Briefing Paper
Renewable Energy Programs

June 3, 2011

Summary

This paper discusses the status of Oregon's renewable energy landscape, Energy Trust's renewable energy program, and the factors we expect to shape the renewable budget next fall.

In short, as demand for Energy Trust funds continues to grow, we will face challenges in managing an increasingly constrained 2012-2013 budget. We plan to propose more investment in early-stage project assistance (studies, permitting, etc.), and less in project incentives (at least for non-solar projects). We also plan to develop progress goals to bring program goals and performance measures in line with this shift in emphasis.

Oregon's Renewable Landscape

Oregon continues to grow its strong base of renewable resources. According to 2010 and 2011 Integrated Resource Plans (IRPs) both PGE and PacifiCorp are on track to meet their Renewable Portfolio Standard (RPS) requirements, serving 25% of 2025 retail loads with renewable energy. Neither foresees a significant investment in new renewables until 2019. The utilities are meeting their RPS obligations with large scale wind investments and power purchase agreements.

Portland General Electric and Pacific Power also lead the states in voluntary green power program participation. Customer demand increases purchases of Renewable Energy Certificates (RECs) from renewable resources above and beyond those used to meet the RPS,

The 2007 Oregon RPS legislation had two other impacts: 1) Energy Trust's renewables scope was narrowed to support only projects 20 megawatts (MW) and under, and 2) it set a goal for the state to generate at least 8% of its electricity from projects less than 20MW in size by 2025.

Energy Trust projects, utility large-scale solar projects (mandated to achieve 20 MW by 2020), and the Volumetric Incentive Rate (ViR, aka "Feed in Tariff") pilot for small-scale solar systems all contribute to the 8% goal. However, the goal is not explicitly linked to these projects, and Oregon is unlikely to meet it.

Energy Trust's Current Role

Our role is to catalyze development of small-scale renewable energy systems that use Oregon's diverse and abundant resources, We play a unique role in supporting the State's renewable goals, distinctly different from the resources utilities are likely to develop to meet the RPS:

- Many project owners we support are not energy developers by trade. They are working on their first and only projects and need basic industry information to be successful.
- The delivery markets for small-scale biopower, wind, hydro, and geothermal are immature, moving projects requires time, effort and knowledge. Much more care and feeding is required than with larger projects.

- Even with our help, the complexity of steps in project development can easily derail a project, only 1 in 10 custom (not standard solar) projects that begin the study process are completed.
- These projects cost more to install and operate since they don't have the efficiencies of scale of larger projects and markets.
- State and federal tax credits and other grant programs pull the majority of the business decision weight compared to our above-market cost incentives.
- The solar markets have progressed substantially over the past few years. Supporting high-quality installations and lowering the first cost of installation is effective currently, but our longer-term role will depend upon policy and budget constraints.
- As distributed generation resources, these projects bring additional value to the grid due to their proximity to load; lower line losses incurred to serve load, increased local grid reliability and deferral of transmission and distribution system investments. These values vary by site and are not fully monetized, making project fundamentals challenging.
- Also as local resources, they bring extra value to the communities in which they are built by adding more jobs per MW than large scale projects and helping communities become more energy independent. These are also values that don't typically appear in the project economics.

Energy Trust works to counteract these issues by filling in the gaps of knowledge and some funding where possible. Over the years, we've seen two distinctly different approaches develop within our programs; standard solar (residential and commercial systems < 500kW) and custom projects (biopower, geothermal, hydro, wind).

The solar program provides a streamlined approach for delivery of our standard project incentive based on system capacity. A strong trade ally network delivers these incentives. We support quality installations through our requirements and provide data to inform policy makers of market needs.

