



Oregon

Theodore R. Kulongoski, Governor



OREGON
DEPARTMENT OF
ENERGY

625 Marion St. NE
Salem, OR 97301-3742
Phone: (503) 378-4040
Toll Free: 1-800-221-8035
FAX: (503) 373-7806
www.energy.state.or.us

Date: July 16, 2004

To: Interested Persons

From: Mike Grainey, Director

Subject: Renewable Energy Action Plan, Second Draft

As most of you know, Governor Kulongoski has directed a number of state agencies to work together in a joint effort to make greater use of renewable energy a priority. We prepared a First Draft and sent that out to stakeholders in February of this year.

In response, we received many comments with suggested additions, deletions, and other changes. We also had ten public meetings, which gave many of you the opportunity for discussion about your suggestions. Furthermore, we exchanged more information and discussed additional initiatives with other state agencies. We appreciate all those contributions.

This Second Draft incorporates many of the suggestions made. Among the major changes, you will see long and short term goals, legislative initiatives and specific actions to be taken by specific agencies.

Again, we are asking for your comments.

Please send your *comments* to renew.comments@state.or.us by **August 27**.

If you have *questions*, please feel free to call Carel DeWinkel at (800)-221-8035 in Oregon, or (503) 378-6099 or send an email to carel.dewinkel@state.or.us

Thank you in advance for participating in this effort.

Oregon Renewable Energy Action Plan (Second Draft)

Please send your *comments* to renew.comments@state.or.us by August 27, 2004.
If you have *questions*, please call Carel DeWinkel, Oregon Department of Energy, in Oregon 800-221-8035 or 503-378-6099, or send an email to carel.dewinkel@state.or.us

“We can make Oregon the national leader in renewable energy and renewable product manufacturing. Development of renewable energy will lessen our reliance on fossil fuels, protect Oregon’s clean air and create jobs.”

Governor Kulongoski, 2003

1 Introduction

Promoting a diversity of renewable generating resources is good energy policy for an electricity system that is heavily dependent on hydropower and increasingly dependent on fossil fuels. And because some renewable energy fuels are free, and others aren’t subject to the price swings in fossil fuels, they help stabilize electric rates. It thereby contributes to a healthy electricity infrastructure. Similarly, developing a biofuels industry in Oregon will help reduce our dependency on petroleum for transportation. As importantly, developing the state’s renewable energy resources and related manufacturing and research and development presents a huge economic opportunity, particularly in rural parts of the state where economic development can be most challenging. Investments stay in Oregon, creating jobs and growing a “second crop” for farmers and ranchers. Finally, renewable energy is an investment in the environment by displacing the use of fossil fuel generation and avoiding numerous pollutants and global warming gases.

“It is a fairly rare initiative that is good policy, good economic development, and good for the environment, but renewable energy development is that rare gem.”¹

Oregon has long been one of the nation’s leaders in encouraging renewable energy resources. For example, the state provides tax credits and low-interest loans for all types of renewable resource projects through the Oregon Department of Energy. The Energy Trust of Oregon uses public purpose charge funds from Portland General Electric (PGE) and Pacific Power customers toward achieving a goal of renewable sources supplying 10 percent of the state’s electric power by 2012. Many utilities in the state offer consumers “green power” options to support development of renewable resources. PGE ranks second in the country in sales for green power options; PacifiCorp ranks fourth. More than a million Oregon households and businesses receive information regularly on the power sources, environmental impacts and costs of generation from renewable energy sources versus fossil fuels. The Bonneville Power

¹ Quote from comment letter

Administration (BPA) and the publicly owned utilities offer renewable incentives through the Conservation and Renewable Discount program.

Among the benefits of renewable energy for the state:

- A \$100 million investment in renewable energy resources creates some 1,250 new jobs.
- Using forest residues to produce energy can reduce wildfire risk and costs.
- Clean transportation fuels can come from Oregon farm and forest products, instead of out-of-state sources.
- Generating energy from waste gas at dairies, landfills and sewage treatment plants can reduce environmental liabilities and provide another revenue source for businesses and communities.
- Renewable resources help insulate Oregonians from volatile fossil-fuel prices.
- Using renewable energy resources reduces air pollution, thereby reducing health care costs and limiting the impact of likely stricter federal emission standards in the future.
- A clean environment helps attract and retain businesses and is also very important to the tourist industry.

Oregon is proud of its outstanding past achievements. But it can and must do better. By building on these achievements with the actions as outlined in this Renewable Energy Action Plan (the Plan), Oregon will continue to be a leader on renewable energy policy and will meet a large fraction of its energy needs with new renewables by the year 2025. The Plan also will play a central role in furthering the Governor's initiatives on sustainability and global warming. And the Plan complements the state's energy efficiency programs.

2 Driving forces behind the Renewable Energy Action Plan

Oregon's policy supporting this Action Plan is described in Oregon Revised Statute 469.010, adopted three decades ago:

- 1) Continued growth in demand for nonrenewable energy forms poses a serious and immediate, as well as future, problem. It is essential that future generations not be left a legacy of vanished or depleted resources, resulting in massive environmental, social and financial impact.
- 2) It is the goal of Oregon to promote the efficient use of energy resources and to develop permanently sustainable energy resources. The need exists for comprehensive state leadership in energy production, distribution and utilization. It is, therefore, the policy of Oregon:
 - (a) That development and use of a diverse array of permanently sustainable energy resources be encouraged utilizing to the highest degree possible the private sector of our free enterprise system.
 - (b) That through state government example and other effective communications, energy conservation and elimination of wasteful and

uneconomical uses of energy and materials be promoted. This conservation must include, but not be limited to, resource recovery and materials recycling.

(c) That the basic human needs of every citizen, present and future, shall be given priority in the allocation of energy resources, commensurate with perpetuation of a free and productive economy with special attention to the preservation and enhancement of environmental quality.

(d) That state government assist every citizen and industry in adjusting to a diminished availability of energy.

(e) That energy-efficient modes of transportation for people and goods shall be encouraged, while energy-inefficient modes of transportation shall be discouraged.

(f) That cost-effectiveness be considered in state agency decision-making relating to energy sources, facilities or conservation, and that cost-effectiveness be considered in all agency decision-making relating to energy facilities.

(g) That state government shall provide a source of impartial and objective information in order that this energy policy may be enhanced. [1975 c.606 §1; 1979 c.723 §1]

Risk Mitigation

There are significant risks in both the availability and prices of fossil fuels. 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 percent more per British thermal unit (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. 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 this percentage is growing.

Readily available energy at an affordable price is essential for the manufacturing, agricultural, transportation, retail, and indeed all sectors of Oregon's economy. It is prudent that we diversify our investments and allocate a greater portion to renewable resources. By focusing our efforts on renewable energy markets, Oregon will better protect itself from the volatility of the wholesale electric and natural gas markets. It is essential that we act now to lay the foundation for accelerated renewable energy development that will sustain Oregon's progress.

