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JULY/AUGUST 2005

*Mealybugs and
grapevine leafroll disease*

*Smarter
solar energy*

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for premium wines*

*Pinot Noir winegrowing-
Russian River Valley*

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SMART VITICULTURE
*California spared
from little stinker?*





129 KW solar system at Shafer Vineyards, Napa, CA. Two arrays face east, two face west, and the ground mount (top right of photo) faces south for maximum exposure of panels. Photo courtesy Premier Power

Advice from the experts

SMARTER SOLAR ENERGY

BY Tina Vierra

No one doubts that solar energy and other forms of renewable energy are a smart move for wineries, and Planet Earth in general. The process of switching your winery to solar energy, however, is expensive, complicated, and requires months to accomplish. Experts and the wineries who have already done it offer a variety of suggestions (and cautions) to wineries contemplating the change.

Manage your energy demand first

The first task involves establishing your winery's baseline energy use, and perhaps obtaining an energy audit if you haven't already. (See "Benefits of Energy Auditing for Your Winery" May/June 2005.) Although *PWV* offered several alternatives for low-cost partial audits in that article, experts say that if you are going solar, invest in a professional engineer and a full audit. You'll see why this relationship (winery to independent engineer) will be important both before and after you install a solar photovoltaic (PV) system.

Why obtain energy use figures and an audit? Because your energy con-

sumption will determine the size of solar array appropriate to your winery's needs. Given the large capital investment demanded by the installation of solar power, reducing your energy demand before going solar will pay you back in reduced capital outlay.

"The most common ways for wineries to reduce demand are with insulation,

upgrades of lighting, HVAC, refrigeration, and drive motors," says Rick Whisman of PowerLight Solar Electric Systems (Berkeley, CA) which recently installed a 424 KW system at Wine Service Co-Op (WSCO) in St. Helena, CA.

Gopal Shanker of Wine Business Strategies (Calistoga, CA), was the independent consultant who advised WSCO general manager Bob Holmes on efficiency upgrades and selection of a solar installer to meet WSCO's needs.

"WSCO had already replaced one roof with a more efficient, better-insulated one, which meant they did not need the added expense of insulated solar panels," explains Shanker. "They also planned a lighting retrofit, a second insulated roof, and an HVAC upgrade, which reduced the size of the solar array needed from 508 KW to 424 KW. Reducing baseline energy use allowed WSCO to install a system 17% smaller than originally needed."

Many solar energy providers work with wineries to reduce energy demand before solar panels are installed. Darryl Conklin, president of Renewable Technologies Inc. (RTI) in Sutter Creek, CA, says: "RTI engineers are trained by Pacific Gas & Electric (PG&E), to perform energy audits in a winery to reduce energy



33.3 KW solar system at Robert Sinskey Vineyards, Napa. Panels are west-facing, with the larger array on a 20° slope and the smaller on a 10° slope. With five inverters, real yield of the panels averages about 28 KW. Phase II — a second PV system estimated at 35 KW, will be installed on the parking lot trellis structure in 2005. Photo courtesy REC Solar

SUSTAINABLE BUSINESS

demand before designing a solar installation. Implementing these 'Best Practices' is how RTI and the market set the standards for the renewable technologies industry."

Sun Power and Geothermal Energy (San Rafael, CA) holds a general contractor's license and provides full professional audits by qualified engineers.

Shafer Vineyards (Napa, CA) installed a 129 KW photovoltaic system in 2004. "Prior to going solar, we had always been careful about our electrical use, so we didn't need to take extraordinary measures," reports Doug Shafer, president. "We worked with an independent engineer and our solar installer, Premier Power."

Rebates, incentives, tax credits

Once you've established your energy demand and know the size of the solar array required, you are ready for the red tape. Solar energy installation is such an expensive venture that its proponents have long fought for, and obtained, government and utility incentives to attract homeowners and businesses to make the switch. That, of course, comes with complex paperwork requirements.

Currently, the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC), through PG&E and other utility companies, offer rebates on the initial solar power installation. The rebates come from capped funds provided by utility rate-payers and dwindling state government funds, and since the money is limited, the waiting list is getting longer every day.

