

Special ♦ Reprint ♦ Edition



# Off the grid or on, solar and wind power gain

## Incentives, savings push more families to renewable energy

By Paul Davidson  
USA TODAY

WILMINGTON, Vt. — The wind whips up in Dale Doucette's expansive backyard, furiously spinning the blades on his 80-foot-tall silver wind turbine and leaving a broad smile on his square-jawed face.

The gusts nudge the voltage on his battery bank and help power Doucette's wood-carving saw, as well as the PC, printer and recessed lights in his wife Michele's home-based chiropractic office.

But overcast skies mean the Doucettes' 10 solar panels won't be as productive as usual. So his two teenage sons can use the computer but not the TV or GameCube.

"I'm the power Nazi," Doucette, 47, says as the turbine blades emit a shrill hum on a late March afternoon.

The Doucettes live off the power grid, but they're far from granola-crunching hippies eking out a bare-bones existence in the hinterlands. They live in a sleek



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\$500,000 plaster-and-tile house a quarter mile from electric lines and could have hooked in for \$10,000. Instead, they opted to pay about \$41,000 for their own solar and wind energy systems.

"We want to be as self-sustaining as possible and get out from under Big Brother," Doucette says. "I enjoy not getting an electric bill."

Amid soaring electricity prices, the renewable energy industry is increasingly being driven by families such as the Doucettes who choose to be off the grid for environmental or political reasons and by a much faster-rising number of Americans adding solar and wind systems to grid-connected houses. Such equipment used to be bought almost exclusively by off-the-gridders in remote rural reaches who couldn't afford fees of \$30,000 or more to tie in to electric lines.

Now, in 27 states, homeowners on the grid can get state rebates or tax breaks that subsidize up to 50% or more of the cost of clean energy systems. They then sell the electricity they generate, but don't use themselves, to utilities, offsetting the cost of the power they draw from the grid as they spin their meters backward and drive their electric bills toward zero.

AS SEEN IN USA TODAY'S MONEY SECTION, APRIL 13, 2006

Seventeen states, and some power companies themselves, now offer utility customers rebates on the purchase and installation of solar or wind systems, up from three in 2000. Florida and Pennsylvania are among those considering rebates. Meanwhile, the number of states with "net metering" laws — which permit customers to sell the power they produce to the electric utility at retail rates — has nearly doubled to 36 in the past six years.

Despite a hodgepodge of state laws, the trend points up a budding grassroots movement to displace at least some of the nation's power generation from pollution-belching plants to small, clean neighborhood nodes. That eases strains on transmission lines. Some

180,000 families live off-grid, a figure that has jumped 33% a year for a decade, says Richard Perez, publisher of Home Power magazine.

Yet, thanks to the incentives, another 27,000 grid-connected houses supplement the utility's power with their own energy systems, most of which are solar, says the Interstate Renewable Energy Council and the American Wind Energy Association. Perez expects the number of utility customers using clean energy to overtake off-the-grid households in a decade.

"It's accelerating very quickly," says Michael Eckhart, of the American Council on Renewable Energy.

The movement got an added jolt in January when utility customers could start taking advantage of a new \$2,000 federal tax credit for solar power system purchases as part of the Energy Policy Act of 2005.

After soaring 30% a year the past five years, sales of solar, or photovoltaic, systems could ratchet even higher this year. Bob-O Schultze, owner of Electron Connection in Northern California, says solar sales have risen 50% annually since 2002. About 75% of his business is from on-grid customers, vs. just 1% four years ago.

### Off the grid

For decades, dealers in small solar and

## What is 'the grid'?

- 1. Power plant**  
Generators produce current, which is boosted by transformers to several hundred thousand volts.
- 2. Power line**  
At high voltage, the current is capable of traveling long distances with less energy lost than if the voltage were low.
- 3. Distribution substation**  
A transformer reduces the current to several thousand volts for distribution.
- 4. Individual supply**  
Before the current reaches houses and businesses, a transformer further reduces it to 110 volts.

**How the grid is structured**  
The national power grid covers most of the USA, parts of Canada and a northern portion of Baja California, Mexico. The grid is broken into smaller regions to make distribution more manageable.