Economic Development and Job Creation

Investments in renewable energy result in a *net* increase in jobs. For every \$100 million in investments in renewable energy, about 1,250 full time equivalent jobs are created.² Furthermore, the *net* increase in economic output (the value of the production by the industries involved), wages, business and other income total almost \$200 million. In addition, the increase in state and local taxes is about \$1 million.

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 3,700 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.

Recent studies indicate that by making investments in public/private renewable energy partnerships and providing incentives for the renewable energy sector, the *net bill* to American consumers may be *lowered* because an increased use of renewable energy will stem the rise of natural gas prices.

Environmental Benefits

Renewable energy systems have far less impact on the environment than those systems that rely on fossil fuels and nuclear power. Reducing the environmental impact of energy use helps preserve Oregon's natural resources and enhance Oregonians' quality of life.

In addition to the obvious environmental benefits, such as cleaner air and water, we can reduce the health risks associated with pollution, minimize the impact of future federal mandates on air and water quality standards, bolster tourism and recreation, and grow Oregon's economy.

Oregon's renewable energy policy allows no backsliding on important siting standards. All new large-scale energy facilities in Oregon, including those using renewable resources, must meet siting standards that protect the public health and safety, and the environmental protection policies of the state.

3 Goals, Initiatives and Budget Impacts

The Plan's goal is to encourage and accelerate the production of energy from renewable sources, stimulate economic development, particularly in rural parts of the state, and improve the environmental future of the state. The Plan intends to demonstrate a variety of

² Based on Economic Impact Analysis of Energy Trust of Oregon Program Activities, Final Report, by ECONorthwest, Portland, April 2003. It is important to emphasize that these are *net* benefits because they were calculated relative to the case where ratepayers, following their normal spending patterns, spent an equivalent amount of money. If a comparison were made between investing in renewable energy projects within Oregon versus with making the same investment outside the state, then the benefits from the investments would be much greater. Accordingly, they are conservative estimates.

technologies for tapping renewable resources, and removing barriers to renewable resource development.

This section presents long term and short-term goals, followed by potential legislative initiatives, coordination initiatives by the Governor's Office and an estimate of the fiscal impact for the next biennium. Section 4 lists the actions that will benefit renewable energy development across sectors, and section 5 lists sector-specific action items.

Long Term Goals: 2007 - 2025

Electricity Generation

1. Forty percent of electric generation capacity that will be built between now and the year 2025 to serve the electricity needs in the state, will be from new renewable generating resources.
2. Twenty five percent of state government's total electricity needs will be met by new renewable energy sources by 2010 and 100 percent by 2025.³

Transportation Fuels

1. All petroleum diesel sold in Oregon will contain 5 percent biodiesel (B-5) by 2010, growing to 20 percent (B-20) by 2025.
2. All standard gasoline sold in Oregon will contain 10 percent ethanol in 2010.
3. Five percent of all gasoline sold in Oregon will be an E-85 blend of ethanol and gasoline (85 percent ethanol, 15 percent gasoline) by the year 2015, growing to 15 percent in 2025.
4. Ten percent of state government's transportation fleet fuel needs will be met by biofuels by 2010.⁴ This percentage will grow to 25 percent by 2025.

Short Term Goals, to be achieved by the end of 2006

Electricity Generation

1. Three hundred megawatts of new wind energy resources will be developed, of which 10 percent will be from *community or locally owned* wind energy projects.
2. Find a solution to the transmission capacity bottleneck(s) between eastern and western Oregon to provide access from renewable resources in eastern Oregon to load centers.
3. Two and a half megawatts of new solar electric systems will be installed.
4. Five megawatts of new biogas generation facilities will be obtained from wastewater treatment, dairies and landfills.
5. Twenty-five megawatts of new biomass-fueled electric generation will be built.
6. Fifty megawatts of new combined heat and power generation systems will be built.
7. Two hundred 5-kilowatt fuel cells will be installed.⁵

³ This goal is dependent on funding. See discussion under Budget Impacts below.

⁴ Assumes 20 percent biodiesel blend for all diesel and 2 percent ethanol blend for all gasoline.

8. Thirty megawatts or more geothermal electric generation in the process of being developed.
9. One to four megawatts of new environmentally sustainable hydroelectric generation on line or in the process of being developed (primarily irrigation piping channels).
10. Completion of a feasibility assessment of a renewable portfolio standard (RPS) for the state.

Transportation Fuels

1. Diesel sold in Oregon will contain 2 percent biodiesel (on average).
2. Gasoline sold in Oregon will contain 2 percent ethanol (on average).
3. One hundred million gallons of ethanol will be produced annually.
4. Fifteen million gallons of biodiesel will be produced annually from Oregon crops or products.

State Government

1. Ten percent of state government's total electricity needs will be met by renewable energy sources (through green tag purchases and/or direct development of renewable energy by state government).⁶
2. Five percent of state government's transportation fleet fuel needs will be met by renewable biofuels.
3. Creation of a streamlined process for leasing state land to develop renewable energy resources.

Demonstration Projects

To highlight the benefits of renewable electricity generation and fuels, the following projects will be completed:

1. Five public or private energy-efficient buildings that make use of passive solar design features.
2. One biodiesel plant using mustard, other agricultural products or "waste" products.
3. One ethanol plant.
4. Projects that generate electricity either singularly or through any combination of the sun, wind, geothermal sources, irrigation district micro-hydro, biomass burning, on-farm dairy waste digesters, waste heat recovery systems and renewably-fueled fuel cells.
5. Five sites that directly use geothermal energy.
6. One industrial park that integrates renewable energy and sustainability related products or services.

⁵ Some, but not all, of the fuel cells will use renewable fuels.

