

# RURAL RENEWABLE ENERGY SPECIALIST REPORT



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# ABSTRACT

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Renewable energy is one of the prevalent issues of our time. The news is filled with stories about ethanol as an alternative to oil, solar power for our homes, and huge wind machines being built to make electricity. The interest in and demand for renewable energy is spawning new enterprises – enterprises producing renewable energy directly, enterprises manufacturing equipment that produce, control or save energy, and enterprises installing, servicing, or maintaining this equipment.

This growth in energy-related enterprises is good for the economy, but is necessary if the country is to become less dependent on oil and natural gas. After all, homeowners and businesses who want to replace oil and gas they use with renewable energy need enterprises to turn to who can provide these goods and services.

The area of renewable energy is complex, however, and involves technologies, regulations, and issues that often go beyond the topics of financing, marketing, and business development that are typically associated with economic development.

This project known as “Rural Renewable Energy Specialist” has engaged Robert Rogers and the Oregon Renewable Energy Center (OREC) to develop and implement public/private partnerships for investments into and use of rural renewable energy services, primarily in Lake County Oregon.

# EXECUTIVE SUMMARY

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Klamath and Lake Counties, located in southern Oregon, abound in natural resources, agriculture activities, geothermal resources, and forest by-products that provide opportunities for the region to be a leader in renewable energy. As part of its regional economic strategy, the South Central Oregon Economic Development District (SCOEDD) is working to establish a sustainable energy base to provide a solid foundation of related job opportunities and industry development. Using our resources to promote renewable energy allows for economic diversification, creation of jobs, and reduction of major health risks. The strategy also affects land use in a positive manner, thereby improving the environmental future of our region.

Several renewable energy projects have resulted from the work of SCOEDD and its partners. Following is a summary of these projects:

- ☆ **Geothermal Ag Industrial Park Development**– SCOEDD is working with Liskey Farms to expand the geothermal operation to include about 40 to 50 acres of marginal farm ground. The farms geothermal heated water already serves multiple purposes. A biodiesel plant, launched on the farm by farmer Rick Walsh, uses geothermal for processing canola seeds. Spent water from a greenhouse operation also warms about 28 small ponds to 85 degrees F, where aquaculture expert Ron Barnes raises freshwater tropical fish. Using Funds from the US Department of Energy and the Natural Resources Conservation Service, SCOEDD has hired engineering consultants to design the next phase of the park which includes installation of a re-injection well. In addition to leasing more ground to entrepreneurs like Walsh and Barnes, Liskey plans to turn the geothermal resource into an energy supply. The water can heat a refrigerant such as Freon, causing it to expand into a gas. This will force turbines to rotate and generate electricity.
  
- ☆ **Renewable Energy Project Financing Assistance** – SCOEDD has assisted several projects that utilize geothermal heat to offset their cost of doing business. These include:

- **Klamath Brewing Company**—Economic Development Administration Revolving Loan funds financed a geothermal supported brewing company that created 40 new jobs.
- **Greenfuels of Oregon** – SCOEDD staff assisted the biodiesel company in packaging a loan request which was funded by the Regional Investment Board Revolving Loan Fund and the Klamath Community Development Corporation (KCDC).
- **Biotactics** – Joint loan financing from SCOEDD, KCDC and the State of Oregon and a grant for the Climate Trust have allowed Biotactics to occupying greenhouses in the geothermal agriculture industrial park located on Liskey’s Farm property to take advantage of the Basin’s geothermal heat. The business produces biocontrols used as an alternative to toxic pesticides and will employ 32 local employees within the first two years, providing livable wages and health benefits.
- ☆ **Biomass to Energy** – The Lakeview Biomass Project is a community-based, multi-stakeholder effort to create an ecologically sound solution to forest restoration that includes an economically viable biomass energy facility. The biomass energy facility (approximately 10-15 megawatts in size) will be adjacent to the Fremont Sawmill in Lakeview, Oregon. The sawmill is located in the center of the 492,642 acre Lakeview Stewardship Unit on the Fremont –Winema National Forest. The Japanese based company, Marubeni Corporation is working with The Collins Companies, the owner of the Fremont Sawmill, to pursue the development of the biomass facility, and the companies have entered into initial development agreements and are progressing accordingly.

SCOEDD has provided supports to Lake County Resources Initiative (LCRI) and the Lakeview Biomass Project through USDA Rural Community Development Initiative and Regional Investment Fund grants to develop the feasibility study and business plan.

- ☆ **Coordinate with Lake County, North Lake Chamber of Commerce and other partners on the Backscatter Site Project.** -The Christmas Valley Back-scatter site, once designed

to provide national security information needed during the cold war, but made obsolete by satellite technology, consists of 2,622 acres, surrounded by thousands of additional acres of federal BLM land.

U.S. Air Force (USAF) is interested in partnering with the Bureau of Land Management (BLM) to support "enhanced use leasing" and develop ideas for renewable energy production at the Air Combat Command Radar Transmitter (ACCRT) in Christmas Valley, south-central Oregon.

In April 2007 it was announced that Oregon Solutions received funding from USDA Rural Community Development Initiative to assist with building collaborative partnerships in Lake County, OR to develop alternative energy resources. Oregon Solutions will provide staffing and institutional support for the Christmas Valley Alternative Energy Development project at the Christmas Valley Back-scatter site. SCOEDD's Executive Director and Energy Specialist actively participate in the partnership.

☆ **Biofuels Conference** - At the Klamath Regional Biofuels Conference held March 2007, USDA Rural Development and the Oregon Department of Energy made presentations on "Funding Biofuels". This conference was cosponsored by OREC, SCOEDD, the Klamath Basin research and Extension Center and the Klamath County Biofuels Task Force.

