

Renewable Energy Advisory Council Meeting Notes

February 5, 2014

Attending from the council:

Erik Anderson, PacifiCorp
Brittany Andrus, Oregon Public Utility
Commission
Bruce Barney, Portland General Electric
Alishia Dunlap, Pacific Power
Matt Krumenauer, Oregon Department of
Energy
Frank Vignola, University of Oregon
Dick Wanderscheid, Bonneville
Environmental Foundation

Attending from Energy Trust:

Jackie Callahan
Fred Gordon
Hannah Hacker
Jennifer Hall

Jed Jorgensen
Betsy Kauffman
Dave McClelland
Dave Moldal
Elaine Prause
Thad Roth
Gayle Roughton
Peter West

Others attending:

Bill Eddie, One Energy Renewables
Thomas Farringer, Oregon Solar Energy
Industries Association
Wendy Koelfgen, Clean Energy Works
John Reynolds, Energy Trust board of
directors

1. Welcome and introductions

Betsy Kauffman called the meeting to order at 9:30 a.m. and reviewed the agenda. The minutes from the November meeting were approved. The agenda, notes and presented materials are available on Energy Trust's website at www.energytrust.org/About/public:meetings/REACouncil.aspx.

2. 2013 wrap-ups and look ahead for each technology

Thad Roth presented sector-wide 2013 preliminary annual results. Energy Trust 2013 annual results will be published April 15 in the annual report to the Oregon Public Utility Commission. The results presented at today's meeting are preliminary and reflect the best data available at this time. Any changes to these numbers are expected to be minor. The 2013 results are the last to include conservative and stretch goals. Beginning in 2014, Energy Trust will track progress toward a single goal.

The renewables sector achieved 72 percent of its conservative goal for 2013. This represents projects completed in 2013. It excludes funding commitments to projects that will begin generating power in future years. Biopower projects were the largest producers of generation brought on line in 2013.

Renewable energy projects in 2013 achieved 1 average megawatt in Pacific Power territory and 1.87 aMW in PGE territory. The conservative goal was 4 aMW. A number of projects on the non-solar side anticipated to complete in 2013 have been pushed out to 2014 or 2015. Three non-solar projects fell into that category. At this time one of those projects is expected to complete in 2014. Two other projects face significant challenges. These projects account for the difference between the 2.87 aMW achieved in 2013 and the 4 aMW goal.

Staff members presented the background and current status of each technology, and provided a look ahead to 2014.

Jed Jorgenson presented activities supporting hydropower projects. Energy Trust enabled 11 hydropower projects to come on line, most of which were irrigation district projects. Another five projects are currently moving forward. Not all projects represent new capacity. In some cases a pipe is added to increase generation. As the program has progressed, costs have risen, a reflection of the changing marketplace.

Bruce Barney: Does a dedicated project refer to something in progress that will eventually complete?

Jed: Yes.

Bruce: So construction on some dedicated projects may not have started?

Jed: That is correct.

In 2013, one project reached commercial operation, and commitments were made to four installations in Pacific Power territory. Six project applications were reviewed, including phase two of Central Oregon Irrigation District, Warm Springs and others that previously were reviewed by the Renewable Energy Advisory Council. Another of the projects was the City of Astoria. This project ran into some fish passage issues in the past. Energy Trust was part of the group that worked on resolving those problems, enabling this project move forward. Project development assistance was provided at 10 sites and these represent the pipeline now.

Looking forward, although market fundamentals continue to be poor, hydropower projects can still be viable. The technology has capacity factor advantages. For example, some projects can access winter water flows and run year-round. Grants are available, especially for projects with water savings. Low-interest financing for municipal projects is available through the Oregon Department of Energy. Bonneville Environmental Foundation is working with Farmers Irrigation District on a new financing approach in which farmers finance part of a project. If enough participate, the farmers can see a return on that financing as a reduction in payments to the district for their water. If successful, this approach might be applied to other types of projects.

The program will target two of the six opportunities for hydropower in Oregon. The top priority is irrigation canal pressurization. This is the easiest pathway is for hydropower projects, because irrigation districts have the most potential for financing and grants. A secondary priority is pressure reduction valve replacements. These typically are municipal projects, which face greater challenges. Other opportunities include non-powered dam retrofits, upgrades at existing small hydropower facilities, aquifer storage and recovery systems and micro-hydropower on natural streams. The program is open to these types of projects but is not targeting them.

