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SUMMIT BLUE
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Memorandum

To: **Fred Gordon and Peter West**

From: **Frank Stern and Jane Pater**

Cc: **Kevin Cooney**

Date: **August 25, 2008**

RE: **Description of and Recommendations for Renewable Energy Roles for Energy Trust**

This memo is the sixth in a series developed as part of Summit Blue's work with Energy Trust of Oregon. It focuses on future roles for Energy Trust that warrant further consideration. These roles address the financial and related barriers faced by developers of small renewable energy projects in Oregon, including gaps in financial tools available to developers of renewable energy projects with nameplate capacities smaller than 20 MW. Summit Blue identified these barriers in the fifth memo in this series. Previous Summit Blue work products have focused on Energy Trust's current roles in the state's renewable energy market and the associated risks, and the risk management approaches taken by the broader financial community in the renewable energy industry.

This memo is organized to provide context for the discussion of priority roles. First, the universe of potential roles are described and connected to the barriers outlined in the previous memo. From that group, the priority roles for future consideration – for Energy Trust and for other key market makers – are discussed, summarizing the findings of Summit Blue's analysis. Then, the rationale behind the decision not to address some market barriers through the priority roles is discussed. Finally, the memo sets the stage for the next issues to be discussed: the approach that Energy Trust will take to set its course in the renewable energy market for the next several years including an assessment of risks of new roles and risk decision criteria.

Overview of Potential Roles

This section outlines the roles that warrant further consideration by Energy Trust in its efforts to facilitate development of renewable energy projects across the spectrum of technologies in which it

currently invests. These roles were identified by Energy Trust staff, by Energy Trust stakeholders and through Summit Blue's experience in the field. These roles can be segmented into four categories:

1. Providing information
2. Offering additional technical assistance
3. Re-considering the structure or form of incentives
4. Increasing the certainty around woody biomass fuel supply

This section presents only a subset of the roles that are within the realm of possibility for Energy Trust. Summit Blue selected these roles from the broader universe of potential roles using three basic criteria:

- They address the major barriers to development of renewable energy projects
- They leverage existing resources and expertise at Energy Trust
- They enable Energy Trust to create economies of scale that the private sector has yet to address.

The remainder of this section describes the most promising roles, according to these criteria, that fall under each of the four categories and how they address the barriers outlined in the previous memo in this series. The appendix provides additional information about each of these roles, including information about the arguments in favor of and against each role, examples of other organizations that have implemented a similar role, and the connection between the role and the barriers described in the previous memo. The appendix also provides the universe of roles considered before focusing on these most promising roles.

To preview the section, Table 1 provides a high level overview of Energy Trust's potential roles within each technology sector. The roles are segmented according to how they fit in with Energy Trust's current legislative mandate. The roles that *expand* on existing roles leverage Energy Trust's existing strengths and do not require changes to Energy Trust's formal mandate. The suggested *enhancements* require minimal policy, regulatory, or legal changes for the Energy Trust. The *new roles* require significant changes. The last column examines the roles that could be undertaken by other market actors to complement Energy Trust's role in each market.

Table 1. Potential Energy Trust Roles within Existing Renewable Energy Programs

	Expand current practices	New roles within current mandate	New roles outside of current mandate	Key Roles for Other Market Actors
Community Wind	▪ Perform feasibility studies at the county level ▪ Create a long-term plan for Energy Trust's market involvement ▪ Facilitate matchmaking	▪ Aggregate turbine orders ▪ Allow buy-out clauses for RECs	▪ **Facilitate development** ▪ Become equity investor ▪ Create model programs for other utility territories	▪ Federal government: Extend PTC for a substantial length of time
Small wind	▪ Facilitate matchmaking ▪ **Targeted marketing effort** ▪ **Expand demonstration of close-to-market technologies**	▪ Reconsider REC policy		
Small PV (<100 kW)	▪ **Create a long-term plan for Energy Trust's market involvement** ▪ Facilitate matchmaking ▪ Targeted marketing effort			▪ Consider alternative financing structures: • On-bill financing • Property tax financing ▪ Federal government: Extend ITC for a substantial length of time ▪ OPUC: Consider alternative policies: • Feed-in tariff • Solar set-aside

*Note: Roles in **bold type** indicate that these roles would have the greatest impact in the technology-specific market.*

	Expand current practices	New roles within current mandate	New roles outside of current mandate	Key Roles for Other Market Actors
Larger PV (>100 kW)	▪ **Create a long-term plan for Energy Trust's market involvement** ▪ Expand standard offers ▪ **Allow buy-out clauses for RECs** ▪ Expand demonstration of close-to-market technologies	▪ Offer bridge financing	▪ Create model programs for other utility territories	▪ Federal government: Extend ITC for a substantial length of time
Biomass	▪ **Create a long-term plan for Energy Trust's market involvement** ▪ Expand standard offers ▪ Allow buy-out clauses for RECs ▪ **Help developers examine their project from investor perspective**	▪ **Increase certainty around regional fuel supply and costs**		▪ Federal government: Extend PTC for a substantial length of time
Geothermal	▪ **Expand demonstration of close-to-market technologies**			▪ Identify insurance products or other tools to mitigate drilling risk
Small Hydro	▪ Develop a guide book for developers ▪ **Facilitate matchmaking**	▪ **Offer pre-construction financing**		▪ Negotiate a MOU with FERC to delegate smaller projects to state jurisdiction

*Note: Roles in **bold type** indicate that these roles would have the greatest impact in the technology-specific market.*

Providing information

- **Establish and communicate a long-term plan for Energy Trust's role in renewable energy.** Energy Trust can reduce one source of uncertainty in the market place by clarifying its role in Oregon's market for renewable energy, ideally for the next five to 10 years. Such a plan may be tied to goals such as nameplate capacity installation or share of households using some form of on-site renewable energy.

  A five- to10-year financial commitment may be more than the Energy Trust can practically do, given the dynamic nature of efficiency markets and Energy Trust funding. A more modest commitment, however, (e.g., a specified minimum share of the budget for three years) may also be useful. This activity would address or help to compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Overall level of uncertainty is significant for developers	▪ By creating a plan for the future, Energy Trust would increase the market's certainty about the state's support of each technology-specific market.
▪ Higher labor cost	▪ Renewable energy companies can plan better – including for staff expansion and training – if they understand the types of support that will be in place in the future. (If the plan includes a provision for a ratcheted incentive for certain technologies, companies in those sectors will also be able to plan to reduce the cost of labor.)

- **Facilitate matchmaking among interested and relevant parties.** There is a spectrum of potential roles for Energy Trust within this area. Matchmaking may be as simple as expanding the list of trade allies to include accountants with relevant renewable energy tax credit experience, contractors that perform feasibility studies for various technologies, and potential financial partners. In the middle of the spectrum, Energy Trust leverages its own contacts to identify potential matches for developers or other parties that request assistance; this builds on its existing efforts to build bridges at conferences, workshops, and other Energy Trust-sponsored activities. At the far end of the spectrum, Energy Trust serves as an arranger for promising projects, connecting the entities with resource potential to those with professional and financial resources. This addresses or helps compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Benefit of state tax credit is limited.	▪ The ability to monetize the Business Energy Tax Credit (BETC) is critical, and developers are challenged to find partners with sufficient tax appetite.
▪ Inability to match development interest with financial and professional resources	▪ Energy Trust can help overcome this barrier by identifying parties with similar goals and interests and connecting them.
▪ Uncertainty over accounting issues	▪ In most cases, most accounting issues could be addressed by consulting with a tax accountant that understands the relevant code, but it is difficult to know which ones have credible experience with renewable energy investments.
▪ Gap between Energy Trust support of feasibility and payment of incentives	▪ Energy Trust would not need to contribute capital to support projects in this arrangement, but it could help identify partners that are willing to invest.
▪ Municipal staff do not understand the project development process (esp. small hydro)	▪ Early in the project development process, many challenges caused by unfamiliarity with development can be addressed by meeting with a professional in that sector. The matchmaking service would help staff identify potential experts that can provide such assistance.

