Renewable Energy Advisory Council Meeting Notes

October 25, 2017

Attending from the council:

JP Batmale, Oregon Public Utility Commission (by phone)
Michael O'Brien, Renewable Northwest
Frank Vignola, University of Oregon
Dick Wanderscheid, Bonneville Environmental Foundation
Erik Anderson, Pacific Power
Les Perkins, Farmers Irrigation District
Suzanne Leta-Liou, SunPower
Kendra Hubbard, Oregon Solar Energy Industries Association
Mark Bassett, Oregon Public Utility Commission
Adam Shultz, Oregon Department of Energy

Attending from Energy Trust:

Jed Jorgensen
Joshua Reed
Rachel Wilson
Judge Kemp
Dave McClelland
Dave Moldal
Susan Badger-Jones
Hannah Cruz
Betsy Kauffman
Lily Xu
Zach Sippel
Amber Cole
Fred Gordon
Peter West
Jeni Hall
Matt Getchell

Others attending:

Alan Meyer, Energy Trust Board of Directors
John Reynolds, Energy Trust Board of Directors
Jason Zappe, Portland General Electric
Marc Thalacker, Three Sisters Irrigation District

1. Welcome, Introductions and Updates

Jed Jorgensen convened the meeting at 9:30 a.m. The agenda, notes and presentation materials are available on Energy Trust's website at: https://www.energytrust.org/about/public-meetings/renewable-energy-advisory-council-meetings/.

2. Opal Springs Hydro Project

Dave Moldal, renewables senior project manager, presented on a revised Opal Springs hydropower project. This project was presented to the Renewable Energy Advisory Council last summer. It is an existing 4.3 megawatt run of the river hydropower facility located in the lower reach of the Crooked River. The owner is the Deschutes Valley Water District. The project presented to Energy Trust a year and half ago called for the installation of Obermeyer weirs, which would have resulted in a six-foot increase in the height of the pool. The previous project would have yielded about 3,200 additional megawatt hours of generation annually. Energy Trust board of directors approved a $750,000 incentive last October. Thereafter, the District received construction bids that were far higher than they budgeted.

Jed Jorgensen added that Energy Trust previously executed an agreement with the District; however, the District needed to revise the project's design and has now reapplied for an incentive.

The Opal Springs project is primarily a fish passage project. Raising the pool height by three feet to accommodate the fish ladder will increase the hydraulic head of the hydropower project and therefore increase annual average generation. Given anadromous fish in the Deschutes watershed and lack of fish passage at the existing Opal Springs dam, this project was designated as Oregon Department of Fish and Wildlife's number-two ranked fish passage project in Oregon.

The District has been very successful securing fish passage related grants including grants from the Oregon Department of Fish and Wildlife, Oregon Watershed Enhancement Board, and two weeks ago from the Oregon Water Resources Department. Almost 50 percent of their total capital cost is covered by external grants. Staff did not include those grants in the above market cost modeling because they were related to fish passage.

Staff is proposing an incentive of $450,000 in two installments, one at commercial operation and one a year later given a generation threshold. In exchange, Energy Trust will request 100 percent of the renewable energy certificates, or about 20,200 delivered over two years. This project delivers renewable electricity to Pacific Power. The proposed incentive equates to about $3.9 million per average megawatt.

John Reynolds: What are they actually doing to the dam?
Dave Moldal: They will not install the inflatable Obermeyer weirs across the face of the rock fill dam. They plan to install flashboards.
John Reynolds: Is the pool raise permanent?
Dave Moldal: Yes, it is permanent. New flashboards will span the crest of the dam. Most of the redesign work was related to the fish ladder. The three feet of additional pool height is to accommodate the geometry of the fish ladder.

Jed Jorgensen: One other point in terms of process for this project and the next one is that for any project with an incentive less than $500,000 staff has the ability to dedicate funds to the project using our internal process. Such projects are brought to the Renewable Energy Advisory Council on an information basis. The third project you will hear about today crosses the $500,000 threshold and we are looking for feedback before we take that project to the Energy Trust board of directors for funding approval.