Our approach for the other technologies has been to cost share with early stage feasibility studies and other development expenses and then provide a custom calculated project incentive post completion based on the above market cost of the project. Although most of our budget is directed to project incentives, over the years, we've increasingly supplemented these incentives with early stage technical assistance for feasibility studies, grant writing, permitting, interconnection and financing, development of hydro permitting and interconnection guidebooks, and staff assistance with municipal RFPs and regional policy development. This work has been well received and resulted in the healthy pipeline of custom projects we are seeing today. By increasingly "going up stream" we've seen positive results in reducing many of the barriers to development unique to this market segment.

Energy Trust Results

Roughly half of our renewable budget supports the solar programs and the balance supports the other four technologies (biopower, geothermal, hydro, and wind) plus occasional large-scale solar projects reviewed on a custom basis. Standard program solar projects typically range from 2kW residential systems to 200kW commercial systems. Custom projects other than solar are typically less than 3 megawatts (MW) and span both public and private ownership models. If we supported a project more than 5MW, it would consume the entire custom incentive budget.

Since 2003, Energy Trust has supported the development of 103aMW across the five technologies we support. We have funded 91 aMW in utility projects and 12aMW in small scale projects. Of that 12aMW, biopower projects make up 54% of the total while solar and hydro

projects contribute 25% and 20% respectively. Wind and geothermal projects are a small (<2%) but growing portion of the mix. In total we have funded 2,750 projects. Of these, 2,708 have been solar. While the amount of solar generation we have funded has at least doubled each year from 2007 through 2010, installations for the other technologies continue to follow a saw tooth pattern of development. (See Figure 3).

In 2010, we met the OPUC renewable performance target of 3aMW averaged over three years, completing 3.29 aMW for a three year average of 3.05aMW, We foresee meeting this goal through 2012 as committed projects are completed in time to claim soon-to-expire Business Energy Tax Credits (BETCs).

Influence of BETC

At the end of 2010, we expected that for all technologies, we'd be as opportunistic as possible and use our funds to support: 1) projects that can get a BETC precertification yet still have above-market costs, and/or 2) help fill in some gaps for projects that cannot get a BETC. Also in 2010, we initiated a pilot program to provide early-stage loans to a few projects to see if we could catalyze projects that could not float with a promise of incentives upon completion. Through the winter and spring of 2011, we've seen unexpected results. Where we had planned to be able to go to the board in January or March with 1-2 project incentives greater than $500,000, as of mid-May, we have no projects far enough along to offer incentive commitments.

We've seen;

- Projects turning down BETC precertification because they know they won't meet the April 30, 2012, expiration deadline
- Projects that no longer need our funds. One project received a BETC, 100% bonus depreciation, plus a federal grant. Other projects received BETCs and did not need our funding
- Still another project once interested in construction financing stalled because of the economic and policy turbulence.

In summary, it's been an unanticipated roller coaster of activity. What we expected to fund has had to shift to meet changes and the results of BETC allocations.

What's Driving Renewable Energy Programs?

There are several factors commonly found in successful projects: a project champion with good credit who can secure financing and leverage tax credits; a business plan with long-term vision and goals; a secured and dependable renewable resource; a project that generates co-benefits beyond electricity; and an adequate interconnection point.

In addition, each technology has specific market drivers:

- Biogas markets are growing around co-digestion and discussion of "destination digesters". Political support is helping with biomass related to forest policies and economic growth initiatives.
- Geothermal installations using small-scale, low-temperature units are now proven, and there is increasing federal support for drilling and early stage risk reduction.
- Irrigation districts are investing in hydroelectric projects on their canals.
- The solar market is continuing to grow exponentially in response to the streamlined delivery and lower cost of Solarize initiatives, and new 3rd party financing models.

  - Overall system costs continue to decline on a dollar-per-watt basis but solar remains the most expensive resource for us to support
  - Because of the relatively high level of payments, demand for the ViR is overwhelming, selling out in minutes.
- The community wind market appears interested in additional early-stage assistance but we are waiting to see if it develops into projects. Smaller wind installations (<50kW) are increasing in number each year but the industry needs to focus on improving performance for some systems.

