

# Port of Oakland supports solar with public-private partnership

Port of Oakland, CA, USA

## Overview

### First in US

On a clear day, passengers flying over Oakland International Airport (OAK) can see the very first solar power system built alongside an airport runway in the United States. Shimmering panels are organised into sets of arrays that absorb sunlight and produce clean power. From the ground, it is one of the greenest methods of generating electricity. As we travel along the security fence of the runway at OAK, we see these sleek panels, silently doing their job of converting sunlight into electricity to help power Oakland International Airport.

### Greening the Port

The Port of Oakland, which owns and operates Oakland International Airport (OAK), is also a municipal utility that purchases electricity from the wholesale market for its own use and for use by its tenants at the Oakland seaport and at OAK. The Port, as an urban public agency, strives to reduce its impacts on the environment while growing in a sustainable manner. For example, the Port's governing body, the Oakland Board of Port Commissioners, has established a Renewable Portfolio Standard (RPS) that requires the Port to obtain at least 20 per cent of its electricity from renewable sources and with a further goal of going well beyond that minimum. The zero-emission clean solar power system is a major step in meeting the Port Commissioners' environmental directives. Port Board President Anthony Batarse said, "The Port of Oakland's mission includes promoting the environmental well-being of our region. With the Port's very first energy plant, the decision was to go solar and that contributes to a healthy community."

To meet its renewable energy goals the Port is exploring every opportunity. At OAK there is considerable open area within certain aircraft safety zones that can support a low ground-mounted solar energy system. As a Municipal Utility, the Port is able to connect a large-scale solar energy system to its own electrical distribution system. That energy can be used throughout the airport without going on the transmission grid, thereby reducing congestion and strain on the grid during the hot summer days.

## Public-private partnership

The cost of financing a solar power system built, operated and maintained by the Port of Oakland was prohibitive. We all recognise that the cost of solar energy remains high because of the expense of the equipment relative to the energy produced. The Port of Oakland is a non-taxpaying public entity. Therefore it cannot benefit from available energy tax incentives and rapid depreciation schedules. Instead the Port took an innovative approach and chose to work with a private partner that could benefit from the tax and depreciation incentives. According to Port of Oakland Executive Director Omar Benjamin, "This innovative public-private partnership allows the Port to leverage its investment in clean energy for maximum environmental and community benefits. We are pleased to have taken this small but important step toward reducing greenhouse gases and providing renewable energy at our airport," added Benjamin.



Port of Oakland utilities administration engineer, Anthony Kekulawela, implemented the 756 kilowatt solar energy generation system project for the Port.

## Innovation

### Lift-off

In 2005, due to the rising cost of conventional energy prices and the associated environmental impacts, the Port of Oakland launched its expedition to obtain alternative, nearly pollution-free energy. At the time this project began, there were existing solar energy companies who would sell their power to the Port. However, a feasibility study indicated that such solar power would cost the Port three times what it paid for conventional power. An alternative for the Port was to build its own solar energy generating facility, but it did not have sufficient capital funds to finance the project. Instead the Port was able to secure a US\$ 2.9 million rebate from the local investor-owned utility in January of 2006 for a one Mega Watt (MW) solar energy generation system on the Port's property. That made it possible for the Port of Oakland to seek a public-private partnership.

### Process

A Request for Proposal (RFP) was issued and after a selection process and challenging negotiations, the Port was able to reach a Power Purchase Agreement (PPA), with a leading company in solar energy – SunEdison. Terms of this 20-year agreement requires SunEdison to design, build, finance, own, operate and maintain a solar energy system on Port property and for the Port to buy all of the solar energy that this system produces at prices stated in the PPA. The Port also has the option to purchase the facility after five years of operation.

Following approval by the Federal Aviation Administration for safety considerations, the project was built. In November 2007 SunEdison and the Port of Oakland held a 'Flip the Switch' ceremony to officially mark the beginning of sending solar-generated electricity into the Port's distribution system. Jerry Serventi, the Port's Director of Engineering, described the power of the project, "In its first full year of operation, this photovoltaic power system with nearly 4,000 panels will generate more than

1,000,000 kilowatt hours of clean renewable solar energy. This will have an immediate beneficial impact upon our environment.”

According to Port of Oakland utilities administration engineer, Anthony Kekulawela who implemented the project for the Port, “The installed solar panel array is capable of generating 756 Kilo Watts (KW) of electricity when the sun is ‘just right’. Even though the Port and SunEdison wanted a larger project, there were limitations imposed by the Federal Aviation Administration (FAA) due to particular aviation concerns.”

**Design**

The solar panels are installed on galvanized steel posts between the aviation safety buffer zone and the security fence of the Airport in an area of approximately 3.7 acres. In its current setting, these solar panels fully comply with the height limitations and aviation operational safety zone requirements.

This solar array generates a Direct Current (DC) of 200 volts from the sunlight. This current in its DC form has to be converted to Alternating Current (AC) in order to use it for normal energy needs. A device known as an inverter converts the Direct Current to Alternating Current. Then, using isolation step-up transformers, the 200 volts of alternating current is stepped up at different stages to create a voltage of 12,470 volts. That voltage is then connected to the Port’s power grid to provide part of the Port of Oakland’s daily electricity needs at Oakland International Airport.

**Conclusion**

**Benefits**

It is estimated that this system will generate approximately one million kilowatt hours (KWH) annually. From a layperson’s perspective, this is equivalent to powering approximately 175 homes for a year. Additionally, over the next twenty years, this solar energy system will effectively eliminate 17 million pounds of greenhouse gas emissions that would have been produced using conventional power. But these are not the only benefits attained from this project. By paying a fixed price for electricity to hedge against ever-increasing electric utility provider prices, the Port will know exactly what it will be paying for its electricity generated via the solar array for the next 20 years.

David Peixotto, manager of the Port’s utility department in the engineering division, said, “An additional benefit from the system is reducing the likelihood of brownouts or blackouts that can occur when the electric transmission grid is overloaded during peak energy demand periods such as summer hot spells. The energy from the solar array goes directly into the Port’s distribution system without going on the grid thereby reducing the stress on the grid.”



The zero emission solar energy system built on Port of Oakland property.



The solar panel array is capable of generating 756 Kilo Watts (KW) of electricity when the sun is ‘just right’.

**Room for more**

Interest in the Port of Oakland’s solar power system from other public agencies seems to indicate increasing interest in the public sector for building projects that produce renewable power. It is hoped that this example will inspire other agencies, in particular airports that have useable safe acreage alongside runways, to consider the possibility of constructing a ground-mounted solar energy system.

**ABOUT THE PORT**

Established in 1927 as an independent department of the City of Oakland, the **Port of Oakland** spans 19 miles of waterfront, oversees approximately 900 acres of maritime terminal facilities, and owns and operates Oakland International Airport. Approximately US\$30 b worth of goods move through the Port of Oakland on an annual basis. The Port of Oakland handled a record two m TEUs in calendar year 2004, an increase of nearly 6.5 per cent over 2003. Imports rose 15.8 per cent to 694,314 TEUs while exports gained slightly, increasing 1.8 per cent to 813,716 TEUs. The Port of Oakland has seen approximately a 30 per cent increase in the volume of its inbound (imports) business in the first half of 2005.

**ENQUIRIES**

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