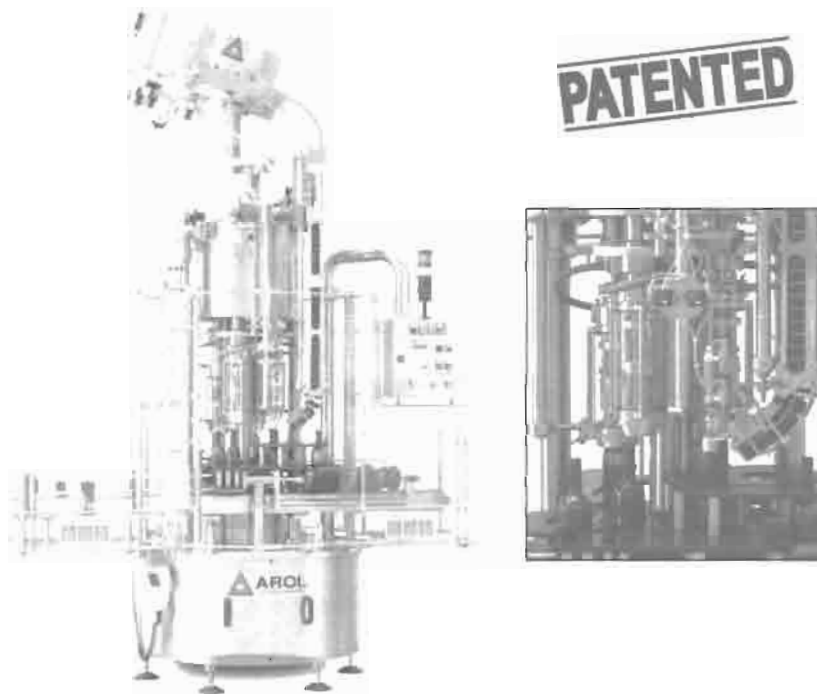
In addition to rebates, the State of California offers tax incentives. Solar-powered businesses are exempt from property taxes on the amount their property value increases from the solar installation. They also receive a 7.5% state tax credit. The federal government gives a 10% investment tax credit. Both state and federal governments offer accelerated depreciation savings on solar installation.

How to make sense of all this? First, all solar energy providers have made themselves experts on the number-crunching and paperwork. Each can quote you a price for solar installation, followed by a list of reductions from the credits and rebates for which your winery qualifies. Many will even file the paperwork for you, or as Sun Power and Geothermal Energy did with Green & Red Winery (Napa, CA), will carry the rebates for you, charging the winery only the post-rebate cost of the system.

Then there is the matter of taking all of the above numbers to your bank for financing. Chris Bunas of SolarCraft (Novato, CA) knows his winery clients have a variety of financing options. "There is a personalized flavor of financing for every customer need. A winery may obtain financing by conventional property-secured means, or by business equipment lease," he explains. "In either case, we can provide a detailed 30-year proforma to a bank for review of the financing request."

Bunas cautions that rebates are up-front cash costs the installer can handle

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for the winery, but the tax credits and depreciation are the tax-responsibility of the new system owner, and the solar provider can only estimate these numbers.

Once financing options are established, it makes the best sense for the winery to consult its accountant. "Solar companies provide good and valid information," affirms CPA Barbara Cooke of Brotemarkle, Davis and Company (St. Helena, CA). "But a winery needs projections specific to its own financial situation. Accountants should be pro-active, and should be brought in before a winery commits to solar installation, as with any acquisition or sale of assets."

Rob Sinskey, owner of Robert Sinskey Vineyards (Napa, CA), is a client of Brotemarkle Davis & Co., who consulted his accountant before the winery installed a solar photovoltaic system (by REC Solar, Los Osos, CA) in late 2004. Sinskey filed for rebates but was turned down for the CPUC rebate (from PG&E) when the funds ran out before his claim was processed.

Though Sinskey determined his winery could use a solar array of 68 to 72 KW for 100% of its energy needs, with the loss of the rebates, he elected to install only a 33 KW system in 2004. The winery did receive the CEC rebate, tax credits, and accelerated depreciation.

Robert Sinskey winemaker Jeff Virnig is handling "Phase-2" — the second solar installation of about 35 KW — on the trellis system above the winery's visitor parking lot in 2005. Both available rebates were obtained on the second installation.

