

Board Decision

River Campus One 60-kW photovoltaic sunshades

February 16, 2005

Purpose

Adoption of this resolution authorizes Energy Trust staff to negotiate and execute a contract of up to \$186,910 with OHSU Medical Group for the installation of 60 DC kilowatts (kW) of photovoltaic capacity on OHSU's River Campus One, to be built on Portland's South Waterfront Block 25. This capacity would be integrated into sunshades located over the windows on ten floors of the south façade. By policy, staff must seek approval for a project of this size on the Board's regular agenda.

Background

Gerding Edlen Development Corporation (G/E, the applicant of record to Energy Trust) is developing River Campus One on behalf of Oregon Health and Science University (OHSU). The overall budget for the building is approximately \$145 million. The project broke ground in April 2004, and is scheduled for completion in June of 2006.

G/E believes that a LEED Platinum rating is possible for River Campus One, although the sunshades will generate insufficient power to earn a LEED point. Other sustainable features of the building include microturbines generating one-third of the building's power. A membrane bioreactor will treat the building's wastewater. River Campus One is expected to achieve 60% energy savings over code.

OHSU will accept a 40-year payback on this project.

Relation to Strategic Plan

This project meets Strategic Goal 2, by providing approximately 66,000 kilowatt-hours (0.0064 average AC megawatts) of electricity annually from a renewable resource; and Goal 4, by demonstrating building-integrated photovoltaic technology in a highly-visible location.

Technical Analysis

Energy production from the solar sunshades will be degraded if a tall building is erected to the south on Block 29. Shading would begin in mid- to late summer, depending on the height of the Block 29 building. OHSU also owns Block 29, although G/E is not involved in its development, and plans for Block 29 are still apparently in flux. G/E believes that OHSU is unlikely to build higher than 250 feet, although 325-foot buildings have been actively (and controversially) discussed for this general area.

- Construction of a **250-foot** building on Block 29 would lower annual energy production of the Block 25 sunshades to about **80%** of optimum.
- Erection of a **325-foot** building would lower the sunshades' output to **below 70%**.

For comparison, the Energy Trust Solar Electric program requires that approved photovoltaic projects be capable of achieving at least 75% of the optimum solar production possible.

G/E reports that they have discussed our concerns with OHSU; that OHSU understands those concerns; and that OHSU expressed willingness to negotiate an appropriate contract provision to protect our interests (e.g., via a rebate if shading from Building 29 lowers Building 25 energy output below a certain level).

Benefits

This project will demonstrate building-integrated photovoltaic technology in a widely visible building that incorporates a variety of sustainability features. The electricity produced by the solar sunshades will help avoid approximately 46 standard tons of CO₂ emissions per year over the first 20 years of operation. To sequester this much carbon would require planting approximately 18 acres of forest.

Cost Analysis

The total cost of the G/E sunshades as designed is \$13.20 per installed Watt, consisting of \$4.86 for the basic sunshade structure, and \$8.34 for the photovoltaic portion of the sunshade. Our review suggests that this cost is at the low end for such products, although few direct comparisons exist.

The table below summarizes our estimate of above-market costs, based on a system life of 20 years.

Total installed costs	\$500,400
NPV of operating costs	23,112
NPV of green tag sales	(13,090)
NPV energy output	(42,778)
NPV BETC, net of Federal tax impacts	(94,847)
NPV of state and Federal accelerated depreciation	(57,278)
Federal Investment Tax Credit	(50,040)
NPV above-market costs	265,479

Notes:

1. This analysis assumes a discount rate of 8.25%.
2. Installed costs include only the incremental cost of the photovoltaic portion of the sunshades, and not the cost of the sunshade structures themselves.
3. The energy value assumes a power purchase price of 5.61 cents/kWh, inflated at 2.5% annually.
4. This analysis assumes an ownership structure able to exploit all applicable tax benefits.

In their application, G/E requested \$200,000, less than our estimate of the project's above-market cost. We adjust that to \$186,910 by assuming a green tag sale at 5 cents per kilowatt-hour for the first five years of operation. This incentive represents \$3.12 per installed Watt, and corresponds to 70% of the project's above market costs.

For comparison, the incentive on the conventional (i.e., not building-integrated) Kettle Foods photovoltaic project was about \$1.00 per installed Watt. The Energy Trust incentive for the building-integrated Pepsi project was approximately \$1.30 per installed Watt. (The G/E installation will produce only about 80% of the electricity per Watt as the Pepsi project.)

The higher proposed incentive for River Campus One reflects the higher cost of G/E's architectural PV solution and the higher value of its visible, urban location – particularly in the PGE service territory.

Committee and Public Review

With the help of Doug Boleyn as an outside consultant, staff began analyzing the proposal in December of 2004 on an expedited basis, in response to G/E's hope for a funding determination in time to make their purchase decisions. The RAC endorsed the project on January 19, 2005.

Recommendation

Staff supports acceptance of this project into the Open Solicitation, and recommends a grant of up to \$186,910. Our funding will be contingent on the project meeting Energy Trust's technical requirements, and on achieving a satisfactory contractual provision to protect our investment should future construction impede access to sunlight.

RESOLUTION 316 TO FUND RIVER CAMPUS ONE SOLAR SUNSHADES

WHEREAS:

- 1. Gerding Edlen Development Corporation proposes to install a building-integrated system of photovoltaic sunshades representing 60 kilowatts DC of generating capacity on OHSU River Campus One, a building aggressively designed for sustainable use of energy to be built on Block 25 in Portland's South Waterfront development area.**
- 2. Building-integrated photovoltaics represent a promising but currently costly application of renewable energy technology worthy of support.**
- 3. Additional demonstration projects at highly visible locations in the PGE service territory are important to help better market the Energy Trust Solar program and aid in the program's expansion into the new construction market.**
- 4. The proposed project is consistent with Energy Trust's strategic plan, action plan and 2005 budget, delivering up to 66,000 annual kilowatt-hours of renewable energy to the PGE grid.**
- 5. This solar installation coordinates with expected support for energy efficiency measures provided by the Energy Trust through the New Building Efficiency program.**
- 6. A funding level of \$186,910 would represent an Energy Trust subsidy of \$3.12 per installed DC kilowatt.**
- 7. Construction of a building above 250 feet to the south of Block 25 would have potentially significant shading effects on the solar sunshades.**

- 8. The proposal was reviewed and endorsed by the Renewable Resources Advisory Council.**

It is therefore RESOLVED:

- 1. The Energy Trust of Oregon, Inc., Board of Directors authorizes staff to execute a contract with OHSU Medical Group for up to \$186,910 to support the installation of solar sunshades on OHSU's River Campus One at Block 25 of the South Waterfront, contingent on the satisfactory contractual treatment of possible shading effects from future development of surrounding buildings.**

Moved by: _____ Seconded by: _____

Vote: In favor: _____ Abstained: _____

Opposed: [list name(s) and, if requested, reason for no vote]