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Progress Report to the Bonneville Power Administration

Renewable Energy Activities October 2006-September 2007



from The Bonneville Environmental Foundation

June 30, 2008

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About this Report

This report is provided to BPA in fulfillment of BEF's obligations under MOA No. 04PB-11472, Section 4(c), executed July 15, 2004.

This report summarizes BEF's use of funds received from BPA public customers during FY 2007 (October 2006 to September 2007).

Our current activities are outlined in the Current Activities section. This section includes an itemized list of expenditures incurred during the reporting period.

Information on the future direction of our programs, as envisioned at the time of this report, can be found in the Anticipated Activities section.

Use of Funds

Funds provided to BEF under the BEF funding Memorandum of Agreement (04PB-11742) shall be used for the following activities for the benefit of BPA's public utility and electric cooperative customers:

1. Renewable education programs;
2. Renewable research, development and demonstration (RD&D) activities;
3. Direct Application Renewable Resources by end-use customers served by BPA's public utility and electric cooperative customers.

Eligible Expenses include:

- Capital expenses associated with renewable education programs, RD&D or Direct Application Renewable Resources projects;
- Expenses associated with activities directly related to installing or implementing renewable education programs, RD&D projects, or Direct Application Renewable Resources projects;
- Expenses associated with studies or research demonstrating the viability of new renewable technologies;
- Expenses associated with other activities that have been approved in writing by BPA;
- A maximum of 20% may be used for general and administrative expenses that jointly support BEF in general, and this agreement in particular.

FY Consolidated Expenses-FY '07

Figure 1.

Expenditures By Category	
Direct Application	Expense
Solar Co-op	\$1,445
Wind Co-op	\$4,868
Grant Review	\$4,596
School & Public Utility Outreach	\$11,069
General (project planning & installation)	\$61,572
Total Direct Application:	\$79,550
RD&D	Expense
Ellensburg Community Solar	\$2,289
Building-Integrated PV (BIPV)	\$7,512
Biomass	\$27,909
Wind Integration	\$17,922
Wave and Tidal Energy	\$397
Smart Grid	\$1,198
Analysis of PV Incentives in the Northwest	\$15,899
Total RD&D:	\$73,126
RE Education	Expense
S4RS Program Improvement	\$61,299
Internet Monitoring & Data Display	\$31,245
Educational Assistance to Public Utilities and Regional Stakeholders	\$16,256
Last Mile Electric Cooperative	\$1,751
Total RE Education:	\$110,551
G&A (20% of total expenditures)	\$65,807
Total MOU Funds 10/1/06-9/30/07	\$329,034

MOA Funds Balance Summary

Figure 2.

Funds Rolled Forward to Next Period	
Current Period Budget	\$973,038
Dollars available from prior budget (rolled forward)	-\$197,102
Total Available Dollars	\$775,936
Total Current Period Expenditures	\$329,034
Total Dollars Allocated to Next Period (rolled forward)	\$446,902

Current Activities:

Current Direct Application Renewable Resource Activities:

This section details the installation of current direct application renewable resources in the territories of BPA's public utility and electric cooperative customers.

BEF continued its support of distributed generation in FY 2007, adding more than 67 additional kW in the reporting period (Figure 3), excluding solar and wind coop installations.

Through the solar and wind coops, BEF supported an additional 810 kW of renewable energy technology installations during this period. Since the year 2000, BEF has supported the installation of more than 1.7 MW of small-scale distributed generation (Figure 4).

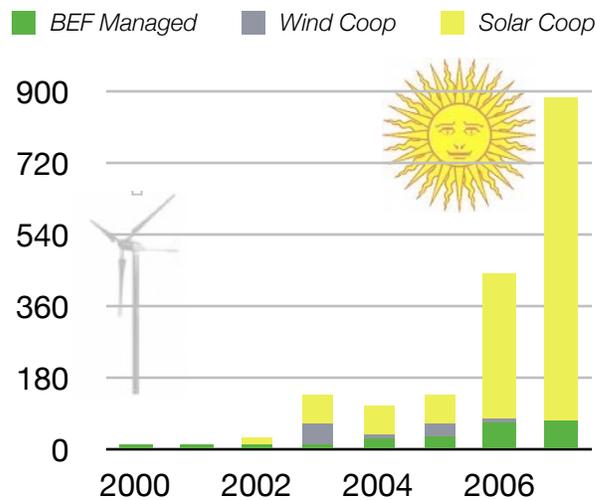
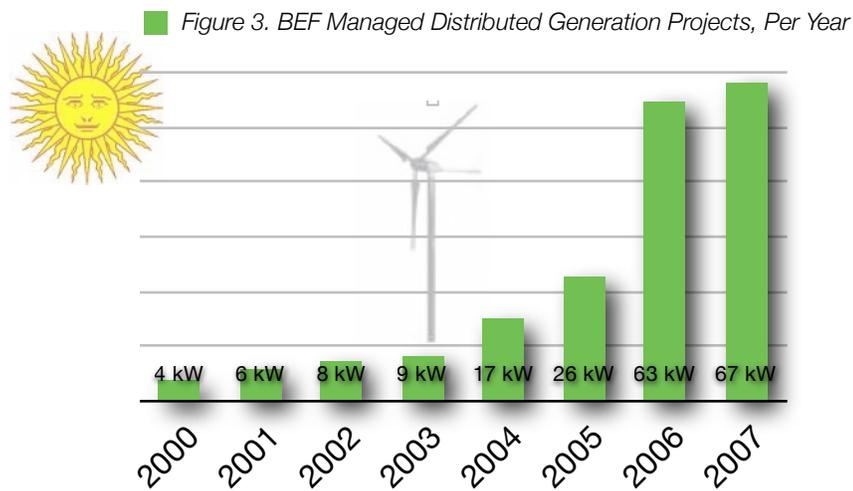


Figure 4. Installations supported per year

During FY 07, BEF's Project Management Team broke ground on 22 new projects, 6 of which are located in BPA public territory. (Figure 5). We commissioned eighteen projects during the year, meaning the projects are generating power, and completed nine, meaning that all installation, marketing and educational activities complete.

