RENEWABLE RESOURCE ADVISORY COUNCIL
Notes from meeting on February 18, 2009

Attending from the Council:
Doug Boleyn, Cascade Solar Consulting
Kyle Davis, Pacificorp
Carel DeWinkel, Oregon Dept. of Energy
Bill Eddie, Bonneville environmental foundation
Thor Hinckley, PGE
Jeff King, NW Power and Conservation Council
Suzanne Leta Liou, Renewable NW Project
Frank Vignola, Solar Monitoring

Attending from Energy Trust:
Dave McClelland
Jed Jorgensen
Pete Catching
Thad Roth
Keith Rossman
Betsy Kauffman
Elaine Prause
Ashley Jackson_

Attending from the Board:
John Reynolds

Others attending:
Diane Broad, Ecofisc
Mark Kendall, ODOE
Mark Osborn, PGE
Pam Sporborg, BPA

1. Welcome and Introductions

Betsy Kauffman convened the meeting at 9:38am. Everyone in attendance introduced themselves. Adoption of the December minutes was pushed to the next RAC meeting. The agenda for the current meeting was adopted without change.

2. Douglas County Landfill Biopower Project

Thad Roth presented a proposed 1 MW project using a third-party ownership model.

Thad stated that there will be more talk at the end of March or April on the Landfill gas energy project. He has been working with the project developers for 5 or 6 months. This is an indication of how long these projects can take.

The Roseburg Landfill is an environmental challenge. This project has a number of advantages that address these challenges.

When on 1-5 going south, you can see the landfill. It started out in the 30 s and was known as a burn dump. The main portion of the land fill is no longer open. There is an expansion that opened in 1999. There are 2.9 million tons of waste in place between the main dump and the expansion.

The majority of the waste is in the main landfill. It will generate methane many years into the future. The expansion to the landfill will close in 2025, but gas production will continue for up to 40 years afterwards, peaking after about 15-20 years. There is an active gas collection system in both sections and improvements to that system will be made with this project.

In 2007, Douglas County led an RFP for beneficial use of landfill gas. The most popular method is to capture methane and generate electricity. There are many landfills across the US using methane for thermal purposes or to generate electricity.

Ameresco (a US corporation) submitted a full application to Energy Trust in August of 2008. Energy Trust is now within a couple of week of a specific deal on an incentive.

This landfill will generate enough gas for a 1 megawatt system. Ameresco operates 12 such system within the US.

The planned expansion of the LFG collection system will increase gas recovery by 150%. Ameresco plans to manage and operate facility for 20 years and will make royalty payment to Douglas county. The project will provide 0.97 aMW of generation, or about 8500 MWh/yr.

Kyle Davis mentioned that it is possible to measure and demonstrate a reduction in methane, creating a carbon offset recognized by many states.

Thad stated that Energy Trust is trying to forecast the value of these carbon credits using standards found with The Climate Trust and the EPA. They have calculators where you can plug in the amount of gas that you will be destroying to calculate the offset.

At the end of the day, this project is small and remote, but the environmental benefits are important. Without carbon offsets, we would support the project at a 12% IRR. There is a cost in verifying carbon credits to the project developer which lowers their effective value.

Bill Eddie said the offset component could be significant. These utilities will be subject to cap and trade in the future. The market is betting these will have regulatory value.

Kyle says if the landfill is large enough, then the offsets disappear because it falls under regulations.

Thad says that offsets are an important issue because we are seeing projects on the agriculture side which also will likely qualify for offsets. Those projects have asked if we will be taking control of the offsets. He thinks we need to have a conversation about that as we may not have thought through all the details.

Suzanne thought this would be a good thing to have on agenda next meeting.

Thad said Energy Trust has evaluated the project s above market costs and has extended an offer to Ameresco. They are reviewing the offer. One challenge is that we need to have security because they are paying us back in tags over 20 years. This comes in the form of a letter of credit. We expect a final decision no later than mid March.

John Reynolds asked if the project will operate 24/7? Are there any opportunities to use the waste heat? That replied that it will operate at a 97% capacity factor but there are no industries close by to use the waste heat.