Plans for 2014 include more work in the field, as 2013 did not allow for that. The main focus for the year will be on building the pipeline of potential projects. Work will happen with Bonneville Environmental Foundation and Farmers Conservation Alliance around outreach to possible irrigation projects, using past projects and the Farmer's Conservation Alliance study done in 2013 to provide more information and highlight benefits of hydro.

John Reynolds: Roughly how many possible projects are in the municipal category?

Jed: There are quite a few. The City of Portland has one in northeast Portland. The City of Astoria has a project. Bonneville Environmental Foundation is moving forward with a project in

the City of Corvallis. There also is some opportunity in the City of Joseph. We will press harder this year on the municipal opportunities.

Peter West: It is a struggle from a customer perspective to deliver potable water for consumption. They must have a fail-safe system. When you talk about electrical generation, you have to start at the very beginning. You have to find the opportunities to connect to the grid right there and you have to go from underground to above ground, then it's electricity and water so there's even a psychological conversation around this. It seems basic to us but you really have to bring the customer along.

Jed: The operating examples that we now have will be helpful in those conversations.

Betsy Kauffman addressed geothermal technologies. One geothermal project has been funded so far, at the Oregon Institute of Technology, OIT. This was a 280 kW system, and the project is going very well. A second project at OIT—1.5 MW—was in the 2013 budget for completion but shifted to 2014, which is a major reason why the sector did not meet its generation goals. There is additional activity going on in Oregon, with no Energy Trust involvement, that helps the climate for geothermal. This includes a project by U.S. Geothermal Inc. in eastern Oregon that is selling power to Idaho Power and a project by Sunrise Valley Electric Co-op in the Paisley area. In 2013, Energy Trust did a study in the Paisley area with the same family as this project. They have some U.S. Department of Agriculture funding and some project development assistance funding from Energy Trust, but that is the only the beginning of the analysis that needs to happen. Energy Trust has also committed to two studies in the Klamath Falls area.

Looking ahead to 2014, we are seeing the same challenging fundamentals as the other technologies. Low avoided cost rates make it very hard for projects to pencil out. Some unique challenges for geothermal include the fact that it is an expensive technology. The risks and costs are all upfront; a lot of money is required just to prove out the resource. However, it also has some strategic advantages such as a high capacity factor and occasional U.S. Department of Energy funding.

Energy Trust is offering project development assistance in larger chunks—up to \$150,000 for larger projects through a competitive process and up to \$40,000 through a noncompetitive process. This is proving to be popular and is catching the attention of geothermal developers. Although this support represents a small portion of a developer's overall costs, it helps developers to leverage other funding. Completion of the larger OIT project will also be a great opportunity to learn the actual costs of a project. The strategy for this technology is to remain opportunistic.

Betsy Kauffman next addressed small wind activities. Energy Trust's first small wind turbine was installed in 2006, and a small wind initiative was rolled out in 2008. Since then, a range of turbines have been installed from 1.5 to 225 kW, most of them in the 10 to 20 kW range. Capacity is almost 700 kW and generation is about 0.1 aMW. Incentives total about \$1.2 million.

The Small Wind Certification Council is up and running, certifying turbines to specific standards. There are 300 or so manufacturers of small wind turbines but only about 15 have been certified. Certification by the council doesn't speak to company business practices. In general, installations are down about 50 percent. We can speculate as to why, but we aren't certain.

There was some decline in the program in 2013. Three turbines were installed, and some project development assistance was provided. Energy Trust continues to market

throughout the service territory. The Anemometer Loan Program is no longer available. Additional changes include new developers and new buying opportunities. United Wind and XZERES Wind are rolling out leasing programs similar to the SolarCity model, in which the customer pays a certain amount of money each month. The customer does not own the turbine but gets the benefits. This approach has the potential to renew demand. Moving forward to 2014, a 50 kW turbine will go up in a few weeks with Umatilla Tribe. There will be a trade ally training during this installation as well. This year Energy Trust will take a hard look at the small wind program to see how it's going and whether adjustments need to be made.

Bruce: Is that 50 percent decline in installations just in the small wind category?

Betsy: Yes.

Bruce: And what delineates small wind?

Betsy: I consider a small wind turbine to be up to 250 kW. Some small wind programs include up to a 1 MW turbine, but we don't feel that the larger turbines work in a standard program. This statistic probably includes turbines up to 1.5 MW.

Bruce: Are the 300 manufacturers you mentioned working globally?

Betsy: Yes.

Bruce: Do we have any manufacturers in the Northwest?

Betsy: Yes, XZERES, but they most of their sales are in the United Kingdom.

Bruce: Are they certified?

