Oregon
Theodore R. Kulongoski, Governor

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To: Interested Persons

From: Mike Grainey, Director

Subject: Renewable Energy Initiative

At the recent Harvesting Clean Energy Conference, Governor Kulongoski announced that he would be creating a renewable energy strategy. He also indicated that this should be developed in a broad-based fashion, with input and suggestions from people throughout the State interested in renewable energy.

Governor Kulongoski has also directed a number of state agencies to work together in a joint effort to make greater use of renewable energy a priority. As part of this effort staff from the Departments of Energy, Agriculture, Economic & Community Development, Forestry, and the Public Utility Commission have prepared an initial draft outline which I have enclosed.

This outline is intended to serve as a starting point and to generate further ideas and discussion. Let me emphasize that this outline is intended as a working draft. We welcome your additions, deletions, changes and other suggestions you might have.

We will be holding meetings soon to provide the opportunity for discussion about your suggestions. We will let you know when those are scheduled. In the meantime, please feel free to send comments directly to renew.comments@state.or.us . For more information, contact Carel DeWinkel at (503) 378-6099 or Mark Kendall at (503) 378-6043.

Thank you in advance for participating in this effort.

Please submit comments on this first draft of the Renewable Energy Action Plan by Feb. 27. Based on your input, we will schedule public meetings to report on the response we've received and to take further comments. Following the public meetings, a revised version of the plan will be issued.

Even though we have made the first deadline Feb. 27 for the purpose of scheduling meetings, we do accept comments at all times.

Please submit your comments to renew.comments@state.or.us, via fax to 503-373-7806 or call the Oregon Department of Energy at 503-378-4040.

Thank you

Oregon Renewable Energy Action Plan (First Draft)

1. SUMMARY

Introduction
Recently, Governor Kulongoski requested state agencies to formulate a Renewable Energy Action Plan, in coordination with essential stakeholders. State agencies have prepared this *first Draft*. We are requesting input from stakeholders.

As part of this initiative, the agencies intend to continue to meet with stakeholders in a Renewable Energy Working Group, which will assist with the implementation of the action items outlined in the plan as ultimately issued by the Governor.

In 2000, Oregonians spent $7.6 billion on energy, which was 8 percent of personal income. Developing energy efficiency, co-generation and renewable resources provide economic development through environmental stewardship. All of these alternatives help protect Oregonians from high-energy prices, reduce energy expenditures that leave the state, increase investments by individuals and businesses in Oregon, and grow businesses and jobs in Oregon. This plan addresses renewable energy resource development.

The Plan
The Plan's goal is to encourage production of energy from renewable sources, demonstrating a variety of technologies for tapping these resources, and removing barriers to renewable resource development. By the end of 2006, we hope to achieve the following:

New renewable energy production targets:
- 300 megawatts of wind energy resources (enough electricity to power a city one and a half the size of McMinnville).
- 50 megawatts of biomass fueled electric generation.
- 10 megawatts of environmentally sustainable hydro electric generation (primarily irrigation piping channels).
- 5 megawatts of biogas from waste water treatment, dairies and landfills.
- 100 million gallons of annual ethanol production.
- 15 million gallons of annual biodiesel production from Oregon crops.
- one geothermal electric generation project underway.

Demonstration projects will include:
- Projects that use biomass for electric generation, make biodiesel from mustard and other agricultural products, produce ethanol, install solar systems, generate electricity from wind and geothermal sources, directly use geothermal energy, and demonstrate sustainability in a renewable-resource powered industrial park. Such projects may include wind farms in various locations, biomass projects, irrigation district micro-hydro, on-farm dairy waste digesters, geothermal assessments, 500 solar electric and domestic water heating systems, and businesses using direct geothermal heating.