What can you expect solar panels to produce?

Solar photovoltaic energy systems are 100% efficient only under ideal conditions, as in laboratories. The true performance of PV systems depends on many real-world conditions and factors.

The first place you can lose power is in the intensity of UV light on a given day. The temperature of the panels and their inverters also plays a role, as does the age of the PV modules. "Equipment warmed by outdoor temperatures higher than those in lab conditions can produce 10% to 12% less power," notes Shankar.

Next, the number of panels wired together, and the number of inverters used, can reduce system output. The more inverters in use, the more system efficiency you stand to lose. Jeffrey Patterson

of Mount Eden Vineyards (Saratoga, CA) evaluated the pros and cons of using multiple inverters when Akeena Solar installed a 20 KW system in 2003.

"The inverters can be the weakest link in a PV system," says Patterson. "If we had only one inverter and it went down, the whole system would

be down. We decided it was safer to use nine inverters, in spite of power loss. If one inverter goes down, we still have a working system."

Positioning (facing direction and angle of the panels), distance from the meter, and unblocked exposure of the panels to UV rays are the final ele-

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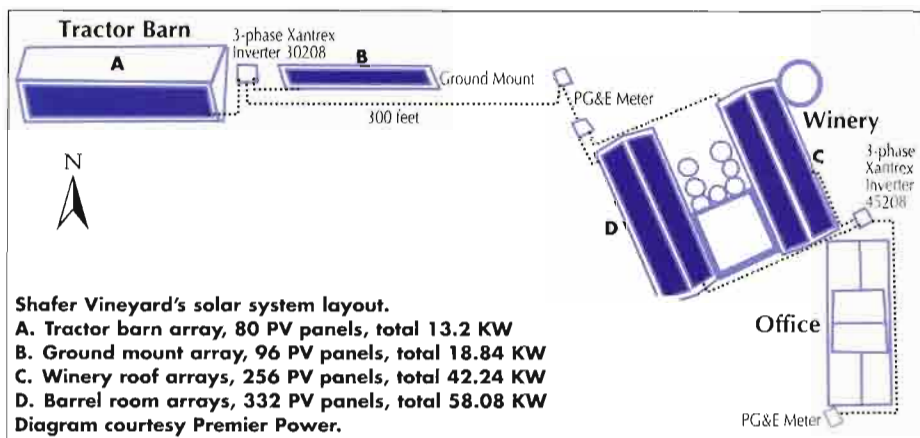
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Shafer Vineyards has panels on four rooftops plus a ground-mount set of panels. "We used existing rooftops for the two arrays facing east and two facing west," Shafer says. "On the ground mount, we were able to use the best south-facing direction."

Shanker of Wine Business Strategies summarizes the potential energy collection of panels with this example: "Say you have a 100-watt PV panel. The CEC rebate may be based on 84 of those 100 watts, indicating they expect about 84% of full efficiency from solar panels under field conditions. Given losses for multiple inverters (4% to 10%), dirt, daylight hours, precision of installation, wiring and voltage mismatches, panel direction (south-facing is best) and other factors, you can realistically realize anywhere between 67 and 84 watts from a 100-watt panel."

Net metering

Barry Cinnamon of Akeena Solar (Los Altos, CA), has shown clients how

ments in the efficiency equation. Mount Eden Vineyards may have sacrificed some efficiency with inverters, but it was able to use optimal panel positioning. "We're up on top of a mountain, and were able to mount the panels at a 30-degree angle, facing south on a hillside," Patterson reports.

The only disadvantage to the location of Mount Eden's panels is their proximity

to the winery's dirt access road. Patterson admits to being plagued by dust, and has to wash the panels weekly. He watches the monitoring system (provided by the solar photovoltaic system installer) for signs that the panels are losing efficiency. "Solar energy is so passive, you have to watch over it — a little bit of dust, a little cloud cover, and you can watch your output go down quickly."