☆ **Expanding the use of Geothermal** - The communities of Klamath Falls, Lakeview and Paisley have known geothermal resource available which is being used at some level. The Klamath Falls Geothermal district heating system provides space heating for 24 buildings totaling about 400,000 square feet.

The Town of Lakeview has been providing geothermal heat to the Department of Corrections for nearly three years to heat the Warner Creek Correctional facility.

Use of low temperature geothermal water for power generation has been successfully demonstrated in Alaska and feasibility studies are under way to understand the power generation capacity in Klamath Falls, Lakeview and on private wells in Paisley.

In Lake County Geothermal Heat Pumps systems are also a feasible source of for heating and/or air conditioning that uses the Earth's ability to store heat in the ground and water thermal masses. This system takes advantage of a land mass as a heat exchanger to either heat or cool a building structure. These systems operate on a very simple premise; the ground a few feet below surface stays around annual average temperature throughout the year, typically somewhere in range of 50-85 °F (10-30 °C) depending upon location's annual climate. A water-source heat pump uses that available heat in the winter and puts heat back into the ground in the summer.

☆ **Demonstration Center** – with funding from the U.S. Department of Commerce, Economic Development Administration SCOEDD funded an Energy Specialist position. Bob Rogers from OREC at OIT was hired. Located in Lake County, he has provided the staff expertise and capacity needed for Lake County to actively partner with potential private and public investors. As part of the Oregon Institute of Technology (OIT) Geo-Heat Center, he has set up a Renewable Energy demonstration center at the Lake County Fairgrounds. The projects at the Pacific Power - Lake County Fairgrounds Renewable Energy Center include:

- 1) Ground source heat pump
- 2) Solar photovoltaic
- 3) Solar hot water
- 4) Wind
- 5) Bio fuels

☆ **Making Green Work partnership** - SCOEDD, Oregon Renewable Energy Center at OIT and the Klamath Community College joined together with other statewide partners to submit a "WIRED" proposal to the Department of Labor. The \$5 million proposal was not funded, but the partnership will continue to look for funding to implement the Making Green Work Partnership

The project's three transformational strategies include:

1. Connecting existing communities of interest to one another, so that investors, firms, communities, and consumers in Oregon and elsewhere can access information, products, services, business, and training opportunities offered by the entire alternative energy industry rather than specific sectors. Goal: To turn

renewable energy into an economic powerhouse in the region and beyond.

2. Growing unique, globally competitive assets including intelligence, new technologies, research, development and commercialization capacity, and the region's brand. Goals: To leverage and grow Oregon's renewable industry (5% > growth in region), resulting in increased intellectual property and technology transfer (5% > average increase in region), and product manufacturing and service sector growth (10% in region, with growth in state, national, and international markets > overall industry average).
3. Cultivating renewable energy talent through K-12 science and technology-based linked to community colleges and universities (e.g., at Lane and Columbia Gorge colleges, Oregon Institute of Technology, etc.). Goal: to attract and train a new cadre of energy professionals, training and placing at least 500 workers in three years, growing the proportion of the workforce in renewable energy and efficiency by 15%, and generate an increase of 12-15% in their wages.

Other projects being developed include:

- Sustainable home building program – hands on training for workers
- Micro-hydro-energy project development
- Mini-biomass plants in schools and public facilities
- Economic incentives, including reduced power rates and a revolving loan fund to entice businesses to locate in area and use renewable energy
- Exploration by local governments of additional wind, solar, biomass and geothermal opportunities

SCOEDD is an ORS 190 organization designated as the regional Economic Development District by the U.S. Department of Commerce, Economic Development Administration. SCOEDD provides assistance to communities within the Oregon counties of Klamath and Lake to strengthen the local economy.

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# RURAL RENEWABLE ENERGY SPECIALIST REPORT

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## **Background**

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The South Central Oregon Economic Development District (SCOEDD) received funding from the U.S. Department of Commerce, Economic Development Administration (Grant #07 79 05823) to fund a Rural Renewable Energy Specialist position. The role of this person/firm was to provide the expertise and capacity necessary to identify and plan for an economic cluster in renewable energy plus partner and leverage additional public and private investment in energy efficiency. The temporary specialist was located in Lake County to provide the staff expertise and capacity needed for Lake County to actively partner with potential private and public investors.

Lake County and the Town of Lakeview are solidified in their determination to become a leading renewable energy community. They recognize they have the most available sources of renewable energy in the State of Oregon and have the opportunity to become “per capita” the most energy efficient county in the State of Oregon and perhaps the country. They have abundant energy resources of geo-thermal, wind, solar, bio-fuels and bio-mass.

SCOEDD is an ORS 190 organization designated as the regional Economic Development District by the U.S. Department of Commerce, Economic Development Administration. SCOEDD provides assistance to communities within the Oregon counties of Klamath and Lake to strengthen the local economy. As part of its regional economic strategy, SCOEDD is working to establish a sustainable energy base to provide a solid foundation of related job opportunities and industry development. Using our resources to promote renewable energy allows for economic diversification, creation of jobs, and reduction of major health risks. The strategy also affects land use in a positive manner, thereby improving the environmental future of our region.

