RENEWABLE RESOURCE ADVISORY COUNCIL
Notes from meeting on October 17, 2007

Attending from the Council:
Thor Hinckley, PGE
Lori Koho, OPUC
Frank Vingola, UOSRML
Jeff King, NWPCC
Carel DeWinkle, ODOE
Jesse Jenkins, RNP

Attending from the Trust:
Lizzie Giles
Peter West
Kacia Brockman
Alan Cowan
Adam Serchuk
Betsy Kauffman
Danielle Gedding
Dave McClelland

Attending from the Board:
John Reynolds, University of Oregon

Others attending:
Jessica Morrison, David Evans and Associates
Virinder Singh, Hat Trick Energy and Environment
Mark Olson, Dynalectric
Joe Esmunde, IBEW #48

1. Welcome and Introductions

Peter convened the meeting at 9:40 am. The September notes were adopted without change.

2. Emerging Renewable Technologies

Virinder Singh from Hat Trick Energy and Environment Consulting presented his findings from the review of emerging renewable technologies commissioned in response to SB 838's mandate that public purpose funds focus on renewable energy projects less than 20 MW. The goal of the review was to provide Energy Trust and its stakeholders with context on the technologies available, recent project developments, suppliers, and permitting issues. It offers considerations for Energy Trust and its stakeholders as they think about whether and how to enter these markets

The focus was on technologies or technology applications without a large presence in Oregon today. Information was gathered through interviews with developers, manufacturers, utilities, financiers, and independent experts, in addition to an extensive review of the available literature.

The key findings were: “Large-scale” PV (over 1 MW) is an opportunity today; solar thermal Dish stirling is worth watching; solar trough and tower projects will likely be above 20 MW; wave is immature, but aggressive in-state activity merits Energy Trust's involvement; small geothermal has up-front risks, but represents a new and promising opportunity for Oregon; fuel cells with biogas is not an active market segment today.

Solar: Parabolic troughs, Power towers, Dish Stirling, and Photovoltaics

There is a lot of development in Spain with troughs and power towers thanks to EU and state subsidies. In the U.S., the Southwest is looking to trough, power tower, and dish technologies because of RPSs. California is focused on PV, with large incentives for 1 MW+ projects.

Oregon's solar resource, while inferior to the Southwest, still offers project opportunities. The State receives 6-6.5 kWh/m/day in southern Oregon east of the Cascades. The solar resource is not as ideal for concentrating solar thermal as other states, and what resource is available is located far from transmission.

Southern Oregon offers power marketing opportunities to other states, which are willing to offer more for projects. However, there are challenges with existing transmission to the south. PacifiCorp has a proposed new line which may open up opportunities for solar in Southern Oregon. California is willing to pay $85/MWh, but their RPS requires green tag delivery.

PV and Dish Stirling can be done successfully under 20 MW. Troughs and power tower projects in the future will be at least 30 MW with limited modularity. PV and Dish Stirling offer a better opportunity to Energy Trust based on modularity and desired project size. The performance risk for all these solar technologies will go down over time, but Dish Stirling has a longer way to go and still needs to be proven in a commercial setting. PV is the most proven and trusted technology.

Peter asked for a cost estimate for these technologies. Virinder replied that trough is about $3.9/watt, Dish Stirling $6/watt, and PV $5/watt. These are installed costs and do not account for operations and maintenance.

The type of incentive desired by developers depends on the maturity of the technology. Without the federal investment tax credit (ITC), non-PV projects will go away due to cost and risk. In Oregon, the Business Energy Tax Credit (BETC) can mitigate ITC impact for PV projects.

Power tower and trough projects face higher development thresholds than Dish Stirling and PV due to water use permit, RCRA and air permitting. There are also FAA challenges for towers, which are 377 feet high. Troughs and towers have longer development lead time, so RFPs need to take the permitting lead time into account.

Wave

There are currently four wave energy projects in Oregon with preliminary permits, and three projects have pending preliminary permits. Developers typically obtain a FERC permit for a site bigger than eventual project footprint. There is a mixture of hope and concern about the volume and size of possible projects off the Oregon coast.