Offering additional technical assistance

- **Help biomass developers examine their project from the perspective of investors.** Energy Trust could use its staff's financial expertise to proactively analyze project *pro formas* and identify weaknesses in the project economics. Engaging in such analysis *before* a project developer brings in the financial community will enable developers to present viable, well-organized project economics to the funding community. Energy Trust could do this through seminars to reach a broad audience and then provide some project-specific

support to developers that previously attended the seminar. This addresses or helps compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Inability to match development interest with financial and professional resources	▪ Energy Trust could help developers present a more coherent business case for their projects to the investor from the outset, facilitating the partnerships between developers and investors.
▪ Energy Trust acquisition of RECs in exchange for incentive reduces project value to the developer	▪ Project financiers give more value to REC prices when the RECs are under a fixed-price contract with a buyer (which Energy Trust's incentives provide) than when they are left to a speculative market. Examining the project from an investor's perspective would enable developers to see the value of securing a contract with Energy Trust.

Re-considering the structure or form of incentives

- **Allow buy-out clauses for REC payments.** Buy-out clauses allow one party to pay to relieve itself of contractual duties. For Energy Trust partners, the contractual duties would be the delivery of RECs. When Energy Trust pays out incentives and negotiates its agreement with the seller, a clause would be included that allows for the seller to pay a specified amount to be excused from its obligation to deliver RECs under certain conditions. If Energy Trust thinks the market price will stay within smaller bounds than the developer thinks, this is a way of providing reassurances with a low probability of cost. This approach effectively allocates risk to the parties that are most willing to accept it, a fundamental principle of project negotiation. This addresses or helps compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Perception that Energy Trust's method of valuing RECs undervalues RECs	▪ If developers have an "out," they can live with Energy Trust's initial valuation of RECs with the understanding that they can escape from it if it undervalued the RECs.
▪ Energy Trust acquisition of RECs in exchange for incentive reduces project value to the energy purchaser	▪ In some cases, the party purchasing the energy prefers to own the green attributes of a system (e.g., PV) in order to use it for marketing or to meet corporate commitments. The buy-out would enable them to do that.
▪ Concerns about the accuracy of Energy Trust's calculation of above-market costs	▪ If developers have an "out," they can live with Energy Trust's initial valuation of RECs with the understanding that they can escape from it if it undervalued the RECs.

- **Offer financing for development stages: bridge and construction financing.** Energy Trust can offer low-interest financing during pre-development and construction periods to help bridge the gap between its feasibility assistance and post-construction incentive payments. Once the borrower repays the loan, the money is returned to the pool available for additional loans. This addresses or helps compensate for the following barriers.

Barrier Addressed	Link between Barrier and Potential Role
▪ High fixed costs of wind development make small projects unreasonable	▪ Investors in wind industry have many options for investment. It is more difficult for small projects to secure enough capital to move forward because investors could commit the capital to larger projects with better returns.
▪ Gap between Energy Trust support of feasibility and payment of incentives	▪ Project developers must put up significant amounts of capital to prepare for construction (e.g., permitting, project design) and during the construction phase. Arranging this capital infusion, which is only needed until Energy Trust's incentives are paid, can kill projects.
▪ Up-front capital commitment can be difficult for small hydro projects	▪ Many small hydro projects are put forward by public agencies with multiple demands on capital. Although the money is only needed temporarily, the opportunity cost can discourage the investment since it is not needed to maintain a functioning system.

- **Facilitate project development for community wind and small hydro.** Energy Trust would facilitate the project development process: seeking out assisting potential project owners in identifying appropriate partners for each critical development role: obtaining necessary permits, procuring equipment, securing needed capital, and managing the construction process. In this role, Energy Trust would not need to put capital at risk but could work with partner organizations to accelerate the development of projects. This addresses or helps compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Interconnection is expensive and risky for small developers.	▪ Energy Trust's experience with interconnection issues would enable it to assist project developers to navigate the process more efficiently.
▪ Inability to match development interest with financial and professional resources	▪ Energy Trust would facilitate the matchmaking for entities with development interest but without professional resources. This would streamline the development process.
▪ Municipal staff do not understand the project development process.	▪ Energy Trust would teach the municipal staff about key aspects of project development during the facilitation. By empowering the municipal staff with the knowledge of what it takes to make a project happen, Energy Trust would build a network of support for community-based renewable energy in the state.

- **Expand program for demonstrating close-to-market technology.** New technologies are available that may facilitate the deployment of renewable energy projects. Technologies include small-scale geothermal projects with lower temperature conditions than conventional technology, building-integrated PV systems, and small wind systems that haven't gotten much traction in the marketplace. Energy Trust could expand its existing demonstration program that showcases close-to-market or emerging technologies to include these technologies. The goal of this activity would be to provide additional information to the market about technologies' viability with the intention that the information would promote adoption of the technology. This addresses or helps compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Drilling of geothermal wells incurs too much risk for potential return	▪ New geothermal technologies can produce electricity at lower temperatures than conventional technologies. Thus, the likelihood that a viable resource is found for these technologies is higher.
▪ Low consumer awareness about the risks and benefits of renewable energy technologies	▪ Deploying these unfamiliar technologies in high profile settings will enable the public to become better acquainted with them and to consider the possibility of installing the technologies on their own property.

Increasing the certainty around woody biomass fuel supply

- **Increase certainty around the market for biomass fuels.** Uncertainty of supply is a common problem for biomass projects. There is a spectrum of potential roles for enhancing certainty around forest waste/mill residue fuel supplies. At a basic level, Energy Trust can conduct regional fuel assessments to identify potential fuel sources and current demand for them. Taking another step, Energy Trust can identify areas in which to concentrate urban wood waste or forest waste and secure aggregated supplies of those resources for biomass facilities.

  The important concept in this role is risk sharing, rather than full risk bearing. Energy Trust can take on a quantifiable share of this risk while requiring the developer to maintain a stake in the risk as well. This is appropriate since the developer maintains the benefit of the upside potential and should, accordingly, take on an appropriate amount of the downside risk related to fuel price. While Energy Trust can help to put some parameters on the extent of that downside risk, it cannot be expected to fully bear this risk. This addresses or helps compensate for the following barriers:

Barrier Addressed	Link between Barrier and Potential Role
▪ Inability to secure long-term fixed price supply contracts for fuel	▪ The aggregator of the fuel (Energy Trust or another party) may decide to offer long-term fixed-price contracts , alleviating this barrier.
▪ Rising transportation fuel costs change project economics.	▪ Identifying and aggregating fuel sources near potential development sites can help to create economies of scale in the logistics for these fuels.

Key Roles for Other Market Actors

The most significant external driver of success of Energy Trust's programs is the federal government's willingness to establish a long-term energy policy. A policy that extends the PTC and ITC by five to 10 years or introduces other policies designed to incentivize renewable energy (e.g., a greenhouse gas regulatory scheme) would reduce the uncertainty around project economics and facilitate a more continuous development cycle.

A secondary important driver of successful implementation of Energy Trust programs is the establishment of certain rules around Oregon's RPS. In the current situation, it is not clear how the state's REC market will evolve over the next five to 15 years. Specifically, the market needs to understand the penalties for non-compliance. By July 1, 2009, the OPUC is legally required to establish the alternative compliance payment (ACP),[1] which will, in practice, serve as the cap on the price of RECs sold into the Oregon utility system. Until that level is known, there is uncertainty about the value of RECs, and developers will view existing forward price curves as conjecture. Once that level is set, project economics can incorporate the forward price curves, and developers will become more accepting of the REC prices that Energy Trust assumes in its calculation of incentives. As REC prices for sale to out-of-state utilities are established, uncertainty about prices will further diminish for those projects with access to out-of-state transmission. However, with regional and federal carbon legislation expected in the next two years, and an ongoing discussion of feed-in tariff legislation in Oregon, turbulence and uncertainty will still be significant for the next two to three years at a minimum.