The region has a unique opportunity to diversify its economy by focusing on its renewable energy resources. Specific strategies and priorities for maximizing the use of these resources are being developed. Listed below are identified opportunities and issues that were addressed related to each one of these possibilities:

- ✓ **Biomass** – power generation through forest and Juniper thinning has progressed into a viable option in Lake County. Energy generation from biomass has been proven feasible and needs to be moved forward to the implementation stage.
- ✓ **Geothermal** – There are a number of different projects in Lake County centered around geothermal. The proposed geothermal industrial park is currently in the planning stage and is progressing into a prominent future economic development opportunity. There is also a proposed heating district for the Town of Lakeview and the City of Paisley that is in the conceptual stages of development and if implemented would offer a number of residents and businesses energy at a reasonable cost.
- ✓ **Wind** – In Lake County there is work being done to determine the feasibility of wind power generation. If the data collected proves sufficient, Lake County will be able to penetrate a growing market in wind power generation.
- ✓ **Solar** – Lake County lies in the high desert area of Southeast Oregon where sunlight is almost a daily occurrence. With an estimated 290 days a year of sunshine, the development of viable solar energy opportunities is an economic development option that needs to be pursued in Lake County.
- ✓ **Biofuels** – Development of this sector requires ongoing research and development of the potential for local crops and processing facilities for bio-fuels, including bio-diesel and ethanol.
- ✓ **Energy Trust** – Energy Trust of Oregon is an organization that is set up for the reason of energy efficiency and the promotion of renewable energy that offsets traditional power generation methods. Information on the programs the Energy Trust has to offer, many times does not reach the rural areas. Lake County could benefit from these programs and has a need for someone to work with the Energy Trust to present their information to the public.
- ✓ **Climate Trust** – Climate Trust is an organization set up to fund projects that offset CO<sub>2</sub>. CO<sub>2</sub> mitigation funds would be directly related to many of the renewable energy projects that are being developed in Lake County. Piecing together funding sources to

develop an economically viable project in Lake County is a much needed resource.

## **Methodology**

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SCOEDD issued an RFP to contract with an individual or firm that would work with partners in Lake and Klamath County focusing on opportunities to further its renewable energy initiatives. The successful candidate would be responsible for implementing the renewable energy and energy efficiency programs and services designed to leverage investment in business and residential energy technologies in the two-county region. The Energy Specialist served as part of a professional team that delivers economic and community development programs and services.

The scope of services included, but was not limited to:

- Oversee the operation of the energy programs including various projects undertaken as part of the initiatives.
- Develop and oversee an energy resource and referral services;
- Develop cooperative relationships with other agencies providing economic development assistance and/or financial assistance related to energy projects;
- Work with industry prospects to provide incentives to locate in the two county region when/if possible.
- Develop complex applications for the capitalization of energy related programs and investigate other private and public funding sources necessary to implement programs and services identified to support economic development.
- Coordinate with Lake County, Town of Lakeview and other partners on the Backscatter Site Project. The former radar site is being investigated as a potential solar and /or wind generation site. The site has two 120 KV power lines plus existing building, providing already in place infrastructure.
- Work with the Energy Trust to present their information to the public.

The goal of renewable energy development is two-fold: first reducing the region's dependence on external energy sources and secondly, developing needed economic development opportunities.

These economic development opportunities include:

- Attracting new businesses that support and integrate with our targeted industry sectors and long-term economic development goals — creating new job opportunities, retaining existing employment, and promoting private investment.
- Promoting the development of diversified, value-added, and niche opportunities for natural resource businesses.
- Creating opportunities for existing businesses to expand locally.
- Providing services and resources that are aimed at promoting industry development and entrepreneurial efforts, ultimately improving community health and prosperity throughout the region.

A RFP selection committee received seven proposals and selected Robert Rogers and the Oregon Renewable Energy Center (OREC) as contractors for the Rural Renewable Energy Specialist position. Robert Rogers has been an energy system engineering designer and project manager as well as teacher of energy systems for the past 35 years. He has designed high efficiency mechanical systems for buildings to 10 stories, schools, commercial, industrial and residential projects. He is registered in four engineering branches including Mechanical, Environmental, Control Systems and Manufacturing.

The contracted scope of work included:

1. Review current status of projects ongoing in Lake and Klamath Counties and identify and implement actions necessary to move projects forward.
2. Coordinate with Lake County, City of Lakeview and other partners on the Backscatter Site Project.
3. Develop and oversee an energy resource and referral service
4. Develop cooperative relationships with other agencies to identify available and refer clients to economic development assistance and/or financial assistance related to energy projects.
5. Work with industry prospects to provide incentives to locate in the two county region when/if possible.
6. Develop complex applications for the capitalization of energy-related programs and investigate other private and public funding sources to implement programs and services to support economic development.
7. Work with the Energy Trust, DOE and USDA Rural Development to present their information to the public.
8. Work with existing businesses to help them identify potential business expansion into renewable energy fields

9. Work with SCOEDD staff to identify opportunities for entrepreneurs to enter the green building construction industry.
10. Provide OREC Geo-Heat Center technical Expertise as feasible.
11. Provide outreach and coordination between local and state partners.

## **Project results**

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*Review current status of projects ongoing in Lake and Klamath Counties and identify and implement actions necessary to move projects forward.*

## **Biomass Utilization**

### **Current Status**

#### *Lakeview Biomass Plant*

In January 2007, Governor Ted Kulongoski announced that DG Energy will build a biomass power plant in Lakeview, Oregon — marking the first new biomass facility in Oregon since 1992.

The \$20 million investment in the facility will produce nearly 100,000 MW/Hr of renewable energy to the regional Oregon grid annually. In addition, the facility will supply steam to the Fremont Sawmill, owned by the Collins Companies of Portland Oregon.

The Lakeview Biomass Project was designated an Oregon Solutions project by Governor Kulongoski in 2005. The Oregon Solutions Process resulted in a collaboration of nearly 70 public, private and community organizations to develop an economically viable, ecologically sustainable power plant. The fuel sources for the plant will become a key part of an integrated solution to a multi-faceted forest health problem.

Since the announcement by the Governor and DG Energy back in January several key things have happened.

DG Energy was purchased by Marubeni Corporation out of Japan and a subsidiary called Marubeni Sustainable Energy was created. This purchase and transition has slowed the progress the Lakeview Biomass Project a little. The good news is that Marubeni decided to go ahead with the Lakeview Biomass Project while this was not the case with a couple other energy projects DG had started.