Adam asked if there were seven separate developers for the seven permitted projects. Virinder replied that some of the projects were being developed by the same companies with multiple sites.

There is no sense of a “winning” technology nor of the actual costs associated. The required incentive level may change over time and for the same project. Opportunities for small pilot (5 MW and less) projects may arise more quickly than expected, possibly within the next 2 years.

Adam asked about the capacity factor for these projects. Virinder replied that there is a lot of variability – range from 17% to 35%.

Federal policy needs to mature to make wave energy competitive with other renewables (there are currently no federal incentives for wave energy), and utility participation will be important for early projects. The utilities are raising concerns and offering opportunities for projects up-front. The near-term ratepayer benefits will be small, but the State can reap longer-term benefits from the economic development and clean energy supply.

While Oregon is generating a lot of interest in wave energy, California beckons. The wave energy resource is similar in both states, and there are plentiful incentives and lots of load in California. In order to be a major player, Oregon needs to maintain its efforts.

Geothermal

There are three big, existing projects under development in Oregon: Newberry Crater (Deschutes County), Crump Geyser (Lake County), and Neal Hot Springs (Malheur County).

The emergence of a new binary technology may open the market up for projects in the 250 kW to 5 MW range. In Lakeview and Klamath County, Oregon Institute of Technology and Chevron Energy Solutions are looking for support for projects.

Small, binary projects are poised for growth, but face high initial costs and risk hurdles. Up-front drilling is the biggest challenge, but dual uses (power and heat) help potential project viability. Co-investment by Energy Trust's renewable energy and energy efficiency programs (for the dual uses) could be of assistance. Federal lands need to be available to access all the good in-state resources. Oregon BLM has been very slow in lease processing compared to other Western states.

Oregon faces tough competition from California and Nevada for investment, which have long-standing state RPSs. They also have more rapid lease processing by federal agencies. On the other hand, California offers an attractive market for Oregon developers, and Energy Trust can leverage California's dollars.

Fuel cells with biogas

Fuel cells with biogas are a thin market today. There were 35 projects through 2004, but only 6 new projects since. There are performance challenges and low market penetration. Biogas powers just 2% of the global stationary fuel cells, and fuel cells are in only a tiny portion of landfills with energy projects. There are only two firms are actively seeking biogas projects. However, there are plentiful incentives: $4.50/watt in California compared to $1.30/watt for microturbines.

The biogas market is a low priority for the fuel cell industry, and fuel cells are not the top choice for biogas generators. Breweries may offer some potential in Oregon, but regardless of source, substantial incentives are required for new projects.

Conclusions

In the near-term, PV is the solution, but it is a high-cost solution. Longer term solar troughs and power towers may be available, but they will continue to be expensive. It is better to let other states lead on these Wave may be further out but warrants watching and consideration. Geothermal is closer and worth considering, but drilling risks are a high-cost and high-risk item and overall costs are a little uncertain for the small applications. Fuel cells with biogas and Dish Stirling have potential to be lower cost, but are also long-term.

3. 2008 RE Budget

Peter presented the 2007 accomplishments and plans for 2008. In 2007, Staff expects 77.3 aMW of new projects to be completed, including GoodNoe Hills and Biglow Canyon Wind Farms. This will represent a cumulative total of 94.1 aMW of projects on-line since 2003. Another 2.6 aMW (2 projects) will be delayed to 2008. Staff has reserved funds and received Board approval for an additional 16 aMW (7 projects) that have final contracts pending or in process. If all the pending projects come on line, we will have achieved 112 aMW of new generation with funds from 2002-2007.

Forty-two feasibility studies were conducted or initiated in 2007. Staff developed new program offerings for PV (incentive for non-taxable entities with or without third-party financers) and Small wind. New, strategic partnerships were coordinated with the efficiency programs for dairies and wastewater treatment plants. And, staff re-crafted the green tag policy.

<u>Solar</u>
The volume in the solar program increased 95% over 2006. We completed 200 projects totaling 1.1 MW, 57% of which were commercial installations, and committed to an additional 63 projects totaling 495 kW. Staff created strategic partnerships for outreach with OSEIA, Solar Oregon and the City of Portland Office of Sustainable Development's Solar Now! Campaign. Staff held 30 seminars and presentations reaching more than 1,700 people, and held 6 trainings for more than 240 industry members which lead to approval of 20 new solar contractors.