Betsy: They have a limited certification. They are certified in the U.K. The small wind certification takes that as a "limited" certification, but they have not achieved full certification yet.

Bruce: Does Energy Trust have a certification requirement?

Betsy: Yes, we have made an exception for XZERES. We require not only certification but listing on the Interstate Turbine Advisory Council, which also considers business practices.

Frank Vignola: Why did you end the anemometer program?

Betsy: There were a lot of reasons. Initially we thought we could erect this equipment, let someone gather data for a period of time and then move the device to another location. As it turned out, the costs of refurbishing and moving the equipment were almost as high as buying new equipment. Energy Trust typically does not own equipment, so the program just wasn't a good fit. Also, we initially thought that the biggest barrier to community wind projects was a lack of data, but found there were other market problems as well. We were spending a lot of money to address a secondary barrier. If someone wants to install an anemometer, we share the costs.

Matt Krumenauer: Are United Wind and the other companies providing their own capital for the leasing programs or working with financing programs?

Betsy: I know United Wind has gotten significant funding from outside investors, which speaks well about the finance community's confidence in the company. I think XZERES did as well but I'm not sure about its source.

Dave Moldal addressed biopower activities, focusing on biogas and excluding two woody biomass projects. In total, the program has provided about \$11 million in incentives, with anticipated generation of about 63,000 MWh. The first cogeneration project was supported in 2005 at the Gresham Wastewater Treatment Plant. To date, Energy Trust has supported six projects at five wastewater treatment plants, three projects at dairy digesters, one food processor project and one merchant biogas project.

Two projects reached commercial operation in 2013. The JC-Biomethane project in Junction City achieved commercial operation in September. It is running smoothly and

almost at full capacity. The second project to achieve commercial operation was the Farm Power Misty Meadows dairy digester in Tillamook. It is delivering power through Tillamook Public Utility District to Pacific Power. Last year, incentives were approved for two biopower projects using anaerobic digestion: the City of Gresham for expansion of its cogeneration system and Clean Water Services for an expansion of the cogeneration system at its Durham Advanced Wastewater Treatment Plant. Last year also was the first full year of generation for both the Pendleton Wastewater Treatment Plant and the Medford Wastewater Treatment Plant. In addition, the Forest Glen Oaks dairy digester achieved its target generation for a second incentive in 2013.

As with the other technologies, there are some challenging market fundamentals for biopower. The program sees the greatest opportunity with net-metered biopower projects at wastewater treatment plants, which can benefit from co-digestible high strength organic waste tipping fee revenue and increasing generation to offset plant load. This year, we will provide project development assistance for a pre-design study at Klamath Falls Spring Street Wastewater Treatment Plant. Energy Trust also intends to support a fats, oils and greases, FOG, market assessment and an anaerobic digestion case study.

Bruce: Did you say Salem was doing an expansion?

Dave Moldal: The Salem Wastewater Treatment Plant has a great opportunity to expand its cogeneration system.

John: Do you try to find markets for the projects that are producing excess hot water?

Dave Moldal: That is an opportunity that we haven't promoted yet.

Thad: In most cases, project operators are using heat from the cogeneration engine to heat the digester, so part of the energy being produced is used there. I think wastewater treatment plants use some, if not all, of the waste heat as a standard operating practice.

Dave McClelland addressed the Solar program. Incentives were reduced by about 50 percent in 2012, which reduced the pipeline for 2013 and impacted contractors. They had to scale down, and it is not easy to scale back up. There were 880 solar electric projects and only 73 solar water heating projects in 2013. A total of \$4.3 million in incentives were paid. Over the past 10 years, Energy Trust has supported more than 6,000 solar electric projects and 1,400 solar water heating projects with a total of about \$69 million in incentives.

The decrease in incentives in 2012 depleted the pipeline for 2013, and the first quarter was the worst in about four years. Activity began rebuilding in 2013 and finished strong. The residential market has shifted toward third party ownership models, beginning in 2011. This shift expanded the market and added additional customers, particularly in PGE territory and the Portland market. This drove dramatic growth in 2011 that was not sustainable at the incentive rate at that time. In 2012, more projects were installed than applications received. Through cost reductions, the market did increase in 2013, even though there wasn't a residential incentive increase last year. Q4 2013 was the second best quarter in solar activity since the beginning of 2011, and there is still some room for growth. Q4 2013 cost us half as much in incentives as Q4 2011, the only higher-performing quarter. While this activity suggests the effectiveness of lower incentives, many smaller contractors in PGE territory are having difficulties sustaining their businesses. The new incentives are targeted to them.

