Solar Energy Is Ready. The U.S. Isn't

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Clean energy has become a dirty word in presidential politics. In their second debate, Mitt Romney and Barack Obama each tried to outdo the other's love of fossil fuels: Obama extolling his record on oil and natural gas production, Romney vowing to take "advantage of the oil and coal we have here." The Republican candidate has ridiculed the administration's $535 million loan guarantee to Solyndra, the bankrupt California-based solar panel maker, and accused Obama of living "in an imaginary world where government-subsidized windmills and solar panels could power the economy."

The candidates' coolness to renewable energy comes at a time when the domestic supply of traditional energy sources, such as oil and natural gas, is at an all-time high. And yet this failure to make the promise of renewables a keynote in the debate is a huge missed opportunity. In particular, it ignores the dramatic reduction in the cost of photovoltaic solar power worldwide and the considerable benefits to U.S. consumers and the environment. The untold story of this campaign is that what killed Solyndra may turn out to be a boon for the nation. "Economically and technologically, the game is over," says Bill Powers, a San Diego engineer and board member of Solar Done Right, a group that proselytizes for rooftop solar power. "The hangups in the U.S. are strictly political."

Over the past five years the price of photovoltaic panels has plummeted 75 percent, due largely to a glut of Chinese-made panels. The fall in prices rendered technically advanced photovoltaic panels, like those produced by Solyndra and other U.S. companies, too expensive to compete. But cheap panels have been a godsend for consumers such as Powers. He recently took advantage of a sale at his local retail solar panel store and self-installed 1,000 watts of extra solar power on his roof at a cost of $2 a watt, including a 30 percent federal tax credit. Nationally, the average cost of residential installations—including hardware, permits, and labor—has plummeted from $9 a watt in 2006 to $5.46. Averaging in commercial industrial installations, the national installed price plummets to $3.45 a watt, says the Solar Energy Industries Association, a Washington-based trade group.

The result is a burgeoning rooftop revolution. The SEIA says almost 52,000 residential rooftop systems were installed in the U.S. last year, up 30 percent from a year earlier. Total rooftop installations, including on commercial buildings, grew 109 percent from 2010 to 2011, according to SEIA data. Total photovoltaic installations are projected to grow an additional 71 percent this year from 2011 levels.

Worldwide, the picture is even more positive. Australia projects that 10 percent of its 8 million houses will have rooftop systems within the next 12 months—most of that growth coming in the past three years. European rooftop installations continue to outpace those in the U.S., even as some countries begin to pare subsidies that have helped spur a continental rooftop boom. Including residential, commercial, and industrial-scale projects, the world had installed about 67 gigawatts of photovoltaic power at the end of last year—up from just 1.5 gigawatts in 2000.

Despite such breakthroughs, the U.S. economy is harnessing only a fraction of solar's potential benefits. Based on U.S. Census Bureau data, about 100 million U.S. residential units could physically hold rooftop systems one day, generating by one estimate 3.75 trillion kilowatt hours of electricity a year. In 2011, total U.S. electrical generation from all sources was about 4 trillion kilowatt hours—42 percent of that from coal, according to the U.S. Energy Information Administration. The trouble is, many of the big,investor-owned utilities that provide about 85 percent of America's electricity see solar as both a technical challenge and a long-term threat to their 100-year-old profit models. And the lack of a national energy policy means regulation of solar is up to states, public service commissions, and a wealth of local governments and bureaucracies—many of whom have a vested interest in maintaining the status quo.

The experience of Orrin Kohon, a Los Angeles resident with a second home in Hawaii, reflects the hurdles facing consumers hoping to join the rooftop movement. If all goes well, Kohon will soon receive local government approval to let workers mount an $18,000 leased solar power system on the roof of his Honolulu house. Monthly electric bills for his modest 1,750-square-foot abode run about $400—at 32.6¢ per kilowatt hour, the highest in the nation. With his rooftop system, installed by a third-party contractor, he'll generate enough of his own power to lower that rate to 7.3¢ per kilowatt hour for the next 20 years. That's a savings, he says, of $120,000 over that period. "It's a hedge, like locking in $2-a-gallon gasoline," says the 63-year-old owner of a Los Angeles career counseling service. "The thing is, I have to act now. If too many of my neighbors beat me to the punch, I won't be able to connect."

That's because thousands of Hawaii residents have also realized that even the most elaborate systems, costing up to $55,000, can pay for themselves in as little as four years given current power rates and state and federal incentives that chop up to two-thirds off the installation price. This rooftop stampede is overwhelming the permit process—70 percent of all current permit applications in the state are for solar installations—and causing utilities to impose moratoriums in some areas on how much solar they are willing to accept to their power grids.

The rule of thumb had been that once rooftop installations made up 15 percent of the power on a given circuit, utilities could stay new connections until residents undertook an engineering study—costing as much as $50,000—that showed their addition wouldn't destabilize the power grid. While that rule has been eased to 25 percent in Hawaii, the extra burden on consumers explains why "there are places on Maui where the saturation is such that we don't even solicit for business there," says Alex Tiller, chief executive officer of Sunetric, a Hawaii-based rooftop solar power installer.

The hidden costs of obtaining permits and regulators' approval to install rooftop panels is a big reason the U.S. lags behind Germany, which leads the world in rooftop installations, with more than 1 million. The price of installed rooftop solar in Germany has fallen to $2.24 per watt. In fact, on a sunny day in May, rooftop provided all of Germany's power needs for two hours. "This is a country on latitude with Maine," says Dennis Wilson, president of the Mid-Atlantic Solar Energy Industries Association, a solar-installer trade group. "Germany is showing us what's possible—if we can just get our act together."

That's easier said than done. Unlike the U.S., Germany has a national solar policy, a quick, inexpensive permitting process, and a national mandate that utilities sign up rooftop installations under what's known as a feed-in tariff—essentially a long-term contract whereby the utilities agree not just to allow the solar on their grids but also to buy the excess power from consumers.

By contrast, the U.S. has more than 18,000 jurisdictions at the state and local level that have a say in how rooftop solar is rolled out, according to the U.S. Department of Energy. What's more, electricity is supplied by investor-owned utilities, mostly state-regulated monopolies, which supply power from centralized hubs to captured consumers. Profit is in part tied to growth based on an ever-expanding demand as populations increase.

Rooftop solar poses a threat to that model by turning consumers into producers, thereby sapping utility revenue streams. It also diminishes the need to build expensive new plants and transmission lines. The saturation limits being imposed by utilities in places with booming rooftop demand "are a bit like speed bumps," says Mark Duda of RevoluSun, Hawaii's largest residential rooftop installer. "They want to slow things down out of fear of being overrun by PV."

While some large utilities are embracing solar—California's Pacific Gas & Electric (PCG) has 40,000 solar connections and an easy-to-follow guide encouraging consumers to sign up—many utilities and their political backers are standing in the way of changes that could boost U.S. energy independence, reduce carbon emissions, and save consumers billions. The U.S. needs more initiatives like the SunShot Rooftop

Solar Challenge, launched by the Department of Energy to find ways to lower installation costs by cutting down permit times and removing siting restrictions in 19 states. The goal is get these so-called soft costs down to $1 a watt—which would make homegrown solar competitive with commercial power rates in many states.

Congress should also extend beyond 2016 the 30 percent federal solar tax credit for rooftop installation, then gradually phase it out. Five years from now, solar—without subsidies—will be competitive with conventional power prices in 17 states, and the credit could greatly increase that number. Rooftop solar "is a game changer," says Powers. "And the game is already on."