Frank Vignola: How does it compare to last year's incentives?
Jed Jorgensen: The incentive was $750,000 as approved by our board of directors last October and this one is $450,000.
John Reynolds: Is it less generation, too?
Dave Moldal: Yes. The expected incremental additional generation decreased from 3,200 megawatt hours per year to 1,010 megawatt hours per year.
John Reynolds: So what is the comparative cost per megawatt hour for our incentive?
Dave Moldal: It increased from $2.0 to $3.9 million per average megawatt.

Michael O'Brien: How does the incremental increase in average annual generation compare to its total average annual generation?
Dave Moldal: The range of generation from the Opal Springs hydropower project over the last 25 years is between about 26,000 to 36,000 megawatt hours per year. The project averages approximately 29,000 to 30,000 megawatt hours. This project is projected to add an additional 1,010 megawatt hours.

Les Perkins: I am curious about the incremental cost increase between the three-foot and six-foot pool raise. It is $10.7 million now, and was $12 million for the full six-foot pool raise.

Dave Moldal: The low bid for the original project was about $12 million last year. They completely redesigned the project, lowered the pool raise to three feet, and the cost decreased to about $10.7 million.
Jed Jorgensen: I think it was a bridge too far for the district to go out for the additional funding.

3. Three Sisters Irrigation District Watson Hydro Project
Dave Moldal presented on a proposed Watson hydropower project proposed by the Three Sisters Irrigation District. The project is a result of Energy Trust's irrigation modernization program. Dave introduced Marc Thalacker, general manager of the Three Sisters Irrigation District, who submitted this installation incentive application this past spring. The overall purpose of the project is to capture renewable energy from existing water flow and pressure and to serve as a demonstration project. The project will use up to 20 cubic feet of water per second and generate approximately 800 megawatt hours of renewable energy annually.

Jed Jorgensen: Three Sisters is one of the early adopters of irrigation modernization. They have been working on piping their canals and laterals for many years. The irrigation district has about 60 sites where additional on-farm hydropower is possible. They are the furthest along in the Deschutes watershed in terms of pressurizing their irrigation system. The 'demonstration" aspect of the project is to provide their members with the opportunity to see and touch four different on-farm scale turbines in operation, which can operate under different flow and head conditions. There is a lot of value in being able to show the hydropower equipment in operation.

The project has very little or no permitting risk. This project intends to sell generation to Portland General Electric. They are in Central Electric Co-op territory and will need to wheel the renewable electricity to Portland General Electric.

Alan Meyer: Since this is a demonstration project and other folks will be coming in and looking at it, are the turbine manufactures contributing financially since it will help them sell their product?
Marc Thalacker: When we first received turbine bids from everybody, they all came in at about $100,000 to $125,000 per turbine. I sent it back to them and pushed them down to the $20,000 to $40,000 range. We were able to get things down to a reasonable range in terms of costs. Bringing in Energy Trust allows us to go to high-efficiency turbines with HydroTek and really show the other districts there is an opportunity install and operate small turbines. There is significant potential throughout the state.

Dave Moldal: From our modeling, we determined this project needs about $400,000 in additional revenue to reach a sub 20-year pay back. For Three Sisters Irrigation District, this is acceptable. This project has significant non-energy benefits.

John Reynolds: Is one of the advantages of having four turbines that in conditions of reduced flow, you can run one turbine efficiently and shut down the others?
Dave Moldal: Our understanding is that the HydroTek 150 kilowatt turbine will be the workforce in this project and will be generating most of the megawatt hours. There is sufficient flow and of pressure to operate all the turbines. They can be turned on and off as they wish.

Jed Jorgensen: Another aspect of the demonstration project is to assess the long-term operation and maintenance of those four turbines. Documenting this information will give farmers a sense of how the turbines will operate on their land; so there is some long-term learning that can come from that. There are not many relatively small nameplate turbines installed and operating in Oregon.

Les Perkins: Most irrigation districts tend to be pretty conservative how they approach similar projects. Having a facility where you can look at multiple types of turbines and sizes is invaluable.

We get irrigation district operators and managers from all over the western United States coming to our hydropower plant because they want to see and touch the turbine and gain a better understanding.