Suzanne asked about the possibility for other projects like this in Oregon?

Thad mentioned that Metro operates a landfill in St. Johns and there is a thermal application there but there may be an opportunity for generation. There are three other landfills where there are more opportunities, in The Dalles, in Deschutes County, and at Arlington.

3. Telemetry Project

Mark Kendall from Oregon Department of Energy briefed the RAC on a study examining telemetry for projects under 10 MW. The presentation is available on Energy Trust s website.

Mark explained the problem they are working on. He assured the RAC that this is in fact a proper sentence:

> The telemetry hardware, protocols, data structures, reporting and System Control Center requirements for distributed resources (DR) under 10 MW are not standard, substantially increasing variability in cost, data quality, confidence, reliability or security between independent system operators and system control centers.

The projects goals are the following:

> To define standardized DR interface/protocols, naming conventions and data structure(s), monitoring and communication equipment, and system control center reporting.
>
> To evaluate and identify ISO, RTO and SCC concerns, methods, protocols and common elements of data structures, protocols.
>
> To demonstrate four things:
>
> 1) A test-link between PGE and BPA SCC for three DR projects
> 2) A DR performance data-push to BPA Energy Web
> 3) Compliance with FERC/NERC cyber security
> 4) Affordable telemetry equipment and software applications

The project will use conventional DR IO systems and will test radio, cellular, fiber, satellite telemetry systems. They will be installing the telemetry, package software and protocols and believe it should be possible to create a system with significantly lower costs that can provide proven reliable telemetry. They have demonstration sites in Beaverton, Tigard, Hood River, and Echo. They will integrate data at PGE s system control center in Portland and relay real-time data to BPA s system control center.

So far they have signed agreements with three of the four demonstration sites. They also have a list of the telecom equipment they plan to use in their tests. They have contracts in place with BPA and two of the three sub-contractors working on the project.

Telemetry at two sites has already been installed and is confirmed to be working. In addition, the group has completed a survey of system control center operators to understand their needs.

Software to integrate the data is being planned and the data elements are being defined.

Kyle Davis mentioned that Pacificorp is partnering with EPRI on P174 to do the same sort of thing. He wondered if there would be a way to share information so the two efforts aren t duplicative. Mark responded that it was not possible to contract with EPRI on this effort but that information would be shared nonetheless.

Kyle Davis said that just sharing the process would help EPRI improve their results. If Mark runs into problems with EPRI Kyle would be willing to be help out.

Frank Vignola asked if the data will be able to be sent to control centers and seen locally?

Mark replies and states he is doing that for the ODOT project now. You log in and grab the data.

That said, there are agreements with many of these partners because their site specific data is confidential. The ultimate goal is to get manufactures and to put a data port on their inverters, so that everyone can access the same data in the same way.

Dave McClelland mentioned that Energy Trust doesn t allow reporting from inverters because of the lack of standards. But feedback about allowing web based metering would be helpful.

Suzanne is very pleased to hear about the project.

Kyle asked if there was a literature search on equipment? Mark replied that he did a number of searches.

Kyle mentioned how Google just announced their own smart grid effort a week ago. If Mark has done an industry equipment survey, it would be very helpful to share with the RAC. In addition to the results, this survey would be very helpful to include in report.

Marks said that his data is dated not a finished product but it could be pulled together.

Kyle mentioned that 20 companies claim to have this kind product, so it s hard to narrow down what is real and what isn t

Mark feels that many people have web based solutions that are not real yet. They will program anything you want.

Betsy asked if there are plans for taking this info and communicating it down to the people who meet with the utility? Mark said that is the idea.

Kyle said he would get demonstration data. In California, solar systems all start to produce electricity at once and the utilities want to control this system ramp up. Start with one house and then do one at a time to avoid transmission problems.

4. Staffing changes updates

Betsy noted that Elaine Prause is now the Sr. Renewable Program Business Manager. She is very involved in the program design and analysis support role, as well as the interconnection projects.

Steve Lacey is now the Operations Manager. He is overseeing IT, Evaluation and Planning, and Marketing and Customer Service.

Peter is now managing Energy Efficiency and Renewables.