Figure 5. BEF-managed projects, October 2006-September 2007

	Project FY 2006	Technology	Capacity (kW)	Serving Utility	Public
Under Construction	Beaverton Resource Center	PV	1.1	Portland General	
	Bellingham Environmental Learning Center	PV	2.04	Puget Sound Energy	
	CHIME Charter Middle School	PV	13.35	LADWP	✓ (non-BPA)
	daVinci Modular Classroom	PV	5	PGE	
	Hood River Middle School	PV	1.1	Pacific Power	
	Issaquah Fish Hatchery	PV	1.1	Puget Sound Energy	
	John Hay - ASES 2007	PV	1.7	Cleveland Public	✓ (non-BPA)
	Molalla High School	PV	1.1	Portland General	
	Pocatello Community School	PV	1.1	Idaho Power	
	Port Townsend HS PV	PV	1.1	Puget Sound Energy	
	PSE State Capital	PV Data Monitoring	-	Puget Sound Energy	
	RiverStone Community School	PV	1.1	Idaho Power	
	Snopud Community Transit Project	PV	3	Snohomish PUD	✓
	Southridge High School	PV	1.1	Benton PUD	✓
	Southwest JHS PV Project	PV	1.1	Westar Energy	
	St Helens High School	PV	1.1	Columbia River PUD	✓
	Sunnyside Environmental School	PV	1.1	Portland General	
	Toutle Lake High School	PV	1.1	Cowlitz PUD	✓
	Wake Robin Learning Center:	PV	1.1	Cowlitz PUD	✓
	WellSpring Community School	PV Education	-	Puget Sound Energy	
	West Salem HS-wind	Small Wind	1.8	Salem Electric	✓
	Western Washington University	PV	2	Puget Sound Energy	

	Project FY 2006	Technology	Capacity (kW)	Serving Utility	Public
Completed	Barnard Elementary	PV	1.1	PEPCO	
	Brewery Blocks	Data Monitoring	-	Pacific Power	
	Camas High	PV	1.1	Clark Public Utilities	✓
	Ellensburg Community Solar	PV	4.1	City of Ellensburg	✓
	Lake Metroparks Farmpark	PV	1.7	The Illuminating Co.	
	Redmond High School	PV	1.1	Puget Sound Energy	
	Rosa Parks Elementary	PV	1.1	Portland General	
	Sharp Electronics	PV	2.1	Clark Public Utilities	✓
	Vancouver Water Resources Center	PV	1.1	Portland General	

The Northwest Solar Co-op

The Northwest Solar Co-op, founded in 2002 by BEF and Cascade Solar Consulting, provides production-based incentives for new solar energy installations in Oregon, Washington, Idaho, and Montana. Figure 4 above charts the considerable success of this production incentive. By purchasing tags from the Co-op for the first 3-5 years of a project’s 20+-year life-span, BEF has encouraged the growth of the burgeoning residential and small commercial solar market.

In 2005, as the Co-op matured, it began to sell to other buyers, in addition to continuing to sell to BEF. During this current reporting period, the Solar Co-op continued to expand, adding 197 new systems, 30% of which is installed in the service territories of BPA’s public utility and electric cooperative customers, and more than 810 kW of capacity. BEF continued to provide critical staff support to the Co-op. Our input ensured that the Co-op continues to operate in an exemplary manner, with the highest level of product credibility. As of September 30, 2007, the Solar Co-op supported more than 1,466 kW of solar.

MOA Charges for Solar Co-op: BEF staff support (contracts, policies, etc) \$1,445

The Northwest Wind Co-op

“Our Wind Coop”, a project of NW SEED, serves an important function in the region by acting as a clearinghouse for information and expertise regarding small wind energy systems, services from which the entire region benefits.

Initially, BEF supported the Co-op by providing zero-interest loans of \$6,000 per turbine for the ten, 10-kW installations. The loans provided crucial up-front capital to help cover equipment costs. BEF recovers these loans over time, and does not charge them against this agreement. Though the Wind Coop installed its final turbine in the previous

Information on Our Wind Coop projects is available on BEF’s website



reporting year, BEF continued to provide important support in this reporting period in order to ensure ongoing product credibility and to provide access to markets for the Co-op's products and educational services. We also continued to work with the Co-op to determine the viability of a utility-scale wind project near Goldendale, WA (in the service territory of one of BPA's public power customers).

The 10th co-op turbine, located in White Salmon, WA, was erected in September, 2006



Three of the ten Co-op installations are located in BPA's public power customer's service territories (Figure 6), and all of the installations are inside BPA's control area. BEF's expenses covered by the MOA are limited to those incurred while supporting Northwest SEED in its institutional development. No Green Tag payments or loans were charged against the MOA. All turbine installations are listed to demonstrate the work the Co-op has undertaken.

Figure 6. BEF-Our Wind Coop projects

Turbine #	Location	Date Energized	Interconnecting Utility	System Size	BPA Customer
1	Peshastin, WA	May 23, 2003	Chelan County PUD	10-kW	
2	Stanford, MT	Sep. 29, 2003	NorthWestern Energy	10-kW	
3	Glacier, MT	Oct. 9, 2003	Glacier Electric	10-kW	
4	Goldendale, WA	Nov. 3, 2003	Klickitat PUD	10-kW	✓
5	Chester, MT	Dec. 16, 2003	Northwestern Energy	10-kW	
6	Goldendale, WA	Sep. 2, 2004	Klickitat PUD	10-kW	✓
7	Belt, MT	June 1, 2005	Sun River Elec. Cooperative	10-kW	
8	Kittitas, WA	March 9, 2006	Puget Sound Energy	10-kW	
9	Wolf Creek, MT	March 30, 2006	Northwestern Energy	10-kW	
10	White Salmon, WA	September 30, 2006	Klickitat PUD	10-kW	✓

Grant Review

Since 2000, BEF has offered an open solicitation process, allowing Northwest organizations to apply for funding support for their renewable energy projects. This open process is only one part of our renewable energy program, and we discover many of our projects through direct negotiation with partners. However, many good projects continue to come to BEF through the open solicitation process accessible to all interested applicants and explained in details on the BEF website:

www.b-e-f.org/grants

During BPA's FY 2007, BEF reviewed 101 applications, most of which were submitted through our web site. Twenty-six of these applications were submitted by customers of BPA public utilities.¹ Of these, three have turned into actual projects: (Snohomish Community Transit, Toutle Lake High School (Cowlitz PUD) and Wake Robin Learning Center (Cowlitz PUD).