Resource Commitments Required by Priority Roles

In addition to examining the priority roles on a technology-by-technology basis, it is also important to consider the level of resource commitments associated with each of them. It will not be possible to pursue all of the roles outlined in this memo within the constraints of Energy Trust's existing budget. Some roles can be done well with limited additional capital commitment, while others will require significant resources in terms of personnel or dollars or both.

Table 2 provides a framework for considering the resource commitments associated with each of the priority roles described in this memo. It employs a qualitative distinction between modest and significant levels of commitment. Generally speaking, however, the modest commitments involve minor additions to staff or financial resources relative to what is available currently. The significant commitments involve additions of staff or financial resources beyond those that are currently

[2] Further, Energy Trust already has the authority to locate demonstration projects outside of the PGE and PacifiCorp service territories if it is required to establish the viability and reliability of a technology.

available. As these roles are more carefully defined, these resource commitments can be more clearly delineated as well.

Table 2. Relative Resource Commitments for Priority Roles

	Modest Personnel Commitment	Significant Personnel Commitment
Model Financial Commitment	▪ Long-term plan ▪ Facilitate matchmaking ▪ Allow buy-out clauses for RECs	▪ Facilitate project development ▪ Expand demonstration of close-to-market technology ▪ Examine biomass projects from a financial perspective
Significant Financial Commitment	▪ Increase certainty around the market for biomass fuels	▪ Offer bridge and construction financing

Barriers Not Addressed by Priority Roles

Some of the barriers outlined in the fifth memo are not addressed by the roles for Energy Trust that are described in this memo. Generally speaking, efforts to address these barriers would have a less significant impact on the Energy Trust's ability to influence development of smaller renewable energy projects than efforts to address the barriers addressed by the roles proposed in this memo. Energy Trust may consider incorporating strategies to address these barriers as components of other roles that it may adopt in the future, rather than prioritizing these issues. The barriers that fall into this category include the following:

- **PV installation must be performed by Energy Trust trade allies.** One-off installations of PV systems (such as those completed by do-it-yourselfers) are not the most efficient way to expand the market for renewable energy in Oregon. Self-installations involve a limited number of sites and make quality assurance either difficult or uncertain. Instead, Energy Trust can focus on bringing down the cost of hiring a professional installation team to perform PV system installations; as part of the long-term plan, Energy Trust could incorporate ratcheted incentives to accomplish this end. Over time, this will have a more widespread impact on the adoption of PV systems.

- **Limitations of net metering.** Oregonian developers are concerned that changes in facility use patterns may reduce energy use over time, which would then reduce the amount of energy that is eligible to be sold into the grid through net metering. Implementing PPAs for shorter periods of time can address the issue of the effect of changing building uses on the amount of energy eligible for net metering. In other markets, PPAs are being negotiated for time periods that are closer to the planning horizon for commercial real estate investors. That is, PPAs with terms of 10 years are more closely aligned with commercial and industrial facility owners' and occupants' expectations about the facility's use and its level of energy consumption. The private sector can adjust its practices in this way to overcome this barrier without assistance from Energy Trust.

- **Inconsistent permitting requirements.** Permitting requirements for wind projects vary across local community lines as well as across county lines. Getting down to the details of

local governance would require a high up-front cost considering the scale of projects being considered. Further, if the development process includes local governments (as it does when Energy Trust assumes the role of the developer), the permitting process should be facilitated. As a result, this barrier is indirectly addressed by the earlier recommendation that Energy Trust serve as project developer.

- **Development restricted to Portland General Electric (PGE) and PacifiCorp service territories.** One of the key benefits of developing projects that are smaller than 20 MW is that their output can be utilized by local customers. Locating projects outside of the PGE and PacifiCorp service territories will result in wheeling the power back to the population centers. Since transmission constraints are already becoming more significant for larger wind projects that are located far from the load centers, Energy Trust should focus on subsidizing the development of projects that avoid this issue.[2]

- **Refurbished turbines fail to carry sufficient warranties.** Minimal data exist on the performance of refurbished turbines, and Energy Trust's ability to provide insurance sufficient to meet grantors' requirements would require that it assume this unknown risk. Instead of assuming such a risk, Energy Trust can look for new studies on performance of refurbished turbines to provide more certainty around this issue and provide information about appropriate warranty terms to potential buyers of refurbished equipment.

In one case, fully addressing one of the barriers identified by stakeholders may not be in the best interest of Energy Trust or the ratepayers. Several participants in the interviews discussed their dissatisfaction with Energy Trust's acquisition of RECs, typically because of the price offered for them. Enabling the project developers to retain ownership of the RECs, however, may result in Energy Trust funding projects that sell RECs into California and count toward California' RPS requirements rather than Oregon's. Oregon IOU ratepayers would then need to pay for other additional renewable resources to meet RPS requirements.

Several of the roles highlighted for further consideration address aspects of this issue. Contracts for differences and buy-out clauses for RECs would provide developers with needed certainty around the price of RECs but allow them to sell the RECs on the open market if the terms are more agreeable. The targeted marketing role would enable Energy Trust to communicate the rationale behind the acquisition of RECs to key parties, including developers and the financial community.

An important concept surrounding these potential roles would be the terms laid out in the contracts that allow for these modifications to Energy Trust's approach to acquiring RECs. For example, it would be important to include a provision that any market sale of RECs would need to occur within the state of Oregon and perhaps only if sold to PacifiCorp or PGE. This enables Energy Trust to ensure that the benefits of its programs are delivered to the parties paying for its services. Otherwise, there might be a scenario in which developers build projects in Oregon using Energy Trust incentives and Oregon natural resources (e.g., biomass) and sell the renewable attributes into California's market. This would be an unintended consequence of Energy Trust's agreement to comply with the requests of developers in the state.

Conclusions

The roles identified in this memo warrant further consideration by Energy Trust in light of its current strategic planning process. The primary guide to determining Energy Trust's roles in the renewable energy market going forward should be a reconsideration and quantification of the goals

of the program. Within such a framework, Energy Trust can determine which roles fit best with the organization's direction, reputation, and resources.

Depending on which goals receive priority, one strategy may be more appropriate for a given technology than another. For example, the main barrier for geothermal relates to the inadequacy of the risk-reward ratio for drilling. Testing a new technology does not directly address that issue. It does provide some promise that lower temperature settings would yield projects, however, which could improve the reward side of the ratio if the technology is viable. The alternative is to identify insurance products that mitigate the drilling risk. If Energy Trust's priority goal is to meet specific capacity goals, the immediate development of projects is necessary, and the insurance strategy is more appropriate. If Energy Trust's priority goal is to prove new technologies, then the demonstration project approach moves it further in that direction.

The next memo will characterize the risks associated with the priority roles and the decision criteria that Energy Trust's staff and board can use to assess the risks associated with the roles it considers in the future. This set of decision criteria can be used by Energy Trust for its strategic planning process and beyond. The convergence of Energy Trust's preferred risk profile and the types of risks associated with each of the roles it assumes will shape the

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APPENDIX A:

HIGH-LEVEL ANALYSIS OF POTENTIAL ROLES: PROVIDING INFORMATION

Potential Role

Establish and communicate a long-term plan for Energy Trust's role in renewable energy.

