Our Wind Cooperative
Energy Independence for the Northwest

Final Report prepared for
USDA's Value-Added Development Grant Program

Authors: Diane Gasaway, Northwest Cooperative Development Center
Deborah Ross, Last Mile Electric Cooperative
Jennifer Grove, Northwest Sustainable Energy for Economic Development
Peter Moulton, Climate Solutions

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I. Executive Summary

Our Wind Cooperative (OWC) was launched as a project of Last Mile Electric Co-op (Last Mile) Northwest Sustainable Energy for Economic Development (Northwest SEED), Northwest Cooperative Development Center (the Center), Climate Solutions and other non-profit organizations in 2002 to help reduce barriers to distributed customer-owned wind energy development in the Pacific Northwest.

OWC is the first co-op to install small-scale wind turbines (10kW to 100 kW) dispersed across a large geographic area. The initial ten OWC sites will have installed the same systems, consisting of a 10kW Bergey Excel wind turbine, tower, wiring kit and GridTek inverter.

The primary goals of Our Wind Cooperative are:

- Establish a cooperative model for achieving energy independence, rural economic development and community ownership.
- Build familiarity with small-wind turbine technology in rural communities.
- Explore the regulatory, financial and technical needs of a dispersed, inter-tied small-wind turbine network.
- Link rural, small-wind power producers with urban consumers through aggregated Green Tag sales.
- Collaborate on innovative financing opportunities, including public and private grants and loans, utility programs, and manufacturer discounts.

With six turbines operating in Washington and Montana, OWC is more than halfway towards reaching the initial ten turbine, 100 kW goal. The process of selecting the remaining four sites is underway with prospects in Washington, Montana, Oregon and Idaho.

To sustain future development and allow for direct member control and management, OWC was recently incorporated as an independent non-profit business in the State of Washington.

The Bonneville Environmental Foundation and Northwest SEED have fielded numerous requests by current and prospective small wind turbine owners looking for a way to sell their Green Tags. OWC members are discussing how to expand the co-op's marketing activities to include such members.

The 2002 award from the United States Department of Agriculture's Value-Added Grant program has been instrumental in providing support for the feasibility study, financing structure, business operations and marketing plans, and training to assist farmers and ranchers on how to participate in the emerging renewable energy industry.

II. Background

With an abundance of inexpensive hydropower and some of the lowest utility rates in the Country, the Pacific Northwest has traditionally been a poor market for grid-connected small-scale renewable energy technologies. However, much has changed within the past few years. The Northwest has been threatened with power shortages due to both growth in demand and reduced hydropower resources. Some publicly-owned utilities have raised rates as much as 40 percent, and there have been substantial spikes in natural gas prices. Many in the Northwest are anticipating further energy and water crisis and are becoming more concerned about the costs and availability of energy.

At the same time, widespread media coverage is creating more interest in energy conservation and renewable energy. With the region's numerous wind farms making headlines, the public is getting the clear signal that wind power is an important part of the region's energy future.

The combined effect of these emerging influences is a surge in interest in customer-owned wind systems. Despite long payback periods, Northwesterners are installing systems for environmental, religious, "good citizen," energy independence, hobby and other reasons.

Wind power has several attractive attributes for a farm or farming community. Turbines take up very little space, allowing agricultural activities to continue around them. They generate no air or water pollution and, when well sited and developed, generate little public resistance.

In addition to the advantages inherent in any wind project, the development of small-scale wind projects can add unique value to farming activities in the region. Unlike many utility-owned or privately-owned projects, a wind project that is owned by a farmer or a farming community can keep the revenues generated from wind power in the community.

In a recent national survey of farmers sponsored by the American Corn Growers Foundation, more than half of the respondents reported that they would be willing to invest their own money in wind power projects. Nearly a third of those polled – 31% percent – favor farmer-owned wind co-ops as the best way for farmers to realize financial rewards from wind energy.

The cooperative business model can provide significant benefits for wind projects, from aggregating hardware purchases and negotiating discounts with suppliers, to increasing clout and credibility in the marketplace, to building community support. Additionally, co-ops offer a larger combined market presence than individual owners can obtain. Membership benefits can be distributed on the basis of system productivity and level of investment. Members can also leverage experience from early pioneers, saving money and time by being better equipped to tackle unforeseen challenges.

As public interest in wind power has grown, it has become clear that farmers, rural homeowners, ranchers, Native American tribes and rural communities – those who have expressed the greatest interest in small wind turbines – lack familiarity with the technology. Our Wind Cooperative was developed to demystify the technology, financing, permitting and installation processes so that rural landowners could more easily and efficiently install small wind systems for on-site use.

III. Project Summary

With funding support from the Department of Energy's National Renewable Energy Lab and the USDA's Value-Added Development program, the project team formally launched the Our Wind Cooperative project in August of 2002. The Our Wind Cooperative Phase 1 project development budget amounted to approximately $1 million. Of this, the USDA's Value-Added Development Grant program provided $150,000 in funding.