- Projects that use Oregon's strengths and build on existing business and industry. Projects will use engineering, manufacturing, construction, operations, maintenance, contracting and other services from around the state.
- Projects will be distributed primarily throughout the *rural* parts of the state. Biomass projects may be located in Tillamook, Lake, Deschutes, Lane, Union and Klamath Counties. Wind projects are possible in Sherman, Wasco County and others. Micro-hydro projects at irrigation districts may be built in Jefferson, Jackson, Deschutes, Crook, and Harney Counties. Geothermal projects are possible in Harney, Klamath and Lake Counties. Digesters and biofuels facilities may be built in Tillamook, Clatsop, Malheur, Morrow and Union Counties.

Following are the primary actions the state will undertake to meet these goals:

- A national renewable portfolio standard will be supported in cooperation with the state's congressional delegation.
- The reinstatement and expansion of the federal Production Tax Credit and the Renewable Energy Production Incentive will be pursued in cooperation with the state's congressional delegation.
- Local electric transmission, power purchase contracts and grid interconnection regulations and agreements will be evaluated, streamlined and solutions implemented through utility and Oregon Public Utility Commission's actions.
- The process of public input to modify the noise rules that reduce barriers to siting wind turbines will be completed with the goal of making the siting of wind turbines more flexible.
- Higher education expertise in research, renewable resource assessment, technology design and business planning will be pursued and coordinated to support development of the Oregon renewable resource industry.
- Development of new Oregon renewable energy industry businesses and assistance to existing businesses with expansion planning and workforce development will be fostered.

Jobs

Investments in renewable energy result in a *net* increase in jobs. For every $100 million in investments in renewable energy, about 1250 full time equivalent jobs are created. Furthermore, the *net* increase in economic output (the value of the production by the industries involved), wages, business and other income totals almost $200 million. In addition, the increase in state and local taxes is about $1 million[1].

It is important to emphasize that these are *net* benefits because they were calculated relative to the case where an equivalent amount of money was spent by ratepayers following their normal spending patterns. If a comparison is made between investing in renewable energy projects within Oregon versus with making the same investment outside the state, then the benefits from

[1] Based on Economic Impact Analysis of Energy Trust of Oregon Program Activities, Final Report, by ECONorthwest, Portland, April 2003.

the investments would be much greater. Thus, the benefits numbers provided here present a lower boundary.

Initiatives as outlined in this document could lead to an investment of $300 million or more by the end of 2006, which would result in about a 3700 net job increase. This is a significant number of new family-wage jobs in the state's agricultural and forestry segments of our economy, as well as other businesses all over the state.

2. WHY RENEWABLE RESOURCES NOW?

There are two main reasons for a focus on renewable energy at this time. First, there are significant risks in both the availability and prices of fossil fuels. And secondly, the market demand for clean energy is growing which offers the opportunity to add momentum with the right kind of incentives and other governmental actions.

Risks

Oregon is vulnerable to oil price spikes and shortages. Oregonians spent $4.1 billion on oil products in 2000. The vast majority of this money left the state. If oil prices doubled it would have a severe impact on the state.

Oregonians spent $1.1 billion on natural gas in 2000, not including gas used in power plants. As with oil, the vast majority of this money leaves the state. Oregonians spent 50% more per Btu to heat their homes in 2002 than they did in 1998. New supplies are proving to cost as much or more than current supplies.

In 2002, Oregonians spent $2.9 billion on electricity. Oregon's economy is still recovering from the wholesale electric price spike of 2000-2001. Retail electric prices have not returned to their previous level. As loads grow, there will be continued pressure on rates because new resources are more expensive than existing ones. Natural gas provides 15 percent of Oregon's power, but the fraction is growing.

Readily available energy at an affordable price is essential for the manufacturing, agricultural, retail, and other sectors of our economy. In these times of supply and price uncertainty, it is wise to diversify our investments. It is clear that renewable energy sources will only have a small impact on reducing the reliance on fossil fuels in the short run, particularly to meet the energy needs of the transportation sector. However, renewable resources can help insulate Oregonians from these volatile wholesale electric and natural gas markets. It is essential that accelerated renewable energy development get underway to make major contributions on longer term.

