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POWER:

IT'S STILL TOO EXPENSIVE

By **STEPHANIE CHASTEEN** *Sentinel correspondent*

If you look at the bright side, Debi Baker hasn't paid a PG&E bill for three years.

Instead, the beleaguered utility pays her for the excess energy she feeds back into the power grid from the solar panels mounted on her roof.

On the other hand, if you look at her checkbook, Debi Baker paid for the next 20 years of utilities in a lump sum three years ago, when she spent \$14,000 to install solar electric in her Bonny Doon home.

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TOP: The electricity meter at Mike Arenson's solar home can move backward when the home is sending excess energy to the state's power grid.

Dan Coyro/Sentinel photos

ABOVE: Debi Baker's Bonny Doon home has solar panels on the roof and solar-heated water panels at ground level.

Solar: Alternative energy too costly for many

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Despite Santa Cruz's environmentally friendly leaning — even Santa Cruz City Hall's solar power — fewer than 100 homes (about 0.1 percent of single-family residences) in the county are generating solar power. In the nation, solar electric provides less than 0.005 percent of total U.S. electricity consumption, according to an analysis by Greenpeace.

Why? It's simply too expensive up front.

Two local men have been involved with solar since the 1970s: Roger DeNault works with Santa Cruz-based solar-installation company Solar Technologies, and Mike Areson constitutes the Santa Cruz branch of Sunnysvale-based ECoenergies.

Both estimate that they get 20-25 percent for every job installed. DeNault notes that this is a substantially worse ratio than in real estate sales. What turns customers away?

"Mostly money," he says. "Even though the state pays for half the deal, the other half is still expensive for a lot of people."

Areson, or "Solar Mike," says those who do lay down the money are thrilled with the results.

"They love watching their meter run backward," he said. And for him, "It's just a lot of fun. This is their opportunity we've been looking for to give power back to the people; solar power is free, it's already there."

But it's not into that power, however, is not free.

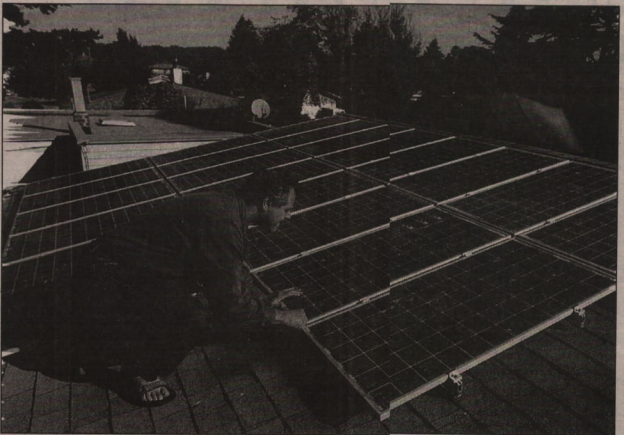
After 25 years of research, the cost of silicon solar cells has been slashed to just a percent of what it was in the 1970s. The best way to fund reductions is unclear. Technological advances could make better solar cells or increased demand and mass production could drive down the price.

DeNault is optimistic that single economies will bring down the price of solar, and he says has seen a reduction in his net cost this year, mostly due to an increase in demand and competition.

The construction of a large-scale photovoltaic production plant could bring the cost of solar within range of fossil fuels, according to a study conducted by independent consulting company KPMG for Greenpeace. The up-front cost of such production would be \$660 million.

Greg Smetstad, a local researcher in solar energy, argues that science and government should instead focus on developing new materials for solar energy.

"The market isn't growing fast enough," he said.



Dan Coyne/Sentinel

'Solar Mike' Areson works on his rooftop solar panels.

Because silicon is fabricated at extreme temperatures and low pressures, it is intrinsically expensive to make. Smetstad says that even large-scale production cannot offset these intrinsic costs to making silicon photovoltaics.

"The challenge," he said, "is to figure out physics so that they're cheaper."

Interest in solar electricity has surged in recent months for a variety of reasons. Energy prices have exploded since last year's energy crisis. In addition, a variety of new economic incentives are available for consumers, including a cash rebate of up to 50 percent on new solar systems installed on a home and a 15 percent state tax credit on residential solar installations.