The Forest Service announced that as a result of this project the local forest would be getting the first 10-year Stewardship Contract in Forest Service Region 6. This announcement assisted the Collins Companies in making a decision to invest in a 6.5 million dollar new small diameter sawmill. BLM is also preparing a 10-year Stewardship contract for rangeland improvement by removing juniper back to historical levels.

LCRI has finished working with BLM, Forest Service, Collins Companies, Marubeni Sustainable Energy, Town of Lakeview, City of Paisley and Lake County on a 20 year MOU for supply. The MOU was signed in November 1, 2007 and was combined with a ribbon cutting for the new sawmill and ground breaking for the biomass plant.

Pat King, Marubeni Sustainable Energy, is in charge of project development for the Lakeview Biomass Plant. At first Marubeni was going to buy a used plant and move it to Lakeview, now they are going to buy a new plant. They received bids for the new plant but have not made a selection. Pat is currently working on land lease and sawmill waste with Collins Companies and negotiating with the Town of Lakeview on water from a well that the Town no longer utilizes. Marubeni is in discussions with a several companies on a power purchase agreement.

Included in **Appendix 1** is a Preliminary Assessment of the Economic Impacts of the Collins Pine and Biomass Facility Project on Lake County prepared by Oregon Economic and Community Development Department (OECDD). Based on this assessment, the direct and indirect impacts of retaining the 78 jobs at the Collins Pine facility is 156 jobs in the county. Total impacts of the Biomass facility is estimated at 493 jobs during the construction phase and 148 jobs annually once the facility is in operation.

### *Boiler Assessment*

Increasing costs for electricity, natural gas, propane and fuel oil have stimulated interest in using renewable fuels, such as woody biomass, in existing and new boiler systems.<sup>1</sup> There is also interest in expanding markets for woody fiber removed to improve forest health and reduce fuel that contributes to fire hazard. Investments in new or retrofitted boilers that use woody fiber can be attractive given the right set of circumstances and current financial incentives for use of

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<sup>1</sup> For the purpose of this Report woody biomass fuel includes hog fuel, chips and compressed products, such as pellets.

renewable fuels. It is difficult, however, for woody biomass suppliers, boiler manufacturers, engineering firms and other businesses that service this market segment to characterize potential market size, and identify institutions and businesses that might want to consider new wood-fired boilers or wood-fired system retrofits to their existing boilers. It is also difficult for public agencies and other organizations to prioritize out-reach efforts to identify best candidates or clusters for renewable fuel conversion projects.

A Request for Proposal has been released to obtain the professional services necessary to analyze state records about existing boilers, identify key characteristics of existing boilers that might make it economically feasible to convert or retro-fit to wood-fired systems, and list and describe facilities, businesses, and clusters of facilities and businesses, as well as geographic locations, where it appears to make economic sense to convert or retrofit boilers to use woody biomass, or consider installing boilers that use wood in some form in new construction.

According to the Boiler and Pressure Vessel License List maintained by the Oregon Department of Consumer and Business Services, Building Codes Division, there are about 11,000 boilers currently licensed within the State of Oregon.

### **Implementation Actions**

A consistent and level amount of biomass supply is essential for there to be a reliable, competitive, and sustainable biomass market. A balance of merchantable timber, small diameter value added production and biomass recovery is essential in today's marketplace to economically move biomass waste out of the woods. Key actions to assure a predictable and sustainable biomass supply include:

- ✓ Develop a better understanding of small-diameter supply potential and the costs of removal for high opportunity areas. Developing data layers for levelized supply like those created for the Coordinated Resource Offering Protocols (CROP) pilots are needed in key areas to enhance market information.
- ✓ Address institutional capacity limitations of federal agencies by providing adequate staffing to accommodate the increased acreage under long-term stewardship contracts, provide for monitoring efforts, and develop collaborative principles to ensure efficient and effective NEPA processes and decrease NEPA costs. We need to work with the Oregon congressional delegation and others to this end.

Harvesting and transportation cost are also a significant economic barrier to biomass utilization. These costs can be reduced through investments in research and outreach that include support for harvesting and transportation innovations. Build on existing harvesting technology studies, fill in the critical research gaps, and develop transportation system guidelines.

In addition, future biomass extraction operations will require some different workforce knowledge including how to be successful in obtaining biomass extraction contracts; understanding ecological restoration objectives and value added markets, and using different types of equipment and extraction techniques for harvesting small biomass. Also, with the new Biofuels tax credits approved in Oregon, expertise will need to be developed in applying for the credits and understanding the potential offsets provided to businesses supplying biomass.

The Klamath Tribes are also looking at establishing a Biomass facility in conjunction with a wood utilization center. They will be working with Oregon Renewable Energy Center (OREC) and South Central Oregon Economic Development District (SCOEDD) to research alternative technologies for smaller scale biomass development.

## Geothermal

### **Current Status**

Known geothermal areas exist in several areas of Lake County. Beginning in the north, existing hot wells are located in the extreme north east corner of the county near Glass Butte, in the Paisley area, between Adel and Plush, at several locations in and near the town of Lakeview and south of Lakeview near the state line. Approximately 60 wells and springs above the temperature of 120 F exist in the county, the vast majority of which are in the immediate Lakeview area.

The available heating capacity north of town serving the Warner Creek Corrections facility and the Barry Ranch site is approximately the same and would be sufficient for an initial phase of commercial development. Although the Corrections source scored higher in a feasibility evaluation, the Barry Ranch probably offers a better prospect for expansion (provided the resource will support it) beyond the currently available capacity as there is less likelihood for interference with other well and property owners. The Barry Ranch site tends to dovetail with the interests of the town and Lake County Resources and their interest in development on the south side of town.

