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# Solar energy: Is it time for it to shine?

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**NEW YORK** • Solar energy may finally get its day in the sun.

The high costs that for years made it impractical as a mainstream source of energy are plummeting. Real estate companies are racing to install solar panels on office buildings. Utilities are erecting large solar panel "farms" near big cities and in desolate deserts. And creative financing plans are making solar more realistic than ever for homes.

Solar power installations doubled in the United States last year and are expected to double again this year. More solar energy is being planned than any other power source, including nuclear, coal, natural gas and wind.

"We are at the beginning of a turning point," says Andrew Beebe, who runs global sales for Suntech Power, a manufacturer of solar panels.

Solar's share of the power business remains tiny. But its promise is great. The sun splashes more clean energy on the planet in one hour than humans use in a year, and daytime is when power is needed most. And solar panels can be installed near where people use power, reducing or eliminating the costs of moving power through a grid.

Solar power has been held back by costs. It's still about three times more expensive than electricity produced by natural gas, according to estimates by the Energy Information Administration.

But the financial barriers are falling fast. Solar panel prices have plunged by two-thirds since 2008, making it easier for installers to market solar's financial benefits, and not simply its environmental ones.

Recently two of the nation's biggest utilities, Exelon and NextEra Energy, each acquired a large California solar power farm in the early stages of development. Another utility, NRG Energy, has announced a plan with Bank of America and the real estate firm Prologis to spend $1.4 billion to install solar systems on 750 commercial rooftops.

Nationwide, solar power installations grew by 102 percent from 2009 to 2010, by far the fastest rate in the past five years.

"Every manufacturer globally is looking around for the next major growth market, and the U.S. is the first one everyone points to," says Shayle Kann, managing director for solar research at GTM Research.

Colorado has been a major beneficiary of the solar power boom. General Electric announced plans in October to build the largest thin-film solar panel factory in the U.S. at a $300 million plant in Aurora that will employ more than 350 people. There are also a number of home-grown solar companies in the state and several large suppliers. Colorado Springs hasn't been a major player in the field, although earlier this year, Olson Motor and Control, a small company that makes power equipment for solar installations, opened a manufacturing facility here, and, also this year, Berken Energy, a small company developing thermophotvoltaics that use heat instead of light to generate power, said it was moving to the Springs.

The largest local impact from the solar surge comes from the military's interest in renewable power. The Air Force Academy opened an $18 million, 6-megawatt solar array this year, while Fort Carson, which hosts a 2-megawatt solar system, is adding 800 kilowatts as it works toward a "net zero" goal in which the post will produce as much power as it consumes by 2020.

Making solar affordable still requires large tax breaks and other subsidies from federal and state governments. The main federal subsidy pays for 30 percent of the cost of a residential system. When state and other subsidies are added, as much as 50 percent of the cost can be covered. Colorado Springs Utilities offers a $2 per watt rebate for solar panels, in addition to the federal rebate, although Utilities' pool of money for rebates is limited. The rebate has fallen along with solar prices — in 2006, it was $4 per watt.

But prices of solar panels, the squares of crystalline silicon or thin layers of metal films that turn the sun's rays into electricity, are falling so fast that its advocates now credibly claim that solar will be able to compete with fossil fuels even when the federal solar subsidy shrinks by two-thirds in 2016.

"Over the past 10 years the industry has made the case that we needed to increase scale so we could reduce prices," says Arno Harris, CEO of solar developer Recurrent Energy, a subsidiary of Sharp Corp. "We're seeing it happen."

The falling prices have made it easier for solar installers to raise the money needed to grow. And they've made solar power systems so affordable they can appeal to homeowners who want to save on their electric bill, not just reduce their environmental impact.

Tim Johnson, a high school math teacher in Philadelphia, had wanted to put solar panels on his roof for years. Like many people concerned about the environment, the thought of powering his home without burning fossil fuels had a strong appeal. But with two kids in college, he couldn't justify spending $15,000, after subsidies, to do it.

But since March, he has generated 50 percent to 75 percent of his electricity with a set of solar panels on his roof, saving 20 percent on his electricity bills. His upfront cost for the system: $0.

Instead of buying and installing the panels himself, he signed up with SunRun, one of a handful of companies that build, own and maintain solar systems on homes. These companies earn money by charging customers for the power the panels produce.

Johnson pays SunRun $52 a month, and he pays his traditional utility for whatever extra power he needs from the grid. In all, he pays $60 to $100 a month for power; he used to pay $90 to $120.

It would be cheaper over the long run for a homeowner to buy and install a solar system because he would not have to pay a company like SunRun for financing, service and maintenance. But these plans have growing appeal because they don't require homeowners to lay out thousands of dollars upfront.

In California, which leads the nation in solar power installations, 51 percent of the residential solar systems installed through the first three quarters of this year were sold with these plans, up from 12 percent in 2009.

Google announced recently that it would create a fund that local installers in every state can tap so they can offer no-money-down plans.

In Colorado Springs, the City Council approved a different concept in September called community solar gardens. In a solar garden, people lease or buy solar panels in a central solar installation rather than putting them on their own roof, but still get credit for the power they generate, which allows condominium owners and renters to invest in solar power. The concept can also lower the price of entry, since people can buy as few as two panels at a time and the companies that run the gardens get economies of scale.

Several companies have plans to develop solar gardens in Colorado Springs. SunShare is building a 500-kilowatt solar installation at Venetucci Farm that should be operating in a few weeks, while Clean Energy Collective plans to have its solar site running by the end of January. Last week, School District 11's board

gave the go-ahead for the district to pursue building its own solar garden.

The Colorado Legislature passed a solar-garden bill in 2010 that will go into effect later this year, allowing solar gardens to be built in areas like Denver and Boulder that are served by for-profit utilities.

Solar panel prices have been declining for years because of lower costs for polycrystalline silicon, the main raw material for most solar panels, and larger-scale manufacturing, especially in Asia. In the past six months, demand has dropped sharply in Germany, the world's biggest solar market, in response to shrinking subsidies. This has created a global glut of solar panels and accelerated the decline in prices.

Solar panels, which are priced based on the amount of power they can produce during full sunshine, sold for $1.34 per watt in mid-September, according to data from Bloomberg New Energy Finance. That's down from $1.90 at the beginning of 2010. In 2008, they sold for $4 a watt.

The glut has been gut-wrenching for companies that make solar panels. Many of them remain profitable and are growing. But three U.S. panelmakers have filed for bankruptcy in two months, including Solyndra, a solar-panelmaker that received a $528 million federal loan.
The Solyndra bankruptcy has sparked a political uproar. Republicans have accused the Obama administration of pushing for Solyndra's loan for political reasons and have used the bankruptcy to question Obama's plan to help boost the economy by subsidizing clean-energy projects.

The market will not get any easier for small panelmakers. General Electric, with its Aurora plant, and other big companies including Samsung are entering the market. This should increase supply and bring down costs even further.

But what has been treacherous for panelmakers has been a boon for companies that market and install solar systems, for companies that make electronics and other parts for solar systems, and for solar customers.

To be sure, solar is growing from a very small base. All of the panels now installed across the nation produce enough electricity to power 600,000 homes, or about as much electricity as one large coal-fired power plant.

There are 30,000 megawatts' worth of solar projects awaiting approval in the U.S., according to the American Public Power Association. Not all of them will be built, either because of regulatory or financial hurdles. But even if only half that is ultimately built, it would be five times what is already installed.

"We're going in the direction the planet and the industry needs to go," says Harris.
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Andrew Wineke of The Gazette contributed to this story.