

Cambridge Solar Power Case Study

Porter Square Shopping Center

Action	Installation of 20 kilowatt solar photovoltaic system to generate electricity on site
Location	Porter Square
Date	October 1999



About the Building

Porter Square shopping center, erected during the 1950s, sits at an important crossroads and subway and commuter rail station. It houses twenty retail businesses, including a hardware store, bookstore, grocery store, pharmacy, and fitness center.

What they did

Motivation

In an effort to demonstrate solar photovoltaic technology in Porter Square, a densely populated mixed-use urban neighborhood in Cambridge, Massachusetts, Gravestar, Inc. installed a highly visible 20 kilowatt photovoltaic (PV) system on its shopping center. The project was part of a comprehensive property renovation project completed in October, 1999.

Project Goals

The PV system was designed to maximize its value as a public education tool. It was oriented on the building so that it would be easily viewed by the public, and passers-by can learn about the system at an educational kiosk located in the parking lot.



Key Players

- Paul Lyons - Solar Energy Consultant; mechanical engineer and President of Zapotec Energy; involved in the site assessment, system specification and selection, plus construction supervision and startup of the project.
- Gravestar - Property Manager Mike Doherty

Actions

- Eighty panels of solar cells were installed, each made from semi-conducting materials that react with the sunlight to produce electricity. Together this array of modules is capable of producing 20 kilowatts per hour of electricity. The electricity is converted by a power inverter system from direct current (DC) to alternating current (AC) and then transferred into the property to power site lighting; if a surplus is produced, it is sold to NSTAR. The PV array generates the greatest amount of energy on sunny days and even when it is cloudy there is still enough ambient light to produce electricity.
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Results

Annual Energy Production: 22,000 kWh, about 30% of the building's common area usage.

Annual Energy Cost Savings: approximately \$4,400

Annual Emissions Offsets: 31,680 lbs. of CO₂, 163 lbs. of SO₂, 53.9 lbs. of NO_x

Size: 80 modules (ea. measuring approx. 4 ft.x 6 ft.) Total panel area =1920 square feet

Electricity Produced to Date: 165,000 kWh between 1999 and 2008

Savings Realized to Date: Approximately \$35,000 in electricity charges

Other Benefits

There has been positive feedback and attention from tenants, surrounding residents and local community groups. The PV array has been a highly visible addition to the Porter Square redevelopment.

Lessons Learned

What Worked Well

A significant portion of the installation cost was due to the steel supports used to hold up the PV panels. This was done specifically to make the panels as visible as possible from Massachusetts Avenue and passersby. The owners of the property felt that this was well worth the added cost; the panels have made a positive statement for everyone to see and discuss.

Many potential retailers have approached the owner to discuss a lease option not just because of the center's location, but also because they share the owner's interest in renewable energy.

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