Preliminary testing of the wells on the Barry Ranch south of Lakeview indicate adequate resources are available to use for providing heat to the Lakeview Hospital and the school with additional resource available for use by businesses in the county industrial park.

The Colahan site in Paisley also scores highly and in fact could rise to the lead given an indication of strong property owner interest. The location tends to reduce the priority of this site somewhat but given the need for economic development in the Paisley area and the high quality of the source, this site should receive immediate attention.

Geothermal areas also exist in several locations around Klamath County but three areas constitute the major targets for this effort: The city of Klamath Falls, Olene gap to the east of town and Klamath Hills to the south of town. Existing development and other factors tend to cause most areas in the city (with the exception of the south Spring Street area) to be unattractive for further development. The Jones property at Olene Gap ranks highly but suffers from poor access. The highest potential is in the Klamath Hills area. Several properties there have existing high temperature wells and several have multiple wells. Zoning in this area allows for the development of greenhouse or aquaculture businesses, land values are generally lower than at other sites and site access is directly from Lower Lake road in all cases.

The communities of Klamath Falls and Lakeview have known geothermal resource available which is being used at some level. The Klamath Falls Geothermal district heating system provides space heating for 24 buildings totaling about 400,000 square feet. The direct economic value of using geothermal energy from the district heating system rather than fossil fuels was about \$589,000 in 2005.

The Town of Lakeview has been providing geothermal heat to the Department of Corrections since 2004 to heat the Warner Creek Correctional facility. Liskey Farms, south of Klamath Falls, utilizes geothermal heat for multiple purposes. A biodiesel plant, launched on the farm in early 2007 by farmer Rick Walsh, uses it for processing canola seeds. Spent water from the greenhouse operation also warms about 28 small ponds to 85 degrees F, where aquaculture expert Ron Barnes raises freshwater tropical fish.

### **Implementation Actions**

Utilizing funding received from the Natural Resources Conservation Service (NRCS), SCOEDD obtained the services of Anderson Engineering out of Lakeview for geothermal well testing at Liskey

Farms (south Klamath County). They determined that a comprehensive aquifer stress test is recommended to provide a better understanding of the geothermal aquifer. The results of this testing should be available in early February 2008.

Tracey Liskey has also identified the need for additional piping from an already operational well. The approximate 120 feet of piping would supply new green houses being built on his property. SCOEDD staff has been working with NRCS on the required NEPA process for funding the piping and pipe was installed during the last part of 2007.

Use of low temperature geothermal water for power generation has been successfully demonstrated in Alaska and feasibility studies are under way to understand the power generation capacity in Klamath Falls, Lakeview and on private wells in Paisley.

The City of Paisley paid for drilling of the "Paisley City Well" initially for the purpose of providing heating for the school. When funding for the expansion of the well project to the school was lost, the project was on hold until funding could be generated. Today's cost to clean the well would be approximately \$17,000 as compared to drilling this well which could be over \$100,000.

Proposals to use Renewable Energy Feasibility funding through the State of Oregon has been submitted and are awaiting announcement of award for both Paisley and Lakeview for geothermal expansion.

If feasible, the major grant opportunity for the completion of funding for the Lakeview and Paisley Community District Heating system portion of this project could come from the USDA "Small Community Facilities" grant program. This grant provides for infrastructure improvement and renewable energy development specifically in cities under 5000 in population. The grant will cover up to 75% of project costs.

In summary, additional resource evaluation is needed to determine the potential for:

- ✓ The City of Paisley to use a publicly owned well to provide heat to the local school.
- ✓ The Town of Lakeview to pipe geothermal water from south of town through the industrial park and to the hospital and high school for space heating

- ✓ The Liskey Farms property to expand the geothermal operation to include about 40 to 50 acres of marginal farm ground for additional industrial applications.
- ✓ A phase one evaluation of potential resource needs to be completed for the North Lake County area.

If feasible, then additional funding will be needed for the infrastructure.

## Wind

### **Current Status**

Wind resources vary with the time of day, season, height above ground and type of terrain. Proper siting in windy locations away from large obstructions enhances a wind turbine's performance.

Oregon has proven wind resource areas on the Oregon Coast and in the Columbia River Corridor. Many other sites may offer significant wind but have limitations on a seasonal or time of day basis. Those sites may provide marginal resources. To know if Lake County has specific sites with good wind resources, the County needs to measure the wind speed and direction with an anemometer (wind speed gauge) and direction gauge. Wind speed, wind direction, roughness of the terrain, seasonal cycles, air pressure or temperature and obstacles affect the amount of wind energy available.

### **Implementation Actions**

Wind energy could be one of the renewable resources at the Christmas Valley site, but current wind resource maps do not show a wind resource potential that is high enough for development. However, as far as we were able to determine, no wind speed measurements at 50 to 60 meter elevations have been made at or near the site. Such measurements for at least one-year are needed to determine the economic feasibility of the resource with a sufficient degree of certainty.

## Solar

### **Current Status**

The Christmas Valley Backscatter property has the potential for development of a photovoltaic solar power plant. The resource potential is known and is very good, plus there are private developers

interested in developing this site. The development level could range from 10 to 100 megawatts. The following issues have been identified:

- ✓ Photovoltaic is more likely than solar-thermal because of limited water supply
- ✓ Have concluded that panel glare will not conflict with air training
- ✓ High efficiency PV requires 10 acres per MW; low efficiency is 20 per MW
- ✓ To invest, developers will want 25-30 year lease and willing buyers of the electricity
- ✓ The peak opportunity to couple solar investment with the state's interest in solar manufacturing is the next 12 to 15 months.