As part of BEF's Project Management program line, BEF reviews applications and manages installations under contract with some specific utilities, utilizing funds from those utilities. BEF staff time and expenses associated with those projects are paid for under those contracts and are not included in calculations in this report.

MOA Charges for Letters of Enquiry: time and expenses associated with soliciting and reviewing LOE's from within the service territories of BPA public power customers - \$4,569

School & Public Utility Outreach

During the year, BEF's Project Management Group produced several documents designed to explain our project management services to project hosts (primarily schools). We designed detailed and abbreviated program guides, updated our program descriptions and FAQs on our website, and created a new electronic PDF application forms. Representatives from BEF's Project Management Group attended BPA's Utility Energy Efficiency Workshop and presented the details of BEF's Solar 4R Schools program. We also reached out to several BPA public utilities, in particular, in an attempt to form new partnerships or to extend existing ones. We talked extensively with Seattle City Light, Clark Public Utilities, Snohomish PUD, Cowlitz PUD, and Benton PUD about collaborating on new renewable energy demonstration projects. Those discussions laid the groundwork for future projects, many of which will be detailed in BEF's next report to BPA.

MOA Charges for School & Public Utility Outreach: BEF staff time (material development, travel, staff time) - \$11,069

General Project Management Group Activities (project planning & installation)

The following bullet points detail some of PMG's activities related to the direct installation of renewable energy resources during the reporting period:

- La Center High School

Though we broke ground on this project, located in Clark Public Utilities service area, during the previous reporting period, the majority of the installation and education work was performed during the current period.

¹ Many of the other LOEs were submitted in response to RFPs that BEF issued in collaboration with funding partners who utilize our Project Management services.

As a participant in BEF's Solar 4R Schools program, the school received a 1.1 kW demonstration solar-electric system, a data monitoring system, full weather station, renewable energy curriculum, teacher-training and ongoing educational support, and an

interactive hallway kiosk that details the function and benefits of various renewable energy

technologies. Teacher-champion Sandra Lanphere will incorporate the renewable energy curriculum into the school's existing science classes.

The solar system augments the school's existing "Sustainables" project; a coordinated effort by the La Center school community to introduce students, staff, and parents to the opportunities afforded

by renewable energy and green building design. Because the school invested in ambitious energy efficiency upgrades in 2005, installing efficient fluorescent lighting fixtures, an advanced HVAC system, 50-year metal roofing, passive solar elements, motion sensing faucets, and low-flush toilets, the new solar-electric system powers a greater percentage of the building's electric load.

1.1 kW roof-mounted PV system at La Center High School



The plaque on La Center's interactive kiosk invites students to explore renewable energy

A large blue banner with a sunburst pattern in the background. The text reads "LaCenter High School Live Solar Data". On the left is the LaCenter High School logo. In the center, there is a circular image of the school building with a blue arrow pointing up. On the right, there is a paragraph of text. Below the main text, there are three columns of smaller text providing details about the solar project and the interactive display.

LaCenter High School
Live Solar Data

LaCenter High School's solar project was made possible by a grant from Clark Public Utilities in partnership with the Bonneville Environmental Foundation's Solar 4R Schools program, and was installed in October of 2006.

Just touch the screen to explore these pages and learn how solar works, about other types of renewable energy, why renewable energy is important and what you can do to make a difference and help save energy.

This interactive display is connected to the solar panels through a live data feed that allows students to view the amount of electricity being produced.

- St Helens High School (St. Helens, OR)

In collaboration with Columbia River PUD, BEF installed a Solar 4R Schools project at St. Helens High School. Located prominently in front of the school parking lot, the installation is highly visible to the entire St. Helens community.

In order to be considered for a Solar 4R Schools project, a school must have a “Teacher Champion” that will lead the educational efforts related to the project. BEF found an extremely dedicated Teacher Champion at St. Helens in teacher Jay Groom. He will spearhead the school’s renewable energy education efforts,

incorporating the system and its data into both science and social studies classes. Commenting on the value of the project to the school, Mr. Groom says, "We are extremely excited to receive the photovoltaic project because it gives us a 'hands on' approach to teaching science. It will help me relate science to the students' lives."

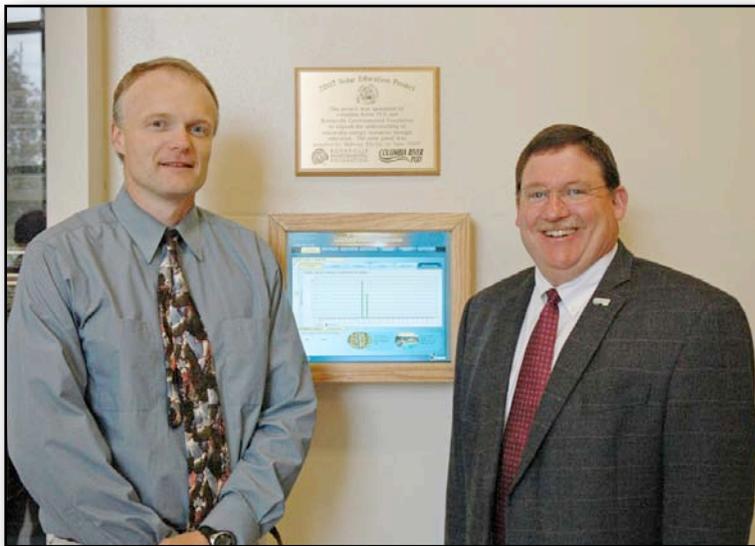
Columbia River PUD was also an active participant in the project.