Description

Energy Trust can reduce one source of uncertainty in the market place by clarifying its role in Oregon's market for renewable energy for the next three to five years. Such a plan may be tied to goals related to nameplate capacity installation or share of households using some form of on-site renewable energy. In it, Energy Trust may commit to a specific set of technologies for a certain number of years and estimate annual budgets for each of them. It may clarify how Energy Trust will implement its REC policy and how Energy Trust envisions contributing to each market's development. A long-term plan will remove one critical source of uncertainty: how Energy Trust will deploy its resources to provide above-market funding for renewable energy projects. Currently, Energy Trust's 2007-2012 strategic plans outlines several goals toward which the renewable energy programs are working. These include contributing toward the RPS, encouraging Oregonians to integrate renewable energy into their daily lives, and to reach hard-to-reach markets. Translating these goals into measurable objectives or targets will provide more clarity for market participants.

It is important to note that such a plan can be completed at several levels of detail. Energy Trust's 2007-2012 strategic plan provides a framework for Energy Trust's activity. A long-term plan could go one level deeper by assigning measurable targets and objectives to each of the goals discussed in the strategic plan. One step further would outline specific strategies that would be utilized to achieve those targets. Another level of detail would include specific incentive levels. It is not necessary to go that far in depth, however. Quantified targets – and a commitment to meet them – would go a long way toward increasing certainty. Such targets would outline a "minimum" standard toward which Energy Trust would work in the future.

These targets may take several forms. They could quantify capacity (MW) installation goals for each technology – either as subsidized by Energy Trust or as developed in the marketplace without incentives. They may include a certain number of renewable energy companies with offices in Oregon or that offer services in Oregon. The goals may also take the form of the amount of capacity that will be funded through Energy Trust each year to provide developers with an expectation about how those incentives will decrease over time. Whatever the goals are, they will help to provide more certainty in the marketplace if they are transparent and measurable.

Once Energy Trust completes the plan, it should be packaged to address the concerns of technology-specific segments. Simply having the plan will not sufficiently address the issue of uncertainty. The plan's contents must be communicated to specific market segments in a way that meets their needs. Energy Trust's work in recruiting and maintaining its Trade Ally network provides needed experience in reaching such markets.

An important consideration in developing this type of a plan is the type of flexibility to adjust funding allocations or areas of focus that is built into it. The renewable energy industry is rapidly evolving, and goals and targets that seem appropriate today may seem laughable in two years. Thus, the plan that Energy Trust develops will need to take into consideration the evolution of the marketplace *and* the needs of the market actors. Some markets need clearer signals than others; for these, Energy Trust can provide more details while still allowing for flexibility. For others, Energy Trust can build in more flexibility to adjust its role as needed. This concept ties back to the

fundamental issue of risk sharing: to affect real change in the renewable energy market, Energy Trust can take on the burden of portions of the risk but need not accept all of the risk. It need only be clear about which risks it is leaving to other market actors.

Relationship to current practices: Expand current practices

Key barriers addressed:

Barrier Addressed	Link between Barrier and Potential Role
▪ Overall level of uncertainty is significant for developers	▪ By creating a plan for the future, Energy Trust would increase the market's certainty about the state's support of each technology-specific market.
▪ Higher labor cost	▪ Renewable energy companies can plan better – including for staff expansion and training – if they understand the types of support that will be in place in the future. (If the plan includes a provision for a ratcheted incentive for certain technologies, companies in those sectors will also be able to plan to reduce the cost of labor.)

Magnitude of impact: Varies by technology, depending on the allocation of funds and flexibility in the plan

Opportunities and Barriers

Opportunities	Barriers
▪ Eliminates one source of uncertainty that adds to the cost of projects.	▪ Strategic – Legislative mandate limits time horizon for planning.
▪ Creates a more stable environment for businesses wishing to locate and do business in Oregon.	▪ Strategic/Financial –Oregon's legislative framework market for renewables are changing rapidly; a firm plan may lead to misallocation of funds over the long run. ▪
▪ Establishes tangible goals against which Energy Trust can measure progress.	▪ Strategic – Internalizes some market risk by shaping the market rather than responding to gaps.
▪ Provides a framework within which all Energy Trust renewable energy activities can take place.	▪ Strategic – Budget allocation is determined by public purposes charge, which may fluctuate over time, affecting Energy Trust's ability to meet its objectives.
	▪ Strategic – Developers of different resources need information on different timelines; some plan on a two-year horizon, some on a 20-year horizon.
	▪ Operational – Limits Energy Trust's ability to reallocate funds on an as-needed basis among the technology markets, which is its current practice.

Examples of existing (or previous) implementation

California established a decade-long plan for its solar incentives through the California Solar Initiative (CSI). Over that period, the state committed over $2.2 billion to its solar program in addition to another $400 million through other programs.[3] Several developers cited such programs as the reason that California is leading the nation in solar installations.

[3] "About the California Solar Initiative." Undated. Available: http://www.gosolarcalifornia.ca.gov/csi/index.html

Potential Role: Facilitate matchmaking among interested and relevant parties.

Description

There is a spectrum of potential roles for Energy Trust within this area. Matchmaking may be as simple as expanding the list of trade allies to include accountants with relevant renewable energy tax credit experience, contractors that perform feasibility studies for various technologies, and potential financial partners. In the middle of the spectrum, Energy Trust leverages its own contacts to identify potential matches for developers or other parties that request assistance; this builds on its existing efforts to build bridges at conferences, workshops, and other Energy Trust-sponsored activities. At the far end of the spectrum, Energy Trust serves as an arranger for promising projects, connecting the entities with energy potential to those with professional and financial resources.

One of the most useful steps within this spectrum would be to provide some guidance on navigating the intricacies of the tax code as they relate to renewable energy projects. For projects in the small wind and small PV realms, these issues can be confusing and cause projects to stop. Such guidance may take the form of a list of accountants that have experience with renewable energy projects or an advice letter from a tax attorney addressing a subset of issues for a target audience (e.g., residential customers).

Relationship to current practices: Expand current practices

Barrier Addressed	Link between Barrier and Potential Role
▪ Benefit of state tax credit is limited.	▪ The ability to monetize the Business Energy Tax Credit (BETC) is critical, and developers are challenged to find partners with sufficient tax appetite.
▪ Inability to match development interest with financial and professional resources	▪ Energy Trust can help overcome this barrier by identifying parties with similar goals and interests and connecting them.
▪ Uncertainty over accounting issues	▪ In most cases, most accounting issues could be addressed by consulting with a tax accountant that understands the relevant code, but it is difficult to know which ones have credible experience with renewable energy investments
▪ Gap between Energy Trust support of feasibility and payment of incentives	▪ Energy Trust would not need to contribute capital to support projects in this arrangement, but it could help identify partners that are willing to invest.
▪ Municipal staff do not understand the project development process (esp. small hydro)	▪ Early in the project development process, many challenges caused by unfamiliarity with development can be addressed by meeting with a professional in that sector. The matchmaking service would help staff identify potential experts that can provide such assistance.

Magnitude of impact: Moderate impact

Barriers and Opportunities

Opportunities	Barriers
▪ Leverages existing interest in development.	▪ Strategic – Some parties may resist making their interest public
▪ Minimal capital commitment, though it does require staff commitment.	▪ Operation/Financial – Energy Trust cannot be construed as a tax advisor
▪ Ability to choose the scale of involvement and to change it as resources change.	▪ Reputation – Care must be taken that Energy Trust not be in a position to pick favorites in competition among highly qualified firms without competitive processes. Even if Energy Trust process is patently fair, it may not be perceived or construed as such.
▪ Builds on existing Energy Trust activity in this area.	▪ Reputation- Energy Trust may lose credibility if referred partners don't pan out.

Examples of existing (or previous) implementation:

Energy Trust is already active in some parts of this spectrum. The Trade Ally Networks is one example of its involvement, as are the conferences that Energy Trust holds periodically. However, Energy Trust rarely recommends individual Trade Allies among competing firms. Energy Trust either provides choices or rotates referrals

Potential Role: Further expand targeted marketing efforts to clarify Energy Trust's role in the marketplace and the importance of renewable energy technologies.