Peter is no longer facilitating the RAC. The RAC has been handed to Betsy and Kacia. Thoughts about the RAC over the next few months will be discussed.

Betsy is now a Sr. Program Manager. She is working with Hydro, Geothermal, Wind all through the Open Solicitation program. Erin, Jed Betsy are now one team. Wind projects are still funded under same guidelines but will become a part of Open Solicitation.

Betsy also explained the organizational redesign effort. Energy Trust is going through a process of taking a good look at how we do business.

It s a three step process:

1) Look at how we do things. Internal process.
2) How we get projects approved.
3) How we process applications for funding.

The goal is to think about who our customers are and how we can best serve even more customers. This means looking at how we are organized and what changes to be made to be most effective.

Kyle Davis asked Energy Trust is doing something about the stimulus dollars. He wondered if Energy Trust would administer these dollars? Pacificorp is being asked lots of questions about the stimulus.

Betsy mentioned that Energy Trust is discussing the stimulus. We need to take a good look to understand where the dollars are going and to see what we could do if our budgets were to increase as a result.

Kyle stated the delivery mechanism isn t clear. Are the monies going directly to state agencies? He suggests that we have stimulus dollars as a RAC agenda item next month.

Mark said stimulus funds are going to come on the energy side in four different areas. One will be low income weatherization money directly through housing and CAP agencies. Another will be the expansion of LIHI as well as loan guarantees.

Suzanne asked who controls the money when it is delivered?

Mark said that Instructions are not clear yet. The State Energy Program spends at their discretion. The monies are for residential, commercial, efficiency and renewables. There is 4.5 billion for the entire country.

The other pool is smart grid money. ODOE has programs where there is already contract authority to transfer money.

Suzanne asked if Energy Trust, given the authority it has, can contract with counties or cities that receive stimulus funds? Could the City of Portland work with Energy Trust to distribute funds?

Pete says that Bonneville and Energy Trust are talking about contracting a limited slice of programs. It is possible that other entities could do the same.

Kyle Davis says Pacific Power wants to partner with Energy Trust on this. He want to make sure we are getting attention and assistance. They are brainstorming and sitting down with PGE and get on the same page. On the EE and renewables side, they see low income housing and schools as being very cost effective projects. Historically, these are areas where they have not been able to provide funding. The projects have been identified, but have never had the dollars to do so.

Carel mentioned that some counties are more prepared than others.

That mentioned that the US Dept. of Agriculture and Forest Service have put up formal requests for project lists, and need answers by Feb 20th.

5. Hydro Resource Assessment

Jed Jorgensen reviewed a hydro resource assessment that was just completed for Energy Trust covering the PGE and Pacific Power service territories.

Over the past several years we ve seen interest in hydro grow a great deal. It s at the point where we have enough experience and think there is enough demand to create a stand alone hydro program separating it from OSP.

To help us think about the design for a hydro program we commissioned this study. We issued an RFP in June of last year and had three companies respond. We ended up choosing to work with Summit Blue consulting which is the same firm that Energy Trust worked with on our Risk Assessment RFP.

We had the study look at the following things:

1. What is the state of hydro technology? Are there any opportunities we are unaware of?
2. What are the cost ranges for hydro projects?
3. Can we get an estimate on how many in-conduit projects are potentially out there to get a sense of the scale of the market? (And I ll come back to why we chose this sector for the resource assessment.)
4. Where is the market at? Is there a functioning market?

The first result we ll talk about is technology. There s more about this in the full report if you are interested in it. The key take home message is that hydro is a mature technology. The key advancements that are happening in hydro at this time are improvements to the efficiency of turbine systems, and the creation of turbine generators that can take advantage of low head sites.

With respect to the new turbines: the areas of improvement tend to be specific to certain site situations, though some package units are starting to be created for array-style installations.

There have also been some improvements on the operation and system integration side. This mostly has to do with new control systems with programmable logic controllers that are easily developed on site or taking advantage of SCADA (supervisory control and data acquisition) systems.

The next result is cost. The consultant s work here reflected what we ve seen with our own participation in hydro projects. It all depends on the site. If you are taking advantage of some existing infrastructure your costs may be considerably lower. But really, the costs are all over the map.