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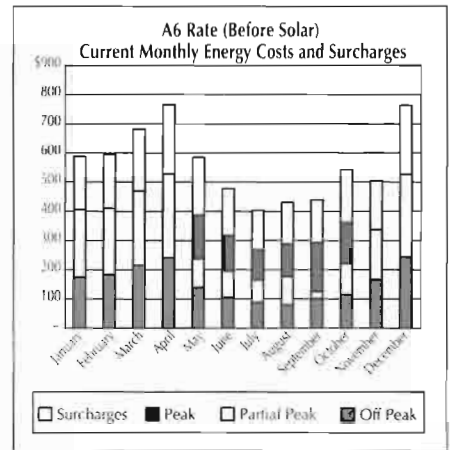
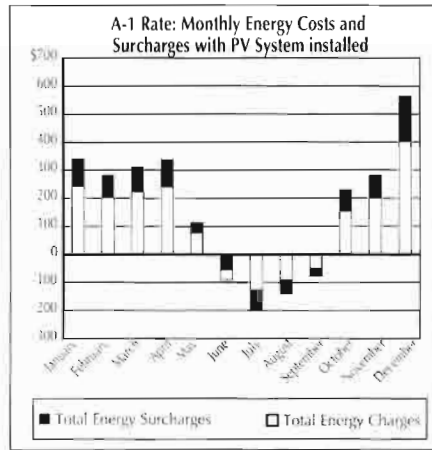
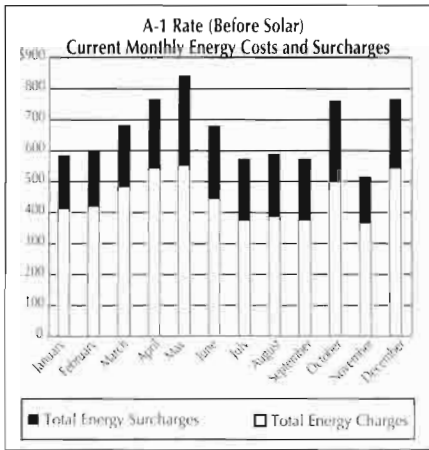
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the net metering program (whereby new solar energy-producing wineries can feed excess electricity to the utility grid) is a good one but not without pitfalls and technical glitches.

“Rebates like net metering are available from most states to reduce or eliminate your electric bill, *not* to help consumers get into the commercial power generation

business,” says Cinnamon. “As a result, while your utility is legally required to buy power back from you at the retail rate, you are paid only up to the point where your net annual PV production equals your net consumption. In other words, the best you can do is break even.”

Solar wineries on a net metering system are billed by the utility annually. It’s

better for the winery to get a small annual electric bill than to see a negative one. That’s because if your net annual bill is in the negative, you’ve installed a larger PV system than necessary.

Back at the beginning, when you were establishing baseline energy use, you also needed to determine your winery’s utility rate schedule.