⁶ See discussion under Budget Impacts below

Legislative Initiatives in 2005

1. Make changes in the Small Energy Loan Program to allow renewable energy projects to be more easily financed.⁷
2. Repeal the provision in state law that creates a conflict for renewable energy projects between the state Business Energy Tax Credit (BETC) and the federal production tax credit.
3. Increase eligible project cost for renewable energy projects for the Business Energy Tax Credit (BETC) from \$10 million to \$20 million.
4. Revise the Residential Energy Tax Credits (RETC) for large solar electric systems to be applied over several years (up to \$1,500 per year for up to three years).⁸
5. Allow builders who are building speculation homes to claim Residential Energy Tax Credits (RETC) on the installation of renewable resource features.
6. Extend the 50 percent property tax exemption for ethanol production facilities until the close of the 2016 fiscal year and expand this exemption to biodiesel facilities.
7. Introduce a production-based tax credit for biofuels: 5 cents per gallon of biodiesel produced from Oregon grown crops or grease and 4 cents per gallon of ethanol produced in Oregon.
8. Introduce a ban on MTBE⁹ in the state.
9. Establish a government approved *voluntary* labeling program for identifying “lower carbon dioxide” fuels at the pump.
10. Allow biomass facilities to qualify for net metering and allow the Oregon Public Utility Commission to adopt rules to increase the 25-kilowatt limit on a net metering facility for customers of Portland General Electric and Pacific Power.
11. Authorize state agencies to develop renewable energy projects on state property where renewable energy resources, such as remote wind sites or geothermal, may not otherwise be developed by private organizations.
12. Establish a fund to collect wind characteristics data at ten sites throughout the state, *and make those data publicly available*, to help community and locally-owned wind farm developments as well as large scale wind farm development and wind energy integration with the grid.
13. Establish a fund to collect information on the geochemistry of wells and springs, *and make those data publicly available*, to assist the geothermal industry, state and federal agencies and research institutions in geothermal resource target evaluation in Oregon.¹⁰

⁷ For example, the Oregon Department of Energy proposes to remove the five-megawatt limit on loans for projects that increase the output of a hydroelectric project and to make projects that *enable* the use of renewable energy eligible for loans as well.

⁸ This initiative will not increase the total amount of tax credits. Currently, a small system is installed the first year and then expanded over the next few years, claiming a tax credit with each expansion.

⁹ MTBE - methyl tertiary-butyl ether. It is one of a group of chemicals commonly known as "oxygenates" because they raise the oxygen content of gasoline. Oxygen helps gasoline burn more completely, reducing harmful tailpipe emissions from motor vehicles. The US Environmental Protection Agency's Office of Water has concluded that available data are not adequate to estimate potential health risks of MTBE at low exposure levels in drinking water but that the data support the conclusion that MTBE is a potential human carcinogen at high doses. Eleven states including California and Washington have banned its use as a fuel additive.

14. Establish a revolving fund *for units of local governments only*¹¹ to finance feasibility studies of renewable projects to be owned by those units of local governments.

Key Coordination Initiatives to be taken by the Governor's Office

1. Appoint a Renewable Energy Working Group to be coordinated through the Governor's Office to guide the implementation of this Plan.¹²
2. Appoint a blue-ribbon Transmission Expansion Working Group to make recommendations to the Governor on how to solve the regional transmission issues.
3. Coordinate this Plan with Western Governors' global warming and renewable energy efforts.
4. Play an active role in recognition of programs, projects or policies that help promote this Plan's objectives.

Budget impacts

Revenue impact estimates

The following lists only the estimated reductions in tax revenues and funds needed for the action items as outlined in this document. The increase in revenue as a result of the additional investments and jobs associated with the renewable resource projects, which would not have taken place without these incentives, is not included here.

The proposed Business Energy Tax Credit (BETC) increase in the maximum project cost from \$10 to \$20 million would have an estimated \$750,000 impact for the 2005-2007 biennium. The actions to promote the use of forest-based biomass would have an estimated impact of \$300,000 for 2005-2007 (use of BETC for gathering and hauling biomass from the forests to the generating facilities).¹³ The BETC for one new ethanol plant and two new biodiesel plants during the 2005-2007 biennium would be \$680,000.

The changes in the Residential Energy Tax Credit (RETC) for solar electric systems, fuel cells, and speculation homes would have an estimated impact of about \$170,000 for 2005-2007.

Production based tax credits for biofuels would likely have a minor impact for the 2005-2007 biennium. However, assuming that the production level at the end of 2006 reaches full output of 100 million gallons of ethanol per year with a 4 cents/gallon tax credit, ethanol tax credits

¹⁰ Funding support will be sought from a number of sources, including US DOE grants

¹¹ Such as counties, municipalities, and special districts.

¹² This working group could delegate many of the action items to several smaller resource specific working groups like the Wind Working Group, but other implementation actions and policy considerations will require this higher level integrated approach.

¹³ Equipment for gathering and transporting the biomass from the forest to the energy facility is already eligible for the BETC.

would total \$4 million per year. As for biodiesel, 15 million gallon/year with a 5 cents/gallon payment would total \$750,000 per year.

A fund for gathering wind characteristics data at ten sites would have an estimated cost of \$200,000 for 2005-2007. A fund to collect information on the geochemistry of wells and springs would have an estimated cost of \$150,000 for 2005-2007.

A revolving fund *for units of local governments only*¹⁴ to finance feasibility studies of renewable projects to be owned by those units of local governments could initially be set at \$200,000.¹⁵

Amendments to existing incentives that are under consideration would likely have a relatively small impact on state or local revenues next biennium, such as extending the 5-year 50 percent property tax exemption for ethanol production facilities to 2016 and expanding this exemption to biodiesel facilities.

State agencies' budgets

The extra activities outlined in this Plan by individual agencies and the coordination of work between agencies and stakeholders would require an estimated 3 FTE spread out over several agencies.

Purchases of renewable energy resources by state government

The amount of renewable energy resources that state government purchases will depend on the funding level, source and which of the following three mechanisms the state uses to achieve these goals: green tags, bundled stable- price power purchases and/or investments in renewable resource projects at state facilities.

It would cost about \$200,000 per year to buy green tags for 10 percent of state government's electricity needs as proposed for the 2005-2007 biennium.¹⁶ Payments would go toward renewable resource projects in Oregon. A "stable- price" renewable resource product is an alternative that has the added benefit of fixing power costs over several years. However, only one Oregon utility offers such an option today. The state may not want to enter a contract with an alternative electricity supplier for a term sufficient to acquire such a product, if available. Estimates of the costs of this option are not available at this time. Investments in renewable resources at state facilities could include solar electric systems on government buildings and wind turbines at government sites with favorable wind resources. The projects could meet load at the site, displacing the need for purchased power, or be sized to sell excess power to a utility or third party.

¹⁴ Such as counties, municipalities, and special districts.

¹⁵ This would be sufficient for four to five studies in the first year. Assuming that three out of four studies would result in a successful project and return the funds once financing of the project has been obtained, such fund would be sufficient for five years or so, after which this has to be reviewed.

¹⁶ Assuming a cost of 0.5¢/kWh for green tags.

The added costs of these investments could come from the state general fund. The Energy Trust could contribute toward these investments to the extent they benefit the PGE and Pacific Power customers (including state agencies) that provide the Trust's renewable resource funds. Investments would be tied to increasing generating capacity from renewable resources in the state and demonstrating on-site generation.

4 General Renewable Resource Actions

The following actions will be taken to enhance and expand support for development of *all* renewable resources in Oregon. Actions supporting expansion of specific renewable resources follow in section 5.

