the modern turbines to be used in the Harvest Wind Project were quieter than ever and emitted little to no vibrations. With advancements in technology, control systems altered the blade pitch to allow larger wind turbulence to pass by, which would normally account for periods of increased noise. According to Hedges, the sound pollution from turbines in Klickitat County would be so insignificant that the average person would only be able to hear the wind itself.³³

Hedges was not oblivious to all of the health complaints from community members. Because the non-residential Harvest Wind property was semi-restrictive (people could access the land after a brief, safety introduction) there were valid concerns of injuries in the winter months due to ice throw from the blades. This extended to publicly-owned roads and private households. Harvest Wind turbines could throw softball sized chunks of ice up to 900 feet at 160 miles per hour; a significant safety concern.

Another health concern was ‘shadow flicker’ on windows. Bjorn admitted this could extend beyond being merely annoying as he witnessed this firsthand in his office. Residents experienced a strobe light effect on their windows due to the shadow cast by the spinning blades. The possibility of adverse health reactions due to shadow flicker were acknowledged, but not yet proven. Hedges felt that much of the “shadow flicker” effect could be alleviated by either applying a photovoltaic eye, which could limit the operation of specific turbines during certain angles of the sun, or mitigating with fences and trees adjacent to affected residences.³⁴

There was some agreement that further studies were needed with regard to these health claims. Adequate data had yet to be gathered to the extent required to make definitive conclusions. As the number of wind farms increased, additional studies into the physiological effects were likely to take place. For example, the Oregon Public Health Office had begun supplying substantive evidence relating these types of ailments directly to wind farms.

Dreyer, however, did not enjoy the luxury of being able to wait for definitive answers. With imperfect and incomplete information, he had to do his best to take these concerns into account.

Impacts on Local Workers

Curt Dreyer knew that any new business brought to the area was sure to help local businesses as well as residents find work. High-paying jobs in timber and aluminum had withered away over the years, causing Klickitat County’s economy to struggle to find ways to bring in new employment. Mike Canon, the county’s Economic Development Director, put it colorfully to a local reporter, “There’s more than windsurfing on this stuff - if the wind blows anyway, it might as well blow money.” Canon said he didn’t know yet how many temporary construction jobs had been created through the construction of existing wind farms, but he did estimate that an estimated 535 permanent, good quality jobs were associated with wind projects in the area. Dreyer knew that with Klickitat County’s chronically high unemployment, that number was significant, and Harvest Wind would add to this total.³⁴

Construction work on wind farms was done through numerous subcontractors, which made employment statistics and wage information elusive. Jobs ranged from clerical work to wood framing and wiring to road and site excavation. It was estimated that as many as half of the workers employed through wind farm construction were from Klickitat County. Some work was contracted to regional firms, but the out-of-town companies also hired local workers. Those local contractors were able to purchase new equipment and hire additional workers.³⁵

While building wind farms typically took a couple years (Harvest Wind, as a relatively small project, was expected to take about 7 months), their operating life was expected to be at least 20 years. According to Mike Canon, wind farms created one permanent job for every five megawatts generated and those jobs paid from \$50,000 to \$60,000 per year.³⁶ For a job the size of

Harvest Wind, with installed capacity of 98.9 megawatts this could mean as many as 20 new permanent jobs for Klickitat residents.

The Multiplier Effect

Previous wind farm construction had caused a ripple effect in the area, multiplying the jobs and the income associated with the direct wind jobs created. Local restaurants and motels were seeing more customers because the work required specialists from out of the region. Additionally, Columbia Gorge Community College, located in the area, had launched one and two year training programs in wind technology, responding to the labor needs of the wind farm companies.³⁷ In addition, thousands of wind turbine components had been shipped to the Port of Vancouver, Washington, which necessitated further transport to remote wind farm sites on the Plateau. In response, energy companies created a network of new and improved roads which also benefited county residents. “Poor roads have been a firefighting risk,” Canon said. “Now you have those good paved and gravel roads.”³⁸

The growth of wind farms brought tax revenue flowing into many of the small towns located in Klickitat County. In the small town of Bickleton, Washington, property taxes from wind farms helped the 500-square-mile school district serving only 100 students build an \$8.9 million school, with wind farms paying 97 percent of the school’s costs.³⁹ Not only did wind farm money pay for new schools; it also gave taxpayers a break. The tax rate for the Goldendale School District dropped from \$15.50 per \$1,000 of assessed property value in 2001 to a 2009 rate of \$9.17, due to property tax revenues paid by wind energy companies. In additions, sales tax revenues in Goldendale were expected to have grown by about 50 percent from 2005 by the end of 2009.⁴⁰