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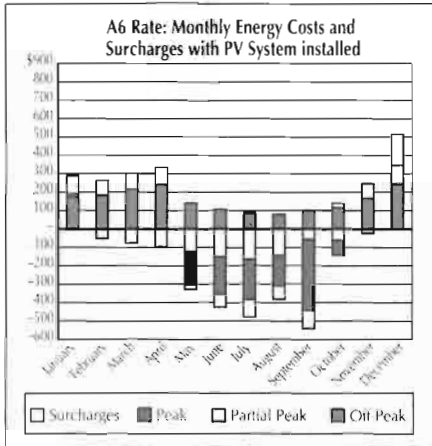
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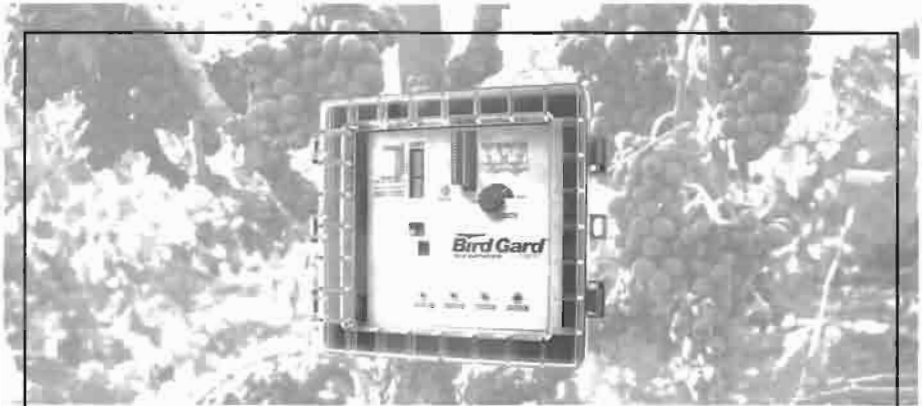
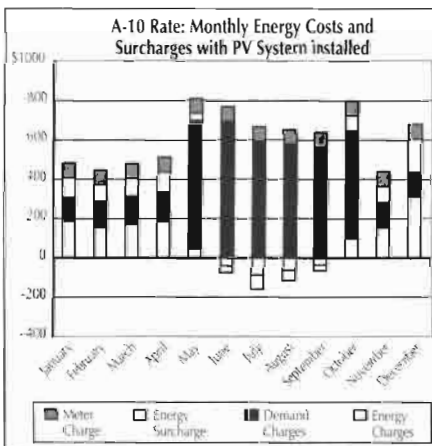
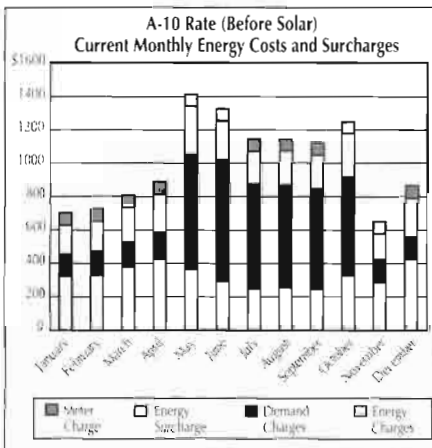
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"A1, A6, A10, and E19 are the schedules we're seeing most often at wineries," says Cinnamon. "In general, time-of-use (TOU) rates like A6 are most advantageous to wineries going solar, as long as the PV system is sized properly."

Cinnamon has also found that some wineries are on E1 residential rates, owing to the winery having been a home-based



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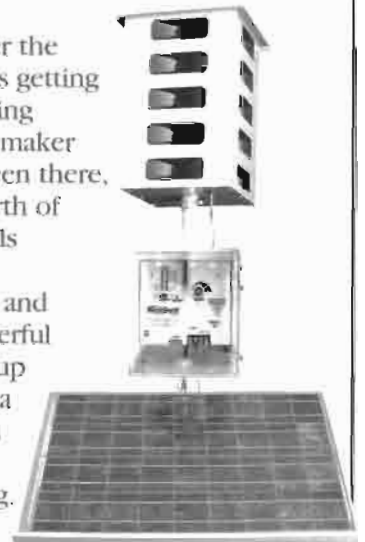
What vineyard managers are saying about the Mega PRO

"All the birds just left...nothing left. We even stopped using the canons. The Mega PRO really did a great job." - Bob Kidston, Dykeview Farms

"The Mega PRO paid for itself the first season because of the money we saved on bird patrols and pyrotechnics" - Daryl Salm, Valley Farm Management

"Two years ago we got the Mega Pro. After the horrible 2004 season, with many vineyards getting little or no grapes, a 3 acre section of riesling yielded 20 tons. Needless to say, our wine maker was very happy. Had the starling flocks been there, we would have lost \$20,000-\$30,000 worth of grapes." - Jack Keller, Hazlitt 1852 Vineyards

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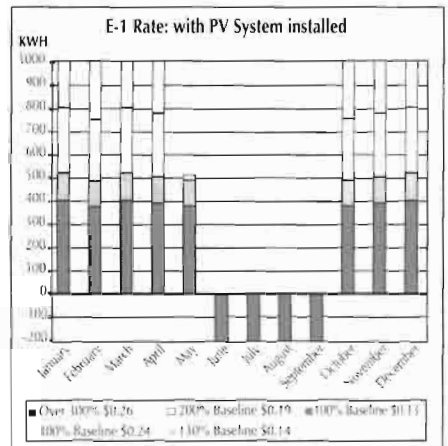
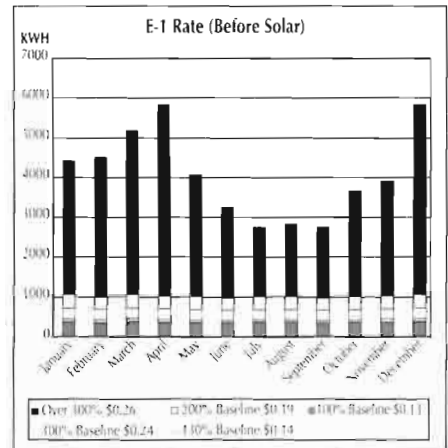
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business which then grew to a viable commercial size. "In these cases, it may be advantageous to install a new commercial meter, since the basic commercial rate (A1) is more favorable under net metering than the basic residential rate. Your utility may not explain this to you."