The national power-grid system is divided into three sections that are managed by 10 regional councils:

Sources: The Way Things Work, by David Macaulay; Distributed Energy Resources; North American Electric Reliability Council; Howstuffworks.com

Reporting by April Umminger, graphic by Robert Ahrens, USA TODAY

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"I love living off the grid and being independent. I wanted to live on a large piece of property out in the country."

— Sunny Tappan

wind systems depended on the small band of mavericks who moved off the grid to live in the countryside, where land is plentiful and inexpensive. California, Washington, Oregon, Colorado, Vermont and Maine have long been havens, though people live off the grid in almost every state.

"These are people who want a big garden, have no close neighbors and the only land they can afford is beyond the reaches of the grid," Perez, an off-gridder himself, says. Property without utility hook-ups, he adds, can cost about a third less than a standard lot. These days, a growing number of off-gridders could link up fairly cheaply but prefer to be untethered for myriad reasons, including rising electricity rates, a desire to cut power plant pollution and concerns about blackouts or terrorism.

The Wilmington area, in rural southern Vermont, nestled at the foothills of the Green Mountains is speckled with off-grid homes on back roads where the area's criss-crossing power lines don't reach.

Doucette, a wood carver, and some friends built his 3,200-square-foot house four years ago on a 22-acre, tree-rimmed property, moving from a smaller grid-tied house a few miles away. Considering his old electric bill ran to \$1,700 a year and was certain to go higher, Doucette figures his green energy system will pay for itself in 20 years. But money was not

at the heart of their decision.

"We made a conscious choice not to get on the grid," Doucette says, noting he has long been rankled by the electricity price increases of the local resort town during ski season and by periodic winter blackouts.

Like other off-gridders, Doucette uses his gleaming blue solar panels on the roof of a small shed about 150 feet from his house, as his main energy source. The turbine, another 300 feet away, provides added juice on cloudy days when the wind is swirling.

The power generated by both solar and wind systems is stored in 24 batteries in a bin in the shed. An inverter converts the DC current produced by the systems to the AC current used in homes. The batteries could last several days in the unlikely event there is neither sun nor wind. A backup propane generator kicks in if the batteries get low.

Like other clean-energy homes, Doucette's two-story, earth-toned house is built for conservation, with energy-efficient refrigerator and dishwasher, low-voltage light bulbs and straw-bale insulation.

In nearby Marlboro, Sunny and Nat Tappan live in an older-style off-grid home, about 2 1/2 miles up a hill off a dirt road on an isolated 90-acre tract. The rustic, timber-frame house, which sits next to a pasture with sheep and chickens, has a composting toilet and no running water (they have a well). Sunny and her former husband bought the property 18 years ago and spent a few thousand dollars on a solar power system. Connecting to the power grid would have cost \$80,000, but Sunny, 53, had no interest anyway.

"I love living off the grid and being

independent," she says. "I wanted to live on a large piece of property out in the country."

Four small solar panels angled on brackets in a garden few feet from the back door supply 680 watts of power. But noting she has no TV, dishwasher or washing machine, Sunny says that's more than enough, "We use very little electricity." And if it's persistently cloudy? "So I don't vacuum one week," she says.

For others, living off the grid is a matter of principle. Maynard Kaufman, 77, who lives in a saltbox house on a farm near Bangor, Mich., could have connected to the grid for \$10,000. Instead, he spent \$30,000 on a solar power system and \$12,700 on two wind turbines. Noting he had demonstrated in front of the local nuclear plant, he said, "It was totally a matter of conscience."

### On the grid

For many utility customers, installing an alternative energy system largely boils down to the dollars and cents that state incentives help them save.

California was the first state to offer a generous package of renewable-energy incentives for homes and businesses in the late 1990s as power companies were deregulated. It's blessed with abundant sunshine and plagued by high electric rates and an overtaxed grid that led to rolling blackouts.

By 2002, California was offering households 60% rebates on solar power systems, as well as tax credits, letting homeowners pay less than 30% of retail cost. Residents send much of their solar energy into the grid during the day when they're not home, easing peak demands, and draw from it at night when the sun isn't shining.

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Demand for solar power has surged, with about 15,000 utility customers installing systems, and last year the state cut the rebate to 35%. The goal is to use rebates to drive so much demand that solar prices plunge, and the rebates can be phased out. But a worldwide shortage of solar panels, spurred by even-more-generous incentives in Japan and Germany, is keeping prices high until more factories are built in 18 months.