The growth in renewable energy resources

Renewable resources can meet a significant portion of Oregon's incremental energy and, in some cases, at about the same cost as that of conventional fossil fuels. For example, long term natural gas prices are predicted to be in the range of $4 to $5 per million Btu. This translates into about 4

to 5 cents per kWh (levelized). This is about the same as the current 5 cents per kWh busbar cost of wind energy (not taking into account the Federal Production Tax Credit) for the windiest regions in the country. Biomass can replace natural gas in industrial heat applications. Developing biodiesel and ethanol production based on in-state renewable resources will provide long-term benefits and local business opportunities.

Clean and renewable energy sources will help sustain our economy and enable it to grow. Reducing the environmental impact of energy use helps preserve Oregon's environment, which is good for the economy in three ways. First, we can lessen the cost of health impacts by reducing air pollution. Second, we can limit the impact of future federal mandates such as a carbon dioxide tax or changes in air quality standards. Third, we can preserve Oregon's quality of life, which helps attract and retain businesses by maintaining a clean environment.

Oregon is uniquely situated to respond to these challenges. Oregon has businesses with nationally recognized experience in developing renewable energy resources, a higher education system that is expert in the entire range of renewable resources, and consumers that are informed and motivated to support expansion of this sustainable industry.

3. ECONOMIC DEVELOPMENT AND JOB OPPORTUNITIES NOW AND IN THE FUTURE

In 2001, economic development and energy agencies from Oregon, Washington and British Columbia commissioned *Poised for Profit: How Clean Energy Can Power the Next High-Tech Job Surge in the Northwest*. It showed that the clean energy sector could be twice the size of the aircraft industry within 20 years and generate as many as 30,000 new jobs. Follow-up research focussed on the application of advanced technology to the electric power system, one of the few industries yet to feel the full impact of computerization. It spans the entire value chain, from generation (including renewables) to transport (grid) to consumption (end-use). This new study, *Poised for Profit II*, estimates that this industrial sector in British Columbia, Oregon and Washington encompasses more than 225 companies with revenues in excess of $1.9 billion, plus at least another $150 million in research and development funding, for a total in excess of $2 billion. Oregon's universities are a tremendous resource with excellent scientists. With some further coordination, they could increase their role of advancing the use of renewable resources.

On a smaller regional scale, Central Oregon may serve as an example of an economic renewable energy development *cluster*. The nine-County Central Oregon corridor (Wasco, Sherman, Gilliam, Wheeler, Deschutes, Jefferson, Crook, Klamath, and Lake Counties) possesses a diversity of renewable energy resources including solar, wind, geothermal, and biomass resources. A Central Oregon industry cluster of several dozen renewable energy-related companies already exists. Many local economic development leaders consider that the time is ripe for the renewable energy industry in Central Oregon to grow and become significant to the local and state economy. An eco-industrial park, with renewable resource use on-site, could become part of this cluster as a demonstration for other parts of the state. This will also provide the opportunity to promote our own Brand Oregon products.

In general, renewable energy development results in direct local economic impacts during two different phases. The construction phase creates a onetime surge in economic activity, while operation and maintenance makes an ongoing economic contribution by creating long-term jobs. Return on investments in locally owned projects may provide additional benefits. Emerging evidence from locally owned ethanol plants and wind farms in Minnesota suggests that economic benefits to the local economy may be 10 times higher than those from projects that are owned by corporations located outside the region. Either way, increased local business activities of installing and maintaining projects, and expanded renewable resources and technologies for export out of the state provide compound benefits to the economy.