On a smaller scale the opportunity for conservation through residential and small business use of solar is significant in the region. One demonstration project which is being pursued is to install a 20-30 KW photovoltaic grid-tied solar system to power irrigation pumps on the Sparrowk Ranch in Lakeview. In one case the pump provides water to a reservoir that is then used all growing season. In two other cases wells directly pump water to watering troughs. The grid-tied element of the system will allow the power to be generated all year long feeding excess power back into the grid during the months when irrigation is not needed and drawing power from the grid when the pump load is greater than the solar capacity. The goal is to have net-zero power use over the year.

An opportunity exists to recruit solar manufacturing companies to the region and to work with those companies on the training necessary for product installation.

### **Implementation Actions**

Infrastructure requirements still need to be clarified for the Christmas Valley backscatter site, including the amount of water available at the site and transmission capacity available.

Local ranchers need assistance with applications for Energy Efficiency/Renewable Energy grants and loans available through the USDA Rural Development 9006 funding.

One specific constraint to fostering the installation of solar in the region is that there are not enough trained technicians available for installation of solar devices. Availability of training dollars for solar would also greatly increase the potential for manufacturers to locate in the region.

### Current Status

The biodiesel production facility located at Liskey Farms has the capacity to produce up to a million gallons of biodiesel per year. The constraints currently being experienced by this company are the availability of oil for processing and a need for a marketing campaign and information sharing addressing utilization issues with both the general public and the vehicle maintenance personnel.

To address the resource issue, Rick Walsh and Tracey Liskey planted 500 acres of canola this past summer, 80 of which were lost to frost, which yielded approximately 1,956 pounds per acre of canola seed. The potential for other farmers to switch to canola production is unlikely at this time because of the high prices of wheat and other proven crops.

In September 2007, officials with Evergreen Biofuels officially announced the purchase of a used chemical processing plant in Klamath Falls for biofuels production and is expected to be the largest such facility in Oregon and California. About 22 million gallons of biodiesel a year, worth about \$70-\$75 million in product, will be produced after the plant is retrofitted, with a tentative opening date in January or February 2008. When it first opens, the plant will produce biodiesel from soybean oil purchased from Cargill and shipped by rail.

### Implementation Actions

Additional information is needed on the range of crops that could be grown locally for biodiesel production and other value added activities that may increase the viability of biodiesel such as using geothermal to dry the left over mash for cattle feed.

Rick Walsh out at Liskey Farms in Klamath Fall, Oregon, is in the process of setting up a bio-diesel processing plant where the oil used in the creation of the bio-diesel will be pressed from Rapeseed. A key piece of this process is in the pressing of the seed to extract the oil. OREC is working with Liskey Farms to help optimize the pressing process.

The formation of a growing cooperative for biofuels may increase the potential for increasing crop production. The USDA Center for Cooperatives has offered information and expertise to look at this. Also included in **Appendix 2** is *Oregon Renewable Energy Incentives for Farmers* as posted on the Oregon Department of Agriculture website.

*Coordinate with Lake County, City of Lakeview and other partners on the Backscatter Site Project.*

The Christmas Valley Back-scatter site, once designed to provide national security information needed during the cold war, but made obsolete by satellite technology, consists of 2,622 acres, surrounded by thousands of additional acres of federal BLM land.

U.S. Air Force (USAF) is interested in partnering with the Bureau of Land Management (BLM) to support “enhanced use leasing” and develop ideas for renewable energy production at the Air Combat Command Radar Transmitter (ACCRT) in Christmas Valley, south-central Oregon. U.S. Congressman Greg Walden (R-OR) urged the USAF, together with the BLM, to leave intact the facility’s massive electrical transmission lines and support infrastructure (access roads and buildings). Leaving the facility intact provides the option of feeding solar, wind, and possibly geothermally generated power back into the local power grid, delivering renewable power to communities.

On March 14, 2007 the Oregon Central Corridor Economic Revitalization Team met with local community leaders, BLM and Air Force representatives and interested private businesses at the Christmas Valley site. The purpose of the tour was to identify the potential for utilization of the site for solar and to determine issues that might need to be resolved. This tour was organized out of the SCOEDD office.

Also in March it was announced that Oregon Solutions has received funding from USDA Rural Community Development Initiative to assist with building collaborative partnerships in Lake County, OR to develop alternative energy resources. Oregon Solutions will provide staffing and institutional support for the Christmas Valley Alternative Energy Development project at the Christmas Valley Back-scatter site.

The end of May 2007, the first meeting of the Oregon Solutions Team met to identify a short term action plan for the project. (**Appendix 3**) Both Bob Rogers and Betty Riley have participated on the Renewable Options Subgroup for the Christmas Valley Backscatter Site. One of the information needs identified by the committee is the availability of water to the site. Investigation showed that there are no water rights associated with the site, and that the water at the onsite wells is poor quality. Water rights are available for purchase from existing irrigators which could provide the water necessary for both solar PV and thermal

solar. Also included as **Appendix 3** is the meeting summary from the October 18, 2007 Christmas Valley Backscatter meeting held at Kinsley Field advising the group of activities to date.

### *Develop and oversee an energy resource and referral service*

The Oregon Renewable Energy Center (OREC) is developing a referral service which will be web linked through their website at <http://www.oit.edu/Default.aspx?DN=2769,7,1,Documents>

Additionally, a business resource guide for existing business has been developed for distribution with links to SCOEDD's website [www.scoedd.org](http://www.scoedd.org).

### *Develop cooperative relationships with other agencies to identify available and refer clients to economic development assistance and/or financial assistance related to energy projects.*

A Lake County Renewable Energy working group has been formed which includes both public and private representatives. It is the goal of the group to coordinate renewable energy activities and prioritize activities including grant applications for funding.