Actions:

1. The Governor's Office will:
 - Coordinate the legislative initiatives as outlined in section 3 of this Plan.
 - Appoint a **Renewable Energy Working Group** to assist in reaching long and short term goals. It will coordinate the implementation of the action items outlined in this Plan and prepare regular progress reports to the Governor's Office and stakeholders. This group will consist of private sector citizens, renewable industry representatives, agricultural representatives, a governor's office representative, key state agencies, private and consumer-owned utilities, and others. The Oregon Department of Energy (ODOE) will provide staff support for this working group.
 - Appoint a blue-ribbon **Transmission Expansion Working Group** to make recommendations to the Governor on how to solve the regional transmission issues. This will particularly benefit the further development of wind energy, but also future geothermal power development. Members of this working group will include executives of Portland General Electric (PGE), PacifiCorp, Public Power and the Bonneville Power Administration (BPA), as well as representatives of the ODOE, Oregon Public Utility Commission (OPUC), and independent power industry. ODOE will provide staff support for this working group. **Target date to complete this task is July 1, 2005.**
2. The Renewable Energy Working Group's tasks include, but are not limited to:
 - Assist in reaching the long and short term goals of this Plan; coordinate the implementation of the action items outlined in this Plan; prepare regular progress reports to the Governor's Office and stakeholders.
 - Work with the Oregon's congressional delegation to support a national renewable portfolio standard.

- Work with the Oregon’s congressional delegation to continue and expand the federal Production Tax Credit and the Renewable Energy Production Incentive to include all renewable energy resources.¹⁷
- Assess as the feasibility and effectiveness of production-based incentives for electricity generated by small to medium scale renewable resource facilities.¹⁸
- Assess the feasibility of a state Renewable Portfolio Standard, and compare it with production-based incentives as to its effectiveness to encourage renewable energy.
- Work with the state’s publicly and privately owned utilities, the Northwest Power and Conservation Council and BPA to develop a process and protocols for expediting interconnection requests and developing more distributed generation.
- Work with Oregon’s congressional delegation, BPA and publicly owned utilities to expand BPA’s Conservation and Renewables Discount Program.
- Work with BPA and publicly owned utilities to promote PURPA’s¹⁹ Qualifying Facilities using renewable resources, while avoiding negative financial harm to the utilities.
- Explore whether some transmission constraints for community owned renewable energy projects can be overcome if a portion of new or upgraded transmission capacity were reserved for such community owned projects in exchange for a reduction in property taxes.
- Identify growing Oregon renewable energy businesses and assist them with expansion planning and workforce development. Identify how that growth can be replicated through export service.
- Help improve coordination and provide tools to attract new renewable energy businesses to build facilities in Oregon.
- Focus efforts to solidify the strength of a Brand Oregon renewable energy market for our technology services and commodities.

3. The Oregon Department of Energy will:

- Assist the Governor’s Office with the coordination of the legislative initiatives for the 2005 session, as listed in section 3.
- Include in its Biennial Energy Plan a section that tracks the progress towards this Plan’s goals.
- Provide staff support for the Renewable Energy Working Group and the Transmission Expansion Working Group.

¹⁷ In case the current efforts in Washington, DC don’t succeed.

¹⁸ Production based incentives have been very successful in the Midwest and Europe. For examples of community wind projects in the Midwest, see <http://www.windustry.com/community/default.htm#Projects>.

For discussion of the European incentives “called feed laws”, see http://www.energy.state.or.us/renew/Wind/WindPubs/feed_laws_Hvelplund.pdf.

¹⁹ PURPA: Public Utilities Regulatory Policies Act of 1978. Before PURPA, only utilities could own and operate electric generating plants. PURPA required utilities to buy power from independent companies that could produce power for less than what it would have cost for the utility to generate the power, called the “avoided cost”.

- Continue to assist households, businesses, units of local government 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 and BPA.
 - Manage the revolving fund *for units of local governments only* to finance feasibility studies of renewable projects to be owned by those units of local governments, if such a fund is established.
 - Provide information on model siting standards and technical assistance to local governments to help them plan for siting renewable resource facilities.
4. The Oregon Economic and Community Development Department will:
- Help develop a viable renewable energy industry “cluster” by working with key stakeholders in government, business, non-governmental organizations, higher education, and local communities.
 - Create financial incentives, support regulatory streamlining, provide technical assistance, and publicly recognize businesses and communities that implement energy conservation programs, purchase renewable energy, and adopt best practices.
 - Support research and education to further development of new technologies that leverage renewable energy sources.
 - Grow Oregon's economy by obtaining funds for the development of and facilitating the transfer of new technologies from Oregon's university system and Research and Development centers to private enterprise.
 - Encourage and support infrastructure projects that incorporate eco-friendly design and innovative technologies that use renewable energy resources and enhance livability.
5. The Department of Administrative Services will:
- Report on the state's purchases of renewable energy resources on an annual basis.
6. The Oregon Public Utility Commission has investigations underway or may examine for the *regulated* utilities the following:
- How to assess the benefits of renewable resources in avoiding fuel price volatility and emissions costs.
 - Standards to streamline the interconnection of small generators.²⁰
 - Increasing the size of qualifying facilities eligible for standard purchase rates, a standard power purchase agreement with an extended contract length, and a standard method for determining avoided costs.
 - How distributed renewable and combined heat and power resources can help meet energy, capacity, distribution and transmission system needs at the lowest cost.

²⁰ Generally less than 20 MW.

- Backup service for renewable resources and other distributed generators to ensure that costs and benefits are properly reflected in rates and terms.
- Ways to remove utilities' disincentives for accommodating independently owned renewable resources and combined heat and power resources.
- Standard rates and terms for retail customers to use the distribution system to sell power to other customers and marketers.

In addition, the Oregon Public Utility Commission will continue to work with its Portfolio Advisory Committee, the utilities and third-party providers to improve green power options for Oregonians and increase participation.

7. The Oregon Department of Agriculture will:
 - Assist, jointly with ODOE, in planning and conducting workshops and other educational activities to inform agricultural producers about renewable energy information, technologies, resources, and programs.
 - Assist, jointly with ODOE, agricultural producers in evaluating project feasibility and eligibility for federal energy grants, ODOE tax credits, and other resources for renewable energy projects. Assist growers in applying for these resources as appropriate to the project.
8. The Oregon Department of State Lands will:
 - Review its administrative rules guiding the leasing of state-owned lands managed by the agency to determine what more can be done to further streamline the process for leasing state lands for the siting of renewable energy projects while meeting its Trust obligations. The Department will also consider the importance of renewable energy resources when revising its Asset Management Plan.
9. The Department of Forestry will:
 - Assess, in cooperation with other agencies including the Oregon Departments of Energy and Fish and Wildlife, the feasibility of a streamlined process for leasing state lands for purposes of renewable energy development.
10. The Oregon Department of Consumer and Business Services' Building Codes Division will:
 - Provide education and training materials to local governments regarding renewable energy installations.
 - Update its code and standards to reflect the new technologies and developments in renewable energy installations.
11. The Oregon University System and Community Colleges will:
 - Inventory all of the renewable resource and energy efficiency research, development and curricula.