Commercial solar has been a similar story, but the rebound has been much slower. In Q1 2013, more incentive dollars were cancelled than new dollars reserved. Because of

this, incentives were raised in both PGE and Pacific Power territories, and a good response was noted in Q2. In Q3, activity leveled off again. Energy Trust increased the PGE business incentives a second time in October; they are now almost back to where they were before the reductions in 2012. As Oregon no longer offers a Business Energy Tax Credit, projects have access only to federal tax credits, federal depreciation and Energy Trust incentives. Some grants and other opportunities for funding are available, particularly in Pacific Power territory, and account for much of the activity in that area. The program began 2014 with a much stronger pipeline than it did in 2013.

Market barriers include a lack of awareness and feelings of missing out on a good deal. A commercial solar market assessment is in review and has led the program to shift to more targeted marketing. A targeted marketing campaign last fall produced a number of leads. Costs are continuing to come down, more so for commercial installations than for residential projects, which have been hovering under \$5 per watt. The program is optimistic about prospects for 2014.

Bruce: I wasn't aware that there was differential in residential incentives based on ownership.
Dave McClelland: Yes, we increased incentives this year but only for direct-owned projects in PGE territory. We found some additional above-market costs for direct-owned systems. In Pacific Power territory, we don't have room to move up our residential incentive but we did increase the incentive cap.

Frank: What is the range in solar prices?

Dave McClelland: For residential solar, we have few contractors that are in the \$6-7 per watt range and some down to around \$3 per watt, so the range is wide. The average is about \$5. For commercial solar, we do some have economies of scale. Small projects are comparable to residential prices but larger projects can be in the \$2-3 per watt range.

The federal government has aggressive goals for price reductions. They would like to bring costs down to \$1 per watt by 2020. For utility scale projects, the goal is \$1 per watt. Trends we notice suggest the goals may be reasonable. Most of the cost reduction has been driven by lower module costs. The non-hardware costs haven't changed much over the last five or six years. Soft costs have become a bigger portion of the overall costs, and that is where Energy Trust is focusing. If we want to continue expanding our program with a flat budget, we have to be able to reduce incentives over the next few years. To do this, we are increasing our focus on soft cost reduction.

Last year was difficult year of rebuilding. We were down one staff person for the entire year. I started as the program manager in May, Gayle was hired in August, Jennifer was hired in December and we just hired a new assistant. We have revised roles with a functional focus that aligns with the areas of soft cost reduction we are targeting. We also have the opportunity to develop some longer-term plans for our program, aiming for greater market stability. We have a stronger pipeline and customer interest, suggesting 2014 could be a very good year. We have set aside \$1 million for larger projects available through a competitive process.

Erik Anderson: Do you have any thoughts on why commercial pricing seems to be equivalent to other states but residential pricing hasn't reduced as much as it has in other states?

Thomas Farringer: The average system size disparity from residential to commercial would be my guess.

Dave McClelland: I think soft costs are a big part of it right now.

Peter: What are permit costs in the other states?

Thomas: Significantly lower. The City of Portland has high permit rates.

Jennifer Hall: City of Portland costs are more than twice those in other areas.

Dave McClelland: A lot of our projects are in the City of Portland.

Fred: Has the feed-in tariff affected your results?

Dave McClelland: The tariff has had a big effect on consumer interest. In particular on the commercial side, the feed-in tariff has attracted more activity. The pilot program is ending this year, so activity may shift back to seeking Energy Trust's incentives.

Bruce: At the end of 2013, the PGE average net metered site is over 5 kW.

Dave McClelland: In particular with third party systems, we are seeing very large systems going in and the average system size inching up. With direct-owned systems, there is only so much that the customer is willing to bite off.

Peter: How does the average net-metered Energy Trust size compare to feed-in tariff average size?

Bruce: The feed-in tariff average size is much bigger. I don't have the exact number; I think the average is 7-8 kW.

Frank: Do you ever think about working with community solar projects?

Dave McClelland: Yes, there are a lot of models for community solar projects. The City of Portland has Solar Forward, for example. At this point we haven't seen a model that we think is going to take off in Oregon, so we haven't put our weight behind any. We are open to the community approach and are keeping our eye on it. A lot of customers can't put a solar system on their own roof, so I think there is demand and interest in community ownership.

Thad: Just a reminder, Energy Trust is focused on our standard solar program and a range of other technologies. The budget reflects this focus and has been endorsed by the OPUC. If we have some unallocated funds in the second half of the year, there may be opportunity to fund something more unique like a community solar project, but the approved budget does not provide for this.