The caps for commercial projects were increased and a new incentive for non-taxable entities was rolled out. A standard application process for third-party owned systems was developed and launched, and Energy Trust completed a feasibility study of PV for OMSI.

<u>Wind</u>
The 3 community wind projects were delayed to 2008 due to tight turbine supply. Staff conducted and initiated 5 feasibility studies and secured 3 USDA grants for feasibility studies, leveraging $222,840 in additional funds. The program loaned two (20-30m) anemometers, for a total of 22 since 2003. Staff began a phase-out of the Anemometer Loan Program and re-orientate customers to a web-based tool. Energy Trust installed one tall tower (50m), for a total of 5 since 2006. Three new sites will be added in support of the new USDA grants. The small wind program supporting turbines <250 KW was launched.

<u>Open Solicitation</u>
The program supported 2 hydro projects scheduled for completion in 2008 and provided funding for 2 large, solar projects scheduled for completion in 2008. Swalley Hydropower is scheduled for completion in 2009. Staff conducted or initiated 20 feasibility and scoping studies and met with 25 agencies, organizations, and municipalities to present program offerings.
The program identified credible third-party financers and has continued to act as an incubator For new program offerings such as non-taxable entities. Staff launched the Multnomah County solar RFP, and demonstrations of small wind led to a separate standard offer under the wind program.

Biopower
Rough & Ready's 1.2-MW biomass CHP is slated to be completed in November. Portland's 1.7-MW biogas generator should be on-line in early 2008. Funding was approved for the 15.8 MW biomass CHP at Warm Springs Forest Products. Staff conducted and initiated 16 feasibility studies. The program also supported USDA applications and market analysis for animal byproducts. The Dry Creek Landfill's 3.2-MW project came on line. The program initiated a coordinated outreach effort to Dairies, with the ETO PE program, the OR Dairy Farmers Association and OSU, Wastewater treatment plants, with Oregon Association of Clean Water Agencies

Budget Overview
Themes for the 2008 budget include the maturation of a successful set of base programs; addressing the increase of volume and demand; and finish the transition to a focus on projects 20 MW or smaller (as a result of SB 838). There is a greater customer need for Energy Trust presence before and during project development: more technical assistance, project evaluation and market validation. Serving the role of the neutral party for reviewing is still important.

The goals for 2008 are to bring on line the commitments from 2007, commit to an additional 9 aMW of new projects (to be on line 2009-2010), continue to support a range of resources and technologies, and link with PGE on their 2008 PGE RFP for new resources.

To respond to SB 838, Staff will incorporate the new offerings from 2007, continue to build the pipeline of new projects and expand efforts in OSP for hydro and small geothermal. Programs will strive to meet emerging opportunities for wastewater treatment plants (biogas), dairies, large PV (in PGE only). The programs will develop a proactive approach for new markets and technologies, and add staff to help meet growth.

New Revenues for 2008
In Pacific Power there will be $4.9 million, and in PGE, $7.8 million. From prior years there will be an additional $5.8 million from Pacific Power and $16.5 million from PGE. This includes $7.1 million in contracted funds for projects to be completed in 2008-2009and $ 6.1 million in other board-approved projects for 2008. The majority of carry-over funds are from un-utilized utility-scale budgets.

The total budgets for 2008 will be $ 10.81 million in Pacific Power, and $ 24.19 million for PGE. As a share of the total budgets, expenditures are anticipated to be 86% Incentives, 5% Delivery & Management, 1% Planning & Evaluation, and 8% other costs.

