



# SunMizer™ Residential Case Study 2

*Selective installation of SunMizer on residential PV system saves a tree and harvests extra power!*

## Summary

Residential photovoltaic installations experience shade, which can result in significant power loss. In this case, homeowner and solar professional Tom McCalmont was experiencing energy loss due to shade from a favorite tree. He and his wife love the tree and removing it was simply not an option. By deploying SunMizer units only on the shaded panels, the performance increase, in Mr. McCalmont's words, "...translates directly into more kilowatt hours of solar power generated, greater offsets of my utility power, and dollars back into my pocket!"

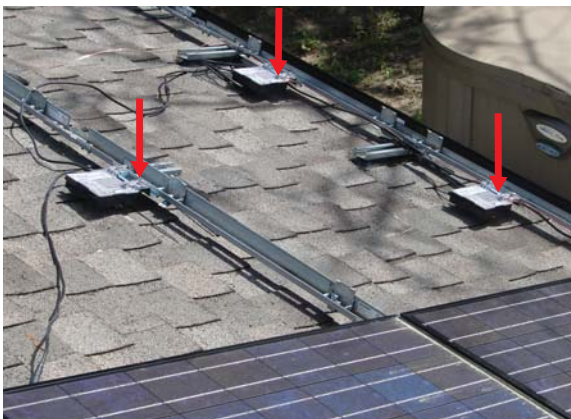
Figure 1. 2.5 kW Installation: Arrows show SunMizer locations



Figure 2: SunMizer bolts easily to the rack system



Figure 3: SunMizer units installed under module locations



## About Tom McCalmont

Tom McCalmont is more than the average solar homeowner. He is also the cofounder of REgrid Power, a premier solar installation company with an installed base of over 2,000 solar power systems that generated over \$30 million in sales in 2009. Mr. McCalmont served on the board of directors at Real Goods Solar after they acquired REgrid in 2008, leaving in 2009 to cofound McCalmont Engineering ([www.mccalmont.net](http://www.mccalmont.net)), which provides solar design and engineering services for development of large scale solar power systems to commercial, utility and manufacturing companies.

Mr. McCalmont is also the cofounder of SolarTech ([www.solartech.org](http://www.solartech.org)) a non-profit consortium of solar manufacturers, installers, utilities, workforce and finance organizations with the common goal of removing barriers to the wider adoption of solar

## Installation Description

- Size:** 2.5 kW residential installation in Palo Alto, CA
- Panels:** 15 Sharp 142 W and 6 Sharp 72 W
- Inverter:** SMA Sunny Boy SB3000U
- String:** One (1) string
- Monitoring:** Sunny Portal, Sunny Sensor Box

## Shade Problem Statement

Prior to installation of SunMizer, 6 modules out of 21 in the system experienced tree shade during the peak sun hour period of the day. Removal of the tree was not an option, due to its attractiveness and sentimental value to the family. SunMizer was chosen as a cost effective solution to increasing the power output of the system, while leaving the tree in place.

## Easy SunMizer Installation

SunMizer is designed to be a "plug and play" solution with simple installation using standard tools and connectors. Tom McCalmont had this to say about experiencing SunMizer's easy installation first hand.

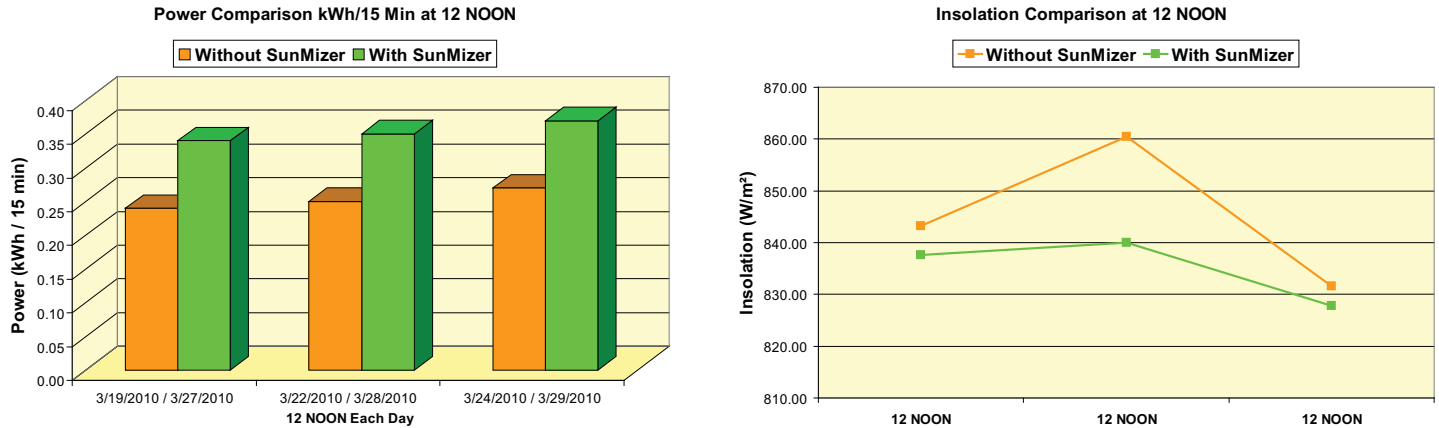
"I observed and participated in the installation of the SunMizer units on my residential solar system. My solar array uses a type of interlocking racking rails and module frames that looks terrific aesthetically on the roof but does constrain the space and mounting flexibility available for power conditioners under the array.