- Further develop higher education renewable resource research and development capabilities to help Oregon businesses gain a national and international leadership role in this market.
- Establish and/or maintain educational standards that will produce future leaders in renewable resource systems integration and resource technologies.

5 Resource Specific Actions

Each resource segment, listed in alphabetical order below, briefly identifies the resource and technologies currently being used and lists the main perceived barriers. Actions are listed next, with the highest priority given to those that address the main barriers.

Biofuels – Biodiesel and Biolubricants

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 and to be used as lubricants. Many of these feedstocks can be grown in Oregon. Biodiesel can be blended in various ways, but generally 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 Oregon Department of Administrative Services began buying B-20 exclusively, which amounts to about 200,000 gallons per year. The total amount of B-20 used in 2003 in Oregon was about 700,000 gallons.

A crushing plant is needed in Oregon to separate oils from crop feedstock. There is no market-pull mechanism in place with mandated goals to increase the use of biodiesel. Consumer awareness is low for both biodiesel and biolubricants. Better incentives are needed to facilitate market penetration.

Actions:

1. The Renewable Energy Working Group will:
 - Help form partnerships with growers, state agencies and interested investors for building a crushing plant to separate oils from crop feedstock.
 - Support a production-based incentive of 5 cents/gallon for biodiesel with ceilings per production facility, per year and total number of years.
 - Support extending the 50 percent property tax exemption for ethanol production facilities through the end of the 2016 fiscal year *and expand the exemption to biodiesel facilities.*
 - Assist in the completion of a demonstration project where oil seed crops are grown as a healthy rotational crop, are crushed and refined on-site, and produce all of the farm's fuel.

- Develop public support for a new law that provides for a government approved *voluntary* labeling program to identify “lower carbon dioxide” fuels at the pump.
2. The Oregon Department Agriculture will:
 - Work with Oregon State University to evaluate and disseminate information on production of bio-fuel crops for conversion to biodiesel and biolubricants.
 - Assist growers assess the feasibility of grower-owned processing facilities, and work with parties interested in biodiesel production on business plan evaluation, plant development and siting, and identifying potential funding sources (in coordination with the Oregon Economic and Community Development Department (OECDD), ODOE, and local communities).
 - Work with OECDD, ODOE and other appropriate entities to identify methods of branding and pump labeling for Oregon produced biodiesel to encourage consumer consumption of locally produced product.
 3. The Oregon Department of Energy will:
 - Work with the BPA to evaluate the potential of using biodiesel in electric generators for rural/remote areas where transmission is a problem during peak hours.

Biofuels - Ethanol

Ethanol is a renewable fuel currently distilled primarily from corn. In the future, ethanol will be produced from lignocellulosic feedstocks such as wood waste and agricultural residue, which are abundant in Oregon. Throughout North America, ethanol is used as a gasoline additive for a wide variety of purposes, including the reduction of exhaust pollutants that become precursors to ground level ozone. The ethanol content in gasoline can be as high as 15 percent without to need to modify standard engines. Slight modifications to a vehicle’s fuel system have to be made to run on E-85 (85 percent ethanol). 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, which accounts for up to 4 percent of Oregon’s gasoline supply, was produced in the Midwest.

The summer nighttime 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.

There is no market-pull mechanism in place with mandated goals to increase the use of ethanol. Consumer awareness is low. Better incentives are needed to make ethanol plants using Oregon grown crops economically viable.

Actions:

1. The Renewable Energy Working Group will:

- Support a production-based incentive of 4 cents/gallon of ethanol with ceilings per production facility, per year and total number of years.
 - Develop public support for extending the 50 percent property tax exemption for ethanol production facilities through the end of the 2016 fiscal year.
 - Support Oregon university system's research on alcohol fuels produced from cellulosic materials.
 - Support a ban on MTBE.
 - Continue and enhance efforts to work with the national Governor's Ethanol Coalition.
 - Develop public support for a new law that provides for a government approved *voluntary* labeling program to identify "lower carbon dioxide" fuels at the pump.
 - Support policies and actions to promote government and private purchases of hybrid vehicles fueled with E-85.
2. The Department of Agriculture will:
- Assist growers and cooperatives, in coordination with Oregon State University research and extension programs and agricultural organizations, in the development of bio-fuel crops for ethanol production, including varietal development, growing and harvesting practices, development of business plans, facilities for processing, siting, market development and promotion.
3. The Department of Forestry will:
- Assist, jointly with ODOE, the forest products industry to get federal funds for biomass-to-ethanol development through demonstration of cellulose to glucose conversion.
4. The Department of Administrative Services will:
- Make sure that its fleet fuel use will meet the short and long-term goals for the use of ethanol.

Biogas

Biogas facilities produce electricity and heat or steam from waste gas (methane) from landfills, sewage treatment plants and manure. Digesters can also produce syn-fuels (equivalent to LNG). 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. For farmers, biogas is mostly a byproduct and other benefits are often the main reason for these projects. With syn-fuels, the value of the fuel is significantly more at current market prices than the value of potential electricity generation, but other byproduct revenue is still needed.

Only the largest cities can afford landfill and waste treatment facility biogas projects. Lack of funding for feasibility studies and lack of fact sheets for best design practices for methane recovery systems have been identified as barriers.

Actions:

1. The Oregon Department of Energy will:
 - Identify the major remaining landfill and waste treatment facility sources of biogas and provide up-to-date “best practices” information to the owners of promising sites.²¹
 - Support efforts to reach the short-term goal of 5 MW of new biogas-fueled electricity production demonstration projects.

2. The Oregon Department of Agriculture will:
 - Assist livestock operations in assessing best design practices for methane recovery and related technologies.
 - Promote the development of methane production digesters - as economically feasible for producers - through industry association events, OSU Agricultural Extension Service and local economic development and Oregon Department of Environmental Quality field staff.
 - Support efforts to reach the short-term goal of 5 MW of biogas-fueled electricity production demonstration projects.

Biomass

Currently, there are biomass combustion boilers at more than fifty 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.

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 thinning in a least-cost, if not profitable, manner. Agricultural and urban biomass wastes can also provide fuel for energy facilities.