2008 RE Draft Budget and Generation

Programs	Total costs		Range in aMW	
	$ million	% Total	Conservative	Best Case
Biopower	$10.85	31.0%	3.78	8.78
Open Solicitation	8.97	25.6%	2.07	3.18
Solar Electric	9.01	25.7%	.43	.57
Utility Scale	.24	.7%		

Wind	5.93	17.0%	2.75	3.93
Total	**$35.00**	**100.0%**	**9.03**	**16.46**

2008 RE Draft Budget: Pacific Power and PGE

Programs	**Pacific Power**		**PGE**	
	$ million	% Total	$ million	Total
Biopower	$2.84	26.2%	$8.01	33.1%
Open Solicitation	2.82	26.1%	6.15	25.4%
Solar Electric	2.62	24.2%	6.39	26.4%
Utility Scale	.20	1.9%	.04	.2%
Wind	2.33	21.6%	3.60	14.9%
Total	**$10.81**	**100.0%**	**$24.19**	**100.0%**

Challenges for 2008 will include the possibility of the expiration of the federal tax credits. Managing differences in opportunity for each utility continues to be an issue, and staff will continue to develop broader opportunities for PGE.

Lori asked what the outlook for PV prices looks like with less expensive technology and additional manufacturers coming online. Peter replied that there are promises of 50% reduction in the cost of modules in the next five years. This may translate into a 20% or less reduction in cost for the end consumer. We are being conservative in our estimates of price decline. Frank added that he does not believe the price of panels will begin to decrease for several years due to increasing demand. By 2010, as new manufacturing facilities get up and running, we may finally see cost declines.

Managing booming expectations for large-scale solar is another challenge staff will face. Interconnection requirements and processes is a concern for all of the programs. The strong resentment of green tag policy by a few potential program participants, including the City of Portland, will continue to test Energy Trust's creativity.

Growth and managing the changes brought by SB 838 will bring their own set of challenges: re-focusing on smaller projects; meeting the needs of new partners requiring more technical assistance; creating new project opportunities; digging deeper in existing markets; coping with longer lead times; filling the need for different financial offers.

Carel said that he likes the balance of program activities and appreciated the overview. Peter replied that he realized that the 1.5% for solar was not mentioned, but it will be a challenge that requires coordination with ODOE.

Jesse asked if solar thermal was on the efficiency side, and Peter confirmed that it is. Thor asked if direct use geothermal is also treated as efficiency, and Betsy confirmed that is the case. Frank said that there is a huge budget increase from 2007, and asked if it is expected that all this funding will be spent in 2008. Peter said that this budget anticipates that all the funding will be added to 2008. This will make 2009 a difficult transition year. The logic is that the money will allow us to make projects happen. It also allows us to take advantage of a good, larger project that crops up in PGE.

Carel said that the Renewable Energy Working Group is considering a regional focus on renewables from an economic development perspective. For example, working with Lake County on a renewable energy plan. Peter said that Energy Trust already partners with the Oregon Department of Economic Development, which has resulted in some opportunities. Adam added that Energy Trust has collaborated actively with a handful of studies that we are co-funding.

Betsy said that there have been discussions about regional workshops for municipalities and counties that would explore economic development.

Jesse asked if the influx of dollars in 2008 would necessitate additional funding for staff. Peter said that there is a position currently open to support commercial activity in solar. A new staff member will be added to the wind program in 2008 as a part of the budget, and we will propose increasing a current half-time position to full-time later in 2008 (if this proves necessary).

Staff will need preliminary budget comments form the RAC by 10/31. The first draft of the budget will be presented to the Board 11/14. Final RAC comments are due by 11/21, and the final budget will be brought before the board on 12/12. The next RAC will focus on staff responses, the 2009 budget, and other budget comments.

4. Public Comments

Carel announced that the Harvesting Clean Energy conference will be held in Portland on Jan 27-29. The website will have the initial program description up soon. Adam added that Energy Trust is a co-sponsor of this event.

Peter clarified that Jesse will temporarily be the official RAC member from RNP until a staff position is filled. Chris Taylor from Horizon Energy is currently a RAC member but has not attended a meeting for 12 months. Policy requires that the RAC evaluate his membership status. Peter added that he would like to extend an offer of RAC membership to Robert Grott at the Northwest Environmental Business Council, Jon Miller of OSEIA, a representative from Enxco and potentially an interested engineer at CH2MHill. The group was supportive. Peter invited additional suggestions.

Peter adjourned the meeting at 11:40 am.