Despite this constraint, I was impressed with how easy the SunMizer units were to install. Their compact footprint and well thought-out mechanical design contributed to a very simple and straightforward installation – you simply unpack the units, bolt them to the rails, and plug in the modules!"



In Figure 4 and 5, array power output and insolation at 12 Noon is compared before and after SunMizer installation. The performance data shows increased power production with SunMizer during "peak sun-hours" even when insolation is greater on all days without SunMizer. The power increase with SunMizer is + 29% during this critical "peak" generation period.

Figures 4 and 5. Array power output and insolation comparison with and without SunMizer over 15 minute intervals at 12 noon



## A Satisfied Customer!

Here is what satisfied SunMizer customer Tom McCalmont has to say about SunMizer.

"The technology of harvesting more energy from shaded solar modules is revolutionary. In lay terms, the way SunMizer units work is to sacrifice a bit of voltage in order to boost the module's current. The SunMizer's automatically match the increased current from the shaded modules to the current from the unshaded modules to yield higher overall power generation than would be possible without the units. Since SunMizer's only need to be installed on the shaded modules in the array, they can very cost-effectively mitigate shading situations by targeting just the portion of the solar array that experiences the greatest shade. I save money by not having to install units on every module in my array.

But the real proof of this concept is in the results. We measured the power generation of my system both before and after the SunMizer units were installed. This data was normalized to account for variations in light intensity throughout the testing period. I experienced a gain in normalized system performance on the day my SunMizer units were installed. Furthermore, I've seen overall performance gains as much as 17% on comparison days with similar insolation and shading. This performance translates directly into more kilowatt hours of solar power generated, greater offsets of my utility power, and dollars back into my pocket!"

Figure 6. Power output comparison in kWh /15 minute intervals before and after SunMizer installation. Note insolation is greater and power is less without SunMizer (orange) than with SunMizer (green).

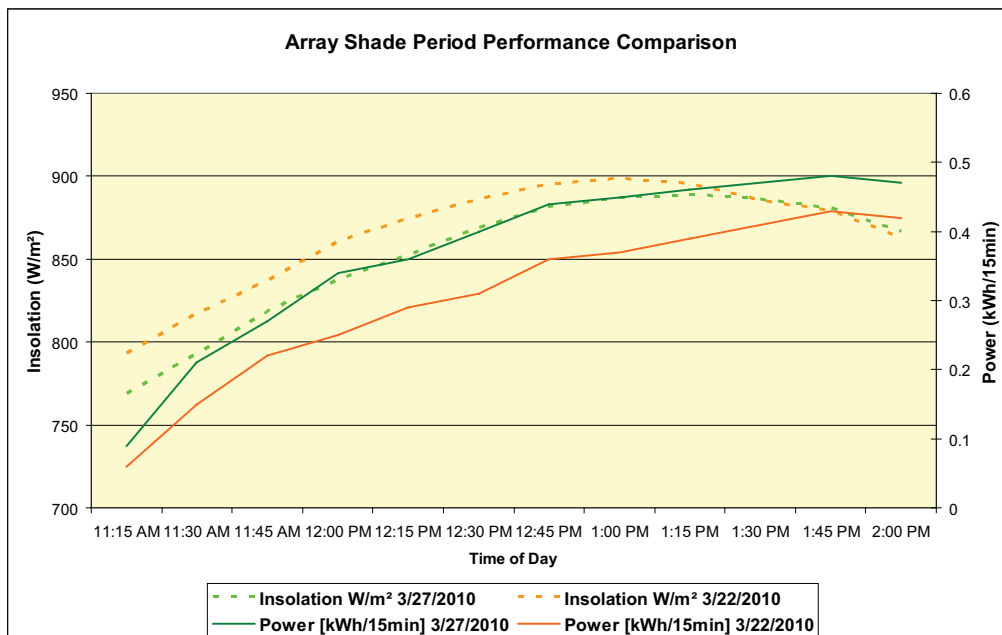


Figure 6 shows power in kWh per 15 minute interval before and after SunMizer installation. Note that even when insolation is higher on the day before SunMizer installation (orange dotted line) power output is less (solid orange line).

Even on a day with less insolation, (green dotted line) SunMizer captures more power from the array (green solid line). This means that with just 4 SunMizer units out of 21 modules in this installation, SunMizer is harvesting more energy from the shaded panels and increasing total array output.