The Value-Added supported feasibility studies for financing cooperatively-owned wind turbines; development of business operations and marketing plans; and trainings in wind turbine siting, installation, maintenance and overall project management to assist farmers and ranchers to participate in this important emerging market.

It is important to keep in mind that over the course of the project the project team received financial support from various sources that helped to accelerate the implementation of the project. Please refer to section V of this report for a complete list of funders, contributors and other participants who have supported to Our Wind Cooperative.

IV. Objectives of the Project

Our Wind Cooperative responds to a rapidly emerging and broadly felt interest in farm-scale wind energy systems in the Pacific Northwest. Even before the program was officially launched, more than 150 pre-applications were received from rural landowners who were interested in hosting a small wind turbine. To date, we have received over 300 applications from prospective turbine hosts. OWC was developed to test the waters for the implementation of a full-scale small wind turbine program in the Pacific Northwest. The project team decided to select an initial ten sites to participate in the program. The initial ten turbine hosts were selected after a very careful screen process based on wind resource, environmental compliance, permitting process, utility interconnection policies, financing and prospect for replication.

Ultimately Our Wind Co-op will help build the necessary infrastructure to support widespread distributed wind development; support a robust market for farmer-owned wind generation and Green Co-op Tags; and foster energy independence and self-sufficiency for farmers, ranchers, and rural communities.

The goals of the project were to:

- Provide numerous regional stakeholders with initial field experience with advanced small wind turbines
- Expand opportunities for distributed wind energy in the Pacific Northwest, which has strong political, public sector, and private sector support for renewable energy technologies, but where small wind system installations are rare
- Document and communicate the project experience to a broad coalition of stakeholders and the general public through a web site, a brochure, trainings, open houses, seminars, and numerous stakeholder communications channels (e.g., rural co-op newsletters)

- Conduct outreach activities in targeted rural communities to identify individuals and utilities seriously interested in participating in a cooperatively owned wind project
- Assist with planning for 10 or more cooperatively owned wind turbines
- Facilitate project financing and purchase of Green Co-op Tags.

The project's success in meeting each of these goals is discussed in section VI below.

V. Program Participants

This section describes some of the many participants who have contributed to the development and implementation of Our Wind Co-op.

a. FUNDERS & CONTRIBUTORS

1. United States Department of Agriculture

The USDA has significantly contributed to Our Wind Cooperative through three different programs.

2002: Value-Added Development Grant provided keystone funding to launch work on the project, a total of $150,000. This funding supported feasibility studies on Co-op development, Green Tags distribution models and mechanisms, data logging equipment, Co-op formation, outreach and marketing efforts.

2003: Renewable Energy Systems Grant provided an additional $77,449 in funding for nine of the ten sites to offset capital and construction costs. Funding from this grant was allocated to amount to approximately $9,000 - $10,000 per site.

2004: Rural Cooperative Development Grant provided to continue Co-op outreach activities, to design a marketing plan and to create a business plan.

2. United States Department of Energy

Northwest Cooperative Development Center was awarded a contract of $300,000 from the Department of Energy's National Renewable Energy Laboratory. A 3-year contract award that began in 2002 was recently extended to 2006. Funding supports site development, outreach and field data collection to verify wind turbine performance in different climactic regions.

3. Montana Department of Environmental Quality

Montana's DEQ supplemented two of Our Wind Co-op's Montana sites, one with a low interest loan and another with a $5,000 contribution.

4. Bonneville Environmental Foundation:

The Bonneville Environmental Foundation, a non-profit organization, was established in 1998 to support watershed ecosystems and further the development and use of new renewable energy resources. Through revenues generated from the sales of green power products, the Foundation funds projects that restore damaged

watersheds and support new renewable energy projects from solar, wind and biomass. The Foundation pioneered the sale of Green Tags (the environmental attributes of renewable energy) in 2000 and helped establish national standards for certification and trading. Created by regional environmental groups and the Bonneville Power Administration, the Foundation operates collaboratively with, but independent of both.

The idea of selling Green Tags as a way of financing the development of new renewable energy is discussed in more detail section VI. The Bonneville Environmental Foundation provided critical funding, $60,000 of "up-front" Green Tag payments to help reduce the small wind turbine equipment costs. This $60,000 will be repaid to the Foundation over the course of 10 years. Northwest SEED has applied $6,000 per system toward down payments on equipment orders with Bergey Windpower. In exchange for this and other financial support gained through the Co-op, the individual wind turbine hosts have agreed to market and sell their Green Tags through the Co-op.

5. Utilities.

Several utilities have provided financial support for Our Wind Co-op installations with funding from green power programs, universal systems benefit funds and the Bonneville Power Administration's Conservation and Renewables Discount program.

Through Northwestern Energy's Universal System Benefit fund, the National Center of Appropriate Technology awarded three of the Montana sites a total of $35,000. Klickitat Public Utility and Seattle City Light contributed more than $20,000 in funding to support Washington turbine installations.

6. Manufacturer Cost Share and Rebates.

Bergey Windpower Company supported OWC by offering a discount on equipment orders of approximately $7,000 per system. NRG Systems offered a 35% discount on the data logging equipment that is installed on each system.