Description

In coordination with other efficiency and renewable energy organizations, Energy Trust could expand its efforts to achieve two objectives, one for each of two target audiences:

Objective	Primary Target Audience
To clarify Energy Trust's role in the market landscape relative to other state, non-profit and private entities	Key industry players (e.g., PV installers)
To communicate the importance of renewable energy technology in the state's energy future	Segments of the public with the ability to influence the adoption of renewables (e.g., financial community)

Under the first objective, Energy Trust would communicate its goals as an organization (as outlined in the long-term strategic plan) and the means used to achieve them (e.g., the above-market cost methodology). This would inform key industry players about the resources that Energy Trust has available. Under the second objective, Energy Trust would help to overcome some of the basic educational needs of project developers, building end user demand for the technologies (especially for PV and dairy-sited biomass).

Relationship to current practices: Expand current practices

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Energy Trust acquisition of RECs	▪ Developers need to understand Energy Trust's rationale behind and approach to calculating is share of the RECs.
▪ Low consumer awareness about PV benefits and risks	▪ Another component of the communication effort could focus on outreach to key markets.
▪ Concerns about the accuracy of Energy Trust's calculation of above-market costs	▪ Communicating Energy Trust's approach to the public would alleviate concerns about its accuracy – and facilitate a dialogue about actual costs.

Magnitude of impact: Significant increase in awareness of Energy Trust's resources

Barriers and Opportunities

Opportunities	Barriers
▪ Create a common language for discussing renewable energy resources	▪ Reputation – If done ineffectively, marketing could hurt rather than help
▪ Leverage economies of scale, accessing hard-to-reach communities with the potential to impact installed capacity	▪ Operation –Requires addition of staff with broader marketing focus rather than technology-specific focus
▪ Opportunity to draw on social networks, other organizations' existing messaging	▪ Operation – Many of these issues are difficult to understand unless the audience is working through a project with Energy Trust.

Examples of existing (or previous) implementation:

Social marketing has been integrated into demand-side management programs across the country, including the San Francisco Peak Energy Partnership and the Energy Center of Wisconsin.[4]

[4] Summit Blue Consulting. January 2007. *Appendix A: Program and Literature Summaries in Support of Social Marketing: Market Review.* Available: http://www.summitblue.com/dyn_downloads/1209484217.pdf

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APPENDIX B:

HIGH-LEVEL ANALYSIS OF POTENTIAL ROLES: RESTRUCTURING INCENTIVES

Potential Role: Expand standard offers.

Description

Energy Trust could extend standard offers to commercial solar photovoltaic (PV) projects that are 30 kW up to at least 1 MW in size and to biomass projects. The inclusion of larger PV projects is a critical step in developing economies of scale in the PV market. When larger projects are successfully incentivized, the labor pool needed to install the projects grows more competitive, driving down the costs of future projects. Over time, this reduction in project cost will enable Energy Trust to reduce its per-project incentive levels. Energy Trust may make a one- or two-year commitment to funding a certain number of these large projects using a standard offer to constrain the impact of such a program on the program's budget.

This is an extension of Energy Trust's current practice of providing standard offer contracts for residential and small commercial solar photovoltaic (PV) systems and to small wind projects. It is Energy Trust's practice to establish standard offers when classes of projects are known well enough to establish standard costs, those costs and above-market cost are fairly consistent and when funds are available for a volume of projects. As such, Energy Trust would still use its above-market cost methodology but would use industry averages when the class of projects is well enough understood. Ensuring that sufficient funds are available to provide incentives for an adequate number of projects will be a challenge, but this could be addressed by establishing rigorous requirements for eligibility for the incentives.

Relationship to current practices: Expand current practice

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Overall level of uncertainty is significant for developers	▪ Many parts of a project's economics are in flux throughout the development cycle. If Energy Trust would extend a standard offer to more projects, it could eliminate its contribution to the uncertainty in project economics.
▪ Cap on project size due to state and Energy Trust incentives	▪ Larger projects start to develop economies of scale, but the project economics typically require additional incentives to make the ends meet. Energy Trust could offer a lower per-kW incentive for larger projects because of the economies of scale and secure more kW development at a lower cost.
▪ High transaction costs associated with project-by-project negotiation	▪ Standard offers eliminate this transaction cost, which can be high if negotiations are extended.
▪ Installation costs using local labor are higher in Oregon than in other parts of the country.	▪ Until the project economics make sense for these large projects, developers of scale will not develop a presence in Oregon, and installation costs for all PV projects – small and large – will remain higher than in other states.

Magnitude of impact: Significant increase in installed MW

Opportunities and Barriers

Opportunities	Barriers
▪ Ability to secure additional installed capacity	▪ Financial – Increasing size of eligible PV projects requires larger budget than is currently available.
▪ Create economies of scale and competition in the labor pool	▪ Operation – May lose some marginal projects by using industry norms rather than project-specific data
▪ Reduce transaction costs for Energy Trust and for developers	▪ Financial – May overpay for some projects when using industry norms
▪ Eliminate one source of uncertainty in the developers' pro forma	• Operational – If level is inappropriately set, there may be no uptake.

Examples of existing (or previous) implementation:

Massachusetts' Commonwealth Solar program offers incentives for PV projects up to 500 kW.[5]

[5] Database of State Incentives for Renewable Energy. "Massachusetts: Commonwealth Solar Rebates." Available: www.dsireusa.org

Potential Role: Allow buy-out clauses for REC payments

Description

Buy-out clauses allow one party to pay to relieve itself of contractual duties. For Energy Trust partners, the contractual duties would be the delivery of RECs. When Energy Trust pays out incentives and negotiates its agreement with the seller, a clause would be included that allows for the seller to pay a specified amount to be excused from its obligation to deliver RECs under certain conditions.

In effect, this would create a price floor for RECs. If the price of RECs were below the price agreed upon with Energy Trust in the contract, the project owner would not pay to terminate the contract. If, in fact, the market price for RECs exceeded the price negotiated with Energy Trust by a sufficient amount to cover the buy-out payment, then the owner would under the terms of the contract pay to acquire the RECs from ET and sell on the open market. This is another strategy for reducing the uncertainty in the pro forma.

Relationship to current practices: Expand current practices.

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Perception that Energy Trust's method of valuing RECs undervalues RECs	▪ If developers have an "out," they can live with Energy Trust's initial valuation of RECs with the understanding that they can escape from it if it undervalued the RECs.
▪ Energy Trust acquisition of RECs in exchange for incentive reduces project value to the energy purchaser	▪ In some cases, the party purchasing the energy prefers to own the green attributes of a system (e.g., PV) in order to use it for marketing or to meet corporate commitments. The buy-out would enable them to do that.
▪ Concerns about the accuracy of Energy Trust's calculation of above-market costs	▪ If developers have an "out," they can live with Energy Trust's initial valuation of RECs with the understanding that they can escape from it if it undervalued the RECs.

Magnitude of impact: Moderate to significant

Barriers and Opportunities

Opportunities	Barriers
▪ RECs could be released into the market when REC prices are high to increase supply (and reduce prices)	▪ Strategic – RECs could be sold in California or another market with higher REC prices
▪ Provide a minimum incentive for developing a project in Oregon, allowing the developer to take advantage of the upside	▪ Strategic – Owners could sell RECs into the Oregon market at higher prices, eliminating the price mitigation benefits to ratepayers
▪ Energy Trust funding is replenished after project is up and running, reducing opportunity cost	▪ Financial [for ratepayers] – Unless the resale of RECs is restricted to Oregon IOUs, utilities may need more RECs at a time when prices are high, thereby increasing costs to ratepayers.
▪ Benefits of Energy Trust's early purchase of RECs could be secured by restricting buy-outs to times when utilities are in balance for the RPS. This would allow the projects to take advantage of higher prices in other states.	▪ Financial [for ratepayers] – Financial benefits of early Energy Trust purchase of RECs are lost.