Following are a few examples of estimated job creation for a specific project or a given level of installed capacity per year:

- A small biomass power plant (10 MW-to-50 MW capacity) creates 20-to-30 direct jobs at the plant site, plus up to 100 forest-related jobs to gather, chip and transport the fuel.
- A typical 40 million-gallon a year ethanol plant will directly employ between 30 and 40 people with average wages exceeding $45,000 per year.
- A typical biodiesel fuel refinery of 15 million gallons per year provides 30 full time jobs. A 15 million-gallon refinery could produce about 2% of Oregon's annual diesel fuel needs, so 10 refineries would provide enough biodiesel to meet Oregon's entire diesel fuel needs with B-20 (diesel fuel consisting of 20% biodiesel).
- If 10 MW of hydropower facilities could be developed over five years, it would lead to about six full-time construction jobs for those five years. Continued plant operations would require an estimated two full-time employees.
- Additional commercial wind development of 200 MW *per year* would generate about 560 manufacturing jobs (these could be in-state jobs if the blades, towers, nacelles, brakes - but not including the gearbox and generator - would be manufactured in our state), 93 construction jobs and would add 27 O&M jobs each year.
- Solar jobs could be developed in two areas. First, companies that put the various systems together in one package ("system integrators") are in demand because of the rapid growth in the California market (a Grants Pass company grew from 4 to 25 employees in the last few years because of this market). Secondly, manufacturing of inverters, balance of system components, and solar production equipment could provide additional jobs. Thirty-to-100 jobs in this manufacturing sector are a realistic estimate.

4. RENEWABLE RESOURCE OPPORTUNITIES AND ACTIONS

Currently, most renewable resources are more expensive than the fossil based fuel systems as determined by short-term market forces. Wind energy in windy locations tends to be an exception. For example, Austin Energy, a community owned electric utility in the city of Austin, TX offers a green residential rate without a fuel adjustment clause because it obtains its green energy largely from wind energy. In some cases, this green rate is now virtually the same as the standard rate with its fuel adjustment clause that varies with the price of natural gas.

Adjustments to the short-term market signals and existing market distortions can be made with various incentives to make investments in renewable resources more attractive. By making these investments in public/private renewable energy partnerships, some recent studies indicate that the *net bill* to American consumers may actually be *lower* than if our society would forgo these incentives. This is because increased use of renewable energy (mostly wind energy at this time) will reduce the up-ward pressure on natural gas prices.

Oregon is one of the nation's leaders in encouraging energy efficiency and renewable resources. The state provides tax credits and low-interest loans for all types of renewable resource projects. Wind and certain biomass facilities also may be eligible for federal production incentives, though Congress has yet to pass legislation to reinstate them. A public purpose charge administered by the Energy Trust of Oregon will provide an estimated $10 million each year through February 2012 for the above-market cost of new renewable generating resources that benefit PGE and Pacific Power customers.

Many utilities in the state offer consumers a "green power" option to support development of renewable resources, including wind, geothermal, biomass and solar. Portland General Electric and Pacific Power customers account for most of the participation, with more than 42,000 taking part.

Some Oregon residents and businesses invest in renewable resource generation on site. Oregon law requires electric utilities to "net meter" from customers with small renewable electric systems of 25 kW or less. "Net metering" allows customers, in essence, to run their meters backwards and receive credit on their electric bill when their generation exceeds their use. Utilities also must purchase excess power produced from small fuel cells, which can run on natural gas or methane, a biomass byproduct.

The *federal* Public Utility Regulatory Policy Act of 1978 (PURPA) requires that electric utilities must connect with and purchase all electric power made by a so-called "Qualifying Facility". The Oregon Public Utility Commission has opened an investigation that may lead to changes to purchases from PURPA facilities.

The following actions can be taken to enhance and expand support for development of *all* renewable resources in Oregon. Actions supporting expansion of specific types of renewable resources follow.

Actions:

- Form a Renewable Energy Working Group to assist with the implementation of the action items outlined in this plan. This Group will consist of private sector citizens, renewable industry representatives, state agencies and others.
- Continue to encourage households, businesses, local governments and others to invest in renewable energy resources through the state's energy tax credit and energy loan programs, in coordination with incentives offered by the Energy Trust.
- Assess possible new state incentives, such as production-based tax credits.