Manufacturer discounts are used to both offset the capital costs and to provide essential matching funds for federal grants.

b. PROJECT SPONSORS & PERSONNEL

The team members developing the Our Wind Co-op project have a solid track record of successfully working together on several joint projects including producing the High Resolution Wind Maps of the Northwest, the Renewable Energy Atlas of the West, Harvesting Clean Energy for Rural Development conferences, and Farming the Wind workshops. A brief description of primary sponsors and key personnel (past & present) are included below.

1. Northwest Sustainable Energy for Economic Development (NW SEED):
Northwest SEED's mission is to mobilize consumers and maximize local benefits from harvesting home grown energy resources - wind, solar, biomass, geothermal, low-impact hydro, conservation, and bio-based products - while maintaining reliable electric service and creating new revenue streams and jobs throughout the Pacific Northwest. As a diverse network of individuals and organizations, Northwest SEED is working to engage and build support among rural communities, Tribes, utilities and businesses to ensure local participation, accountability, and long-term benefits of truly sustainable energy.

Northwest SEED has successfully partnered with Last Mile over the past five years to develop high-resolution wind resource maps a five federal funding awards related to Our Wind Co-op and small-wind development; the U.S. DOE National Renewable Energy Laboratory's Regional Field Verification Program, a USDA Value-Added Development Grant, Rural Cooperative Development Grant, and 2003 & 2004 Renewable Energy Systems Grant.

Staff and Board members of both organizations are well-versed in the technical aspects of small-scale wind development, and we have gained a strong reputation in assisting landowners, community groups, and utilities in building clean energy installations that demonstrate cooperative business models.

<u>NWSEED-OWC Key Personnel:</u>
Project Management & Oversight: Heather Rhoads-Weaver, Don André and Jennifer Grove
Resource and Data Analysis: Jessica Gail Raker, Tadd Lisman
Project Support: Angela Shutak, Sarah Peterson, Rachel Hein, Thom Wallace, Amy Vavak, Kevin Fullerton, Alicia Healey, John VandenBosche, Roel Hammerschlag, Randy Smith, Wind Energy Interns.

2. Northwest Cooperative Development Center:
The Northwest Cooperative Development Center (the Center) is a nonprofit organization devoted to assisting new and existing cooperative businesses, from daycare centers to credit unions. The Center's main focus is cooperative education. The Center has access to a wide range of information on cooperative ownership and participatory management models throughout the country and the globe, and serves as a clearinghouse for cooperative practices. Its mission is to foster community economic development, primarily through cooperative business models. Several programs are available to help low-income or disadvantaged populations that might otherwise not have access to important technical assistance. The Center also helps develop value-added cooperative solutions for beginning and established co-ops.

<u>Northwest Cooperative Development Center-OWC Key Personnel:</u>
Contract Management, Project Oversight, Finances: Diane Gasaway
Project Support: Laura Aymond

3. Climate Solutions:

Climate Solutions, a Northwest non-profit organization, formed through a merger between Atmosphere Alliance and Energy Outreach Center in late 1998. The Atmosphere Alliance, a six-year-old pioneer in regional response to global warming, brought a solid record of groundbreaking publications, scientific expertise, positive media coverage, and strategic partnerships on global warming and clean energy. The 19-year-old Energy Outreach Center brought a record of leadership in developing practical solutions to the problems of urban sprawl and transportation, proven capacities for conference organizing and coalition building, and experience in launching on-the-ground demonstration projects. In its first five years, Climate Solutions has emerged as one of the region's leading sources of ideas and inspiration on ways to act decisively and creatively towards addressing the global warming crisis. Climate Solutions focuses on solutions that deliver multiple benefits, from job creation and economic development to environmental protection and a better, more satisfying quality of life.

Climate Solutions-OWC Key Personnel:
Project Oversight, Outreach & Marketing: Paul Horton, Peter Moulton

4. Last Mile Electric Cooperative (Last Mile):

The Last Mile Electric Cooperative is an association of publicly owned utilities and nonprofit organizations committed to the development of renewable resources by and for its members, using the non-profit cooperative business model. Last Mile furthers this goal by working with partners in the development of small wind projects such as Our Wind Co-op, by researching renewable opportunities in its members' service territories, and by developing utility-scale renewable projects owned by and for its members.

Last Mile-OWC Key Personnel:
Project Oversight, Utility Support, Contract Management: Deb Ross, Dave Warren

c. HOSTS/MEMBERS

The initial six turbine site hosts make up the current membership of Our Wind Cooperative. A brief bio on each OWC member is provided below. For more details on each host, please visit http://www.ourwind.org/windcoop/pages/profiles.html .