The consultants had started off with the impression that for a typical hydro project 25% of the costs are fixed - based on the equipment and that 75% are variable. But after taking a look at studies examining the cost ranges associated with many different hydro projects they threw that rule out in favor of saying that there is no rule of thumb. Again, this matches what we ve seen in the field.

Project costs fall into four categories: Land costs, Technical services (feasibility, engineering), Equipment, Balance of plant (civil works)

Even though there is no rule of thumb, costs do generally go down as the capacity of the plan increases. There are economies of scale. Anecdotally, operations and maintenance at hydro facilities is often estimated to 4-5% of equipment costs.

We shaped the study to fit some of our existing knowledge about hydro: namely, that different kinds of projects have either relatively short and simple or long and complex permitting requirements.

There are two different permitting tracks for hydro projects. Projects that utilize existing dams or natural water features (run-of-river) are easy up to 75kW, then they get very long and

complex at the state level. At the federal level things are fairly easy up to the 5MW level. There s a big disconnect there. Up to 75kW permitting for a project might last a year. Above 75kW you are looking at more like a 4-5 year permitting process.

In conduit projects where water is already in a pipe with a water right for another use (such as irrigation or municipal drinking water) are relatively simpler. Permitting for these kinds of projects is more like 8 months to a year assuming you ve got all your ducks in a row.

Based on these permitting issues, we tend to think that outreach efforts around hydro are going to be better suited to in-conduit projects. Taking this into account, we had the resource assessment portion of the study focus on these kinds of projects.

There s a quantitative and qualitative part to this resource assessment. We want to know how many potential in-conduit projects are out there. And we want to know what those projects look like, what their barriers and opportunities are.

Summit Blue had Golder Associates, an engineering and environmental services firm with a local office in Portland, put together a GIS map overlaying Energy Trust s service territory with Oregon s Water Rights database.

What they found is that there is a total of more than 25,000 diversions in PAC territory, and more than 15,00 in PGE territory. From this result they did some screening to determine the number of these that deal with enough water to make the resource potentially viable for a project.

For this assessment, since we can t know if these sites have any appreciable head, we re only going to look at whether they are moving a lot of water.

This first part is quantitative. From the total list we want to know how many are potential projects. To do that Golder screened the list to see how many of the water rights out there had an annual allocation for a minimum of 5,000 acre feet of water.

There are a total of 973 permits that meet those conditions. This is really the universe of in-conduit projects that Energy Trust could do outreach to.

So why do we set the floor at 5,000AF? If you use that amount of water evenly over the course of a year, it s equivalent to about 3,100 gallons per minute, or 7 Cubic Feet per Second so this is a fair amount of water.

Now, to give you a sense of scale on how much power you can get out of that amount of water:

- 7 cfs falling 10 feet = ~4.7kW
- 7 cfs falling 100 feet = ~ 47kW

To get up around a megawatt of hydro power you need 170 cfs falling 100 feet. That s 77,000 gallons per minute. At that rate you can fill an Olympic swimming pool in 8.5 minutes. The point here is that if want to generate a lot of power you need a lot of head or flow, preferably both.

Using 5,000 AF as the floor for this assessment is probably pretty good threshold for small projects. There might be some projects that have less flow but have enough head to make power, but the vast majority of the list is not going to have those favorable conditions. So in all likelihood we don t need to look further down this in order to do outreach.

We also wanted to get qualitative results from survey, but we need to reduce the size of the list in order to do that. For the qualitative work we really wanted to get to the cream of the crop. So we did another screen for the water rights that are the oldest and the largest.

Oregon, like most western states, has a first-in-time-first-in-right system for allocating water, and most stream basins in Oregon are over allocated. That means if someone upstream of you has a older water right than you - called the priority date - you may not get your water during low water years. This is big risk for hydro projects, having an older priority date is important to ensure you ll have the water you need to generate.

Doing this they get down to a workable number of targets, 38, to survey for the qualitative portion of the study. From the target list, 35 of the 78 were contacted, and 20 of those responded to a survey either in person or online.