Growing Constraints in the Renewable Program

When we completed the Renewable sector strategic plan one year ago, we foresaw an increasing number of projects in the pipeline, reduced tax credits, and a disappearing budget carryover. We expected these trends to challenge us across all technologies. Through the summer and fall, these trends continued.

1) Increasing pipeline of custom projects in need of both early stage support and project incentives. This is reflective of success in our early program work.
2) Increasing demand for residential solar (commercial demand tempered by BETC uncertainty) due to success of Solarize approaches and lower costs.
3) Rising above-market costs due to uncertainty about state and federal tax credit programs (BETC, ARRA) creates greater need for funding. Energy Trust funding simply cannot make up the difference, as illustrated by the table below. Without BETC, a single 1-2aMW hydro project could consume half of Energy Trust's total annual renewable budget,

Project Type	Project Size	No BETC AMC (for a single project)	% 2012 Budget ($5.5M PAC, $8.5M PGE)
Hydro	1-2aMW	$6-8M	44-60%
Geothermal	0.1 aMW	$1M	7.50%
Biopower	0.7-1.3aMW	$3-4.5M	22-33%
Wind - Mid	0.04 aMW	$0.5M	4%
Wind - Community	3aMW	$6M	44%

4) As planned, we are managing down the carry over funds.
   a. As of this year, PacifiCorp carryover is depleted. Approximately $5.7M/yr in revenue is divided across technologies. All programs could spend more PacifiCorp funding if it were available. The budget cap constrains our ability to grow these markets in all technologies.

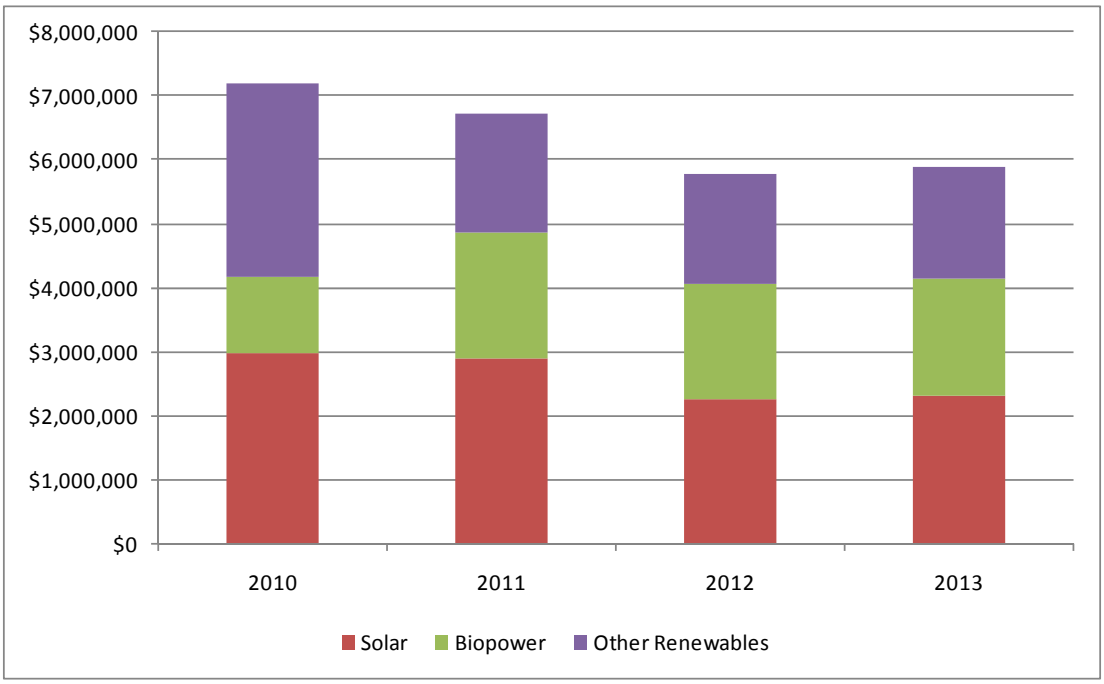

Figure 1: PacifiCorp Activity Budgets by Program (2010 is actual activity)

b. By 2012/2013, ***if successful in committing our 2011 budget as planned***, our PGE carryover will approach zero and the budget will be on par with annual revenues, ~ $8.3M compared to $18.4 M for 2011.