1. Don and Beverly Grim: Peshastin, WA

Don and Bev are the pioneer members of Our Wind Cooperative. Their 10kW turbine sits atop a 100ft free-standing tower at their home in Peshastin, WA. Their system was installed in May, 2003 and is metered separately from their home. The hosts are participants in Chelan County Public Utility District's "Sustainable, Natural Alternative Power" (SNAP) program. As members in this program, they have

agreed to deliver their electrical energy produced by the wind turbine to Chelan County PUD through October 1, 2012. Chelan PUD will pay the hosts for the energy delivered calculated pursuant to the formula set forth in the District's SNAP policy. The amount paid by Chelan County PUD to SNAP Producers depends on the total amount contributed by SNAP Purchasers and the total amount generated by all SNAP Producers.

Beverly currently serves as OWC's Secretary.

2. Jess Alger: Stanford, MT

The Alger site is located in the Judith Basin near Stanford, MT on a 1200-acre cattle ranch and wheat farm. A fourth generation Montana farmer, Jess has been interested in wind power for many years. Mounted on a 100-foot guyed tower, Jess's10 kW turbine was installed in September of 2003 and is interconnected to Northwestern Energy's distribution grid. The production from Jess's turbine is expected to offset most of the electricity used on the ranch.

This site was significantly supported by funding through the National Center for Appropriate Technology through NorthWestern Energy's USB program and the Montana State Department of Environmental Quality.

3. Liberty County: Chester, MT

The Liberty County wind turbine is designed to offset electrical power used by the county's maintenance shop, as well as provide a working example of how wind power can benefit local government. The turbines sits atop a 100 ft tilt-up tower and interconnected to Northwestern Energy's distribution grid. The turbine was installed in December of 2003. County Commissioner, Don Marble, championed the installation and currently serves as OWC's Vice President.

This site was significantly supported with funding from the National Center for Appropriate Technology/NorthWestern Energy's USB program and the Montana State Department of Environmental Quality.

4. Doug Nelson: Browning, MT

Located on the Blackfeet Reservation a few miles east of Glacier National Park, Doug Nelson's 700-acre ranch is in a Class 4 wind area. The land is primarily used to raise bison. His turbine is expected to produce enough power to offset electricity used by his shop and

electric fences. Doug's 60-ft guyed turbine is interconnected to Glacier Electric Cooperative utility grid. Doug's turbine was originally installed during October 2003.

This site was significantly supported with funding from the National Center for Appropriate Technology/NorthWestern Energy's USB program.

5. Ed Kennell: Goldendale, WA

High atop Luna Butte, Ed's turbine towers 80 feet above the windy heart of the Klickitat Valley. Ed's turbine was installed in November of 2003 and is interconnected into Klickitat County Public Utility's distribution grid. Ed currently serves as OWC's President.

Additional site funding was provided by Klickitat PUD's Conservation and Renewables Discount fund.

6. Gwen Bassetti: Goldendale, WA

The newest member of the Co-op raised her turbine on September 1, 2004. Gwen's turbine is the tallest so far in the Co-op, rising 120 feet above her ranch in Klickitat County. Known as Seattle's "godmother of good bread," Gwen Bassetti founded one of the Northwest's best known bakeries, Grand Central Baking Company, in 1972.

As a resident and community member of Goldendale for 25 years, Gwen's interest in the potential for clean energy generation was spurred when she witnessed Co-op president Ed Kennell's 10 kW turbine go up within view of her farmland.

d. IN-KIND SUPPORT

The following organizations and individuals contributed in-kind support in the areas of outreach, project coordination and implementation, technical assistance, training, Green Tags set-up, legal advice and general counsel.

- Department of Energy's National Renewable Energy Lab
- Bonneville Environmental Foundation
- Bergy Windpower Company
- Clean Energy Products
- Foster-Pepper
- NRG
- Renewable Northwest Project
- Chinook Wind
- Whidbey Sun
- Kevin Snively
- David Brugman
- WOW Energy
- Next Generation

VI. Achievement of Work Plan

The project was divided into ten discreet tasks, encompassing both the USDA Value-Added and NREL work plan and funding periods. The entire work plan follows, however only the tasks shaded in gray and highlighted with an asterisk were supported through the USDA's Value-Added Development Grant program. Accomplishments on the Value-Added Development Grant tasks are discussed in detail below.

Table 1
Work Plan

***1. Project Work and Cost Plan**	**Oct-02 - Aug-04**
a. Identify Market Window	
b. Identify potential buyers	
c. Develop promotional campaign	
d. Describe the distribution system	
***2. Site Development Report**	**Oct-02 - Aug-04**
a. Develop a Participation Requirements and Site Application Form	
b. Site Profile Reports	
3. Project Construction and Turbine Installation	Feb-03 - Dec-05
a. Installation of Towers	
b. Construction and Turbine Installation Report	
4. Turbine Commissioning and Project Acceptance	Feb-03 - Dec-05
a. Site specific Commissioning Report	
b. Turbine Commissioning and Review Package	
5. Turbine Operation and Maintenance	Feb-03 - Jul-06
6. Data Collection and performance Evaluation	Feb-03 - Jul-06
a. Field data Collection Plan.	
b. O&M Log and Performance Summary	
7. Reporting	Quarterly - ongoing
***8. Outreach Activities- Brochure and Presentation materials**	**Oct-02 - Mar-04**
***9. Project Review Meetings and Workshops**	**Periodic - ongoing**
10. Final Project Documentation (NREL)	Aug 06