According to Kevin Owens, the PUD’s General Manager, “Columbia River PUD actively supports



St. Helen's PV project supporters

expanding educational opportunities in our community, and we are particularly excited to expose the local students to the science, technology, and career opportunities of renewable energy.”



Jay Groom and Kevin Owens, St. Helens' Teacher Champion and Columbia River PUD GM, respectively, pause in front of the project plaque and interactive kiosk during the school's opening celebration

- Toutle Lake High School and Wake Robin Learning Center

BEF collaborated with Cowlitz PUD during the current reporting period, beginning the installation of Solar 4R Schools education projects at two locations within the PUD's service territory. The Toutle Lake project will be headed by science teacher John Brugman. BEF will introduce renewable energy concepts to thousands of students at the 82-acre Wake Robin Learning Center, as the site routinely hosts groups of regional students for recreation and education. BEF will detail both of these projects in next year's progress report to BPA.

- Data Monitoring for West Salem Small-Wind

BEF initiated a data monitoring and renewable energy education project at West Salem High School, the site of BEF's second Solar 4R Schools project in 2002. The school has erected a 1.8 kW wind turbine, but has no means of tracking and downloading the system data. BEF plans to provide the school with online data monitoring, wind curriculum, and an interactive educational kiosk. Though there are currently significant technical hurdles associated with downloading the wind data in an academically usable format, BEF hopes to devise a solution to this problem so that we can incorporate small school wind projects into the Solar 4R Schools program.

- Ashland Community Solar

BEF collaborated with the City of Ashland to explore how and whether to expand its existing municipal distributed solar PV system through use of CREBS bonds, tax credits, and "solar cooperative" shares sold to Ashland utility customers. (Note: The City's existing solar system was established in 1999 in significant part with BEF's first renewable energy grant.) Ashland's Utilities Director, Dick Wanderscheid, requested and received ongoing BEF consultation in program design, siting, equipment procurement, finance, and structuring an "offering" to Ashland residents. Ashland determined to proceed with the project, and hopes to begin construction in 2008-09. BEF has provided marketing consultation and design services to Ashland, and brought to the City a business interest through whom the CREBS bonds were successfully placed. (Note: the project is being developed independent of BEF's Green Tag co-marketing arrangement with Ashland.)

- Bulk Purchase of Inverters

In the previous update to BPA, we described our bulk purchases of solar panels and data monitoring equipment, and the resulting time and expense savings. The approach worked so well that we extended it to our inverter purchases. By entering into an agreement with SMA-America during the current reporting period, we lowered our inverter costs by 16% and guaranteed prompt on-site delivery of a third major system component.

MOA Charges for General BPA Project-Related Expense (project planning, contracts, installation): BEF staff time- \$61,572

Update on Planned Direct Application Activities (from previous Progress Report)

In the previous report, we listed various Direct Application goals for this current period. According to this list, BEF intended to:

Goal	Outcome
Work with the Northwest Solar Co-op to ensure that growth is accomplished in a way that addresses the needs of all parties in the chain of ownership	Accomplished
Install several more PV demonstration projects, including one at St. Helen's High School and three in Cowlitz PUD territory	Partially accomplished (only two appropriate host schools were found in Cowlitz territory)
Market our Project Management Services to regional PUDs	Accomplished
Organize a bulk order of inverters	Accomplished

Current Renewable Research, Development And Demonstration Activities:

The Ellensburg Community Solar Project (“virtual net-metering”)

BEF and the City of Ellensburg constructed a novel, replicable, community-based, solar electric project in order to, among other things:

1. Provide Ellensburg rate-payers with the opportunity to invest in locally produced renewable electricity without having to worry about maintenance, shading, or building ownership issues.
2. Offset the retail rate of power (like a traditional residential or commercial net-metered system), while capturing the scale benefits of a large installation.

Although the majority of the design and installation work was done during this prior reporting period, significant marketing and educational work continued in this current period, and BEF did not officially close the books on this project until March 31, 2007. Detailed information on this project can be found in BEF’s previous progress report to BPA.

MOA Charges for the Ellensburg Community Solar Project: BEF staff time and project hardware - \$2,289

Building-Integrated Photovoltaics

BEF has chosen to categorize our BiPV efforts as RD&D. Though the BiPV approach has the potential to lower installed costs and improve aesthetics, the concept is still not widely implemented. During the reporting period, BEF continued to develop several new BiPV projects. Most significantly, BEF is partnering with the Portland Public School District to create the nation’s first “net-zero” public school building (also the nation’s first LEED platinum public school building), depicted

on page 15. As designed, the building will incorporate 5-kW of building integrated PV panels and a host of ultra-efficient technologies to reduce energy consumption. Once the building is completed, the plans will be publicly available on BEF's website so that any interested school districts can emulate the groundbreaking project. Though BEF strongly supports the conservation efforts, our participation is limited to the design and installation of the building-integrated solar tiles.

The building features are as follows:

- **Daylighting:** Daylighting will beautifully illuminate the spaces. Daylight will enter the classroom through a large central skylight containing light modulating louvers. This filtered light is then reflected up onto the sloping ceilings by a suspended fabric reflector that also houses electric lights. The end result is an even distribution of light at the level of the occupants. Since electricity for lighting is one of the main energy draws for classroom spaces, this is an important feature in reducing energy consumption.
- **Insulation:** The envelope of the structure will be super-insulated and will be sealed against air leaks, reducing heat loss in the winter and heat gain from hot summer outdoor temperatures.
- **Passive cooling:** Added thermal mass will store heat during the day. At night exterior air louvers will let cooler night air pass over the slab, wicking away heat. In the skylight well, a damper will let air pass through ventilation chimneys to the exterior. Turbine ventilators are fixed to the outlets to provide weather protection and aid airflow.
- **Solar-Electric Tiles:** After all possible energy usage is minimized using the strategies above, a unique, building-integrated photovoltaic array on the south-facing roof will provide the electrical power used in the space. This array is comprised of 153 tiles that integrate into the roofing tile system, providing a power generating roofing assembly. The system has been sized to provide all of the building's electricity usage, making the building net-zero over the course of the year.