The survey went after these types of information:

1. From the participants it gathered basic information about the individual and his or her organization;
2. There were technical questions used to identifying promising projects at storage sites or in pipes, canals, or other channels.
3. There were project development questions to get information about the individual s familiarity with the resources available to assist in hydro project development and about organizational issues that affect the likelihood that an organization would be able to develop a project.

These are the qualitative results:

We have some opportunities at storage facilities: mostly because they tended to have better head and flow combinations than in-conduit resources we surveyed.

We also learned that the market has a lot of variety in terms of site characteristics: Of nine possible head/flow combinations only one could be used to describe more than 3 of 25 sites. Each of these different combinations requires a different kind of technology this makes scaling difficult for developers if this result is true of the broader market

We also found that there are some potentially good sites out there: North Unit ID, Vale ID, Cities of Corvallis, Coquile, and Adair Village

And there are also some places where it would be worthwhile to try and get more information about the resources the cities of Banks and St. Helens and the Tualatin Valley Irrigation District may have resources worth exploring but they only responded with half of the needed information either head or flow, but not both.

We learned other things about the market from this survey as well:

The survey backed up one fact that we see across almost all of renewables: you have to have a project champion to be successful. That person needs to be not just enthusiastic, but also know what they re doing to some extent they need to be able to coordinate and take over parts of the project development efforts.

The biggest water right holders irrigation districts and municipalities generally lack the internal skills needed to push a project through to completion.

This is especially true among municipalities none of the municipal survey respondents had any internal organizational experience with small hydro development. Irrigation districts were slightly more likely to have some of the necessary skills, but this general lack of experience is one of the key barriers preventing projects from moving forward.

In my opinion, this is one of the most important results of the study. And it is an area where we think we can have an impact.

There were additional barriers as well:

1) There are few hydro experts in the eastern part of the state, where many of the largest water rights holders are located.

2) Projects have long development horizons. Even when permitting is easier most hydro projects take 3-5 years to go from concept to completion. These long timelines make developing an internal champion that much more difficult.

3) Part of the long timeline is created by the state and federal permitting processes. But there is a distinct difference in attitudes about permitting from people who have gone through it than for those who haven t. For respondents that have not gone through the process it is perceived to be very long and arduous. For those that have gone through it well, it s still long but they feel it is an achievable task.

Also of concern is that few counties or cities have appropriate ordinances to allow hydro development. The Swalley Irrigation District project which will be completed this spring - had to get a new ordinance passed in Deschutes County in order to move forward with their project. We expect to see the same thing happen in other counties.

Finally, some types of projects face additional permitting issues. Projects located at aquifer storage and recovery sites where municipalities or irrigations pump water into the ground for use at a later time typically can t receive a permit for hydropower until they ve been in operation for 5 years this significantly adds to the costs of doing hydro at these sites.

The Summit Blue team uncovered some other barriers as well, some of which we re seeing with other renewables, some of which are truly specific to hydro.

Not all water rights are equal. The priority date on a water right is very important depending on how where in a basin a project is located. The bottom line is that if you have a project where there are water users upstream with superior water rights you may be exposing yourself to risk that you won t have water to generate electricity during dry years.

Now with respect to irrigation districts in particular, the seasonality of their water rights can definitely hurt project economics. This is something we ve run into a number of times. There may be some opportunities for some irrigation districts to expand their water rights, but the ability to do is site dependent.

The interconnection process can be daunting and confusing for those who don t have experience with it. The real take home message was that projects need to have an experienced interconnection engineer with them during the process and they need to have an understanding of the scale of the fees and deposits that are involved in the interconnection study process.

Finally, a major barrier appears to be simply that project proponents don t know about all the financial resources that are available to them. This includes knowledge of Energy Trust assistance, knowledge of the BETC, and the PTC. This is an area where Energy Trust can definitely make a difference.

So what opportunities do we see?

The first is something that we pretty much figured going in: The sweet spot in hydro development is where water is already being diverted for another use. The permitting is just much easier at the state and federal level. And if a project can go from concept to completion more quickly its economics are generally going to be better.