While the wind farms brought jobs, many local residents believed it was not necessarily a boom. Curt Dreyer remembered listening to a local resident at one of the hearings. Jim Allyn, owner of Allyn’s Building Supply in Goldendale, admitted he saw his highest sales ever, but talked about the area as not being a boom or bust region. Allyn said, “we just kind of rock along. We’ve always had high unemployment.” Christopher Hunt, a local, out-of-work trucker, echoed his sentiments in an interview in the Yakima Herald-Republic: “you don’t come here because you want a good job, you come because it’s a nice area.” He also noted he hadn’t been able to find work with the wind farms currently located in the county.⁴¹

CONCLUSION

The Harvest Wind Project came with many advantages and disadvantages to vested stakeholders. Given the current economic climate, it was hard to overlook the needed boost in revenue that Klickitat County would receive from permitting the new wind farm on top of existing projects. A number of residents had an opportunity to increase their incomes with little impact to their current farming operations. But opponents had brought up a number of valid concerns. Those who owned adjacent land were afraid of a negative impact on their property values. The Columbia Plateau and the Gorge area were unique havens for nature enthusiasts, eco-tourists and native species, and public interest groups had rallied to keep its scenic beauty untouched by human influence. And the human and animal health effects of wind power were still being explored and were not yet fully understood – perhaps only after a generation or two lived through the experiment. Given these concerns and the uncertainty, would the gains to project stakeholders justify

signing off on the project? Although he knew that he would never have perfect information, Dreyer had uncovered more information and feedback than he originally anticipated – and it helped him to make a more informed decision.

Endnotes

¹ Mathew Sathyajith, Wind Energy: Fundamentals, Resource Analysis and Economics. Netherlands: Springer, 2006. 1-8.

² "Explore the Issues: Legislative." AWEA. American Wind Energy Association, 2010. 10 Aug 2011 <http://www.awea.org/ei_legislative.cfm >

³ "World Wind Energy Report 2009." WWEA. World Wind Energy Association, March 2010. 24 Nov 2010 <http://www.wwindea.org/home/images/stories/worldwindenergyreport2009_s.pdf >. 5-17.

⁴ "Columbia River Gorge." Columbia River History. Northwest Power and Conservation Council, Jun 2010. 3 Dec 2010 < <http://www.nwcouncil.org/history/ColumbiaRiverGorge.asp> >.

⁵ Mulkern, Anne C. "Wind is the New Cash Crop in Rural Wash. Town." The New York Times 18 October 2010, par 6. 26 November 2010 <<http://www.nytimes.com/gwire/2010/10/18/18greenwire-wind-is-the-new-cash-crop-in-rural-wash-town-3529.html?pagewanted=1> >

⁶ Mulkern, par 6.

⁷ Phillips, Joseph. Personal Interview. 6 November 2010.

⁸ "Incentives/Policies for Energy Efficiency." Database for State Incentives for Renewables & Efficiency. North Carolina Solar Center and the Interstate Renewable Energy Council, n.d. 28 Nov 2010 <http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=OR222R&re=1ee+1 >

⁹ Joseph Phillips. Personal Interview. 6 November 2010

¹⁰ "About Bonneville Power Administration." Bonneville Power Administration. N.p., n.d. 28, Nov 2010 <http://www.bpa.gov/corporate/About_BPA/ >.

¹¹ Phillips.

¹² Phillips.

¹³ Phillips.

¹⁴ "About Bonneville Power Administration."

¹⁵ Mulkern, par. 3.

¹⁶ "Per Capita Personal Income by State," Bureau of Business and Economic Research. 29 December 2010 < <http://bber.unm.edu/econ/us-pci.htm> >.

¹⁷ Mulkern, par. 2.

¹⁸ Mulkern, par. 36-37.

¹⁹ Mulkern, par. 37.

²⁰ Mulkern, par. 39.

²¹ Kathie Durbin, "Washington's Wind Power Windfall." The Columbian 10 October 2010, Par. 33. 26 Nov. 2010 <<http://www.columbian.com/news/2010/oct/10/washingtons-wind-power-windfall-the-harnessing-of/>>

²² Durbin, par. 39-40.