- Work with the state's congressional delegation to support a national renewable portfolio standard.
- Work with the state's congressional delegation to reinstate and expand the federal Production Tax Credit and the Renewable Energy Production Incentive.
- The Oregon Public Utility Commission may examine for the regulated utilities the following:
    - The hedging value of renewable resources in avoiding natural-gas price volatility and additional emissions costs
    - Standards to streamline the interconnection of small generators.
    - The size of qualifying facilities eligible for standard purchase rates, a standard power purchase agreement, the contract length, and a standard method for determining avoided costs.
    - Distributed renewable and combined heat and power resources, and how they can help meet energy, capacity, and distribution and transmission system needs at the lowest cost.
    - Backup service for renewable resources and other distributed generators to ensure that costs and benefits are properly reflected in rates and terms.
    - Performance-based ratemaking aimed specifically at reducing utilities' disincentives to independently owned renewable resources and combined heat and power facilities.
    - Standard rates and terms for retail customers to use the distribution system to sell power to other customers and marketers.
- Continue to improve green power options for Oregonians and increase participation.
- Work with utilities to allow aggregation of meters on a site for "net metering" and add biomass as a qualifying resource.
- Provide model siting standards, training and technical help to local governments to help them plan for siting renewable resource facilities.
- Assist agricultural producers with obtaining federal Farm Bill energy grants.
- Identify growing Oregon renewable energy industry businesses and help them with expansion planning and workforce development. Identify how that growth can be replicated through export service.
- Work with the state's utilities to develop a process and protocols for expediting interconnection requests and developing more distributed generation.
- Organize and further develop Oregon higher education renewable resource research and development capabilities to help Oregon businesses gain a national and international leadership role in this market.
- Establish and solidify the strength of a Brand Oregon renewable resource market for our technology services and commodities.

Wind

Currently, large wind farms are operating in Oregon with a total capacity of 259 MW, the largest of which is Stateline with 120 MW. Several of these existing wind farms are planning expansions and new plants are in the planning phase as well. Utilities have incorporated wind

energy in their expansion plans. Transmission access and cost is one of the main barriers for further large-scale development of wind.

The feasibility of smaller wind farms (of up to 20 MW) owned by local communities and landowners is being investigated at several locations. These projects have the potential to offer economic development opportunities.

Actions:

- Assist in building 300 megawatts of wind energy resources by the end of 2006 (currently, 350 MW has received permitting).
- Form "Wind on the Wires NW", an initiative to remove bottlenecks in the transmission system, to make sure that wind energy has equal access and reasonably priced transmission, and to develop transmission corridors and products that allow more renewable energy development.
- Work with Bonneville Power Administration to expand transmission capacity between John Day and McNary dams to allow for more bulk power transmission (wheeling) flexibility in that region of the grid.
- Coordinate technical and financial assistance for community and farmer-owned wind farm demonstration projects.
- Work with BPA and others to expand the anemometer loan program that is currently offered by the Energy Trust.
- Initiate a wind resource assessment study for local governments so that wind data for promising land areas become publicly available.
- Provide incentives to attract a wind turbine manufacturer to build a facility in Oregon (such as BETC that can be used for some new manufacturing facilities).
- Modify noise rules to reduce barriers to siting wind turbines.
- Provide a revolving fund source for feasibility studies of small wind farms for communities and landowner groups.
- Work with the BPA to use the federal hydropower system and BPA's new wind integration services to reduce the cost of energy to customers.
- Continue to encourage efforts by the Energy Trust and the regulated utilities to leverage investments in wind development for the benefit of ratepayers.

Biomass

Development of biomass resources will benefit the agriculture and forest products industries in Oregon. Using agriculture or food processing biomass can reduce problems with wastes and create additional revenues. New biomass energy markets may provide a way of disposing of otherwise problematic forest biomass residues from timber harvests, stand improvement activities, fuels treatments, and thinnings in a least-cost, if not profitable, manner.