Some wineries have reported to *PWV* that they had difficulties with PG&E when installing solar energy. Complaints ranged from slow service when swapping in the new meter for net metering, to glitches and failure of the new meter connection. Given these reports, keeping that engineer you hired in the beginning available, as Mount Eden Vineyard has done, may be advisable.

"The trick to achieving trouble-free interconnection is to do all of the paperwork properly at the outset," Cinnamon advises. "Make sure your installer knows about special utility requirements, and there is nothing out of the ordinary about your meter or electrical service before installing solar. We have heard about problems that relate to customers installing systems without utility

approval, or trying to get PG&E to sign off before the local building inspector signs off on the construction permit.”

Post-installation warranties

By law, PV panels and inverters must be warranted for a certain number of years after installation. Ask your solar provider what warranty they offer under the laws of your state.

Savvy wineries need to know that they can also obtain warranties for

more than just parts and service on the solar array. Holmes at Wine Service Co-Op has a PowerLight contract stating that they pay the Co-Op if the system does not earn the return on investment promised. Not all solar installers will offer a post-installation warranty unless the customer knows to ask.

Green Tags

Green Tags, more formally known as Renewable Energy Certificates (RECs),

are purchased by energy consumers who wish to support renewable energy financially, even if they are not or cannot become renewable energy producers. The money from the sale of Green Tags must be used by the company who sold it for investment in renewable energy. One Green Tag is the equivalent of 1 megawatt (1,000 KW) of energy.

“If an energy consumer (such as a winery on a standard utility grid drawing power from fossil fuel sources)

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System inverters (brand is PVPowered, model PVP2800) mounted by REC Solar on back of solar panel racks at Raymond Burr Vineyards (Healdsburg, CA). Inverters convert DC to AC electricity and are the control units of the PV system. Photo courtesy Chris Bunas, SolarCraft.

wanted to switch to solar or other renewable energy, they could theoretically sell these Green Tags to help offset the cost of the project," reports Heather Zwaduk of REC Solar. "Green Tags vary in value from a few dollars to a few hundred dollars per MWh (Megawatt hour) of energy produced over the life of the system.

"Bonneville Environmental Foundation (www.b-e-f.org) is an example of a Green Tag buyer. The non-profit foundation supports renewable energy by purchasing Green Tags from companies who install renewable energy."

For-profit businesses also buy Green Tags when they find they want to support renewable energy, but are not good candidates for installing it on their own sites. To find sources to sell your Green Tag, check with your state and federal Energy Commissions, or the internet.

"The complication to Green Tags is the question of who owns them in the first place. In states such as New Jersey, the government has established that the solar power producers own their Green Tags. But in many other states, including California, the utility companies insist *they* should own the Green Tags, because they built the utility grids which receive the energy produced, and because they subsidized the installation cost through rebates."

The State of Nevada reached a compromise on the issue by requiring solar photovoltaic system owners to accept either the rebate or the Green Tag, but not both. The State of California, specifically the CPUC, is expected to clarify the issue for its citizens in 2005, a ruling that will affect the accumulated 93 MW of photovoltaic systems installed so far under rebate programs.

Since the Federal Energy Regulatory Commission (FERC) ruled in 2003 that the renewable system owners own their Green Tags unless stated otherwise by a state or a contract agreement, wineries who own renewable energy systems are advised by Fred Sisson (REC Solar vice president), to transfer ownership of a Green Tag only by signed contract, and to carefully investigate Green Tag ownership regulations in their own states.