Examples of existing (or previous) implementation:

The Massachusetts Technology Collaborative (MTC) used price floors as one option in its Massachusetts Green Power Program (MGPP).[6] MTC guaranteed a minimum price for the projects' RECs by establishing an escrow account in the name of the project. In the event the project used MTC funds, MTC sold the RECs into the market and received the proceeds.

[6] Cory, K. and N. Bolgen and B. Sheingold. "Long-term Revenue Support to Help Developers Secure Project Financing." Presented at the American Wind Energy Association's 2004 WINDPOWER conference.

Potential Role: Offer financing for development stages: bridge and construction financing

Description

Energy Trust can offer low-interest financing during pre-development and construction periods to help bridge the gap between its feasibility assistance and post-construction incentive payments. Energy Trust should plan to limit its share of the project costs to a certain dollar amount and a certain percentage of overall project first costs. It should also assure that the borrower provides collateral in case the project is not finished or the loan is not repaid. This will ensure that the partners have a stake in the project and provide some assurance that the project developer will complete the project.

Once the borrower pays back the loan, the money is put back into the pool available for additional loans. This will enable Energy Trust to continue providing assistance to new projects, adding installed capacity of renewable energy technologies.

Relationship to current practices: New roles within current mandate

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ High fixed costs of wind development make small projects unreasonable	▪ The competition for capital investment in the wind development community is fierce. It is more difficult for small projects to secure enough capital to move forward because investors could commit the capital to larger projects with better returns.
▪ Gap between Energy Trust support of feasibility and payment of incentives	▪ Project developers must put up significant amounts of capital to prepare for construction (e.g., permitting, project design) and during the construction phase. Arranging this capital infusion, which is only needed until Energy Trust's incentives are paid, can kill projects.
▪ Up-front capital commitment can be difficult for small hydro projects	▪ Many small hydro projects are put forward by public agencies with multiple demands on capital. Although the money is only needed temporarily, the opportunity cost can discourage the investment since it is not needed to maintain a functioning system.

Magnitude of impact: Significant increase in installed capacity

Barriers and Opportunities

Opportunities	Barriers
▪ Bridge gap between Energy Trust technical assistance/feasibility funding and incentive payment	▪ Strategic – Eliminates existing Energy Trust screen for developers to prove their ability to manage the project. (Energy Trust would need to develop other methods to prove developer readiness.)
▪ For small hydro, overcome capital constraints of government agencies	▪ Operation – Transfers risk of project failure or delay from developer to Energy Trust if no collateral is held for the loans
▪ Leverage funds available from developer (e.g., through matching)	▪ Strategic – Potential overlap with Oregon Department of Energy's energy loan programs (SELP), which also provides financing for construction

Examples of existing (or previous) implementation:

The Renewable Energy Trust of Massachusetts will provide funding for up to 75% of pre-development costs for certain renewable energy technologies.[7] This amount is capped at $250,000 for wind and biomass projects and $150,000 for other eligible renewable energy technologies. These funds are disbursed as a loan, subject to an interest rate of prime plus 2%, at the time costs are incurred (either invoiced or paid) rather than at the time of approval.

[7] Massachusetts Technology Collaborative. July 8, 2008. "Pre-Development Financing Solicitation." Solicitation Number 2009-PDI-01. Available: http://www.masstech.org/grants_and_awards/CE/predev_overview.htm Additional information, including terms and conditions, are available at this website.

Potential Role: Act as project developer for community wind and small hydro.

Description

Energy Trust would take on the role of a developer, identifying potential projects, working with relevant parties to ensure that all necessary permits are obtained, procuring equipment, putting up capital, and managing the construction process. If Energy Trust took on the role of solely a developer, it could try to find another party (e.g., a municipality) to pay Energy Trust a developers' fee and to front the pre-development, development, and construction costs. In other words, the third party would act as the equity investor. The development role would work best, however, if coupled with the next role in which Energy Trust also serves as an equity investor.

Relationship to current practices: New role outside of current mandate

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Interconnection is expensive and risky for small developers.	▪ Energy Trust's experience with interconnection issues would enable it to navigate the process more efficiently.
▪ Inability to match development interest with financial and professional resources	▪ Energy Trust would serve as the match for entities with development interest but without professional resources. This would streamline the development process.
▪ Municipal staff do not understand the project development process.	▪ Energy Trust would develop the projects, teaching the municipal staff about key aspects along the way. It would not require municipal staff to replace their regular duties with development activity, however.

Magnitude of impact: Significant increase in installed capacity

Barriers and Opportunities

Opportunities	Barriers
▪ Fills a significant gap in the market	▪ Strategic – Must find another party that is willing to put up capital and pay Energy Trust a developers' fee.
▪ Leverages existing Energy Trust capacities	▪ Strategic – Energy Trust builds capacity internally rather than in private sector.
▪	▪ Strategic – Complicates relationships with utilities.

Examples of existing (or previous) implementation:

This role has not been taken on by other public or ratepayer-funded agencies.

Potential Role: Act as project equity investor for community wind and small hydro.

Description

This role could serve as an alternative to the financing role described earlier. For projects developed by outside entities, Energy Trust could serve as one of several[8] equity investors in exchange for a reasonable return on its investment. If Energy Trust serves in the developer's role, Energy Trust could negotiate with the local municipality for project purchase at the time of project completion, reducing risk for the municipality and creating a guaranteed exit (with a sufficient rate of return) for Energy Trust. In either case, the returns could be used to fund additional projects going forward. Energy Trust could build a portfolio of these smaller projects to mitigate the risk that any single project does not reach completion.

Relationship to current practices: New role outside of current mandate

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Project owners with only one project cannot hedge risk using a portfolio approach.	▪ If it maintained a stake in several projects, Energy Trust could build a portfolio of projects, hedging the risk associated with any single project
▪ Up-front capital commitment can be difficult.	▪ Many small hydro projects are put forward by public agencies with multiple demands on capital. Although the money is only needed temporarily, the opportunity cost can discourage the investment since it is not needed to maintain a functioning system.
▪ Inability to achieve ideal project size	▪ If Energy Trust served as an equity investor in several community wind projects, it could aggregate the turbine orders. This would overcome the hurdle of securing turbines.
▪ High fixed costs of wind develop make small projects unreasonable	▪ The competition for capital investment in the wind development community is fierce. It is more difficult for small projects to secure enough capital to move forward because investors could commit the capital to larger projects with better returns.

Magnitude of impact: Significant increase in installed capacity

[8] One of the other investors should be able to directly take advantage of the tax benefits offered for renewables.

Barriers and Opportunities

Opportunities	Barriers
▪ Fills a significant gap in the market	▪ Operational – Requires more funding than is currently available for Energy Trust
▪ Addresses difficulty in securing capital in municipal/community settings	▪ Strategic – Energy Trust builds capacity internally rather than in private sector.
	▪ Strategic – Eliminates existing Energy Trust screen for developers to prove their ability to manage the project. (Energy Trust would need to develop other methods to prove developer readiness.)
	▪ Financial – Energy Trust's funds are at risk without collateral

Examples of existing (or previous) implementation:

This role has not been taken on by other public or ratepayer-funded agencies. One of the clean energy funds in Pennsylvania has invested equity in clean energy companies, though not at the project level. In its investment in the companies, the fund partnered with a private equity fund as a limited partner, reserving veto rights over investments that failed to meet its risk profile. This partnership leveraged the funds of both the state fund and the private equity partner and enabled the public investment to benefit from the expertise of the private equity investor, which examines hundreds of deals every year.

Potential Role: Aggregate turbine orders

Description

Energy Trust can aggregate the turbine purchases of several community-scale projects in order to develop turbine orders that get attention from turbine manufacturers. Energy Trust can identify several community-scale projects in need of turbines and combine their orders into a single order. Such agreements would need to be driven by contracts that specify the terms and conditions under which the order is placed.