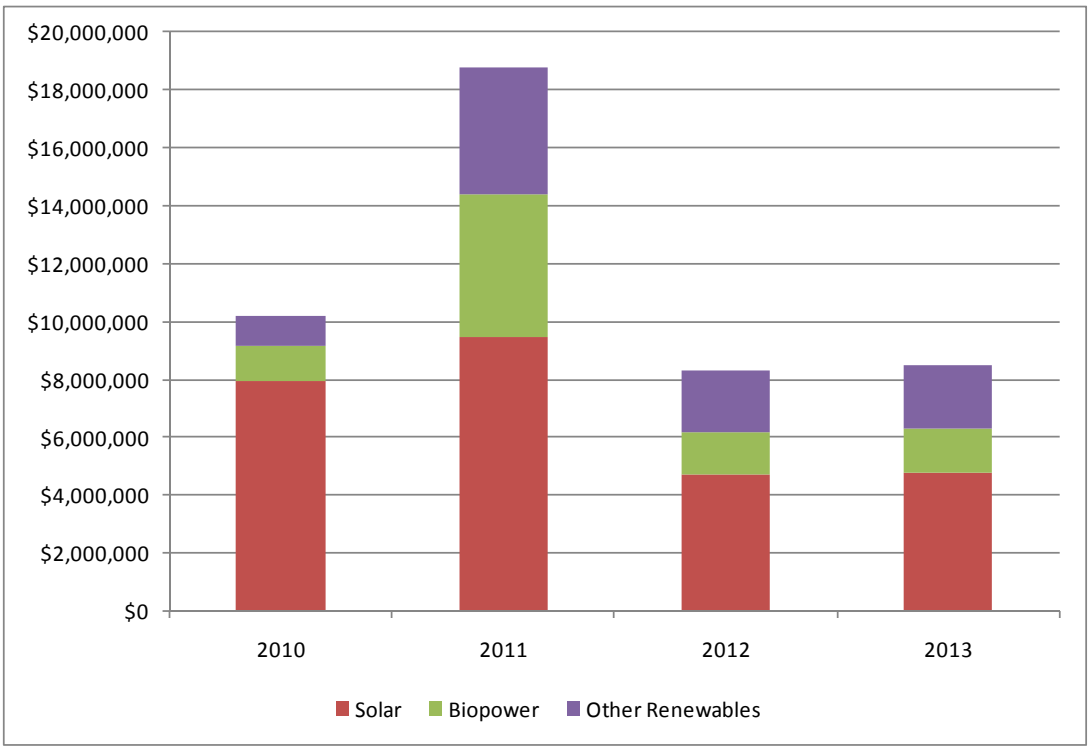

Figure 2: PGE Activity Budgets by Program (2010 actual activity)

As we go through 2011, we'll reassess the program needs. If Biopower and Other Renewables are not able to commit their funding, solar may be able to use it. It's most likely that there will be continued carryover funding available for PGE for 2012 into 2013.

Projecting these influences forward, we expect to see decreases in estimated generation to under 2aMW for 2013 and 2014. In other words, there will be more projects, more need for funding and development assistance, and less room in our budget.