MOA Charges for BiPV: BEF staff time and commissioning of report- \$7,512

Biomass

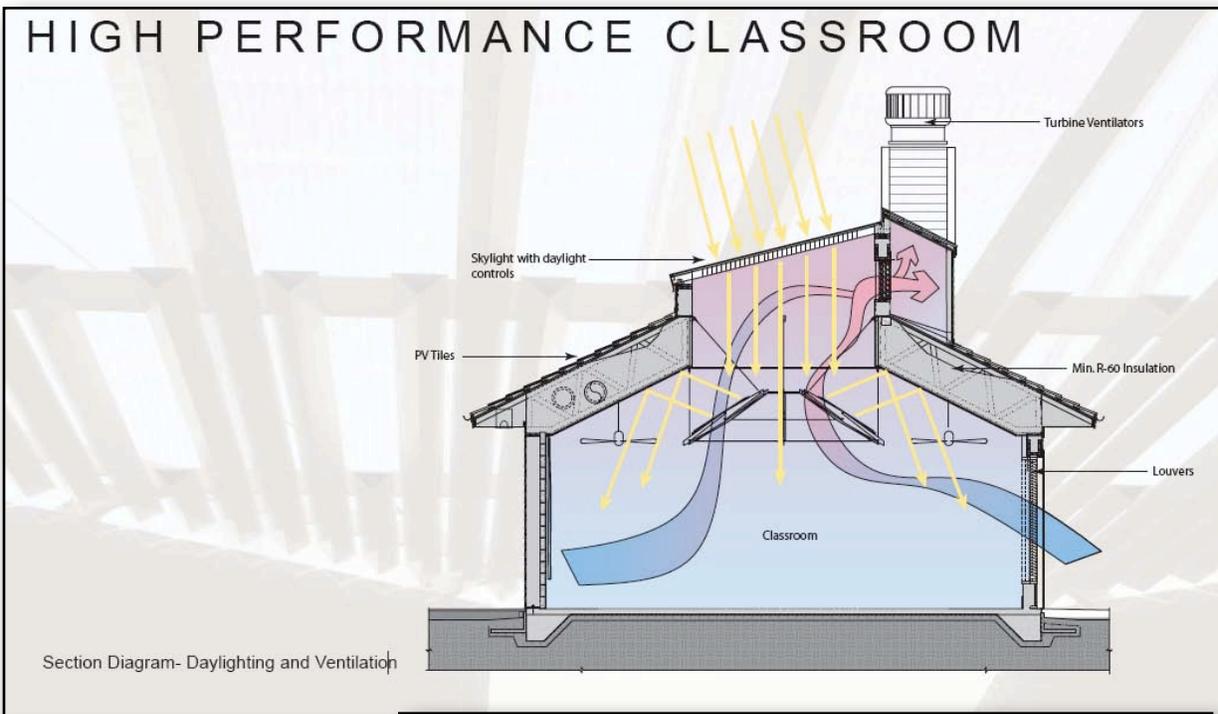
BEF continued its pre-development due diligence of the requirements for developing a forest biomass generating project of a scale that will permit deployment across the rural timbered areas of the PNW. Many of these are served by COU's, including the south central area of Oregon where BEF would likely site its project. Due diligence has included continuing review of commercially-available gasification and liquefaction technologies, and generators compatible with the biofuels that would be produced. BEF has identified potential partners including MidState Electric Cooperative, Central Oregon Intergovernmental Council, the US Forest Service, and private timber recovery and processing businesses. MOA's with several of these partners have been executed or are in process.

MOA Charges for Biomass: BEF staff time and commissioning of reports- \$27,907

Wind Integration

The Regional Wind Integration Policy Committee, chaired by Steve Wright and Tom Karier, met in the summer of 2006 to adopt a work plan. Angus Duncan, BEF's President, is a member of the Policy Committee and of the Technical Committee on Flexibility Augmentation. In 2007 the project issued its first report to the region, concluding that while many issues had yet to be worked through, "there are no fundamental technical barriers to operating 6000 megawatts of wind in the Pacific Northwest." The project succeeded in identifying several opportunities for recovering system flexibility and adding to the region's ability to cost-effectively increase wind resource's contribution to the need for new renewable generation.

MOA Charges for Wind Integration: BEF staff time-\$17,922



Wave and Tidal Energy & Smart Grid

BEF invested a limited amount of staff time to explore the possibilities of Wave Energy in Oregon PUD service territory and potential “smart grid” application along the OR and WA coasts. To date this remains an early-stage exploration and we do not anticipate significant expenditures in the near future.

MOA Charges for Smart Grid: BEF staff time-\$1,595

Analysis of PV Incentives in the Northwest

BEF’s Solar 4R Schools projects are, by design, primarily educational in nature. BEF hopes, at some point, to generate significant amounts of electricity from these projects, while continuing to provide the same or greater educational value. Schools offer excellent locations for PV generation and most have rooftops that are free from shading issues. Generally, these facilities expect to remain in operation for the long term, and have an interest in stabilizing their power costs.

Despite the many reasons why larger-scale solar projects on schools make sense, the relative cost of solar electricity precludes us from installing larger systems, at the moment. The fact that non-profits and public entities are unable to take advantage of some significant tax incentives (e.g. federal tax credit, accelerated depreciation) contributes to the cost dilemma. As such, BEF is seeking to develop innovative financial models that allow schools to monetize such tax incentives. Based on the so-called “[Minnesota Flip](#)” model, where tax-motivated investors own the project during the initial period when the tax incentives are most valuable, BEF’s financial model may significantly reduce the cost of installing large-scale solar projects on public and non-profit facilities, and are expected to be of particular usefulness to important BPA non-profit stakeholders such as consumer-owned utilities and tribal governments.

During the year, BEF spent significant time and effort to devise a legally and financially sound business model. We performed due diligence, along with consulting attorneys. We created financial modeling tools, and secured financial contributions from 3rd party funders such as Portland General Electric and PacifiCorp. Finally, we worked with engineers to consider the designs for the initial project (located on the East Portland Community Center).