3. Energy Trust Strategic Plan update

Every five years, Energy Trust engages in a strategic planning process. Elaine Prause gave an update on the organization-wide process.

Elaine: We are looking for feedback from members of our advisory councils at different points in the process of writing a new strategic plan. Strategic planning is a requirement of our grant agreement with the OPUC. We must produce a plan at least every five years. The last plan was developed in 2009. That strategic plan produced some big changes. Responding to SB 838, the plan shifted our mandate to support new renewables under 20 MW, while utilities could now provide additional funding to acquire efficiency within their integrated resource plans.

The strategic plan must have a mission. We aren't sure yet if this plan will change our current mission in any way. We also must have goals for what we think we will achieve in the next five years and strategies for how we will achieve these goals. We also must seek input on this plan, including yours. Energy Trust's board of directors is leading this process, with staff supporting the process.

The process started last June. Since then we have been gathering information and trying to flesh out the critical challenges. We are creating a draft plan that will be

discussed by the board at its annual retreat in June. We will engage in outreach over the summer and hope to finalize the plan before our budget and action plan process in the fall. We hope to seek Renewable Energy Advisory Council and Conservation Advisory Council review of strategic issues and priorities in March or April meetings. In June, we will review the draft plan with the advisory groups and gather comments over the summer.

Betsy: This is an early look at strategic issues for the renewables sector. We are considering whether our overall approach is optimal, given current and expected market challenges. Our approach has been to offer a set of standard incentives while supporting a portfolio of technologies and growing projects through project development assistance. Does this approach still work? Should we offer more information and technical assistance in addition to financial assistance? Does the portfolio treatment still make sense?

Our overall strategy will be affected by Oregon's decreasing support for distributed generation. We are examining prospects for increased renewable generation over the next 10 years. Market conditions have changed from the situation five to seven years ago, when Oregon was expanding the Business Energy Tax Credit and enacting the Renewable Portfolio Standard. We will look at the potential for distributed generation on a statewide level and whether that vision will expand to other states. How do we continue to move projects forward in Oregon when companies may decide to do business elsewhere?

Elaine: For energy efficiency, we think the plan will look quite different than our last plan. It will be challenging to maintain growth at the same level of acquisition. What would our business model impacts be if the resources decline? We can also seek new resources. There are a lot of choices for new markets and new visions. An outside-the-box option could be an expansion of our goals, perhaps adding a greenhouse gas reduction goal or an economic development goal. A third-party contractor did a benchmarking study to see what organizations similar to Energy Trust are doing. Many of these organizations have different goals, such as lowering greenhouse gases. Do we need a 10-year vision; is a five-year focus too limiting? If we set a 10-year vision, we can establish goals for the short term that support reaching that longer term vision. As we are in the beginning stages of planning, many options are available to consider.

Frank: I think that what Energy Trust does is a subset of a much bigger picture. It is important to bring in the utilities and government agencies to figure out where we're all heading in terms of energy and uses. Then Energy Trust can figure out the role it can play. Without a bigger picture, you aren't going to see what you should be doing. You could consider bringing together some other players to encourage the Northwest Power and Conservation Council to set the overall agenda for what we want to achieve in the Northwest and consider how Energy Trust fits in. How do we achieve sustainability with a system that can grow as our energy needs grow?

Elaine: That is a great point; we keep coming back to that. The 10-year energy plan was a good starting point, but we wish things were a lot clearer. We will consider what we can do to affect that discussion.

Matt: I was going to offer a similar thought. It seems like a good time to be going through this effort. At the same time as your strategic plan, the seventh power plan is in development, the Oregon Department of Energy is doing a strategic plan and so is Northwest Energy Efficiency Alliance. The utilities are developing Integrated Resource Plans. There are also regional transmission and grid issues we are encountering. It seems like a good time for Energy Trust to

be aware of this bigger context. I can take this thought and come back to you with suggestions for how we can be informed by your efforts and vice versa.

Betsy: What is the timing for the Oregon Department of Energy's strategic plan?

Matt: Originally December 2013, but it's in progress now.

Thad: We have done some outreach to the utilities and the state.

Fred: We are thinking about how this strategic plan can support state policies. If the state wishes to go in a certain direction, then how could we help? We have an on-the-ground view on what it takes to get there, but someone else needs to say where the state wants to go.

Public comment

No public comment.

4. Meeting adjournment

Betsy thanked the council members for their participation and adjourned the meeting at 11:34 a.m. The next full council meeting is March 12, 2014.