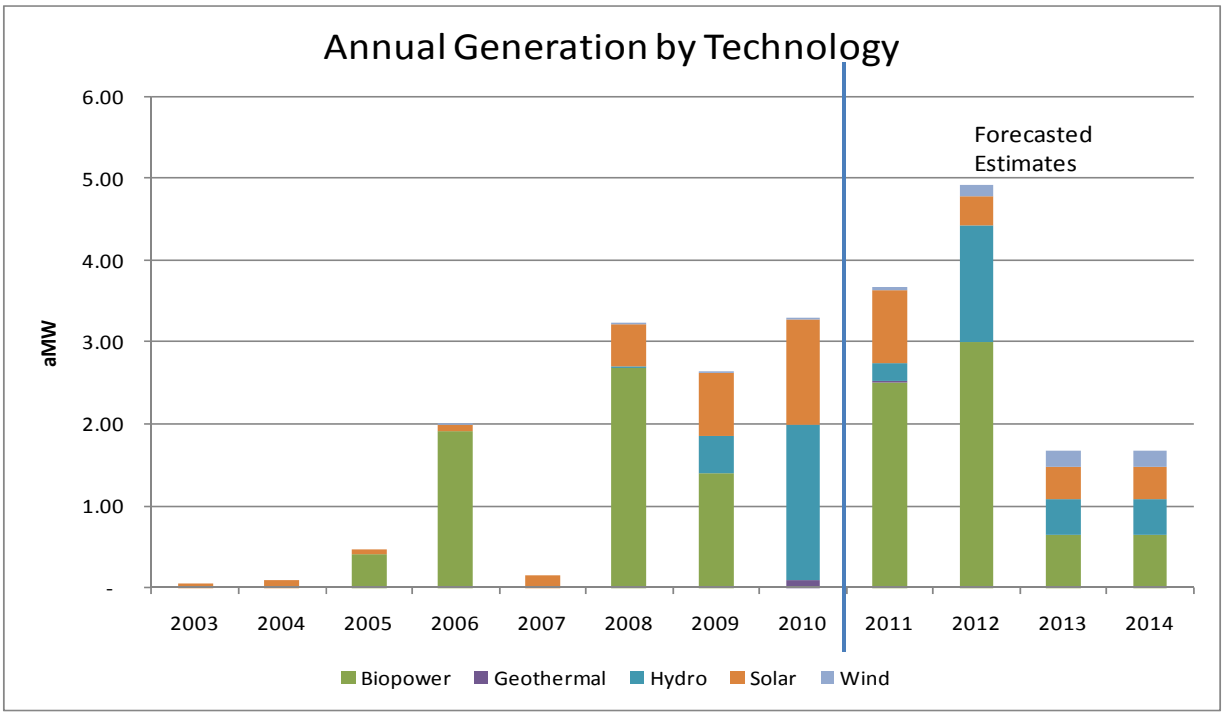

Figure 3: Trends in generation

Program Design Going Forward

During the 2011 budget process, renewables staff engaged the RAC in a series of meetings about how to restructure our programs and redefine our goals to make the best use of available funds. We solicited RAC feedback on four potential approaches: **maximizing generation, limiting support to two technologies, supporting only onsite generation, and focusing on early-stage market and project development for custom technologies**.

RAC and staff determined that, apart from solar, focusing on early-stage market and project development for customer programs best fit our strengths and budget. We found that this focus;

- Plays to our strengths, fills a market need and will lead to completed projects
- Is a good match to our scale of funding
- Is likely to deliver significant impact bringing better projects to market
- Supports a range of resources, not picking winners

We already do a large amount of this work for non-solar projects and it continues the trend of steadily increasing the number and type of services we offer.

Because the solar market is much better developed, we continue to feel that our incentives are important.

Going forward, this is how we see the main elements of our Renewable Programs:

Support all five technologies: Supporting a range of technologies in the early stages will give each a chance to gain momentum. Oregon is lucky enough to have a wide range of renewable resource to develop.

Increase early development support of custom projects: Types of support will vary by technology.

Rework custom project incentive deployment: Even after increasing early development support, there will be significant funds (about 3-4 million per year) for custom project incentives, but less than previous years. We propose to develop new ways to deploy these funds, such as: 1) a targeted RFP process, 2) create a revolving loan fund for construction and/or take out financing.