MOA Charges for Analysis of PV Incentives in the Northwest: BEF staff time-\$15,899

Update on Planned RD&D Activities (from previous Progress Report)

In the previous report, we listed various Renewable Research, Development And Demonstration Activities goals for this current period. These included:

	Goal	Progress
1	Devise a financial model that will allow us to monetize all available federal, state, and local incentives for photovoltaic projects,	In progress
2	Work with the da Vinci Arts Middle School to design a state-of-the-art, “zero-emission”, modular classroom.	In design phase
3	Work with Cowlitz PUD to install a BiPV project on the Science and Technology building on the campus of Cowlitz Community College	On-hold indefinitely
4	Provide additional data monitoring capabilities and marketing support to the Ellensburg Community Solar Project	Complete
5	Pursue a Community Solar Project with the City of Ashland	In progress
6	Complete technological due diligence on the proposed biomass (forest-fuel) project, and turn our attention to fuel supply issues	In progress

Current Renewable Education Program Activities:

Solar 4R Schools (S4RS) Program Improvement

- Curriculum Refinement

During the previous period, BEF refined the S4RS curriculum material, reorganizing the basic “classroom exercises” packet that each teacher champion is given upon entry into the program. In FY 2007, BEF’s Educational Liaison initiated a more radical overhaul of the curriculum material, based on a newly formed Teacher Champion Advisory Committee (comprised, primarily, of teachers from within BPA territory). Taking the teachers’ recommendations into account, and also working with some of the nation’s leading renewable energy educational organizations (NEED, Energy For Keeps, DOE, University of Oregon, Oregon Institute of Technology, and the Oregon Teachers Association), BEF began to develop the highest quality, grade-level specific classroom activities available. The curriculum packet, in its current state, has been mailed to BPA. We anticipate that this new material will be ready for distribution during the following reporting period.

- Ongoing Teacher Support

By the end of the reporting period, nearly 50 schools were actively involved in the Solar 4R Schools program (Solar4rSchools.org). As a result, BEF staff spent significant time communicating with the Teacher Champions. BEF’s educational Liaison distributed the latest educational material, conducted teacher training sessions and answered curriculum-related questions. Other BEF staff communicated with school IT and facilities personnel as necessary to maintain system functionality.

- Improvement to Standard Program Documentation

With each Solar 4R Schools project (Solar4rSchools.org) that BEF manages, we learn how to improve the installation and education processes, and we integrate these lessons into our project management system. Based on feedback from stakeholders, we modify our teaching materials, our training presentations, our contracts, and our standard host school communication documents.

In the past year, we tweaked our standard project host “Acceptance Letter” document to encourage cooperation from each important party at the school. By including a “Solar Supporters” section within this Acceptance Letter, and by requiring that the schools’ Teacher Champion, Principal, IT Manager, and Facilities Manager signed this petition *before* being awarded a project, we have dramatically increased the cooperation from the host participants.

On the installation side, we modified our standard installation contract to require that each contractor incorporate extensive panel theft prevention measures into the installation process (e.g. tamper resistant bolts, tack welding). This additional clause should go a long way to securing each new project.



S4RS students build a solar panel from scratch

- Database Updates

BEF continued to make incremental improvements to the Project

Management database in order to reduce the energy, time, and money required for each project. In FY '07 we added additional functionality to the database so that we could more closely coordinate the three primary project management facets: installation, education, and public outreach. We are now tracking more detailed information on each project so that all BEF staff can access vital information at any time. By publishing and sharing key data points (e.g. contacts, target installation dates, target opening event dates, target teacher training dates) across staff, we streamlined the process. This coordination allows us to spend less time discussing the project details, and more time collaborating with the teacher champions on their educational efforts. Additionally, the database now records serial numbers and the precise on-site location of all major hardware components. This tracking system makes remote troubleshooting and maintenance far less daunting, and should make any future theft reporting more efficient.

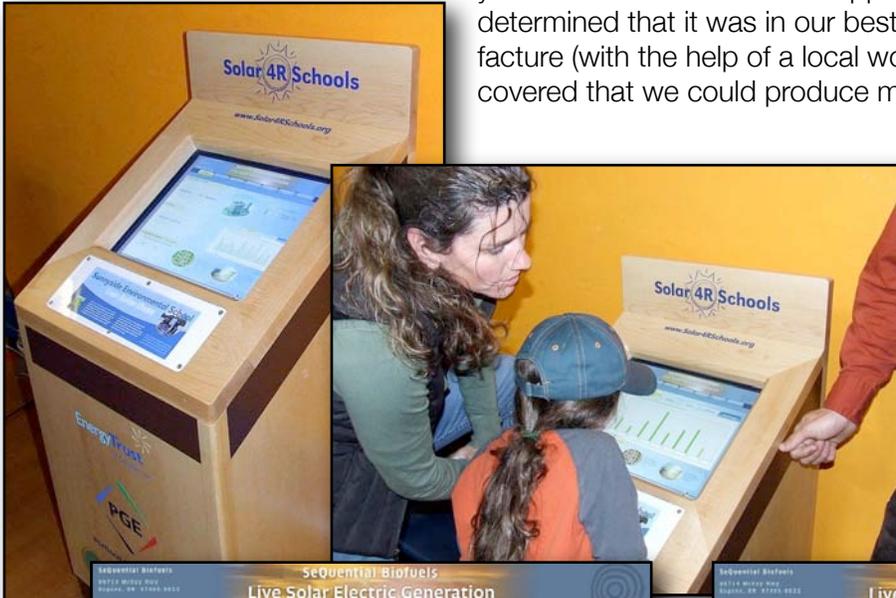
MOA Charges for Solar 4R Schools Program Improvement: BEF staff time-\$61,299