a. TASK 1 – PROJECT WORK AND COST PLAN

To help ensure local interest in the project, Northwest SEED circulated a "Pre-Application/Interest Survey Form" at public events and to selected recipients. More than 150 potential hosts and investors responded, confirming that there would be a strong application pool to select from. The Center and Northwest SEED prepared a final "Project Work and Cost Plan" including detailed business operations and marketing plans based upon the preliminary plan described here. The plan identified a market window, potential buyers, possible promotional campaigns, and described the distribution system. Last Mile and Northwest SEED worked with host utilities and producer-owners to conduct feasibility studies for financing cooperatively owned wind turbines and assisted with determining investment payback periods based on expected output and revenues.

What Are Green Tags?
One of the novel aspects of the project is that it is designed from the onset to produce marketable "Green Co-op Tags." Green Tags represent the environmental benefits that occur when clean, new renewable energy is substituted for power that is produced by burning fossil fuel. In a Green Tag sale, the power from the renewable energy facility is not physically delivered to the customer, but the environmental benefits created by the facility are attributed to that customer, directly offsetting the environmental impact of the customer's conventional energy use.

The Bonneville Environmental Foundation's "Green Tag" or "green certificate" is based on the premise that there are at least two distinct products produced by a renewable energy facility. The first product is electricity. How the electricity is treated in a Green Tag transaction is discussed below. The second is a package of environmental benefits created by displacing the output from conventional, polluting power plants with the output from a new, non-polluting renewable power plant. These environmental benefits can be "stripped" away from the electrical power, quantified (e.g. 150 tons of CO2 displaced) and packaged into a Green Tag. The Green Tag then represents those collective environmental benefits, and creates a property right in them.

Green Tags can also be packaged to help meet the requirements of renewable portfolio standards or other legislative or regulatory mandates. The electricity generated by the wind or solar system is sold separately from the Green Tag, as generic power. No environmental claims can be made for this energy because the Green Tag now represents the entire package of environmental benefits associated with the generation of the electricity. The distinction between the two products is created by enforceable contractual agreements.

Green Tag Financing

A wide variety of federal, state, utility and public and private lending and investing options were identified in the course of exploring funding options for turbine purchases and installation, and OWC administrative support. These included the federal Renewable Energy Production Incentive, Investment Tax Credits, and various USDA Rural Development programs, and state-level funding loan and tax incentive programs. Utility Green Power, Conservation and Renewable Discount, and Universal System Benefits programs, community development loans, non-traditional lenders, major donors, venture capital groups, and Program-Related Investment Funds were also discussed.

Our findings were that Green Tag sales were the primary option for securing community investment in the value-added attributes of distributed, small-scale wind power generation. Both wholesale and retail Green Tag purchasers recognize that the cost of energy from small wind and solar technologies is currently higher than that of larger renewable energy facilities such as utility-scale wind and most biomass. Accordingly, Bonneville Environmental Foundation (BEF) is willing to pay a higher Green Tag premium to these facilities and, in turn realize a higher premium when those Green Tags are sold to their utility partners.

OWC and Northwest SEED collaborated with BEF to establish innovative payment structures for Green Tag sales. OWC is utilizing up-front Green Tag payments of $600 per kW from BEF – representing production forecasts for 10 years at 3.5 cents/kWh – to reduce small wind turbine equipment costs. Northwest SEED executed an agreement with BEF for milestone payments toward the initial ten 10 kW systems, and agreed to repay the initial $60,000 interest-free "grant" over a period of 10 years. Northwest SEED has applied $6,000 per system toward down payments on equipment orders with Bergey

Windpower. In exchange for this and other financial support gained through OWC, the individual wind turbine hosts have agreed to market and sell their Green Tags through the Co-op.

In our marketing efforts, OWC's Green Tags are differentiated from large-scale, commercially produced wind power tags by marketing them as "value-added" Green Tags derived from small-scale, locally owned wind turbines. Tags sales directly benefit farmers, rural landowners and low-income communities across the Northwest.

Northwest SEED has had initial success in selling OWC's first ten Tags (1,000 kWh each) to an individual buyer at 10 cents/kWh. Recently, Northwest SEED and Climate Solutions negotiated a deal with BEF and Puget Sound Energy to for the sale of all tags produced by OWC turbines in Washington from 2004-2006 for $70/tag. We are currently negotiating with BEF to sell the Montana turbine tags at a similar price.

OWC Tags are also being marketed to "Congregations of Concern" in the central Puget Sound region through the Environmental Justice Program of the Washington Association of Churches, and the Caring for Creation Network in Missoula, MT. A similar effort is underway with members of Climate Solutions' Northwest Climate Connections project, a growing regional network of organizations, businesses, and jurisdictions working together to demonstrate how protecting the climate helps build a healthier, more sustainable region.

Selling the Tags at premium price allows for a greater margin after the BEF payment is made, creating an ongoing revenue stream to help turbine hosts offset system costs, turbine operations and maintenance, insurance, accounting, administration, and marketing expenses.