The consultants also recommended that there is an opportunity to add hydro during the construction phase of other major capital projects on water systems. This can likely be accomplished at a minimal incremental cost to the whole project. Getting insight into the long range capital project planning stream for potential customers is the big challenge with this idea, but we do have some thoughts about that.

Finally, as I hinted on the last slide, there is an opportunity for some irrigation districts to get year-round water if a combination of factors happen to align. The basic idea is that even if the district doesn t have senior water rights, if it is upstream of any other senior water right holders, and it is able to non-consumptively use the water (meaning generate electricity and then put the water back in-stream) above any senior water right holders they may be able to expand their rights.

So finally, what did Summit Blue think Energy Trust should do? They had several suggestions for short-term activities:

The first is to provide expert assistance to help project proponents navigate the development process. We ve already tried something very similar to this, providing engineering and project management assistance to OIT to help them develop their geothermal resources in Klamath Falls. That experiment has proved to be extremely successful and we re going to be looking at what we can learn from that to create a more standardized way of operating in this capacity.

Next, we need to do outreach about our support for hydro projects. Lack of awareness about project support is a major hole in the market and one that we can easily remedy. We re working on outreach plans to target major water right holders and industry groups.

Summit Blue also suggested that we create a simple road map to the project permitting process. Because the process is so convoluted it is stopping projects from moving forward. They suggest that if we create a road map that breaks the processes down into manageable chunks we can help proponents to help themselves. This is actually something I started working on a little bit last fall and we ll be revisiting that work in the next few months.

Finally, they suggest that to stimulate the market we need to create long-term certainty in our incentives. Summit Blue found that the British Columbia hydro market is well developed and functioning, largely due to a standard price offering from the provinces utility for renewables project.

We know these projects have long time lines. And we know from experience what the effect of uncertainty in federal tax credits does to renewables markets. Summit Blue is reasoning that our incentives have the same impact.

Right now our incentives are a bit of a black box since they are all custom calculations. We re taking a hard look at whether or not it would be possible to create some sort of standard incentive to give projects some idea of what they could expect from Energy Trust. It s a real challenge though. Our experience has been that above market costs for these projects are all over the map there is no rule of thumb. One idea I m kicking around right now is that we might look at a kWh price floor and still offer a custom incentive if necessary. There will be more on this if we can figure out something that seems to be a workable solution.

Summit Blue also offered some long-term solutions, but these are out of the hands of Energy Trust.

It is two things really make the state and federal permitting line up which would basically mean moving the state major permit requirement from 75kW to 5MW and create a centralized permitting clearinghouse for Hydro. This exists to some extent at the state level, but they envision extending that clearinghouse to the federal level as well.

There s no question that streamlining permitting would make things easier, but those kinds of changes are beyond our mission and scope.

Suzanne asked what the primary barrier is for state permitting? Jed explained that there are a lot of environmental studies that need to happen for any project 75 kilowatts or larger.

Kyle said that he believed municipalities and irrigation districts were having trouble financing hydro projects. His understanding is that they don t have access to capital or infrastructure to issue bonds to finance the project. He wonders how much is just lack of familiarity separate from additional incentives? Is there fundamental lack of access to capital? Energy Trust and BETC dollars can help tip a project. Are the project costs too high by themselves?

Jed explained that in Energy Trust s experience irrigation districts have access to cheap capital. Betsy says the municipalities were not looked at in the study, but we understand that concern.

Bill Eddie acknowledged the need to get a BETC pass-through certified before hand.

Jed said we yet to have somebody approach us that have not had the ability to get capital funding. Some may not be coming to us. Or they may decide the project doesn t pay back fast enough. The lack of technical expertise seems to be a bigger problem.

Betsy mentioned the possibility that projects are not getting to our desk.

Kyle asked if it is the nature of the project or education of the developers that is the problem? Will Energy Trust incentives help? What about on-bill financing? Is that something that can help?

Jed said that the lack of technical expertise is the # 1 thing. Power generation is always a secondary purpose for these clients. We need to give them the technical expertise and show them what the resources are. They are not a generator and don t know what they need to know.

6. Public Comments

There were no public comments.

Betsy adjourned the meeting at 12:05pm.