Expand teaming/leveraging opportunities: Specifically focus on teaming with other similar organizations to bring additional funding resources to projects.

Maintain standard solar and wind project incentives: Although the ViR is extremely popular, demand for our incentives has not lessened. We'll continue to offer standard incentives, fine tuning our incentive with reductions in equipment costs and adjustments to state and federal support..

Revise performance targets: We'll continue to work with the OPUC to modify our performance targets as described next.

Given limited funds, we may not be there at the finish line with a project incentive, but we believe this approach will help bring better projects to the market.

Challenges and Risks

Challenge: Managing limited budget with fundamentally different technology and utility markets

- We are already balancing growing demand for incentives for solar and other technologies in PacifiCorp territory; we will need to do the same in PGE territory, and we expect the pressure to increase.
- Solar has dominated the PGE budget and will continue to do so. Creating opportunities for other technologies means finding resources that can interconnect to PGE through BPA.
- Finding other funding for custom projects will be an important piece in seeing them over the hurdle to completion but it will be difficult.
- We need new tools to manage competition for our custom incentives

Challenge: Solar budget may need to be further constrained

- We may need to modify the program in light of growing demand and desire to create balance among technologies. This could involve:
    - reduced incentives
    - project size caps
    - competitive approach

The biggest risk: State and federal tax credits may not continue

- Our incentives may become even more important, yet our budget won't be able to fill the hole left by expiring tax credits.
- The solar market will be hit particularly hard. Even if our entire budget shifted to solar, we'd see a fraction of the installations we see today. Our plan to reduce solar budgets as installation costs decrease and budgets plateau depends on the continuation of tax incentives
- If this occurs, we'd need to fundamentally rethink what we do, and re-engage with the board and RAC.

Progress Goals

Currently, the only measure of our performance for the OPUC is through the 3 average megawatt installed generation goal. Our market development activities, while a necessary component of our success, have no performance measures. Shifting our focus more specifically toward expanding early-stage project and market development requires performance measures beyond installed generation.

Energy Trust staff has defined two options for performance measures beyond generation goals, and have engaged the OPUC on this issue. The first option attempts to distill progress indicators into 1-4 key metrics that could apply across all technologies. This would be easy to report on and understand. For example:

1. Increasing number of active projects identified at the end of each year. "Active" is defined as progressing from predevelopment to construction.
2. For solar and small wind, decreasing amount of time between initial application and project completion.
3. Developers and other market actors are finding Energy Trust's assistance helps make renewable project development simpler (qualitative/interview)
4. Increasing number of qualified project installers.

Option two requires more ground work to prepare and more effort to track. However, it is specific to our technologies and markets, and staff is inclined to develop it even if the OPUC does not use it as a basis for performance measurement.

- For each technology, characterize the current state of the market to define a baseline
- From the baseline assessment, define specific outcomes to be achieved within three years.
- To achieve these outcomes, identify annual outcomes and activities in Budget Action Plans.
- Set the OPUC Performance target at meeting more than 50% of these annual outcomes each year.
- Every three years, re-characterize markets and measure progress toward long term outcomes.

This option would provide ongoing feedback on program effectiveness and progress over a three-year period. When the metrics are defined, an evaluation plan for how they will be measured would be created.

Option two is the approach we hope to take. Even if the option doesn't work for OPUC performance targets, we plan to pursue it for internal goal setting.

Summary

Project fundamentals for small scale renewable resources continue to be a challenge. Energy Trust is uniquely positioned to influence these challenges by filling the gaps in funding and knowledge to move projects forward. As our resources plateau in 2012/2013, we've refined our business plan to focus more on early-stage assistance and less on project incentives for custom projects. With this shift, we plan to set progress goals in addition to generation goals.

Our 2012 budget will reflect these choices and align action plan activities with updated three-year program progress goals informed by technology-specific market assessments. Ultimately, if tax credits are discontinued, we will need to rethink our options.