4. Three Sisters Irrigation District McKenzie Hydro Project

Lily Xu, renewable energy project manager, presented on the McKenzie hydropower project. Jed detailed the turbine efficiency estimates. Lily provided background on the project, including its water benefits, and pointed Renewable Energy Advisory Council members to the project briefing paper online. This project will wheel power to either Portland General Electric or Pacific Power, we should know within the next six weeks or so.

Michael O'Brien: Did the budget originally have a contingency built into it?
Jed Jorgensen: No.

Erik Anderson: Does the $1.4 million include the 5.5 miles of piping?
Jed Jorgensen: No. The piping cost $10 million and are already in the ground, funded by other grants.

Jed Jorgensen: Our incentive is spread out to help the project cash flow during the low years of the power purchase agreement. We are bringing this project to our board on November 8 following an internal review and your feedback.

Erik Anderson: Since you do not have a designated utility yet, what is the risk of additional changes to avoided cost prices? When does a power purchase agreement need to be in place?
Jed Jorgensen: The district is trying to move forward as quickly as possible.
Marc Thalacker: We are in negotiation with Portland General Electric right now. We have a draft power purchase agreement. We are not that far from being able to execute it.
Erik Anderson: While it is sort of up in the air, it is looking like Portland General Electric will be the purchasing utility.
Marc Thalacker: Yes, it is complicated. This is a double wheel. Going through Central Electric Co-op and then Bonneville Power Administration up to Portland. This is not the best of all worlds but I will point out that Bonneville's monthly wheel per megawatt is $1,800 and for Central Electric Co-op to go 20 miles is $6,200.

Suzanne Leta-Liou: Could you compare the incentive cost per average megawatt to solar?
Jed Jorgensen: The previous hydro projects were $3.9 million per average megawatt, this one is $6.1 million.
Dave McClelland: Right now commercial and residential solar are approximately $4.5 million per average megawatt. Next year the average will go up for residential to something more like seven or eight million per average megawatt on average. It is changing because the residential energy tax credits are going away.

Les Perkins: Is that cost figured as capacity or production?
Jed Jorgensen: It is production, generation value.

Frank Vignola: What are some of the additional benefits?
Jed Jorgensen: When you pipe an irrigation canal you pressurize the water which eliminates the need for farmers to pump water out of canals. You get an energy savings component. You also eliminate seepage and evaporation; typically, between 20 percent to 50 percent of water is lost on the way to delivery. That water has tremendous value. That is why Marc is able to get grant help in piping up that five miles. This project will put another seven cubic feet of water per second permanently back into Wychus creek. They will have restored 30 cubic feet per second for a stream

that previously went dry every summer, which has enabled them to reintroduce steelhead back into that watershed. The district will see operations and maintenance benefits as well in terms of not having to fish shopping carts out of the canal or use herbicides. What we have also seen in Marc's district is that there is a lot of economic reinvestment in the local community. With the pressurized water, farmers are saving money and starting to plant higher value crops.

Alan Meyer: There is also have benefit to the farmers themselves. It changes the economics in the region. It adds resilience so districts can get by with half as much water as they did previously.

Marc Thalacker: The water is also colder. From a temperature standpoint, we have been able to bring the temperature down from 22c to 18.5c. We are almost close to 303D compliant. From an endangered species point of view, Wychus creek historically was a key spawning stream for steelhead and Chinook salmon and is a key part of Portland General Electric's reintroduction program. The last time steelhead and salmon swam through Sisters was 1885. We expect to see them back in about five years. Historically, we had 2,000 steelhead spawners and now there will an additional 18 miles of spawning and rearing habitat.

Suzanne Leta-Liou: I do not see the utilities' voluntary program fund being utilized here. Is there a reason for that?
Marc Thalacker: We did not apply for the program funding.
Jed Jorgensen: Sometimes timing is an issue.
Betsy Kauffman: It is a competitive process and it is a robust competition.
Suzanne Leta-Liou: But otherwise it would have been offered?
Jed: Yes, otherwise it could be utilized.

