

## SOLAR SCIENCE

# Catching some rays

Sunny forecast for Oregon's alternative energy future

**W**HEN SOME SCIENCE WRITER collects the 2048 Pulitzer Prize for Nonfiction for *Saved by the Sun: How Solar Energy Chilled the Earth's Hottest Problems*, it might seem funny that the famously *unsunny* University of Oregon is a lead character as the true-life drama unfolds.

The author will have sifted through a slew of archived articles much like this one, plucking comments that by mid-century appear prophetic. "I see this as just the start of the solar age," she quotes Frank Vignola, then head of the UO's Solar Radiation Monitoring Laboratory, tucked into a cramped office in Onyx Bridge. It was Vignola who suggested back in late 2007 that Americans were quietly becoming fed up with fossil fuels and their legacy of global warming in these emphatic terms: "It's only going to fester unless someone lances the boil, and I see solar as one of the things to do it."

She wrote too about John Reynolds, the UO professor emeritus of architecture who, for more than four decades studied and taught about passive solar heating, but who was anything but passive when it came to preaching the promise of the sun, which he considered the most democratic of energy sources.

"Its potential for world peace is just huge. Countries don't go to war over solar resources because everybody has them," Reynolds said back in the early years of the twenty-first century, when he was chairman of the American Solar Energy Society. At the time, the United States was fighting for stability in Iraq years after overthrowing

the dictator of a nation sitting atop one of the world's last great oil reserves. "Sooner or later we're going to have to be completely reliant on completely renewable energy," Reynolds explained, "because we are going to run out of oil, gas, and coal. Dinosaurs just aren't dying to make more oil."

Of course, no one knows how the history of solar energy will be written decades from now. What is certain is that the future of the sun, our planet's original power plant, is looking brighter in Oregon in early 2008, thanks in large part to work of pioneers at the UO.

In the 1970s, about the time Vignola, M.S. '69, Ph.D. '75, started volunteering at the then-new solar monitoring lab, the United States was pinched in an oil embargo and resulting gasoline crisis. Meanwhile, Reynolds—fearing an ill-advised rush to nuclear power—dipped into local politics to help stop a planned Lane County nuclear plant. Both looked to the sun for answers.

That era is what Christopher Dymond, the Oregon Department of Energy's solar energy expert, calls "the first solar decade," when the Carter Administration actively invested in solar research (and the president ordered solar collectors installed on the White House roof).

"The brain trust that was developed during the first solar decade really was developed in Eugene," which even today is among the most "solarized" cities in the nation, Dymond says. That brain trust includes Vignola and Reynolds and others, such as longtime UO architecture profes-

sor G. Z. "Charlie" Brown, director of the Energy Studies in Buildings Laboratory.

While those pioneers have never given up on the sun, Americans today burn more fossil fuels than ever—the result of a growing population and its increasing energy needs. Solar energy has attracted less public and private investment than gas and coal through the decades, and the technology only recently is proving that it can produce electricity at comparable price in some markets.

Now, as panting polar bears and fifty-dollar fill-ups are the norm, going green has a renewed glow. The promise of abundant renewable energy is everywhere, from invisible atoms to the vast churning of Pacific Ocean tides. Turbines spin electricity from wind over wheat country, and bioenergy oozes from corn, used cooking oil, and cow manure.

And Dymond considers this our second solar decade. It's a time when the cost of fossil fuels is skyrocketing, when solar researchers appear on the cusp of real breakthroughs, when you already can buy solar panels at the Home Depot and Costco.

Oregon again promises to lead. The state's Department of Transportation, for example, is paving the way for the nation's first "solar highways." This concept, already used in some parts of Europe, lines roadway shoulders with energy-generating solar panels. Funding from the Energy Trust of Oregon, where Reynolds is a founding board member, can combine with state and federal tax incentives to cover more



Frank Vignola, head of the UO's Solar Radiation Monitoring Laboratory

than half the cost of a new solar electric system—commercial or residential. The German company SolarWorld is building what it calls the largest solar panel factory in North America in Hillsboro, taking advantage not just of Oregon's green-friendly climate but also of abundant high-tech workers, inexpensive energy for manufacturing, and proximity to California, the company's largest potential U.S. market. And UO researchers such as Dave Cohen are helping pioneer a new generation of solar advances to boost the amount of electricity solar panels can generate, progress the federal government expects will make power from the sun as inexpensive as other sources within a decade. "It's all a matter of costs. Can you beat the cost of electricity coming out of the wall?" says Cohen, a professor of physics and member of the UO Materials Science Institute.

But is a meaningful emergence of solar power realistic in Oregon? Vignola is more qualified than most to say "yes"—although it might take longer because Pacific Northwest electricity rates are among the nation's lowest.

Vignola's lab monitors solar radiation resources at sophisticated stations throughout the Pacific Northwest. It is the only such lab in the world in continuous operation for more than three decades. Such long-term data allow better evaluation of the potential solar energy available

in a location in much the same way that historic streamflow statistics help determine whether a hydroelectric dam is feasible, he says.

What Vignola knows from this research is that two-thirds of Oregon east of the Cascade Mountains has solar resources comparable to Florida. Even Astoria, in the state's grayest corner, gets as much or more radiant solar energy than nearly anywhere in Germany, the world's leader in solar energy production.

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Oregon also has a green ethic and many new laws that will increase use of renewable energy. Vignola, no stranger at the Oregon legislature, helped Representative Paul Holvey of Eugene champion a new law that directs state and local governments to devote 1.5 percent of the cost of new buildings and major remodeling projects to solar energy measures. For that victory and a long history of advocacy, the Oregon Solar Energy Industries Association recently awarded its first Legacy Award to Vignola in September.

A few months earlier, on Earth Day,

President Dave Frohnmayer pledged the UO to adhere to the American College & University Presidents Climate Commitment and drastically reduce the University's greenhouse gas emissions. Steve Mital '01, the University's sustainability coordinator, said the plan will include increased conservation measures as well as solar energy installations on many new and remodeled buildings.

Much of that work will go through Greg Haider, a Facilities Services mainte-

nance team supervisor in charge of campus roofs. Already, solar electricity panels on the Lillis Business Complex, Student Recreation Center, and Erb Memorial Union generate a modest amount of electricity, and a growing number of buildings have solar-heated water. "I feel very passionate about wanting to save energy, save money, and save the planet," Haider says.

"I see a time when we see 10, 15, or 20 percent of the electricity here in Oregon coming from solar," Vignola says. "This is happening. It's really happening." ☺

—Eric Apalategui '89