The high cost of gathering and transporting forest biomass to an energy conversion facility continues to be a barrier to economic biomass energy development. At the same time, there is clearly a public benefit of reduced wildfire risk and reduced fire suppression cost with reduced availability of this fuel source. This benefit is not properly accounted for in the market place.

Therefore, some form of public incentive to reduce the biomass fuel supply costs may be justified.

Currently, there are biomass combustion boilers at more than 50 industrial sites in Oregon. These boilers supply heat and energy for industrial processes. The power generated at these facilities was about 108 megawatts in 2001.

Actions:

- Extend the property tax exemption for ethanol production facilities to all biomass generation facilities.
- Continue tax credits for capital investment in renewable energy generation from biomass
- Provide tax credits to support forest-treatment projects that move biomass feedstock from the forest to the renewable energy plant site.
- Support at least two biomass fueled electricity production demonstration projects in rural Oregon.
- Develop a 10-year agreement mechanism with the U.S. Forest Service and Bureau of Land Management to assure affordable access to forest biomass in regions surrounding biomass generation sites.
- Identify state lands where proximity and conditions lend themselves to long term biomass recovery for energy generation.

Biogas

Biogas facilities produce electricity and heat or steam from wood waste or from waste gas (methane) from landfills, sewage treatment plants and manure. Currently, three landfills tap waste methane gas to generate four megawatts of electricity and provide industrial fuel. In addition, 29 wastewater treatment plants use methane to generate three megawatts of electricity and provide heat for sewage treatment. Electricity is beginning to be generated using manure from dairy cows. Three facilities are on line, two are under construction and three are in the planning phase.

Actions:

- Identify all remaining landfill and waste treatment facility sources of biogas and begin designing and financing development of generation projects at promising sites.
- Promote the recovery of methane from manure at dairies through local economic development and environmental quality field staff by means of at least three demonstrations.
- Accumulate the best design practices for methane recovery from dairies, cattle operations and agriculture, and promote the use through industry associations.

Biofuels - Ethanol

Throughout North America, ethanol is used to oxygenate gasoline, reducing exhaust pollutants that become precursors to ground level ozone. In Oregon, ethanol is the predominant oxygenate in the gasoline supply. In 2002, up to 60 million gallons of ethanol were used to oxygenate the

1.6 billion gallons of gasoline used by Oregonians. That ethanol accounts for up to 4% of Oregon's gasoline supply. All of that ethanol was produced in the Midwest.

Ethanol is a non-toxic, renewable fuel distilled primarily from corn. The summer night time temperatures in Oregon are not ideal for growing the high sugar corn or hard red wheat preferred by ethanol distillers. There are currently no distillers or refiners located in Oregon. Other Oregon biomass feedstocks such as barley or cellulosic wastes (grass straw or wheat stubble) can be used to make ethanol, but at higher cost.

If we do not develop an ethanol infrastructure here, it is possible that Oregon will see increases in the use of toxic methyl tertiary butyl ether (MTBE) as an oxygenate. California and Washington ordered MTBE removed from their gasoline by December 31, 2003.

Actions:

- Support extension of property tax exemption for half the value of biofuel plants.
- Continue tax credits for capital investment in biofuel production plants.
- Help growers and cooperatives with development of rural agricultural fuel crops (growing and harvest practices, varietal development, processing facilities, siting, market development and promotion).
- Urge state purchases of 10% alcohol fuels for dispensing at their fleet sites.
- Promote use of renewable ethanol fuel by helping retailers install E-85 (85 percent ethanol, 15 percent petroleum gasoline) fuel pumps at gas stations that serve Oregon's major population centers.
- Replace MTBE with ethanol.
- Assist local agriculture and forest products to access federal funds for biomass to ethanol development through demonstration of cellulose to glucose conversion.
- Support Oregon University System research on alcohol fuels from crops or biomass.
- Provide direct service to the five ethanol production plants planning to locate in Oregon. Help them capture the local market and access export markets to reduce competitive pressures between those plants that are making Oregon siting decisions.