The high cost of gathering and transporting forest biomass to an energy conversion facility continues to be a barrier to economic biomass energy development. However, investments in forest biomass conversion to energy will lead to multiple environmental, economic, and social benefits. These include:

- reduced wildfire risks to communities and wildfire suppression costs to taxpayers
- increased timber supplies
- improved forest health, water quality, wildlife habitat, and recreation areas

²¹ In cooperation with the U.S. EPA's Landfill Methane Outreach Program (LMOP). This is a voluntary assistance and partnership program that promotes the use of landfill gas as a renewable, green energy source.

- reduced air pollution from wildfire and prescribed forest burning smoke
- reduced and avoided carbon dioxide emissions, and
- maintenance of family-wage jobs and a forest industry infrastructure in rural Oregon.

These benefits are not properly accounted for in the energy market place.

Although electric power is the most widely used end product from biomass, integrated bio-refineries offer another opportunity. These refineries can produce liquid fuels, high-value chemicals and materials, and electric power within the same facility. With proper encouragement, integrated facilities could gasify rather than combust their feedstocks and use the synthetic gas to offset the use of natural gas for power production, while also converting that same synthetic gas to liquid fuels and/or chemicals.

Biomass facilities may need a production-based tax credit in addition to the fuel cost reduction to be economically viable.

Actions:

1. The Renewable Energy Working Group will:
 - Help determine whether financial support (such as a per ton transportation incentive) for forest treatment projects is needed to move biomass feedstock from the forest to renewable energy plant sites. Particular attention should be paid to 1) existing facilities for which utility contracts expire, and 2) how the cost of such projects can be spread out over a larger geographic area than the local utility's service territory.
 - Help the formation of partnerships between private companies and consumer owned utilities to develop energy systems for local communities.
 - Support efforts to develop integrated bio-refineries that produce liquid fuels, high-value chemicals and materials, and electric power within the same facility.
 - Support the legislative initiative to allow biomass facilities to qualify for net metering and allow the Oregon Public Utility Commission to adopt rules to increase the 25-kilowatt limit on a net metering facility for customers of Portland General Electric and Pacific Power.
2. The Oregon Department of Energy (ODOE) will:
 - Reach out, jointly with the Oregon Department of Forestry (ODF), to local governments and biomass energy developers and assist them in locating potential facility site locations.
3. The Oregon Department of Forestry will:
 - Expand its ongoing, statewide Forest Assessment Project to include a comprehensive assessment of forest biomass supply and demand relationships.

- Identify federal, state, and private forestlands where proximity and non-timber biomass production potential provide long-term opportunities for biomass recovery for energy generation.
 - Cooperate with biomass energy developers in locating potential facility site locations on Board of Forestry forestlands and, consistent with other management plans for these lands, work to develop expedited leasing processes for such sites.
 - Assist in the development of long-term forest health restoration contracting mechanisms with the USDA Forest Service and USDI Bureau of Land Management to assure affordable and predictable access to forest biomass on federal forestlands in regions surrounding biomass generation sites.
 - Promote congressionally approved experiments in Oregon where local communities with mature, successful histories of collaboration are empowered to demonstrate their stewardship of federal forestlands.
 - Promote active fuels and vegetation management, along with aggressive fire suppression on public and private forestlands, as key tools to produce biomass for energy generation and to manage forest health.
 - Promote alternatives to prescribed burning through the administration of the Department of Forestry Smoke Management Plan.
 - Monitor, jointly with ODOE, available federal funds for biomass projects and provide this information to stakeholders. Where needed, they will provide assistance with the application process for federal funds.
 - Work with federal agencies to promote forest biomass energy opportunities through administration of the National Fire Plan and the Healthy Forests Restoration Act.
 - Facilitate the use of the federal Environmental Quality Incentive Program to provide matching funds for forest fuel reduction projects that will provide feedstock for biomass energy plants.
 - Investigate the benefits of reduced and avoided carbon dioxide emissions from forest fuel reduction projects in conjunction with biomass energy generation.
4. The Oregon Economic and Community Development Department will:
- Develop, jointly with the ODF, a comprehensive forest sector economic development strategy for Oregon that will encourage continued investment in forestlands by public and private landowners and that promotes biomass energy production along with timber and non-timber forest products.
5. The Department of State Lands will:
- Cooperate with biomass energy developers in locating potential facility site locations on state lands where it can be accommodating taking into account the Department's Trust obligations and current lease commitments.
6. The Oregon University System and Community Colleges will:

- Research and identify Oregon's potential for biorefinery industry. Identify opportunities where bio-refineries can produce liquid fuels, high-value chemicals and materials, and electric power within the same facility.

Combined Heat and Power Systems

The combined heat and power (CHP or cogeneration) form of distributed generation is about twice as energy-efficient, and therefore produces fewer pollutants, than producing heat and power separately.²² These systems capture the waste heat produced during generation for industrial processes or for heating and cooling. Although CHP systems typically use fossil fuels, they can also use renewable energy resources. Due to these benefits, three states²³ have legally recognized waste heat recovery, regardless of primary fuel source, as a renewable resource eligible to satisfy renewable portfolio standards.

Recovering waste heat does not require any burning of additional fuels. Some of the benefits of this technology are:

- Minimal environmental impact, as they are located on existing industrial sites.
- Low operating and maintenance requirements.
- Base load generation.

The current CHP resource in Oregon consists of 41 projects in Oregon with 818 megawatts of electric generation capacity.²⁴ Natural gas turbines comprise 15 of these CHP projects for 540 megawatts of capacity. The other 26 projects account for 278 megawatts and use renewable resource fuels such as wood residue (hogged fuel), black liquor²⁵ and wastewater gas. It is estimated that there is very cost-effective potential for upwards of 1,000 megawatts of new CHP resource in Oregon.

Actions:

1. The Renewable Energy Working Group will:
 - Work with state agencies and others to give waste heat the same status as renewable energy in state legislation, rules and miscellaneous programs or projects that benefit renewable energy resources.
 - Assist the Building Codes Division and the Oregon Public Utility Commission to identify and adopt uniform technical standards, procedures and agreements for

²² Traditional power plants waste up to two-thirds of the fuel's energy value before it reaches customers, most of it waste heat.

²³ Nevada, North Dakota and South Dakota.

²⁴ Those systems range in size from 30 kilowatts at a commercial office to over 100 megawatts at a pulp and paper plant. In almost every case, the systems operate to generate electricity and thermal energy primarily for onsite use. Only a few of the largest facilities sell electricity on the market. Not all of them operate at all times.

²⁵ In chemical pulping the lignin in the wood is dissolved in a digester where the wood chips are cooked. The fibres are separated from the spent pulping liquor (so-called black liquor). The black liquor is first concentrated, and subsequently incinerated in so-called recovery boilers,

interconnecting generators, where the Federal Energy Regulatory Commission does not have jurisdiction.