Key decision points include which party puts up the collateral for the order, how far into the development cycle projects would need to be in order to qualify, how large the aggregate order would need to be, and which turbine manufacturer would agree to deliver the turbines to different locations. One option would be to finance the turbine acquisition through a program such at that offered by Midwest Wind Finance.

Relationship to current practices: New role within current mandate

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Inability to achieve ideal project size	▪ By aggregating turbine orders, Energy Trust could overcome a single developer's inability to place a turbine order with a reputable manufacturer.

Magnitude of impact: Modest effect on installed capacity of community wind projects

Barriers and Opportunities

Opportunities	Barriers
▪ Addresses the primary barrier to development of community-scale wind in Oregon.	▪ Operation /Performance risk: Some turbines work better in certain conditions than others. One turbine may not fit all needs.
▪ Creates economies of scale.	▪ Financial – Risk must be allocated appropriately between Energy Trust and developers. Risk that if projects fail, ET has capital locked up in hardware. ▪
▪ Facilitates development of several projects at once.	▪ Operation – Aggregate number of turbines needed at any given time may not reach critical mass needed for order.
▪	▪ Since one turbine is a large percentage of current ET renewable budget, there are large binary risks. Delays could tie up a large share of ET funds.

Examples of existing (or previous) implementation:

Massachusetts purchased two 1.65 MW turbines and placed them up for sale, first to in-state developers wishing to develop on publicly-owned land.[9] If they fail to sell by the deadline, they will be offered to any developer. This is a slight variation on the theme proposed here for Energy Trust.

[9] Massachusetts Technology Collaborative. November 2007. "Turbine Supply Agreement Term Sheet." Available: http://www.masstech.org/Grants_and_Awards/turbine/turbine63008.html

Potential Role: Expand program for demonstrating close-to-market technologies.

Description

New technology is available that may facilitate the deployment of renewable energy projects. Technologies include small-scale geothermal projects with lower temperature conditions than conventional technology, building-integrated PV systems, and small wind systems that haven't gotten much traction in the marketplace. Energy Trust could expand its existing demonstration program that showcases close-to-market technologies to include this technology. Providing funding for a small number of installations at sites with characteristics similar to other potential installation sites in Oregon would enable the technology to be tested at minimal risk to the host site. If the technology is proven in these installations, it may be eligible for installation in other parts of the state.

Relationship to current practices: Expand current practices

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Drilling of geothermal wells incurs too much risk for potential return	▪ New geothermal technologies can produce electricity at lower temperatures than conventional technologies. Thus, the likelihood that a viable resource is found for these technologies is higher.
▪ Low consumer awareness about the risks and benefits of renewable energy technologies	▪ Deploying these unfamiliar technologies in high profile settings will enable the public to become better acquainted with them and to consider the possibility of installing the technologies on their own property.

Magnitude of impact: Unknown

Barriers and Opportunities

Opportunities	Barriers
▪ Prove technology at minimal risk to end user	▪ Strategic – Some technologies may not have been proven to work in conditions similar to Oregon's
▪ Potential to replicate projects if technology is proven and price is right	▪ Strategic – If technology works, its ultimate success would depend on factors in addition to technical viability (e.g., price point)
▪ Increases local familiarity with technology	▪ Strategic – Up-front labor costs for some technologies will be high due to the lack of trained labor
▪ Provides opportunity for outreach to public on renewable energy and to engage high profile players (e.g., major corporations or municipalities) as project partners.	▪ Financial – Energy Trust would likely need to bear the bulk of financial risk for early projects

Examples of existing (or previous) implementation:

A UTC technology that produces electricity using lower changes in temperatures than traditional geothermal technologies was demonstrated at the Chena Hot Springs Resort in Alaska.[10] Co-funding was provided by UTC and the resort. Further, most renewable energy technologies (including wind and PV) have received demonstration funding by public entities at some point in their development. Examples include U.S. Department of Energy funding of wind and PV demonstrations and Cleveland's Great Lakes Science Center funding of a highly visible wind turbine and a solar array along Cleveland's lakefront.

[10] Karl, B. March 2006. "Renewable Energy and Sustainable Development Projects at Chena Hot Springs, Alaska." Available: http://www.smu.edu/geothermal/Oil&Gas/Karl_Chena,%20AK.pdf

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APPENDIX C:
HIGH-LEVEL ANALYSIS OF POTENTIAL ROLES:
PROVIDE ADDITIONAL TECHNICAL ASSISTANCE

Potential Role: Conduct high level wind feasibility studies at the county level

Description

Feasibility studies could include a *high level* assessment of environmental impacts (including avian and bat impacts), interconnection situation, stringency of permitting process and requirements, and assessment of the wind resource in the area. Energy Trust currently co-funds feasibility studies on a project-by-project level, and this role would expand that activity beyond project-specific studies. Through the more general feasibility studies, Energy Trust would consider an entire county to help a community-scale wind developer identify the economies of scale that could be leveraged by building several smaller projects in the same area. By providing this service, Energy Trust would enable developers to focus their efforts on areas with higher likelihood of project success, thereby increasing the likelihood that a project would be completed.

Relationship to current practices: Expand current practices

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Overall level of uncertainty is significant for developers	▪ Community-scale wind developers would benefit from a framework in which to evaluate project development opportunities. Energy Trust's up-front feasibility studies that are not tied to a specific project will provide such a framework. This will enable developers to assess project economics earlier in the process and reduce transaction costs.
▪ Small projects require the same amount of effort to develop as larger ones but lack economies of scale.	▪ Energy Trust's funding of early stage feasibility studies can help developers identify the projects that will never be successful early on. By reducing some of the up-front costs, this effort will improve project economics.

Magnitude of impact: Dependent on effectiveness of role in turbine acquisition

Barriers and Opportunities

Opportunities	Barriers
▪ Create economies of scale	▪ Operation – Provides only a high-level overview rather than high resolution information
▪ Reduce transaction costs for developers	▪ Strategic – Fails to address the issue that the rights to many of the best sites for wind have already been bought up by large developers.
▪ Assist developers identify wind-friendly permitting and interconnection schemes	▪ Financial – Since this is not tied to a specific project, risk that the funds will be spent and no projects developed
▪ May reduce number of "dry holes" for full studies.	▪

Examples of existing (or previous) implementation:

Several feasibility studies have been conducted at the county level since large-scale wind facilities often span entire counties; these studies are typically funded by the developer. Cuyahoga County, located in Northern Ohio on the banks of Lake Erie, recently sponsored a feasibility study for an off-shore wind demonstration project.[11] It is examining the wind resource, environmental considerations, issues related to grid connection, and other related issues.

[11] Cuyahoga County Board of County Commissioners. 2007. "Wind Turbine Feasibility Study." Available: http://development.cuyahogacounty.us/en-US/Wind-Turbine-Feasibility-Study.aspx

Potential Role: Help biomass developers examine their project from the perspective of investors

Description

Energy Trust could use its staff's financial expertise to analyze project *pro formas* and identify weaknesses in the project economics. Engaging in such analysis *before* a project developer brings in the financial community will enable developers to present viable, well-organized project economics to the funding community. This should reduce the time it takes to identify investors and the amount of time that developers spend chasing after uneconomic or marginal projects. Energy Trust can also leverage this opportunity to communicate with the biomass developer about the range of financial resources available to improve project economics, including Energy Trust funds, and federal and state grants.

Relationship to current practices: Expand current practice

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Inability to match development interest with financial and professional resources	▪ Energy Trust could help developers present a more coherent business case for their projects to the investor from the outset, facilitating the partnerships between developers and investors.
▪ Energy Trust acquisition of RECs in exchange for incentive reduces project value to the developer	▪ Project financiers give more value to REC prices when the RECs are under a fixed-price contract with a buyer (which Energy Trust's incentives provide) than when they are left to a speculative market. Examining the project from an investor's perspective would enable developers to see the value of securing a contract with Energy Trust.