Biofuels – Biodiesel

Canola, rape seed, mustard, possibly soy and other crops, along with waste grease from the food service or processing industry, can be refined into an oil suitable to fuel diesel engine vehicles. Many of these feedstocks can be grown in Oregon. Biodiesel comes in B-20 (20 percent biodiesel, 80 percent petroleum diesel) or B-100 (100 percent biodiesel) forms.

Currently, suppliers are rapidly developing an Oregon customer base of public and commercial fleets. The state of Oregon buys exclusively B-20. Oregon used less than 100,000 gallons of biodiesel in 2001, or 0.02 percent of petroleum diesel sold in the state.

Actions:

- Work towards the goal that petroleum diesel sold in Oregon contains a 2% blend of biodiesel. This would amount to some 15 million gallons of biodiesel each year, which is the size of the smallest economically commercial biodiesel plant.
- Help increase as rapidly as possible the market share of B-20 and B-100.
- Form partnerships with growers, state agencies and interested investors for building a crushing plant to separate oils from crop feedstocks.
- Assist in the completion of a demonstration project where mustard is grown as a healthy rotational crop, crushed and refined on-site, and producing all of the farm's fuel.
- Have Oregon Department Agriculture and Oregon State University assemble the best practices for crop growing, crushing and oil refining and identify regions best suited to which type of crop development.
- Identify a way to label or brand Oregon biodiesel to establish significant domestic preference for the fuel.

Solar

Solar energy can provide space heating, hot water and electricity. Designing buildings to make the most of sunlight for lighting also can reduce energy needs. South-facing windows with overhangs to prevent overheating in summer and heat storage materials add little to the cost of a new building. Solar water heating can supply about half of the hot water for a typical Oregon home.

Currently, residents have installed more than 17,000 solar water heating systems in the last 20 years. There are more than 250 solar electric systems in the state.

Actions

- Stimulate the development of an Oregon inverter-manufacturing sector. Demonstrate the installation of 500 PV inverters built by an Oregon inverter manufacturer by coordinating the BETC pass-through and Energy Trust funds. (A manufacturing capacity of 500 units per year represents about 10 jobs)[2].
- Allow the tax credit for large solar electric systems to be applied over several years (up to $1,500 per year for up to five years) rather than the current tax credit strategy which encourages small systems to be installed and then expanded each year.
- Continue to provide incentives to encourage Oregon residents and businesses to invest in passive solar heating, active space and water heating and solar-electric systems.
- Demonstrate high performance energy homes that use advanced design to reduce energy demand, passive solar for space heating, active solar water heating and photovoltaic systems to produce as much or more electric energy than the home uses on an annual basis.
- Aim to attract a photovoltaic manufacturer with existing financing and tax incentives.
- Seek a legislative change to allow builders of speculation homes to claim tax incentives on the installation of renewable features in their homes.

[2] In Germany, there were 500 inverters installed in 1997, this has grown to 50,000 in 2003. The California market is now at 10,000/yr and growing in double digits

- Enable Oregon Corrections to build and install solar domestic hot water systems on correction facilities statewide (Snake River corrections demo).

Geothermal

Currently, about 1,800 ground-source heat pumps provide space and water heating for Oregon homes. The City of Klamath Falls uses geothermal energy for a district heating system. Geothermal sources elsewhere in Oregon supply heat for buildings, swimming pools, resorts and industrial uses. All of these applications fall into the so-called "direct use" category.

Projects in our state to generate electricity have been less successful. In 1996, a company received a site certificate to build a 30-megawatt geothermal power plant near the Newberry Volcanic Monument in Deschutes County. Despite considerable investment in exploratory drilling, the company did not find a source of heat and steam sufficient for generating electricity. The company canceled the Newberry project and is pursuing a similar project in Northern California. Other developers are looking at the Newberry site and at Mickey Hot Springs in Harney County.