Fuel Cells

Fuel cell technology can play an important role in Oregon's renewable energy future. Fuel cell fuel reformers are able to combine water with renewable fuels including bio-methanol, biodiesel, biogas and ethanol to produce hydrogen. The renewable hydrogen can then be used in a fuel cell stack where it is converted to electricity, or the hydrogen can be used directly in commercial or industrial applications.

Oregon commercial and industrial sectors use approximately 30 million cubic feet of hydrogen per year. All hydrogen is imported since there are no commercial hydrogen generation plants in Oregon. If hydrogen used in Oregon were generated in Oregon using renewable resources, new jobs could be created.

In the short run, most fuel cells are expected to use non-renewable fuels. However, a goal of this Plan is to foster increasing use of renewable fuels as technologies become feasible.

Actions

1. The Renewable Energy Working Group will:
 - Support Oregon companies in attracting funding from regionally targeted federal fuel cell and hydrogen generation programs including regional US Department of Energy and US Environmental Protection Agency (EPA) programs.
 - Support a bill to expand the Residential Energy Tax Credit for fuel cells to provide up to \$1,500 in tax credits for three years.
 - Encourage the University System to explore fuel cell technology and to establish a fuel cell technology center.
 - Support a revision of the federal tax credit language for renewable fuels to include off-road and stationary uses instead of exclusively supporting transportation applications.
 - Support and highlight one or more demonstration projects that generate electricity using Oregon-made fuels with energy technologies engineered and manufactured in Oregon.
2. The Oregon Department of Energy will:
 - Modify its web site and publications to identify more clearly how a fuel cell owner can apply for tax credits and to describe how the owner is using those tax credits.

Geothermal

Most areas of high heat flow are in the Cascades, central Oregon, southeast Oregon and parts of northeast Oregon. These are the locations where geothermal resources are most likely to be found. Geothermal resources include high-temperature for electricity generation, intermediate

temperature for industrial, agricultural and municipal applications and low-temperature heat pump applications. The Oregon Department of Geology and Mineral Industries (DOGAMI) has available to the public geothermal resource maps of Oregon showing both regional and site-specific information.

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, which represents only a small portion of the direct geothermal use in the area. Geothermal sources elsewhere in Oregon supply heat for buildings, swimming pools, resorts and industrial uses. All of these applications fall into the “direct use” category.

Geothermal electric generation could provide important renewable *baseload* generation. Furthermore, geothermal electricity production on federal lands requires that a resource production royalty be paid to the federal government. In Oregon, half of the royalty payment would be paid to the state, and the state is obligated to pass at least 50 percent onto the county where the electricity was produced.

Since 1975, geothermal exploration and development in Oregon has been facilitated by a successful collaboration between state and federal agencies (DOGAMI, Bureau of Land Management and the US Forest Service). Memoranda of Understanding have been useful tools and these agencies anticipate continuing this association in the future. Numerous projects - heat flow and exploratory drill holes throughout the state and the Newberry Project - have obtained useful results.

Geothermal experts at the state and federal level and in private industry continue to consider the area on the flanks of Newberry Volcano, outside the Newberry National Volcanic Monument, to be one of the best prospects for high-temperature geothermal electricity production in the Pacific Northwest. To date, limited exploration drilling has measured temperatures up to 600 degrees F.

The main barrier for development of geothermal electricity generation in Oregon is its above-market cost. Financial incentives similar to those for wind (about 1.5 to 2 cents per kWh) are needed in the near future.²⁶ When power sales contracts are anticipated or awarded, the geothermal industry will likely respond with building a 20 MW or larger demonstration plant. Furthermore, an important round of exploration and assessment in Oregon will likely be undertaken.

Actions to promote direct use:

1. The Oregon Department of Energy will:

²⁶ As of July 2004, the Senate passed an extension of the federal Production Tax Credits which includes geothermal. The House version does not include geothermal.

- Work with the GeoHeat Center and others to help establish training for heating, ventilation and air-conditioning (HVAC) contractors on the benefits of earth-coupled heat pumps and help develop a statewide promotion strategy.
 - Work with the GeoHeat Center and others to highlight demonstrations of homes, businesses and public buildings such as schools and correctional facilities using direct geothermal energy in the community.
2. The Oregon Department of Geology and Mineral Industries, in cooperation with the Departments of Energy, Forestry, and State Lands, will:
- Work with the GeoHeat Center and others to provide copies of existing maps detailing the geothermal resource potential of Oregon and incorporate additional information into the data base as new information becomes available.
 - Periodically publish updated geothermal resource maps of Oregon as additional data availability and demand require.
3. The Oregon Department of Agriculture will:
- Collaborate with ODOE and agricultural producers in identifying new and expanded uses for geothermal application in agricultural operations, and expand implementation through education, pilot projects, and existing incentive programs.

Actions to promote generation of electricity:

1. The Renewable Energy Working Group will:
- Work with the state's congressional delegation to support a federal production tax credit for geothermal electricity generation.²⁷
 - Work with the federal government and others to provide a forgivable loan or grant program for drilling exploratory holes.
 - Work with the Energy Trust, the utilities, BPA and others to expedite a Power Purchase Agreement with added incentives based on above-market costs for a 20 MW or larger demonstration project.
 - Review the royalty and tax implications of geothermal production facilities and explore funding means to help promote geothermal development.²⁸
 - Help develop a partnership plan between state and federal agencies for further development of projects on federal land or involving federal leases.
2. The Oregon Department of Geology and Mineral Industries will:
- Sample and analyze waters from wells and springs throughout the state to develop a statewide data base useful to the geothermal industry, to state and federal agencies

²⁷ In case the current efforts in Washington DC don't succeed.

²⁸ Geothermal electricity production on federal land requires that a royalty be paid. In Oregon, half of the royalty payment would be paid to the state, and the state is obligated to pass at least 50% onto the county where the electricity was produced.

and research institutions as a valuable component in geothermal resource target evaluation in Oregon, provided funding can be obtained.²⁹

3. The Oregon Department of Energy will:

- Continue the collaboration with the Pacific Northwest Section of the Geothermal Resources Council regarding geothermal resources within Oregon.
- Coordinate the Oregon Geothermal Working Group, which is part of USDOE's "Geo-Powering the West" program.

4. The Oregon Department of State Lands will:

- Review and, if necessary, revise its administrative rules governing the exploration for and leasing of geothermal resources to ensure that they are easily understood and usable by persons wanting to conduct these activities on lands administered by the agency.

Hydroelectric Generation

Currently, hydropower meets more than half of Oregon's electricity demands. In comparison, "new" hydro would be a small player in any likely renewable-generation growth scenario. It focuses primarily on the potential to develop micro-hydro (or "seasonal" hydro) in association with numerous irrigation piping canals. Run-of-the-river technology could also make a contribution throughout many areas of rural Oregon. Oregon has significant experience designing, financing, installing and operating these optimized water use systems.