Michael O'Brien: Are there any milestones before the commercial operation date when they get that lump sum? After that, are the funding milestones purely based on generation targets?
Jed Jorgensen: There is not too much left. Marc, do you need to go your bank once you have the power purchase agreement to get a construction loan?
Marc Thalacker: No, we have clean water state loan funds for construction.
Lily Xu: They took out a loan from the clean water state revolving fund and that is a big chunk of where they will get their capital. Our incentives will help to pay back those loans and then for the five years after that, it will help their cash flow.

Jed Jorgensen asked for the sense of the Renewable Energy Advisory Council on the project. All RAC members were supportive.

5. Draft 2018 Budget

Peter West presented Energy Trust's draft 2018 annual budget. In 2017, Energy Trust expects to exceed energy savings for three electric utilities. A large megaproject will bolster savings in Portland General Electric territory. Shortfalls for two gas utilities are expected due to project delays and a strategy to delay savings per NW Natural's request. Energy Trust also expects to exceed its renewable energy generation goal, with strong standard solar demand and completion of two large-scale solar projects. We also expect Northwest Energy Efficiency Alliance to exceed its 2017 goal.

Peter noted that action plans for programs and support groups will be included in the draft budget available on November 1, 2017. Feedback is requested by November 17, 2017.

Dave McClelland mentioned that the August Renewable Energy Advisory Council session was helpful in guiding the Solar program budget. Staff will continue balancing residential and commercial solar incentives and communicating as often and as early as possible with stakeholders. We heard

we need to support the market in non-incentive ways and to support wider adoption of solar among moderate-income customers.

Dave McClelland noted that next year Energy Trust is taking a more custom path for commercial projects. That will give an opportunity to remove caps or restrictions and look at individual projects based on the additional benefits and values a project brings compared to the incentives. This will give staff more data to use for the standard program.

Suzanne Leta-Liou: While I think there are some exceptions, the utility voluntary programs are focused on projects that are for non-profit organizations. Can Energy Trust incentives provide a custom pathway for non-profit organization projects and a pathway for private entities?

Dave McClelland: Yes. We will use the custom process to pair with the voluntary programs because we need to do a custom look at those incentives, but it will not necessarily be restricted to non-profits or governmental entities. What we will likely be looking for is custom projects that bring additional benefits beyond the standard program: a resiliency benefit or a benefit for low- to moderate-income customers or other benefits. There will be more qualitative things we will be looking for with those projects.

Dave McClelland continued with the presentation and provided information on the budget and the number of potential solar projects that may move forward.

Alan Meyer: Have we used up the surplus for both utilities? Are we at a place where income coming in equals income going out now?

Jed Jorgensen: Yes, it is very close to the annual revenues. We may still roll funds forward but it will only be for revenues that went unspent in the current year as opposed to multiple years as it was in the past. This year we are rolling forward some funds for Portland General Electric. Pacific Power is pretty close to just revenues.

Erik Anderson: I have one question back to the hydro project. The average per megawatt cost is going up. As more of these hydro projects are rolling in, is there something driving the higher cost? Is it strictly the lower avoided costs or is that something unique to these projects being more grandiose and requiring more capital costs? Are we going to see more irrigation projects come in? Are there cheaper irrigation projects, or is this the new standard we should have in mind when we evaluate these projects?

Jed Jorgensen: There are multiple answers here. The context is everything when it comes to incentive costs on a per average megawatt basis. The low avoided cost prices reduce revenues for any QF project, be it hydro or another technology. We have lost most federal and state subsidies or tax credits for non-solar renewable energy projects. These factors drive above market costs way up. The low avoided costs are the main driver in why we target biogas projects that can net-meter their generation at a higher rate. We target irrigation hydro because these projects are able to leverage their additional benefits for additional revenues or grants. So you can't really compare what the cost per average megawatt was for an older project without understanding the context of the avoided cost prices it was able to get or other tax incentives that were available at the time. This is a long way of saying that we should expect higher incentive costs for the foreseeable future.

6. Public Comment

There was no public comment.

7. Meeting Adjournment

Jed Jorgensen adjourned the meeting at 12:00 p.m. The next scheduled meeting of the Renewable Energy Advisory Council is on November 17, 2017.