²³ Till, Rick. "Re: UP Graduate Student with Questions about Columbia Gorge Wind Projects." E-mail to Janelle Keller. 22 November 2010.

²⁴ Till, par. 43.

²⁵ Till, par. 31.

²⁶ Till, par. 2.

²⁷ Till, par. 48.

²⁸ Till, par. 4.

²⁹ Scott Learn. "Oregon Public Health office decides it's time to study health effects of wind turbines." Oregonian 21 Oct 2010, par. 2-3, 4 Nov 2010.
<http://www.oregonlive.com/environment/index.ssf/2010/10/oregon_public_health_office_de.html>.

³⁰ Learn, par. 6.

³² Nina Pierpont, "Wind Turbine Syndrome." Testimony before the New York State Legislature Energy Committee 07 Mar 2006, 25 Nov 2010. <http://www.savewesternny.org/docs/pierpont_testimony.html>

³³ Bjorn Hedges. Telephone Interview. 24 November 2010.

³⁴ Courtney Ross, "Klickitat County gets its Wind Back." Yakima Herald-Republic (WA) 22 March 2009, 15 Nov 2010
<http://tdn.com/news/klickitat-county-gets-its-wind-back/article_e4009608-6965-542c-9d39-943d728c3163.html>

³⁵ Ross, par. 14-16.

³⁶ Ross, par. 32-34.

³⁷ Ross, par. 35.

³⁸ Durbin, par. 37.

³⁹ Durbin, par. 8-12.

⁴⁰ Mulkern, par. 46.

⁴¹ Ross, Par. 26-31.

References

About Bonneville Power Administration. Bonneville Power Administration. N.p., n.d. Retrieved Nov. 28 2010 from http://www.bpa.gov/corporate/About_BPA

Columbia River Gorge. (2010, June). Columbia River History. Northwest Power and Conservation Council. Retrieved Dec. 3 2010 from <http://www.nwcouncil.org/history/ColumbiaRiverGorge.asp>.

Courtney, R. (2009, March 22). Klickitat County gets its Wind Back. Yakima Herald-Republic. Retrieved on Nov 15 2010 from <http://tdn.com/news/klickitat-county-gets-its-wind-back/article_e4009608-6965-542c-9d39-943d728c3163.html>

Durbin, K. (2010, October 10). Washington's Wind Power Windfall. The Columbian Retrieved Nov. 26 2010 from <http://www.columbian.com/news/2010/oct/10/washingtons-wind-power-windfall-the-harnessing-of/>.

Explore the Issues: Legislative. (2010) AWEA. American Wind Energy Association. Retrieved August 10, 2010 from http://www.awea.org/ei_legislative.cfm.

Hedges, B. Telephone Interview. 24 November 2010.

Incentives/Policies for Energy Efficiency. (2010) Database for State Incentives for Renewables & Efficiency. North Carolina Solar Center and the Interstate Renewable Energy Council. Retrieved Nov 28 2010 from http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=OR222R&re=1ee+1 >

Learn, S. (2010, October 21). Oregon Public Health office decides it's time to study health effects of wind turbines. Oregonian. Retrieved Nov 4, 2010 from http://www.oregonlive.com/environment/index.ssf/2010/10/oregon_public_health_office_de.html.

Mulkern, A. (2010, October 18). Wind is the New Cash Crop in Rural Washington Town. The New York Times. Retrieved November 26, 2010 from <http://www.nytimes.com/gwire/2010/10/18/18greenwire-wind-is-the-new-cash-crop-in-rural-wash-town-3529.html?pagewanted=1>

Per Capita Personal Income by State. (2010). Bureau of Business and Economic Research. Bureau Of Business and Economic Research. Retrieved Dec 29 2010 from <http://bber.unm.edu/econ/us-pci.htm>.

Pierpont, N. (2006, March 07) Wind Turbine Syndrome. Testimony before the New York State Legislature Energy Committee. Retrieved on Nov 25 2010 from <http://www.savewesternny.org/docs/pierpont_testimony.html >

Sathyajith, M. (2006). Wind Energy: Fundamentals, Resource Analysis and Economics. Netherlands: Springer.

World Wind Energy Report 2009. (2010, March). World Wind Energy Association. Retrieved on Nov 12 2010 from http://www.wwindea.org/home/images/stories/worldwindenergyreport2009_s.pdf