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## Wind power gets personal

**Small turbines being installed in homes, offices carve out a growing niche among state's renewable energy technologies.**

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When Louis Arges bought his house, perched on a bluff above the Sacramento River, he was attracted by nature's gift of a stunning view.

Now Arges plans to harness another of nature's gifts: a steady wind that blows over the Delta.

"I'm on the Port of Sacramento, so I always get a Delta breeze," he said. "It's an ideal spot."

The West Sacramento resident plans to erect a 30-foot wind turbine at the end of the month.

Arges is among a growing group of Americans installing personal wind turbines to cut power costs and help the planet.

Wind is a non-polluting fuel source. That's why the state wants to ramp up production. California's wind-power output is a fraction of the 11 percent of total electricity supplied by "renewable" energy sources like geothermal wells, biomass, small hydroelectric generators, wind, and solar panels. By 2010, the state wants that share to be 20 percent of retail electricity.

But today the wind supplies more power for California than the sun, and demand has pushed companies like Reno-based Mariah Power to fuel a community-scale, "small wind" movement.

"It's basically the equivalent of being able to put solar panels on (a) roof," said Tracy Twist, the company's marketing director.

"As a part of a portfolio, wind energy has a definite place," said Hal LaFlash, director of emerging clean technology policy at Pacific Gas and Electric Co. "It's relatively inexpensive and a clean energy."

Wind energy has its downside, though:

The wind doesn't blow strong enough, or consistently enough, everywhere.

And "the best wind resources are furthest away from people," LaFlash said. He said there's a lack of high voltage wires that can carry currents to areas where people live.

Wind's intermittent nature poses another major challenge said Michael DeAngelis, manager of advanced renewables and distributed generation technologies for the Sacramento Municipal Utility District. He said it may not blow when electricity is needed during peak times.

"Wind is less predictable than solar energy," he said.

So far, both PG&E and SMUD either operate or contract with independent wind energy providers in Solano

County. Large-scale wind farms thrive there because the area gets consistent high winds and is near established transmission lines.

Obstacles exist against small wind turbines too, but thinking very local can be an advantage: There's no need to ship the electricity anywhere.

Paul Misso, who heads Marquiss Wind Power in Folsom, said small wind can be considered "one-site" power generation.

"You generate power in a distributive mode all over the place ... not in one centralized location," he said. "Energy is consumed in the site where energy is generated."

Misso's company produces ducted wind turbines designed to harness turbulent winds over rooftops of industrial buildings. He said wind speeds on large rooftops are higher, because wind is compressed, which makes it accelerate.

"It's the same effect when a river narrows and the water gets rapid," he said.

Sacramento's wind speed average is low, compared to communities in the Delta, but Misso said his turbines, which can be oriented to match wind direction, could maximize the breeze.

"Schools, hospitals, casinos, big-box stores, churches ... warehouses, business parks. It's really only constrained to a flat location," he said.

Twist, of Mariah Power, said businesses see small wind turbines as a way to stand out and draw in customers.

"It's a very visible way to display the green measures they are taking," she said.

For homeowners, Twist said wind energy can't be the sole source of electricity, but "will complement energy needs."

According to the company Web site, Mariah Power's wind turbine produces 1,900 kilowatt-hours per year, with an average wind speed of 12 mph. The turbines cost about \$4,000, and as much as \$1,500 to install. They can supply a third of the annual electricity supply for a typical household, she said.

C.P. "Case" Van Dam, director of the California Wind Energy Collaborative and UC Davis professor, said consumers need to "do their homework" before installing personal turbines. They need to calculate energy savings each year and determine how long it will take to pay off a turbine. Van Dam was among the wind energy researchers, state energy officials and industry representatives who gathered last week at the University of California, Davis, to discuss challenges to wind energy's expansion.

So far, Van Dam said, "small systems are more expensive."

But state rebates can help speed up payback, Twist countered.

Because he'll be using a new version of Mariah Power's turbine, Arges of West Sacramento said the company made it easier to try wind power.

"I will pay after it operates (as promised) for three months," said Arges, adding that he's a willing "guinea pig" because he's convinced the wind can help Sacramento residents green up their energy use.

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