Lessons Learned

- Green Tag negotiations, sales, reporting and contracts takes significant time and is very detail-oriented. Having one or two major buyers simplifies and streamlines the administration involved with Green Tag transactions.
- Specific unique requirements of each co-funder (Seattle City Light, Klickitat PUD, AWISH) add layers of complexity to project.

b. TASK 2 – SITE DEVELOPMENT

Northwest SEED worked with the project partners, the Renewable Northwest Project, the Affiliated Tribes of Northwest Indians, and other stakeholders to select good target communities with receptive utilities and tribal agencies to host distributed wind generation projects.

Last Mile and Northwest SEED developed a Participation Requirements and Site Application Form and invited formal proposals based on nominations and the most promising pre-applications received. Northwest SEED held regular site development meetings to review prospects and status on each site. The team developed the following criteria to aid in evaluation potential sites:

Table 2
Selection Criteria

Criteria	Benefit	Limitation
Use of same technology (Bergey 10 kW turbines)	Bergey provided discount for use of turbines; ties into National Renewable Energy Lab Regional Field Verification goals	Was not the optimal turbine size, technology for some sites
Class 3 winds or higher	Improved cost-effectiveness	Limited number of sites qualify
Interconnection and proximity to grid	Required for net metering; required to market green tags	Off-grid applications eliminated
Significant on-site electricity load	Improved cost-effectiveness for net metering	Some sites did not have enough load
Ability to meet environmental and permitting Regulations	Federal stakeholders required NEPA process to be followed for each installation, including local and state permitting for most sites. Improves local acceptance of project.	Some sites did not meet the environmental compliance requirements

Detailed wind resource data is currently being collected from selected installations to aid in verification of the new Northwest SEED/Center high-resolution wind maps and determining the long-term cost-effectiveness of farm-scale wind generation. The data taken from each site is summarized on the www.ourwind.org website titled "site profiles". These profiles provide information on each site's electricity consumption and electricity costs, permitting and interconnection requirements, predicted wind resource and turbine energy production, installation responsibilities, identification of any special requirements, and a site plot plan.

Lessons Learned

- Sites involving commercial facilities or additional government agencies can easily lose momentum.
- Site interns have been very helpful however 10-week timeframe may be too short for training and wrap-up; need to determine if longer commitments possible from highly qualified applicants.
- Obtaining insurance coverage of wind turbines can be difficult; site hosts assisted each other with tips on providers, guy wires, etc.
- Need to execute host contract prior to installation and clarify expectations on payment terms in writing before turbine balance paid.
- Host contracts should require that all steps in installation manual are followed, that a certified Bergey dealer inspects installation immediately upon tower erection, and that turbine is covered by property owner's insurance policy.

- Many potential site hosts lose enthusiasm over time due to various requirements and challenges.
- Sites need local champion and considerable assistance with county permitting and NEPA applications.
- Permitting and financing delays, and one initial promising site was not pursued further due to the host's reluctance both to seek a variance from the County Commission and to submit loan application materials.
- Although we have received and screened more than 200 host applications, the ideal criteria of strong wind resources, persistence to obtain permitting, and willingness to finance the hardware component of the installations has proven to be more time consuming than expected.
- Site hosts need considerable assistance with county permitting and NEPA applications; approval processes time-consuming.
- NEPA application requires extensive documentation, County permit, and wildlife biologist review of site.

Tasks 3-7, Project construction, installation, commissioning and reporting were not directly supported by the USDA's Value-Added Development Grant program and therefore not discussed in this report.

c. TASK 8 – OUTREACH ACTIVITIES

Through a variety of means including targeted media, a project website, open houses, and seminars, Our Wind Co-op has built awareness of small wind energy systems among rural leaders. The project outreach activities have leveraged Climate Solutions' existing Harvesting Clean Energy for Rural Development program, which strives to foster rural development through clean energy production. This grassroots support base will play a vital role in policy efforts to establish additional state incentives for wind power throughout the region.

The Harvesting Clean Energy (www.harvestcleanenergy.org) and OWC (www.ourwind.org) websites provide central clearinghouses for information on making rural distributed wind energy projects happen. Interested persons can find basic introductions and links to more information on topics such as determining what makes a good site, assessing wind resources, obtaining project financing, available incentives, etc. The sites are vital portals, providing comprehensive listings of Northwest-operating wind energy companies, small wind turbine dealers, and consultants.

Data from the wind resource data loggers and turbines' cumulative energy meters are linked to project case study pages on the OWC website, where members and curious visitors are able to track project performance. Maintaining the web site includes updating project profiles, news items, and performance records for each host site over the course of the 24 month monitoring period.

Additional outreach activities have included several small wind seminars, the development and maintenance of a project web site, a project brochure, participation in

workshops, assistance on the publication of reports on the project, and production of an OWC News Bulletin. Three of the turbine host sites held inauguration open houses or "ribbon-cutting" ceremonies featuring high-profile elected officials and rural leaders recruited to increase the public visibility of the project.