This group includes:

- ☆ Brad Winters, Lake County Commissioner
- ☆ Ray Simms, Town Manager, Town of Lakeview
- ☆ Jim Walls, Lake County Resources Initiative Executive Director
- ☆ Ronne Lindsay, Lake County Development Executive Director
- ☆ Caro Johnson, Lake County Chamber of Commerce Executive Director
- ☆ Darryl Anderson, Anderson Engineering
- ☆ Mark Douglas, Paisley City Council
- ☆ Don Liddycoat, CPA
- ☆ Pete Schreder, Oregon State Extension Office
- ☆ Erin Malone, RARE Participant

In Klamath County a Biofuels task force has been authorized through resolution to accomplish the following mission:

*To promote the research and development of local means to produce crops and processing facilities for biofuels with distribution to agriculture, transportation and power generation.*

SCOEDD staff is actively involved with both these groups.

*Work with industry prospects to provide incentives to locate in the two county region when/if possible.*

SCOEDD has been working with Team Klamath on the recruitment of two potential solar manufacturing firms and the startup of a Biofuels company in Klamath Falls. **Appendix 4** is an article about the new biofuels facility which is projected to bring 40 jobs to the basin.

A financing package consisting of EDA Revolving Loan, Klamath County Development Corporation RLF funding, State of Oregon Loan funds and a grant from the Climate Trust have been completed and funding provided to Biotactics to expand to Liskey Farms. The company is in the process of occupying greenhouses to raise “predatory mites” which are used as an organic alternative to toxic pesticides. The decision to locate in Klamath was driven by the availability of geothermal heat as a way to reduce the cost of doing business. The company anticipates employing 32 full time employees within two years of operation

As match to this grant, KCEDA’s Executive Director has spent more than 200 hours on the recruitment of energy related businesses to Klamath County.

*Develop complex applications for the capitalization of energy-related programs and investigate other private and public funding sources to implement programs and services to support economic development.*

SCOEDD, OREC and the Klamath Community College joined together with other statewide partners to submit a “WIRED” proposal to the Department of Labor. The \$5 million proposal was not funded, but the partnership will continue to look for funding to implement the Making Green Work Partnership.

Paisley residents Mark and Erin Douglas were awarded a Value-Added Producer grant that will be utilized for a feasibility study for using geothermal on the property for electrical production.

Three grants were received for the Paisley and Lakeview governor's energy audits and the Blue Sky Demonstration Project for a total of \$150,000 funding.

The Lakeview Hydro grant request for \$30,000 and the Lakeview Gassifier Project grant for \$250,000 were not funded but were encouraged in both grants to re-submit for next year.

Several of the Community Geo-thermal development grants for Paisley and Lakeview and business grants for Lakeview are due in April 2008.

**Appendix 5** is a document that summarizes the already started grant work and who is involved.

***Work with the Energy Trust, DOE and USDA Rural Development to present their information to the public.***

At the Klamath Regional Biofuels Conference held March 2007, USDA Rural Development and the Oregon Department of Energy made presentations on "Funding Biofuels". This conference was cosponsored by OREC, SCOEDD, the Klamath Basin research and Extension Center and the Klamath County Biofuels Task Force. See Attachment 4 for conference agenda.

As part of his outreach, Bob Rogers has been providing information on incentives available through the Energy Trust, the Oregon Business Energy tax Credit, the USDA 9006 programs and the Oregon DOE loan programs.

Both SCOEDD's Executive Director and Bob Rogers attended USDA sponsored training on how to package successful Value Added Producer Grants and \$9006 grant proposals. The target audience for this training was individuals and groups interested in helping rural Oregonians tap into these Rural Development grant programs.

Having a good idea and a sound plan are not in themselves sufficient to win these grant awards. Just as critical is a well-prepared grant application package.

***Work with existing businesses to help them identify potential business expansion into renewable energy fields***

Lake County Development has received a small grant to work with businesses or entrepreneurs in Lake County that want to be certified in solar installation and/or certified as a solar inspector.

The large amount of publicity being generated by the energy specialist and the region's renewable energy efforts has highlighted the need for

contractors that install solar and in ground source heating systems. One of the next steps is to actually quantify the market potential for contractors and work with Klamath Community College on technician training.

***Technical Expertise - The Geo-Heat Center will provide expertise to this project as feasible.***

The Geo-Heat Center has been working with Anderson Engineering on the well testing and temperature profiles for both the Liskey Farm project and the Barry Property in Lakeview.

They will also be working with the City of Klamath Falls, the Town of Lakeview and the City of Paisley on the potential for low-temperature geothermal electrical production.

The Town of Lakeview and Lake County has embraced the idea of transforming the thinking of the community to achieving energy independence through renewable energy. They have dedicated a space at the Lake County Fairgrounds, right in the middle of town, to be a Demonstration Center for Renewable Energy.

Bob Rogers as part of the Geo-Heat Center has set up a Renewable Energy demonstration center at the Lake County Fairgrounds. He installed a ground source heat pump that was brought over from OIT. The county road department donated equipment to dig the trench and volunteers donated the time to operate it. A road crew dump truck and tractor completed the project.

With a \$25,000 grant received from Pacific Power's Blue Sky Program the following projects are being developed with four now under construction at the *Pacific Power - Lake County Fairgrounds Renewable Energy Center*:

1. The Bio-diesel Processor - The bio-diesel processor will utilize local Lakeview pressed canola oil to convert to bio-diesel. The fuel will be used to power a 20 KW diesel electric power generator.
2. Solar Photovoltaic Grid Tied Residential System - This demonstration system for residential applications will demonstrate how solar power can be more accessible and affordable for remote rural communities such as Lakeview.