Actions:

1. The Renewable Energy Working Group will:

- Work with state agencies and interested stakeholders to explore the feasibility of multi-purpose upstream small storage facilities for use in micro-hydro projects in the context of ORS 536.238's "environmentally and financially feasible storage."
- Seek funding to defray costs of water rights permitting for micro-hydro projects.
- Identify and support generation efficiency improvements as hydro facilities come up for Federal Energy Regulatory Commission re-licensing and State of Oregon reauthorization. Support maximum generation efficiency for new projects in Oregon, while safeguarding the environment.
- Continue to support the state's policy of reauthorizing hydroelectric projects that are found to be in the public interest if they balance the region's generation needs with the enhancement or maintenance of the natural resources of the state.
- Assist irrigation and water service districts as they identify sites in Oregon where untapped micro-hydro could be developed using irrigation piping channels.

²⁹ This has been done in Nevada with positive results. Funding support will be sought from a number of sources, including the state and US DOE grants

- Help develop irrigation canal systems that use pipes to reduce evaporation and percolation losses, concentrate water pressure which reduces irrigation pumping energy use, and provides sites for hydroelectric generation.
 - Help complete an environmentally enhancing hydroelectric demonstration project case study that involves multi-agency analysis and collaboration.
2. The Oregon Water Resources Department (OWRD) will:
- Work with state agencies and interested stakeholders to develop recommendations to streamline rules and application procedures for micro-hydro projects.
 - Continue to develop and enhance the coordination of micro-hydro projects consistent with state policies.
 - Identify micro-hydro resources and make them available to the public on OWRD's web site.
 - Prepare and disseminate a "Guide to Micro-Hydro Permitting in Oregon."
3. The Oregon Department of Energy will:
- Seek changes in its state Energy Loan Program to make it easier to finance small hydro projects.³⁰
4. The Oregon Department of State Lands will:
- Revise its administrative rules governing the authorization of hydroelectric projects on state-owned waterways. The goals of this review will be to develop administrative rules that are easily understood and usable by persons who currently have, or want to place such facilities on state-owned waterways. At the same time, ensure that the Common School Fund receives an appropriate amount of revenue from the use of these lands in this manner.

Solar

Solar energy can provide space heating, hot water and electricity (primarily with photovoltaic cells). 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

1. The Oregon Economic and Community Development Department, with assistance from ODOE, will:
- Stimulate the development of an Oregon inverter-manufacturing sector.

³⁰ For example, ODOE proposes to remove the five-megawatt limit on loans for projects that increase the output of a hydroelectric project.

- Work to attract a photovoltaic manufacturer with existing financing and tax incentives.
2. The Oregon Department of Energy will:
- Seek a legislative change for large solar electric systems so that the tax credit can be applied over several years (up to \$1,500 per year for up to three years).³¹
 - Seek a legislative change to allow builders of speculation homes to claim residential tax incentives on the installation of renewable features in their homes.
 - 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.
3. The Oregon Department of Agriculture will:
- Collaborate with ODOE and agricultural producers in identifying new and expanded uses for solar application in agricultural operations, and expand implementation through education, pilot projects, and existing incentive programs.

Wave Energy

Generation of electricity through conversion of ocean 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 along deep-water shorelines where there is significant year-round wave action. Wave power densities in Oregon are estimated to be capable of producing between five and 15 megawatts per mile of coastline.

The technology is available now to construct a sizeable wave farm. Economics are likely to be in the \$3,000/kW range for smaller than 10 MW offshore systems, falling to around \$1,000/kW for a 200 MW system. Power price is in the range of 10 cents/kWh for small systems, falling to a projected 3-5 cents /kWh for the larger systems. This lower number would be competitive with current baseload generation.

Currently the United Kingdom has a vibrant program of wave, ocean, and marine/tidal technologies being supported through government support. The Electric Power Research Institute (EPRI) recently began studies to build six demonstration projects in six states, including Oregon and Washington. EPRI wants to build a 500 kW demonstration project off the Oregon coast within a 2-4 year time horizon.³²

Actions:

³¹ The current tax credit strategy which encourages small systems to be installed and then expanded each year. The total tax credits will not increase.

³² At the end of 4 years, the pilot project will have generated enough data to begin determining commercial feasibility.

1. The Renewable Energy Working Group will

- Encourage the ongoing ocean energy research 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.
- Coordinate efforts to attract one of EPRI's 500 kW demonstration projects to the Oregon coast by 2006.

Wind

Large wind farms are currently 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 resource plans. The feasibility of smaller wind farms (of up to about 10 MW) owned by local communities and landowners is being investigated at several locations. Net metering is available for systems of 25 kW and smaller.

Transmission capacity between eastern and western Oregon is the main barrier for further large-scale development of wind. Currently, all wind farms need a production based tax credit (or similar financial incentive), but this may not be needed in the future given the price trend of natural gas and the efficiency of larger turbines. Smaller project economics are more challenging due to the higher cost of installing small numbers of utility-scale wind turbines. Transmission issues are often barriers for this kind of developments as well. The lack of long-term wind speed data from different parts of the region (other than the eastern Columbia River area) impairs the marketability and development of wind.³³

Actions:

1. The Renewable Energy Working Group will:

- 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.
- Help develop a project to collect wind characteristics data at ten sites throughout the state, and make them publicly available, to help community and locally owned wind farm developments as well as large scale wind farm development and wind energy integration with the grid, if funds become available. Oregon State University would manage such a program.
- Work with BPA and others to expand the anemometer loan program that is currently offered by the Energy Trust.

2. The Oregon Department of Energy will:

³³ Data are needed by utilities to lower their risk, by network operators to solve their integration problems, and by developers who will go where the good long term data sites are and who need long term data for financing. Regional energy costs can be lowered by the availability of an extensive database.

- Continue to coordinate technical and financial assistance for community and farmer-owned wind farm demonstration projects.
 - Continue to coordinate the Oregon Wind Working Group, as part of the US Department of Energy's Wind Powering America Program with the primary focus to promote small-sized wind farms to agricultural communities.
3. The Oregon Department of Forestry will:
- Cooperate with wind energy developers and community leaders in locating potential facility site locations on Board of Forestry forestlands and state lands.
 - Work to develop expedited leasing processes for such sites, consistent with other management plans for these lands.
4. The Oregon Department of State Lands will:
- Continue to look for opportunities on state lands administered by the agency for the placement of wind farms. Additionally, the agency will cooperate with wind energy developers and community leaders in locating facility sites while meeting its Trust and current lease obligations.
5. The Oregon Military Department will:
- Perform a feasibility study of installing wind turbines on or near its military properties throughout the state.