Lessons Learned

- Site dedication ceremonies provide big boost for project, hosts and local community.
- First co-op membership meeting was a big boost to hosts, provided great opportunity for sharing experiences and increasing understanding of Green Tags aspect of project.
- Without our first few sites in the ground, we were unable to produce a meaningful substantive brochure, containing information on the specific host sites in Our Wind Co-op.

d. TASK 9 – PROJECT REVIEW MEETINGS AND WORKSHOPS

Project Review meetings and workshops have been held monthly or semimonthly and will continue through the course of the grant periods.

Lessons Learned

- Large number of project partners can slow overall progress and add coordination expense.
- Setting formal deadlines and documenting expected steps in writing can be effective for driving decisions and actions.

VII. Budget & Finances

a. COSTS, CONTRIBUTIONS & BENEFITS

This section is a first attempt to identify some of the the costs and benefits associated with the pilot/demonstration project portion of the overall small wind project. It is not intended to substitute for a formal cost/benefit analysis. A true cost/benefit analysis would have limited usefulness for this project for a number of reasons, some of which are described below.

Costs of Project

Table 3 sets forth the primary cost elements of the OWC program to date.

Table 3
Project Costs to Date (through 12/31/04)

	Source	Type	Cost Share
Project Development	USDA VADG	Federal	$ 150,000
	USDA 9006-RESG		$ 50,428
	DOE-NREL		$ 210,000
	In-kind from various organizations and individuals	Private	$ 150,000
Capital	Montana Dep. Env. Quality	State	$ 5,000
	Bonneville Environmental Foundation	Private	$ 36,000
	Bergey Windpower	Private	$ 40,530
	Seattle City Light	Utility	$ 7,000
	Site Hosts	Private	$ 89,565
	NWE Systems benefit funds	Utility	$ 35,000
	Klickitat PUD	Utility	$ 3,125
	State sales tax exemption	State	
	Production tax credit*	Federal	Unknown
	Net metering value	Utility	Approximately

Benefits of the Project.

The benefits of the project are far less quantifiable than its costs. To some extent, benefits to one participant are derived from the contributions made by others. This is most evident in reviewing the effects of the contributions made by the project's funders and sponsors on the affordability of the turbines to the host landowners.

Table 4
Estimated Payback Period to Landowners

Site	Est. annual production (kWh)	Revenue from sale of power	Payback w/o OWC (years)	Payback w/OWC (years)
Grims not incl - part of SNAP				
Jess Alger/Stanford, MT	11,000	$ 770	52	3
Doug Nelson/E Glacier, MT	12,000	$ 792	53	5
Ed Kennell/Goldendale, WA	14,000	$ 910	51	15
Liberty County/Chester, MT	10,000	$ 700	74	11
Gwen Bassetti/Goldendale, WA	12,000	$ 780	52	17
Average	***11,800***	***$ 780***	***56***	***10***

Thus it can be seen that, from an installation cost perspective alone, these turbines would not be cost effective to landowners without the assistance of OWC or some other similar funding source. The average total installed cost of Our Wind Co-op's 10 kW systems

including hardware and labor before cost-sharing is around $44,000. Based on an estimated capacity factor of 13.5% (11,800 kWh per year), the average "payback period" without cost-sharing would be 56 years. As a result of the numerous funding sources provided through Our Wind Co-op (and indirect subsidies provided by governmental entities), the turbine host cost share has been reduced by an average of 80% to about $8,300, thereby reducing the actual average "payback period (to the landowner)" to 10 years.

The ***energy benefits*** of the project can be derived from comparing the utility's average energy cost with the cost they are "paying" to the landowners. Under the net metering program in place for these installations, the utility essentially pays landowners the retail value of the energy instead of the lower wholesale price they would pay to the Bonneville Power Administration or some other wholesale power provider. For the six installations shown in Table 4 above, the wholesale cost of power is approximately half of the retail price. Thus, the energy benefits to the utility will average very roughly $400 per year, per installation.

Environmental benefits associated with the installation of these turbines include reduced air pollution and reduced carbon dioxide emissions. Table 5 shows the annual Co2 offset associated with each of the installed turbines. Other environmental benefits have not been quantified here but have been quantified elsewhere.

Table 5
Annual CO2 Offset

Site	Est annual production (kWh)	Annual CO2 offset (lbs) [1]
Jess Alger/Stanford, MT	11,000	15,400
Doug Nelson/E Glacier, MT	12,000	16,800
Ed Kennell/Goldendale, WA	14,000	19,600
Liberty County/Chester, MT	10,000	14,000
Gwen Bassetti/Goldendale, WA	12,000	16,800
Average	***11,800***	***16,520***

[1] The Pacific Northwest Electric Power and Conservation Planning Council determined that adding new wind energy to the Northwest transmission system would offset approximately 1,400 lbs. of CO2 for each 1,000 kWh of energy produced and delivered to the electric grid.

Table 6 shows ***additional non-monetary benefits*** associated with the project, by participant.