Internet-Based Monitoring for Small Renewable Projects

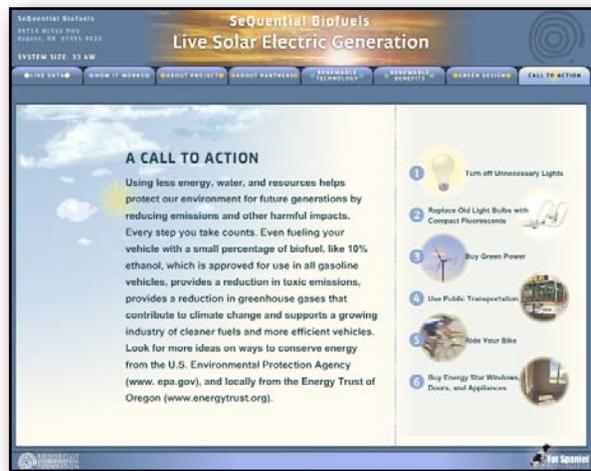
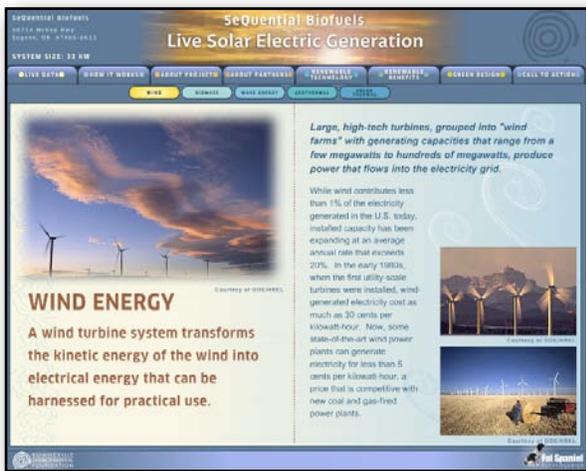
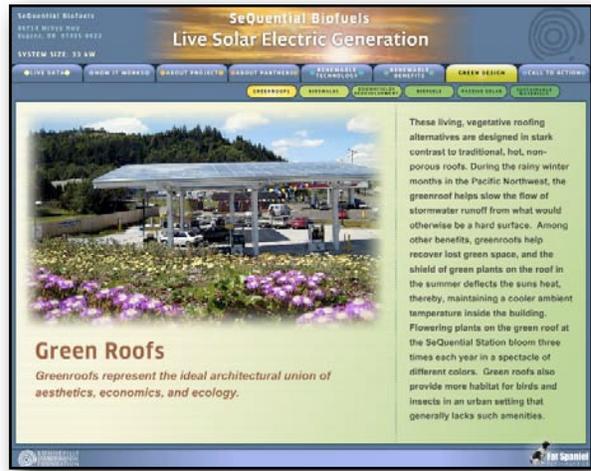
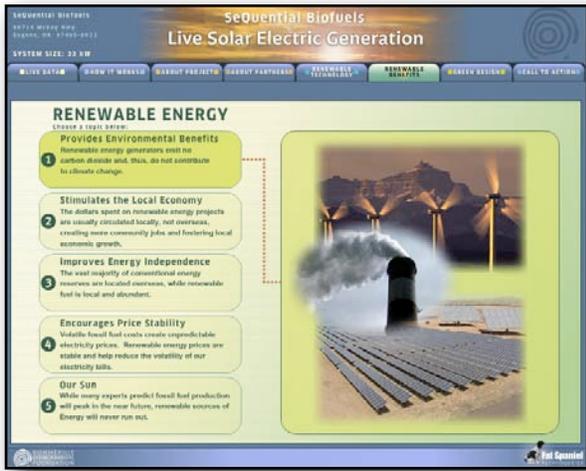
The creation of a custom touch screen kiosk and the development of accompanying customized flash pages were the most significant enhancements to our data monitoring capabilities during the

year. After two of our kiosk suppliers went out of business, we determined that it was in our best interest to design and manufacture (with the help of a local woodworker) our own. We discovered that we could produce more functional kiosks in a more

timely manner at about half the price, so the decision was an easy one. The kiosks, when combined with our new customized flash-animated informational pages, enhance the educational experience of our host schools, and serve as a primary means of informing the school community about the project details.



Additional kiosk flash pages depict renewable energy technologies and their benefits, and encourage students to take action in their own communities



Of course, we continue to monitor and troubleshoot the the data monitoring systems for all of our existing projects. This task became much easier this year when we began using a tool called In-sight Manager to track system function.

Status	Name	Location	System Size	P.R.	Data Download
●	Toutle Lake High School	Toutle, WA 93727 US	1.1 kW	72%	View
●	UW Center for Urban Horticulture -Merrill Hall	Seattle, WA 98195 US	9.6 kW	—	View
●	UW Mechanical Engineering Building	Seattle, WA 98195 US	2.65 kW	—	View
◆	WA State Capitol Building	Olympia, WA 98504 US	20.0 kW	◆%	View
●	Wake Robin Learning Center	Longview, WA 98632 US	1.1 kW	85%	View
●	Washington Middle School	Olympia, WA 98501 US	1.1 kW	71%	View
◆	Washington MS (Seattle)			—	
●	Washington School for the Blind	Vancouver, WA 98661 US	13.5 kW	—	View
●	West Linn High School	West Linn, OR 97068 US	1.1 kW	—	View
◆	West Salem High School	Salem, OR 97304 US	2.8 kW	∞%	View
●	West Salem HS - Wind	Salem, OR 97304 US	2.4 kW	29%	View
●	Western Washington University	Bellingham, WA 98225 US	1.98 kW	44%	View
◆	Willamette High School	Eugene, OR 97401 US	2.4 kW	—	
●	William Thomas Middle School	American Falls, ID 83211 US	1.1 kW	64%	View
●	Wood River HS/Comm Campus	Hailey, ID 83333 US	1.1 kW	—	View

- Web-Based “Solar Classroom”

In order to enhance the educational value of the S4RS projects, BEF previously created a [web-based Solar Classroom](#) that allows students and teachers to access the live and historical data from their projects, and to compare system performance to that of other schools in the program. In the current year, BEF devised plans to substantially increase the functionality of this site, and created a design document that outlines the technical and educational requirements for the second generation of this web portal.

