



MARIN CIVIC CENTER CAMPUS

Flat roof, penetration-less mounting system

LOCATION:	Marin County, California
DATE COMPLETED:	November 2003
SYSTEM SIZE:	89.1kW (DC STC rating)
SYSTEM COST:	\$609,597
TOTAL COST/WATT:	\$6.84/watt
ELECTRICITY OUTPUT:	126,338 kWh/yr

SUMMARY

In response to the energy crisis of 2001, Marin County began looking for opportunities to implement solar energy projects. The first project to be completed was the 89 kW solar array on the General Services Building at the Marin Civic Center campus. The General Services Building, which houses the garage, roads crew and radio shop, receives ample sunlight and is well suited for a net-metered solar rooftop. Marin County initiated a competitive RFP process, which produced six bids. The winning bid was submitted by Prevalent Power and RWE Schott Solar for a flat roof solar energy system with no roof penetrations.

PROJECT DESCRIPTION

Many building managers considering solar energy systems have concerns about the potential impact on the roof. Will roof penetrations cause leaks? Will a solar array make roof access more difficult? Will there be wind loading problems or excessive standing loads? This Sunroof FS mounting system, manufactured by RWE Schott Solar, met the needs of the Marin Civic Center on all these questions. The stainless steel mounting system has passed wind tunnel testing up to 110 mph and weighs less than 3.5 lbs/ sq. foot when installed. The design of the array allows maintenance crews easy access to the roof when necessary. The mounting system lets the panels rest at a 5% tilt facing south, which allows the panels to self-clean when it rains and increases the energy production. On an annual basis, this solar array produces 84% of the building's energy demand and, because the facility is on a time-of-use rate, nearly 100% of the building's annual energy costs.



89 kilowatt solar rooftop installation at the General Services Building in Marin County.

The other advantage that this system offers is the speed of installation. The installers reported this mounting system reduced installation costs by about 30% compared to other flat roof mounting systems.

SYSTEM COST BREAKDOWN

Project Cost	\$609,587
Feasibility Study	\$38,571
<u>GROSS PROJECT COST</u>	<u>\$648,158</u>
	\$648,158
CPUC Self-Gen Rebate	(\$324,079)
<u>NET COST TO MARIN</u>	<u>\$324,079</u>

PROJECT FINANCING

The low-interest loan that Marin County received for this project from the California Energy Commission helped keep costs down. The Energy Commission provides loans of this nature for city and county agencies throughout the state to install energy saving projects at a 3.95% fixed interest rate. Known as the Energy Efficiency Financing Program, the loan program offers an even lower interest rate (3.85%) for customers who complete the project and invoice the Energy Commission within nine months of the date the loan is approved. For this project, Marin County put \$87,388 down, and received a 3.85%, 15-year loan for the remaining \$233,120.

CASH-FLOW POSITIVE

One of the exciting things about this project is that energy savings exceed the debt service. The building is on a PG&E A-6 rate schedule.

Expected Annual Energy Savings	\$23,312
Annual Debt Service	(\$20,747)
<u>IN THE BLACK</u>	<u>\$2,565</u>

ENVIRONMENTAL BENEFITS

Based on EPA emissions data, the Marin Civic Center solar array will prevent emissions of 79,593 lbs of carbon dioxide (CO₂), 72 lbs of nitrogen oxides (NO_x), and 22 lbs of sulfur dioxide (SO₂) per year. More solar projects are expected to follow.