3. 1 KW Solar Photovoltaic Water Pumping for Agriculture - This demonstration system will be a portable photovoltaic power unit to show how solar panels can be transported around ranch sites.
4. ½ KW Solar Thermal Hot Water – A flat panel hot water heating system with tank and controls will be constructed at the center to demonstrate a typical household hot water heating system.
5. Ground Source Heat Pump System - The ground source heat pump is the most efficient heating and cooling system technology known today. Lakeview has no natural gas supply and must rely on propane and oil heat making ground source systems more economical.
6. 5 KW Geo-thermal Heat Demonstration System - Lakeview has one of the largest resources of geothermal hot water energy in the Pacific Northwest and it is presently almost unutilized. This demonstration system will show Lakeview County the opportunity for potential of using geo-thermal to generate power through a low temperature binary cycle generator.
7. ½ KW Wind Power Generator – A 1 kW high efficiency wind generator mounted on a 65 foot tower will generate electrical power.

The Demonstration Exhibit Room is complete and is an addition to the Lake County Fairgrounds Main Exhibit Hall. This was constructed by correction facility labor at a total cost of \$2,500. This structure will house the exhibits which will describe each energy project. The ground source heat pump which will be housed in this area will be heating the exhibit hall and reducing the cost of using the exhibit hall by one half.

The solar photovoltaic exhibit is a tracking solar system that is located right at the entrance to the fairgrounds and visible to everyone driving through Lakeview. The components for this project have been purchased by the contractor, Start Electric in Lakeview, and will be installed this month. The inverter for this project has been donated by PV Powered of Bend, OR.

The Solar water heater is being installed by Powley Plumbing of Lakeview and Klamath Falls. The solar panels have not yet been received by the contractor.

The wind and bio-fuels systems are still being evaluated before being purchased. The wind system will be installed by Start Electric contractors and the bio-fuel system will not require an installation contractor.

The benefits to the Town of Lakeview and Lake County include developing a new community economic base from Renewable Energy. Transforming the thinking of the community to renewable energy required a central site where the education of the community could take place. The vision for this transformation comes from the fairgrounds being a site where students from schools, community clubs, homeowners, ranchers and government can come to see these installed systems operating. The center will include information to learn incentive opportunities and electric utility contributions to alternative energy.

***Outreach, Coordination and Reporting- Provide outreach and coordination between local and state partners.***

Three workshops were held during the summer in Lakeview, Paisley and Christmas Valley. **Appendix 6** is the agenda used for all meetings which were hosted by the County Chamber of Commerce. Included as **Appendix 7** are ten articles in the local press generated by the work of Bob Rogers and the Renewable Energy activity in Lake County.

## **Next Steps**

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Oregon Institute of Technology (OIT) has the potential to be the first university in the nation supplied completely by renewable energy. OIT's Klamath Falls campus is the only known university in the nation heated by geothermal energy. OIT is pursuing two plans to use hot geothermal water to generate electricity for the entire campus. When these projects are complete, OIT will become the first "net zero" campus in the nation. OIT has made sustainability a major theme for the institution, one that focuses the broad managerial and technical skills of the faculty and staff to address the signal issue of modern times.

The Oregon Renewable Energy Center was established by the Oregon State Legislature in 2001 to promote adoption of renewable energy technologies in the state. It is part of OIT and located on the OIT campus in Klamath Falls.

OREC's work falls into five areas:

1. Investigate renewable energy technologies and opportunities for using them
2. Assess which technologies are appropriate for particular circumstances
3. Apply promising technologies with effective instrumentation and controls
4. Evaluate technologies using testing and economic analysis
5. Inform the public through classes, educational materials, and technical data

SCOEDD will continue to work with OREC and help seek funding for a feasibility plan for developing a Green Technology Center at OIT Klamath Campus and pilot an Oregon Community Energy Program that will build on the experience of the Rural Renewable Energy Specialist.

The economic impact to Lake County this year has forced residents, business owners and community service providers to convert from oil, propane, electric resistance and wood heating systems to a lower cost heating source. To help offset this impacts, the Oregon Renewable Energy Center, working in conjunction with SCOEDD are seeking \$140,000 in funding to establish the businesses required to convert Lake County oil, propane, electric resistance and wood heating systems to "geo-thermal heat pump systems". Appendix 8 is a copy of the concept paper for this endeavor.

The SCOEDD board has also adopted the following renewable energy strategies:

- Identify niche businesses that can utilize geothermal heat
  - Market geothermal industrial parks
- Work with Oregon Renewable Energy Center (OREC) on demonstration projects
- Partner with OIT on research and development of new technologies
- Engage the community in discussion about benefits of renewable energy
  - Renewable energy tours
  - Promote energy tax credits and pass through options – Business Energy Tax Credit (BETC) and Residential Energy Tax Credits (RETC)
- Develop strategic plan for renewable resources development including additional opportunities in:
  - Geothermal
  - Solar
  - Wind

- Juniper
- Hydro, low-head hydro and micro hydro
- Biomass utilization
- Agricultural crops – Biodiesel

A continued coordinated effort in both Klamath and Lake County will ensure the work started through this project continues its momentum. Lake County, Oregon has identified itself as the "most renewable Energy County in Oregon" in chamber of commerce advertisements. The County and City governments have adopted this theme. A commitment has been made by the Lake County Renewable Energy task force to continue the efforts started.

The Klamath County Economic Development Association KCEDA and TEAM Klamath have adopted sustainability as its economic development niche. This would includes, but is not be limited to, agricultural endeavors that might assist the Klamath Basin in water savings and alternative crops (what is "greener" than agriculture?); recruiting those companies that either want to make or utilize sustainability (i.e.: wind, solar manufacturing, green houses); and act as an agent throughout the Klamath Basin to help educate our own citizens on sustainability.