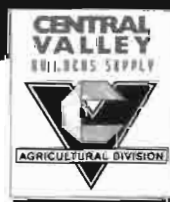
Less than 10% of small-scale renewable energy site owners even know what a Green Tag is, and only 6% know they can sell it for extra revenue,

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according to the Center for Resource Solutions (quoted in *Photon International Magazine*, March 2005). Despite that confusion, the market for Green Tags continues to grow. Over 10 million MWh of Green Tags were traded in 2003, 12 times the volume of 2002.

Green marketing

Marketing your winery as organic, green, or whatnot is a difficult task, but studies show that consumers respond positively. With a choice of two bottles of similar wine on the shelf, 46% would buy an organic-labeled one, for instance, all other things being equal, reports Dean Marks, president of Premier Power (El Dorado Hills, CA).

Fifteen percent of American consumers would even buy the organic-labeled wine at a price up to 22% higher. Marks found the statistics in the National Environmental Education and Training Foundation "Roper Report," an annual evaluation of American attitudes toward the envi-

ronment and knowledge of environmental issues.

"In consumer surveys, 48% of the population cares about the environment," adds Marks, "and is willing to purchase an eco-friendly product if it does not require too much effort."

Marks warns that simply installing solar energy will not automatically generate publicity and higher sales. "You need to go deeper than one step. Solar energy should be only one part of your winery's overall sustainable practices and core values."

Organic farming, recycling, waste management, and energy efficiency practices, together with renewable energy use, comprise the core list of practices most consumers deem "green," adds Marks.

Sinskey agrees with going to sustainable practices in every aspect of winery business. "It has always been our philosophy to be green, so we're not doing this as a marketing attempt. We have been farming organically for almost 15 years. This is just one more

step toward completing the process. We are also looking into alternative fuels and the increased use of animals in the vineyard. We want to walk the walk, not just talk the talk."

"Our approach to sustainable farming has been evolving since planting our first cover crops in the late 1980s," says Shafer. "Eventually it came to include erecting hawk perches, owl nesting boxes, making our own compost, recycling our water, putting songbird houses throughout our vineyards, erecting a bat box, etc."

"At each stage we've tried to communicate what we're doing new and why we're doing it. We know there are a number of consumers who prefer to buy from companies with core values embracing environmentally-friendly practices. I'm not sure that means we have a marketing plan. It would be great if we were that organized."

Future is bright for solar

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SUSTAINABLE BUSINESS

1 (SB1), authored by state senators Kevin Murray and John Campbell (one Democrat, one Republican), to the legislature. SB1, also being called the "Million Solar Rooftops Initiative," is the most ambitious solar plan yet introduced in the U.S. At press time, SB1 had cleared committee and was going to the State Senate floor, where it was expected to pass.

"SB1 is ambitious," affirms Shanker. "It intends to reward energy efficiency and solar energy installation. Wineries that become more energy-efficient before installing solar get extra credits." Shanker attends public forums on the bill's progress.

Under SB1, the CEC and CPUC rebates will be combined in one program. From January 1, 2006, incentive rates will be allowed to decrease no more than 7% annually until December 31, 2016, by which time, given additional rewards for companies who reduce their energy demand before installing solar, the state hopes to see

one million homes and businesses install PV systems.

All new homebuilders would be required to offer PV systems after 2010. (Premier Power has already built one successful all-solar housing subdivision near Sacramento, CA, with two more underway.) The net metering cap would be raised from 0.5% of a utility's power grid to 2%, with the property tax exclusion and the 7.5% state tax credit extended until 2017.

"Right now," says Shanker, "the State of California is third in the world behind Japan and Germany in PV installations." Between 1994 and 2003, Japan increased its solar installations from 24 MW to 860 MW. In approximately the same time frame, Germany grew from 6 MW to 260 MW of solar. Under SB1, California would eclipse these numbers, because if the resulting program is successful, installations would grow from 93 MW in 2004, to 3,000 MW by 2017. ■

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 Wine Business Strategies, www.winebusinessstrategies.com

Pacific Gas & Electric renewable energy program, www.pge.com/selfgen
 California Energy Commission renewable energy program, www.energy.ca.gov/renewables
 Progress of Senate Bill 1 in California, <http://info.sen.ca.gov>

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