Actions to promote direct use:

- Help complete and update the Klamath Falls district heating system "Heat Map" and work with local interests to increase the number of homes, businesses and public buildings such as schools using direct geothermal energy in the community.
- Work with the GeoHeat Center, the Oregon Institute of Technology (OIT) and the Department of Geology and Mineral Industries (DOGAMI) to update the statewide geothermal resource map to set target strategies for different regions and different grade geothermal sources.
- Develop a "Heat Map" of the Lakeview area, as well as a local planning and promotion strategy.
- Complete a case study promoting geothermal use at the Lakeview corrections facility, which is the only known geothermal heated corrections facility.
- Complete the commercial demonstration of the thermal storage and low connected load geothermal heat pump researched and prototyped by OIT.
- Establish training for HVAC contractors to educate them on the benefits of earth coupled heat pumps and help them develop a statewide promotion strategy.

Actions to promote generation of electricity:

- Identify barriers to development of the Newberry Geothermal Resource Area energy generation facility and work with developers to overcome those barriers.
- Offer Harney County assistance to develop the energy generation potential at the Mickey Hot Springs by assessing the site capabilities, identifying potential developers and providing information about siting requirements and available incentives.
- Work with Oregon utilities and incentive providers to expedite services to geothermal plant developers.

Hydroelectric Generation

Currently, hydropower meets more than half of Oregon's electricity demands right now. "New" hydro would be a very small player in any likely Oregon renewable-generation facilities growth scenario. The Revised Fourth Northwest Conservation and Electric Power Plan of the Northwest Power and Conservation Council estimates that about 38 MW of untapped hydroelectric generation capacity is available in Oregon.

What has gotten less attention is the potential to develop micro hydropower in association with numerous irrigation piping canals. Run of the river technology could make a significant contribution throughout many areas of rural Oregon. Some adjustments as to existing water conservation rules may have to be made to fully develop this potential. Oregon has significant experience designing, financing, installing and operating these optimized water use systems throughout the state.

Actions:

- Seek funding to defray costs of water rights permitting.
- Identify and support generation efficiency improvements as hydro facilities come up for Federal Energy Regulatory Commission re-licensing.
- Continue to support the state's unified approach to hydroelectric project reauthorization to balance the region's power generation needs and resource stewardship goals (e.g., Pelton-Round Butte, Klamath Basin, Hells Canyon, and Willamette Falls Projects).
- Assist developers as they identify ideal sites in Oregon where untapped run-of-the-river hydro could be developed. Focus on sites where recreational use is enhanced or where the impact of hydropower development can be minimized, and where fish habitat or passage can be improved.
- Form a task force to assist irrigation districts as they identify ideal sites in Oregon where untapped micro-hydro could be developed using irrigation piping channels. Develop irrigation canal systems that use pipes to reduce evaporation and percolation losses, concentrate water pressure which reduces irrigation pumping energy use, while providing ideal sites for hydro-electric generation.
- Complete an environmentally enhancing demonstration project of at least one megawatt with a case study completed through multi-agency analysis and collaboration.

Ocean Wave Energy

Generation of electricity through conversion of the oceans current, swell, wave action, tidal, or thermal gradients is being successfully demonstrated. Most promising applications are offshore use of the consistent rise and fall of swells, and deep-water shorelines where there is significant year-around wave action. Wave power densities in Oregon are estimated to be capable of producing between five and 15 megawatts per mile of coastline. Currently, wave energy conversion is not yet commercially available in the United States, but several pilot projects are running or being planned.

Oregon is uniquely positioned because of good sites and outstanding research capability in this area. Many wave energy devices have been invented, but few have been tested and evaluated. Most are tested in artificial wave tanks. The largest of these in the U.S. is located at OSU.

Actions:

- Support research of ocean energy projects at OSU to include technology cost reduction, improvement in efficiency and reliability, identification of sites, interconnection with the utility grid, and study of the impacts of the technology on marine life and the shoreline.