Table 6
Non-Monetary Benefits

Participant	**Non-Monetary Benefits**
United States Department of Agriculture	Demonstrate added value to development of small wind installations on farms
	Reduced foreign energy dependence, diversity of energy supply, environmental benefits
United States Department of Energy	Information on turbine technology, information on infrastructure development, needs, challenges for small wind programs
State Subsidies and Contributions (Montana DEQ, Washington sales tax exemption)	Promote renewable energy and economic development
Bergey Windpower	Demonstrate effectiveness of Bergey technology, gain information
Contributions from utilities (host utilities, Seattle City Light)	Diversity of supply
Site Hosts	Independence of energy supply

Value of information

The program funded by this grant was a pilot program. The primary goal of a pilot is to gain information that would be useful in designing and implementing a full scale project. The value of this information is for the most part unquantifiable. The costs associated with the pilot, as with almost any pilot, are, for the most part, not indicative of the actual cost associated with a fully developed small and community-owned wind industry. Some of the reasons why the pilot's costs and benefits are not typical include the following:

- A pilot project cannot take advantage of economies of scale
- A pilot project includes costs associated with data collection that may or may not exist for a full-scale project
- A pilot project contains a number of start-up costs that would not be included in a full-scale project, including a learning curve
- Certain constraints associated with the multiple goals of this project may have increased overall costs. Table 2 in section VI showed some of the criteria/requirements for the pilot project. Each one of these criteria was a valuable addition to the projec**t**, but some may have increased overall costs.

VIII. Summary & Conclusions

Initial Our Wind Co-op members are pioneers engaged in all aspects of the cooperative development process with a deep desire to "make it happen." Northwest SEED has screened more than 300 applications to identify the first 10 hosts. The Center and Last Mile have been instrumental fiscal hosts for the federal funding contracts, as the processes for obtaining funds are often complex.

Our Wind Co-op host contracts include liability provisions and requirements for adequate insurance to protect against natural disasters and unforeseen events. Ease of permitting and state funding greatly accelerated and simplified developments of sites in Montana.

Our Wind Co-op is demonstrating that the cooperative business structure can play an essential role in building the market for small wind systems and reducing installation and financing barriers. It is proving to be a successful model showcasing the benefits of aggregation and collaboration which is ripe for expansion and replication.

Co-op members become more competitive not only in gaining access to new opportunities for federal, state, utility, and foundation funding for capital costs, but also in marketing their Green Tags to potential buyers. In pooling their resources, they can leverage knowledge, experience, and technical skills of other members and industry experts to reduce costs and implementation time.

At the same time, it is important to note that, without major advances in technology combined with major increases in the cost of conventional energy sources, significant subsidies will continue to be required in order to make small wind turbines cost effective to the typical landowner.

IX. Appendices

- **a. COST SHARE BY SITE**
- **b. SITE DATA & GRAPHS – WWW.OURWIND.ORG SITE PROFILES**
- **c. MEDIA COLLATERAL**
  - OWC Initial Press Release
  - OWC Brochure
  - OWC Dedication Event Articles
  - OWC Green Tag Certificate
  - OWC Green Tag Postcard
- **d. FINANCIAL STATEMENTS/GREEN TAGS CASH FLOW & ESTIMATES**
- **e. HOST CONTRACT**
- **f. BYLAWS**
- **g. USDA VALUE-ADDED GRANT QUARTERLY REPORTS**

OWC Cost Share by Site

			OWC Cost Share					Utility	Site Specific Funding		
	Site Host	**Total Installed Costs**	Bergey	BEF	NREL	USDA - VADG	USDA 9006	Utility	Other	Source of Other funding	Host Cost
1	Bev & Don Grims Peshastin, WA	$ 60,901	$ (1,600)	$ (6,000)	$ (4,041)	$ (1,510)	$ -			Host provided	$ 47,749
2	Jess Alger Stanford, MT	$ 40,255	$ (7,746)	$ (6,000)	$ (2,484)	$ (424)	$ (8,900)		$ (12,500)	NCAT/NWern	$ 2,201
3	Doug Nelson E Glacier, MT	$ 41,804	$ (7,552)	$ (6,000)	$ (1,810)	$ (3,204)	$ (9,198)		$ (10,000)	NCAT/NWern	$ 4,040
4	Ed Kennell Goldendale, WA	$ 46,514	$ (7,552)	$ (6,000)	$ (2,706)	$ (390)	$ (9,198)	$ (3,125)	$ (3,500)	SCL	$ 14,043
5	Liberty County Chester, MT	$ 52,016	$ (8,528)	$ (6,000)	$ -	$ (1,740)	$ (10,315)		$ (17,500)	NCAT/MT DEQ	$ 7,933
6	Gwen Bassetti, Goldendale, WA	$ 40,521	$ (7,552)	$ (6,000)	$ -	$ (586)	$ (9,285)		$ (3,500)	SCL	$ 13,598
	Total	**$ 282,012**	**$ (40,530)**	**$ (36,000)**	**$ (11,042)**	**$ (7,854)**	**$ (46,896)**	**$ (3,125)**	**$ (47,000)**	**$ -**	**$ 89,565**