

## Briefing

# Griffen Small Wind Project

June 1, 2005

---

### Summary

Energy Trust staff propose providing up to \$10,500 to install a 1.5 kilowatt (kW) wind turbine at a residence southwest of Salem, Oregon. The turbine is manufactured by African Wind Power and is designed to operate in low wind areas by having twice the swept area of comparably rated turbines. It will provide approximately 55% of electricity required by the residence.

The project will serve as a demonstration of the type of small wind system applicable for the PGE service territory.

### Relation to Strategic Plan/Action Plan/Budget

This project meets Strategic Goal 2, by providing an average of 5,300 kWh of energy per year from a renewable resource and Goal 5, by helping demonstrate a small-scale, rural energy application. The results of the demonstration will be useful as we research the development of a small wind program.

Funds for the project are included in the approved FY '05 budget, within the amount set aside to fund the Open Solicitation Program.

### Project Description

Dr. Warren Griffin proposes to install a small grid inter-tie wind system at his residence southwest of Salem, Oregon. Dr. Griffin is a customer of Portland General Electric (PGE) and the project will interconnect to PGE's distribution system and serve local loads.

The project would consist of the following:

- An African Wind Power AWP3.6 wind turbine. The wind turbine has a rotor diameter of 3.6 meters. Cut-in wind speed is 6 mph and the turbine reaches rated wind speed at 22 mph.
- The turbine will be mounted on a 106 foot galvanized pipe tower.
- An SMA Windy Boy 1800U inverter will connect the system to the grid. The rated efficiency of the inverter is 93% with efficiencies over 90% for most of its operating range.
- All required installation services included. Associated wiring, instrumentation, control and other required equipment.
- An anemometer will be provided through the Energy Trust's Anemometer Load Program. Monthly anemometer data collection will be required along with monthly energy production figures during the first four years of the project.

Wind data for the project was obtained from AWS TrueWind and is based on an anemometer 3.5 km east of the project site. The annual average wind speed for the site is estimated to be 12.1 mph at 30 meters. Based on a shear alpha of 0.165, the wind speed at the hub height of 106 ft (32.3 meters) is calculated to be 12.24 mph

## Cost Analysis

The analyses assume a 15-year economic life to the project. The table below summarizes the comparison of project costs and market values:

<u>Cost/Value</u>	<u>NPV</u>
Total Project Costs	\$ 23,208
Market Value of Energy	\$ (4,075)
Green Tag Sales	\$ (1,066)
RETC	\$ (1,500)
Above Market Costs	\$ 16,566
<b>Energy Trust Contribution</b>	<b>\$ 10,500</b>

The project cost listed above includes all costs for capital equipment, construction, engineering, ongoing operations and annual maintenance.

PGE will pay Dr. Griffin based on terms established under Schedule 203, Net Metering Services and tariffs established under Schedule 201, Small Power Production. Estimated annual energy generation is estimated to be 5,300 kWh. The analysis assumed 96% availability of the wind generator, 99% availability of the utility grid and a 2% blade soiling loss.

The Energy Trust's contribution represents 63% of the above market costs, after netting for the State Residential Energy Tax Credit. Dr. Griffin will receive the green tags for up to five years, after which all green tags will belong to the Energy Trust. The Energy Trust would pay annually for four to five years based upon production.

## Benefits

- Over the expected life of the project, it will avoid approximately 56 tons of CO<sub>2</sub> emissions. To sequester this much carbon would require planting 3 acres of trees.

In addition to the quantifiable benefits of the program, staff believes this project will benefit the Energy Trust in the following ways:

- Demonstrates a residential wind system developed for low wind areas.
- Helps develop a relationship a nationally know small wind system developer.
- Introduces new subcontractors to a wind energy system installation.
- Test the market for acceptance of a performance based, pay on production incentive.

## Committee/Public Review

An initial application for the project was first provided to the Energy Trust in January, 2005. A completed full application was provided in March, 2005.

The project will be reviewed by the Renewable Energy Advisory Council (RAC) on June 9, 2005. Based on the new procedures and policies for Open Solicitation Projects requiring less than \$50,000, the project could be approved by the Executive Director of the Energy Trust.

### **Recommendation**

Staff strongly supports this project.