New Jersey is the only other state with a solar incentive program to match California's. Rebates cover more than 50% of a solar power system's cost. Plus, households can sell credits for the energy they produce to utilities to meet state clean energy quotas. The program "helps reduce peak demands, and that

helps dramatically," says Jeanne Fox, president of the New Jersey Board of Public Utilities. "Our goal is to drive energy generation and a lot of that is to be distributed" in neighborhoods to improve power-plant reliability and security.

Other states with rebate programs include New York, Massachusetts, Illinois and Rhode Island, where electricity prices are high.

Clark Beebe, 57, of Springfield, N.J., bought a \$50,000 solar power system two years ago for \$15,000 after rebates, installing it on the roof of his four-bedroom house. Because he offsets what he uses with what he pumps into the grid, his annual power bill has dropped

from \$1,270 to \$170, though he also installed energy-saving appliances. His \$1,100 yearly savings is supplemented by \$500 in clean energy credits, cutting the payback period for his system to nine years. After that, he'll effectively net at least a \$200-a-year profit. "I am now an electricity company," says Beebe 57. "Plus, I'm generating electricity without any pollutants."

Carrie Buczeke, 42, of Livermore, Calif., rolled the cost of her \$54,000 solar panels — \$25,000 after rebates and tax credits — into a home-equity loan. She has wiped out her \$400 monthly electric bill and pays \$300 a month for the loan. After seven years, the loan will be paid off. "It was such a no-brainer," she says.

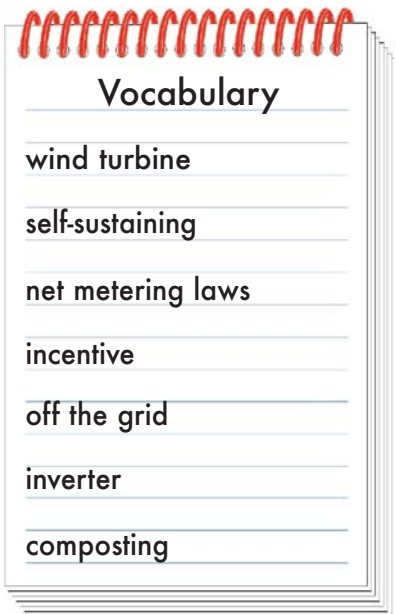
## Off the grid or on, solar and wind power gain



**APPLICATIONS:** *environment, economics, problem solving, evaluation*

**DISCUSSION:** What factors motivated Dale and Michelle Doucette to "live off the power grid"? Will their solar and wind energy systems ultimately save the family money? How are states and the federal government encouraging residents to opt for clean energy systems? Why are some people attracted to properties without utility hook-ups? How do solar panels and turbines work? What other measures help homeowners conserve energy? How has California made solar systems attractive to consumers? If your entire city began using clean energy, what would the social, environmental and economic impact be? After considering these questions, use the concept map on the following page to enhance your understanding of renewable energy.

**ACTIVITY:** In small groups, identify an economic or environmental problem mentioned in USA TODAY that could be alleviated if more Americans adopted clean energy systems (e.g., solar or wind power). Next, identify three strategies (other than those mentioned in the article) that the government, environmentalists, businesses and/or other groups could use to encourage citizens to convert to clean energy. Then, list the factors that might make implementing each strategy difficult. Finally, present each idea and its pros and cons to classmates. Ask your peers to choose the most effective strategy.



**Vocabulary**

- \_\_\_\_\_ wind turbine
- \_\_\_\_\_ self-sustaining
- \_\_\_\_\_ net metering laws
- \_\_\_\_\_ incentive
- \_\_\_\_\_ off the grid
- \_\_\_\_\_ inverter
- \_\_\_\_\_ composting

# Concept Map

## How do people live off the grid?

What equipment, lifestyle changes, financial resources, etc. are required?

## What does it mean to live "off the grid"?

## Renewable energy: Living "off the grid"

## Who lives off the grid?

What are the characteristics of the people who are choosing this option?

## Why do people live off the grid?

What environmental, political and economic concerns motivate people to choose alternative energy?

### Environmental concerns

### Political concerns

### Economic concerns