

Open Solicitation Hull 7.5-kW Wind Turbine

November 17, 2004

Purpose

Helen Hull of Newberg, Oregon, proposes to install a 7.5-kW, 7.2-meter African Wind Power (AWP) wind turbine.

To support this installation, Ms Hull requests \$10,226 through the Energy Trust's Open Solicitation Program (OSP). This briefing paper documents the Energy Trust staff's review of the proposal. As part of our review, we seek input from the Renewable Energy Advisory Council (RAC).

Recommendation

Staff supports this project and recommends it be accepted as a project under the OSP, receiving up to \$10,226 in funding. As a test of production-based incentives for small systems, staff recommends paying from this fund at a rate of \$0.0949/kWh.

This recommendation is contingent on Ms Hull retaining in service an anemometer installed nearby and delivering to the Energy Trust the wind data on a regular basis; on the project meeting ETO's technical standards; and on Ms Hull obtaining a net metering agreement with PGE.

Background

Ms Hull's husband, Robert Preus, operates Abundant Renewable Energy, and hopes to build a business selling AWP products. Abundant Renewable Energy will serve as the contractor on the project. Ms. Hull has already installed a 1.5-kW AWP 3.2 wind turbine without Energy Trust support.

Ms Hull is applying for Energy Trust funding as the proprietor her own small business. She has qualified the project for a Business Energy Tax Credit through the Oregon Department of Energy.

Relation to Strategic Plan

This project meets Strategic Goal 2, by providing over 21,500 kilowatt-hours of energy per year from a renewable resource; and Goal 4, by supporting the demonstration of a wind turbine potentially able to offer competition to the established market leader.

Technical Analysis

The project will use an AWP 7.2 wind turbine. An early – and perhaps the first -- unit produced at this size by this manufacturer, the AWP 7.2 is modeled on the firm's successful AWP 3.2, several hundred of which are installed worldwide. The project will use three WindyBoy 2500 inverters.

Based on its design and the performance of AWP's 3.2 unit, Abundant Renewable Energy expects Hull's machine to perform particularly well at low wind speeds. Ms Hull expects the project to generate 21,557 kWh annually. However, this is likely to be the top end of what is achievable.

Benefits

If successful, this 7.5-kW project could help establish an alternative to the Bergey Excel 10-kW machine, which currently dominates the market. The AWP machine might also represent a sound product for regimes with lower wind speeds.

Over the first 20 years of the project, the clean power produced by the turbine will help avoid over 300 tons of CO₂ emissions. To sequester this much carbon would require planting approximately 6 acres of forest.

Cost Analysis

The table below summarizes our analysis of project costs. We base our analysis on a system life of 20 years. We have limited Ms Hull's proposed costs through assessing what is "usual and reasonable" for some individual cost components.

Total installed costs	\$44,632
NPV of operating costs (interest, O&P and insurance)	5,010
NPV energy output	(18,181)
NPV BETC net of Federal tax impacts	(4,733)
NPV of tax value of depreciation	(16,051)
NPV above-market costs	\$10,226

Notes:

1. This analysis calculates net present values with a discount rate of 8.3%.
2. The energy value assumes a retail rate of 7.30 cents/kWh, inflated over time at 2.5%.
3. The NPV for the state's Business Energy Tax Credit (BETC) recognizes that federal tax liability may increase due to lower state tax payments, since state taxes are deductible.
4. This analysis assumes the Energy Trust would take title to all green tags. Ms Hull is still researching opportunities to sell the tags, and we are open to opportunities that would lower Energy Trust's above-market funding.

An award of \$10,226 from Energy Trust to Ms Hull represents 21% of the net present value of project costs. Our proposed award will be paid over the first five years of operations at a rate of 9.49 cents/kWh, capped at \$2,045 per year. We will extend the agreement up to two additional years in the case of low production due to low wind, but the overall grant will remain capped at \$10,226. Paying on production for small wind projects is a new practice, but allows the Energy Trust to avoid performance risk.

On a capacity basis, our award is equivalent to \$1.36 per Watt. For context, Energy Trust's support of the 161-kW Pepsi photovoltaic project was equivalent to \$1.30 per Watt.

Committee/Public Review

With the help of an outside consultant, staff analyzed the project early in September and October of 2004. It met the criteria established in the application process. Staff seeks input and review by the RAC on November 17, 2004. By Board policy, the project is small enough to be approved by the Energy Trust's Executive Director.