Magnitude of impact: Marginal impact but would increase interaction with interested developers, which may have secondary benefits

Barriers and Opportunities

Opportunities	Barriers
▪ Enables Energy Trust to identify quality projects early in the process	▪ Operation Risk – New service requires marketing to reach target audience
▪ Leverages existing Energy Trust expertise	▪ Operation Risk – Developers may be wary of divulging details of project finances so early in the process
▪ Minimal capital commitment required	▪ Operation Risk – Developers (or interested parties) may bring in an abundance of marginal or poor projects, overloading Energy Trust staff
▪ Increases touch points with potential developers, facilitating development of viable projects	▪ Operation – Energy Trust's existing financial capabilities are a starting point but will need to be enhanced with financial sector experience.
▪ Identifies other sources of financial support early on, leveraging Energy Trust resources	▪ Financial/Reputation – Providing investment advice can lead to lawsuits. Need to define role carefully.
▪ Minimal exposure to financial risk for Energy Trust	
▪ Helps less experienced developers find financial partners	

Examples of existing (or previous) implementation:

This is an extension of services that Energy Trust is already providing for biomass. Currently, Energy Trust will co-fund feasibility studies for developers and can provide targeted guidance in building the financial case for a project. This role would have Energy Trust expanding its participation in the latter area significantly, including providing information to a broad audience of potential developers. The proposed role would also incorporate more detailed analysis and guidance on the financial aspects of a project.

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APPENDIX D:
HIGH-LEVEL ANALYSIS OF POTENTIAL ROLES: INCREASE CERTAINTY AROUND THE MARKET FOR BIOMASS FUELS

Potential Role: Increase certainty around the market for biomass fuels

Description

Similar to the spectrum of matchmaking services that Energy Trust can provide, there is a spectrum of potential roles for enhancing certainty around forest waste/mill residue fuel supplies. At a basic level, Energy Trust can conduct regional fuel assessments to identify potential fuel sources and current demand for them. Taking another step, Energy Trust can identify areas in which to concentrate urban wood waste or forest waste and secure aggregated supplies of those resources for biomass facilities. These roles would reduce some uncertainty about the sources of fuel but not about the price of the resources.

Relationship to current practices: New roles within current mandate

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Inability to secure long-term fixed price supply contracts for fuel	▪ The aggregator of the fuel (Energy Trust or another party) may decide to offer long-term fixed-price contracts , alleviating this barrier.
▪ Rising transportation fuel costs change project economics.	▪ Identifying and aggregating fuel sources near potential development sites can help to create economies of scale in the logistics for these fuels.

Magnitude of impact: Moderate to significant increase in installed biomass capacity

Barriers and Opportunities: Resource assessment and resource aggregation

Opportunities	Barriers
▪ Assessment takes steps toward overcoming market failure of imperfect information	▪ Operation – Assessment and aggregation of fuel supply does not guarantee a fixed price ▪
▪ Resource aggregation encourage concentration of plants near load centers	▪ Operation/Reputation – Resource assessment would require regular updates as new biomass facilities are built and demand for the resources increases
▪ Resource aggregation creates economy of scale, reduces transaction costs	▪ Operation/Reputation – Federal access policy to forests may change with new administration and is not predictable- may influence scale of potential market.

Examples of existing (or previous) implementation:

Massachusetts[12] commissioned a statewide resource assessment of woody biomass, as did Wyoming.[13]

Potential Role: Deploy Contracts for Differences

Description

Contracts for differences (CFD) are used to manage price risk; in the financial markets, they are also known as swaps. CFDs allow parties to trade fixed and floating cash flows: one party with access to a floating cash flow (e.g., merchant REC sales) trades it to a counterparty for a fixed cash flow (e.g., a set payment for RECs). The counterparty that is accepting the floating cash flow charges a premium for providing the service. CFDs enable the parties to match their risk appetites to their risk profiles.

To address the issue of fuel price volatility, Energy Trust can utilize the contracts for differences (CFD) or establish plant-specific contingency funds for years in which biomass prices exceed a specific price. Developers cite the scarcity of fixed price fuel supply agreements for forest biomass and mill residue as the primary barrier to development. At a minimum, CFDs would need to last five to seven years. CFDs with Energy Trust would enable developers to remove that uncertainty from their financial statements, reducing the risk and the associated cost of capital.

Either of these instruments would serve as insurance to the biomass facility owner and would put Energy Trust in the position of underwriter. Such a position would require significant research to establish appropriate price points, risks, and mitigation efforts. Energy Trust could assemble a portfolio of CFDs to mitigate risk, which is difficult for small-scale developers.

Relationship to current practices: New role- may require changes in PUC grant agreement or exceptions from PUC for term beyond 3 years.

Key barriers addressed

Barrier Addressed	Link between Barrier and Potential Role
▪ Overall level of uncertainty is significant for developers	▪ Developers face uncertainties in many aspects of project development and operation. CFDs would address the major uncertainty for woody biomass projects.
▪ Uncertainty in fuel supply availability and price	▪ Certainty in the price and availability of fuel is the primary barrier to developing woody biomass projects. CFDs can alleviate part or all of that uncertainty

[12] Massachusetts Biomass Energy Working Group Supply Subcommittee. May 2002. *The Woody biomass Supply in Massachusetts: A Literature-Based Estimate.* Available: http://www.mass.gov/doer/programs/renew/rps-docs/woody.pdf

[13] Wyoming State Forestry Division, Office of State Lands and Investments. 2007. *Wyoming Biomass Inventory: Animal Waste, Crop Residue, Wood Residue, and Municipal Solid Waste.* Available: http://slf-web.state.wy.us/forestry/adobe/biomass.pdf

Magnitude of impact: Moderate to significant for biomass

Barriers and Opportunities

Opportunities	Barriers
▪ Could generate income for Energy Trust	▪ Financial – Energy Trust adopts market risk, making it difficult to predict the cost of this approach for Energy Trust
▪ Reduce uncertainty about biomass fuel supply availability and price	▪ Financial – Involves setting aside funds (e.g., in escrow) to secure the contract. Amount of escrow required is difficult to estimate, and may be larger per project until there is a diversified portfolio.
▪ Provide a more straightforward approach to valuing RECs	▪ Financial/Operation – Requires data analysis to forecast fuel/REC prices going forward
▪ Assembly of portfolio of CFDs would enable Energy Trust to hedge risk	▪ Strategic –Flow of large projects at Energy Trust scale is sporadic, and market conditions are volatile; demand for the product may be erratic and is difficult to predict.
▪ CFD, contingency funds take steps toward overcoming the primary barrier to biomass development	▪ Financial – CFD, contingency funds transfer significant financial risks to Energy Trust. Level of capital reserves required may be difficult to estimate. This may be a significant investment relative to Energy Trust's renewable energy budget.
	▪ Strategic – Market for CFDs for biomass fuel supply is not liquid; alternative hedging instruments must be used
	▪ Strategic – CFDs, contingency funds could suppress price signals, resulting in overdevelopment of biomass plants relative to available supply of fuel.
	▪ Strategic – RPS rules and carbon regulation may completely change the market by the time Energy Trust establishes its products in the market.
	▪ Strategic – The biomass market is tied to both wood products and pulp and paper markets. Each of these markets is susceptible to global influences that are difficult to predict. Committing funds to this area would result in unknown levels of risk exposure.

Examples of existing (or previous) implementation:

Enel North America and Fortis Merchant and Private Banking entered into a CFD for the energy from a wind plant in Texas.[14] The introduction of CFDs in REC and fuel markets is not documented.

[14] Cory, K. and T. Coughlin and T. Jenkin and J. Pater and B. Swezey. February 2008. *Innovations in Wind and Solar Financing."* National Renewable Energy Laboratory: NREL/TP-670-42919.