MOA Charges for Internet-Based Monitoring: Project hardware and BEF staff time-\$31,245

Educational Assistance to Public Utilities and Regional Stakeholders

- Puget Sound Green Power Awareness Campaign

BEF worked with Tacoma Power, Seattle City Light, Snohomish PUD, and Puget Sound Energy to launch a Green Power Awareness Campaign modeled on the highly successful 2004 campaign. We ran another highly successful campaign during FY ‘07, increasing utility signups significantly. The campaign again received a national Green Power Beacon Award at the national Green Power Marketing Conference. BEF intends to launch a similar campaign for Spring 2008.

- Oregon Municipal Electrical Utilities

At the request of the Oregon Municipal Electrical Utilities (OMEU), BEF joined other presenters in briefing OMEU members on offset/RECS options for complying with Oregon’s new Renewable Portfolio Standard.

BEF’s President, Angus Duncan, also undertook various educational activities to benefit regional stakeholders during this reporting period. Such activities included preparing and delivering presentations on renewable energy technologies, economics, and public policies to numerous Consumer-Owned Utilities and other regional stakeholders. Copies of these presentations are available upon request.

Mr. Duncan also spent significant time participating in other regional educational activities not charged to the BPA MOA. These activities include his participation in:

- State and regional task forces (e.g., Oregon Governor’s Renewable Energy Working Group [REWG]; Governor’s Carbon Allocation Task Force; Energy Trust of Oregon’s Renewables Advisory Committee);
- Wind Integration Project’s Policy Committee proceedings leading to the NW Wind Integration Action Plan adopted in 2007

MOA Charges for Educational Assistance to Public Utilities and Regional Stakeholders: BEF staff time-\$16,256

Last Mile Electric Cooperative

Mr. Duncan continued to support the LMEC, attending Board meetings. (Note: No time spent as a member of the White Creek Participants' Committee supporting development of the White Creek project was included in this category.)

MOA Charges for LMEC-Related Educational Support: BEF staff time-\$1,751

Update on Renewable Education Activities (from previous Progress Report)

In the previous report, we listed various Renewable Education Activities goals for this current period. These included:

	Goal	Progress
1	Retrofit 5 existing projects in the City of Ashland with data monitoring systems	Projects underway
2	Improve the content and delivery of our school educational materials on an ongoing basis, and provide better support to teachers participating in the S4RS program	Complete (and ongoing)
3	Add functionality to our web-based "Solar-Classroom"	In process
4	Design customized, less expensive project kiosks	Complete
5	Develop additional flash-animated kiosk pages to inform students about renewable energy	Complete
6	Create a PowerPoint (or similar) presentation so that public utilities in the Northwest can better understand what the S4RS program entails	Complete
7	BEF will devise a plan to deliver renewable energy	Complete
8	Deliver educational material to schools in Seattle City Light territory.	Complete (and ongoing)

Anticipated Activities

Anticipated Direct Application Renewable Resource Activities:

The Northwest Solar Co-op

We anticipate that the solar co-op will continue to grow. We intend to work with the co-op to ensure that this growth is accomplished in a way that addresses the needs of all parties in the chain of ownership.

The Northwest Wind Co-op

We anticipate continuing to provide a modest amount of support for NW SEED in their efforts to educate the public regarding the use of small wind technology in the Northwest.

PV Demonstration Projects

During the period, we talked extensively with, among others, Seattle City Light, Clark Public Utilities, and Snohomish PUD, about collaborating on new renewable energy demonstration projects. Those discussions laid the groundwork for future projects, many of which will be detailed in BEFs next report to BPA.

We will also detail the completions of the Toutle Lake High School, Wake Robin Learning Center, and West Salem Small-Wind data monitoring projects

Anticipated Renewable Research, Development And Demonstration Activities:

Analysis of Solar Incentives in the Northwest

BEF will continue to offer Solar 4R Schools projects in COU territory, but we also plan to make available the option of larger scale solar projects to schools and other community (non-profit) facilities through tax-advantaged financing tools. We hope to install one or two initial projects, using this model, in the upcoming reporting period.

Building Integrated Photovoltaics (BiPV)

In the coming year, BEF hopes to work with the da Vinci Arts Middle School in Portland to bring the state-of-the-art, "zero-emission", modular classroom project to fruition.

Community Solar Projects

BEF will continue to provide support to the City of Ashland's Community Solar Project.

Biomass

In the 2007-2008 period, BEF will complete technological due diligence on the proposed biomass (forest-fuel) project, and will identify fuel supply partners and issues associated with long-term fuel supply contracts. Siting of an initial unit in association with a potential co-generation heat host is a principal goal. Initial discussions around financing will be initiated, as will legal analysis of project structure and requirements to leverage state and federal tax benefits. BEF hopes to complete the pre-development/RD&D evaluation phase in 2008-2009 and to decide, at that point, whether to field a demonstration unit in 2009.

Wind Integration

As Oregon and Washington both have adopted Renewable Portfolio Standards that govern both IOU's and COU's, and both states are joined by Montana in the Western Climate Initiative, the need to increase system flexibility to accommodate additional demands for low-carbon, renewable resources, has not abated. The next set of tasks for this Project will focus on new storage and control technologies that can augment the system's inherent flexibility and accommodate still greater penetrations by wind and other intermittent renewable technologies.

Anticipated Renewable Education Program Activities:

Data Monitoring Retrofits-

We have firm plans to upgrade 5 existing projects in the City of Ashland with data monitoring equipment.

Enhance the Solar 4R Schools Program

- BEF's Educational Liaison plans to:
 1. work with content and copy editors to make our school curriculum more professional
 2. match the lesson plans in the curriculum with state education standards
 3. devise renewable energy "classroom toy" packages for various grade levels. The packages might include learning toys such as solar race car and model wind turbine kits
 4. write and distribute a quarterly Solar 4R Schools newsletter geared towards the Teacher Champions in the program
 5. assess and select remote training tools so that the teacher training sessions can be delivered on-line when necessary
 6. continue to enhance the Solar4RSchools.org website

Regional Puget Sound Green Power Awareness Campaign

BEF intends to launch another campaign with Tacoma Power, Seattle City Light, Snohomish PUD, and Puget Sound Energy in Spring, 2008.