Recent federal and state laws also require that utilities allow "net metering" so that homeowners can receive credit for excess energy they feed back to PG&E.

Consumers can't count on these credits forever. The tax credit is slated to drop in half in 2004.

On Sept. 12, Gov. Gray Davis signed a law guaranteeing the continuation of the cash rebate, or "buydown program" for another five years. The \$20

million per year allocated to buydown, however, just isn't going to be enough — the money set aside for 2002 has run out. The cash amount of the rebate is likely to be reduced next year.

Business and industrial customers can benefit from similar rebates and tax incentives. It's cheaper than ever to install solar. But for most consumers, the cost has not decreased enough.

According to Areson and DeNault, and the California Energy Commission, a 4 kilowatt solar system to meet 80 percent of the energy needs of the average family typically has a net cost from \$250 to \$300,000 — even after the generous rebates and tax incentives. Spreading this price over the lifetime of the solar panels (about 20 years) this brings solar energy within the range of a mere 20 cents from conventional sources.

In essence, consumers have to pay 10 to 20 years of PG&E bills at 60¢/kWh to finance the purchase through a mortgage loan, according to the California Renewable Energy Program.

A more modest system, like Baker's, can cost as little as \$13,000 and will cover the needs of households that have less than average electricity usage. Unfortunately, it will take longer to realize the return on the invest-

ment because utility rates are cheaper for lower use.

Santa Cruz resident Sarah Rabkin, who uses just half the electricity of a typical household, found herself in just this position. Solar electric didn't make economic sense.

"It would probably take us about 30 years to recoup our initial capital outlay — quite possibly longer than the life of the system," she said.

"Solar electric pays off especially for larger electricity users, of which there are plenty," says Areson. "If you are in the fourth or fifth tier of electricity pricing from PG&E, then you're looking at something like a 15 to 20 percent return on your investment."

There is some disagreement over the financial return of solar electric.

"I've never been able to argue it from a bean-counting perspective," said Luke Lehman of Solar Technologies.

Even satisfied customers admit that a businessperson wouldn't consider a solar electric system to be a good investment. Instead, "it's a matter of principle," said Santa Cruz firefighter Ron Pomerantz, who recently installed solar panels on his home.

But the majority of consumers and politicians operate on economic, not environmental, principles. If energy

prices drop, and government rebates are cut, there will no longer be good economic argument for solar. In most parts of the country, solar power is four times as expensive as utility-generated power.

People in developing nations, for whom solar energy would bring dramatic improvements in lifestyle, are even less able to afford it.

"Solar technology is a question of the haves and have nots," said Sue Carter, a researcher on new solar technology at the UC Santa Cruz.

Carter, and many of her colleagues, is working on finding alternative materials to silicon, which promise cheaper solar energy in the future. She is frustrated by the continued reliance on nonrenewable fossil fuels.

Fossil fuels are likely to last a few generations at least, before the cost of extraction overcomes the payback. Researchers and the government agencies that appropriate their funding — and the public whose tax dollars are spent on such research — must make the best use of this "period of grace" to continue the quest for cheap, stable, easily manufactured solar cells, among other types of renewable energy.

At the same time, stimulation of the existing solar market must continue — through government rebates and increased manufacturing. With passage of SB 1038, California has allocated \$1 billion to solar commercialization and research and development during the next five years.

"This is the largest renewable energy fund by far in the U.S.," says Ralph Cavanagh of the Natural Resource Defense Council. "It accounts for about half of all the other states combined. It's the substantial investment."

Yet, this amount only works out to a half of a percent of what we spend on energy production.

"This doesn't seem like very much to pay as an insurance policy," he said.

If you're considering solar, it's worth looking at the numbers. Depending on your location, energy needs and priorities, solar may be for you.

"I love my solar system," says Debbie Malkin of Santa Cruz, grinning. "I love seeing the meter run backward, I love the idea of getting my energy from the sun."

Rabkin, who writes about the environment for a living, laments the high cost of solar blocks her from living her ideals.

"We have limited financial resources, so we also have to consider the economic wisdom of solar as an investment," she said.

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