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Welcome To The Residential Solar Revolution

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Solar upstarts like Sunnova will lease you a roof-full of panels for about the same price you pay your old-fashioned electric utility. This has the makings of a solar boom.



A more common sight. (Photo credit: Wikipedia)

With the loud bang of an exploding transformer the power went out at my house last Friday night. While I think it's good fun to scrounge around for candles and flashlights amid torrential rains and booming thunder, it wasn't long before the rest of my family was complaining about missing their fans, hairdryers and email. On Saturday, as the bright sun started drying Houston, I kept thinking, "If only we had solar panels." That was followed by my standard knee-jerk rejoinder: "If only solar panels were economic."

I had solar on the mind anyway; last week I was dazzled reading a giant new report from Bernstein Research asserting that the solar revolution is finally here and that solar power is now economic, even on an unsubsidized basis, in much of the developed world. From just 31 gigawatts of new worldwide solar installations in 2012, Bernstein's analysts predict that will grow to 300 GW a year by 2020. That would be a very material annual addition equal to 1.5% of global energy demand. Sounded incredible, but I was skeptical.

That skepticism eroded over lunch Monday with John Berger, CEO of Houston-based solar company Sunnova. His main message — solar is economic. In fact, he will sell you solar power for about 12 cents per kilowatt-hour — less than what many pay their electric providers today. “Residential solar has already become conventional energy,” he says. “The future will be baseload natural gas and residential solar. The coming solar boom will be just as big and important as the shale gas boom.”

It's tempting to take Berger up on it. Especially given Sunnova's value proposition. Here's how it works. With no money down, one of Sunnova's installation contractors will install panels on your roof. Then you will enter into a long-term leasing agreement with Sunnova under which you agree to pay a certain amount for each kWh that the panels generate (usually the same or less than what you can get from other retail electricity providers). The electricity created on your roof displaces much of the electricity that you would otherwise buy from the utility (about 70%). So you save money and have the added reliability of solar on those rare times when the power goes out.

This is not a rent-to-own deal. Sunnova will always own the panels on your roof, but if something malfunctions they are responsible for fixing it — or they don't get paid. Some homeowners might feel odd about having such a substantial piece of capital equipment bolted to their roof without actually “owning” it. But then again, if something goes wrong with a system you own, then fixing it is your responsibility. Do you really want that? After all, when my power went out over the weekend I didn't get a call from Centerpoint Energy asking me to chip in a few hundred bucks toward the repair of the lines on our side of the street. And if there's a hitch at one of the power plants owned by my electricity provider Reliant Energy (a division of NRG Energy) I don't get a letter from them asking me to fork over a couple thousand dollars or else live in the dark. Sunnova is just extending that model on the other side of the electric meter, on and in the home.

Sunnova is far from the only one in this business. Other companies that provide leasing and financing (and even in-house installation) of home solar systems include [SunRun \(http://www.sunrun.com\)](http://www.sunrun.com), [SunPower \(http://us.sunpowercorp.com\)](http://us.sunpowercorp.com), [Vivint \(http://www.vivint.com/en/\)](http://www.vivint.com/en/), [Sungevity \(http://www.sungevity.com\)](http://www.sungevity.com), and the big attention grabber [SolarCity \(http://www.solarcity.com/pressreleases/pressreleases.aspx\)](http://www.solarcity.com/pressreleases/pressreleases.aspx). They're all different in one way or another, but what these companies have in common are that they own solar panels. And though these companies have their assets distributed across thousands of rooftops, when you aggregate them together what they are effectively operating is a big, complex solar installation. This aggregated asset is similar in

performance to the giant utility-scale solar installations built on thousands of acres out in the desert, except that Sunnova doesn't have to give any thought to transmitting that power from the middle of nowhere to where the demand is. What's more, because the power is generated right where it is used, there are no transmission losses, and they cut out the middleman companies that own the power lines and extract a toll for every kWh that moves over them.

Berger's model has already been validated. In January Sunnova sold 22 megawatts of residential solar systems to NRG Energy for about \$120 million. This represented about 3,000 customers, says Berger. By my math that comes out to about \$40,000 per customer or about \$5.50 per watt of generation capacity. That's in line with what a recent study by Lawrence Berkeley National Laboratory found to be the median price of installing solar nationwide, but about twice the installation costs of SolarCity.

Berger rightly admires NRG's CEO David Crane as a solar visionary among electric utility chiefs. He has stated emphatically that he believes in the future of distributed power and the gradual shrinkage of the existing electric grid. This despite the fact that NRG still generates 98% of its power from big fossil-fuel burning power plants. NRG has invested about \$1 billion in solar, including about \$300 million in the [brand new](http://www.forbes.com/sites/uciliawang/2013/09/24/solar-power-from-giant-mirrors-flows-into-californias-grid/) (<http://www.forbes.com/sites/uciliawang/2013/09/24/solar-power-from-giant-mirrors-flows-into-californias-grid/>) \$2.2 billion Ivanpah solar project (392 MW) in California, a 50% stake in the 290-mw Agua Caliente project being built in Arizona and a 50% stake in solar outfitter Sunora (<http://sunoraenergy.com>), which has developed easily erected [solar canopies](http://www.forbes.com/sites/uciliawang/2013/04/02/nrg-rolls-out-solar-pergola-to-target-residential-market/) (<http://www.forbes.com/sites/uciliawang/2013/04/02/nrg-rolls-out-solar-pergola-to-target-residential-market/>). In July NRG even raised nearly \$500 million in the IPO of a new subsidiary called [NRG Yield](http://investor.nrgyield.com/phoenix.zhtml?c=251846&p=irol-irhome) (<http://investor.nrgyield.com/phoenix.zhtml?c=251846&p=irol-irhome>) (NYSE: NYLD). The idea behind NRG Yield is for it to own NRG's cash generating renewable energy assets and pay solid dividends. And it gives NRG a low-cost financing mechanism to keep acquiring more of those assets, from the likes of Sunnova.

John Berger isn't new to the renewable energy game. Back in 2009 [I wrote](http://www.forbes.com/2009/11/25/solar-power-prices-business-energy-electricity.html) (<http://www.forbes.com/2009/11/25/solar-power-prices-business-energy-electricity.html>) about his previous company Standard Renewable Energy. Unlike Sunnova, which merely finances and owns solar installations, Standard Renewable was built as a vertically integrated business, offering everything from energy audits through installation of insulation, lighting and solar panels. But the vertically integrated installation business is expensive and capital intensive.

That vertically integrated model is the one being pursued by SolarCity, the publicly traded upstart backed by billionaire Elon Musk. SolarCity may be growing its leased solar systems fast and enjoying a bubbly \$2.7 billion market cap, but in the past six months (through June) it lost \$55 million on revenues of \$68 million. In the same period in 2012 it "only" lost \$23 million on a bigger \$71 million in revenues. Seems like both those numbers are going the wrong way even as the company's costs of installation have fallen to about \$2.25 per watt (according to Bernstein). SolarCity has its detractors — Barron's did [this takedown](#)

(<http://online.barrons.com/article/SB50001424052748704719204579025283044181654.html>)

a month ago, while Forbes contributor William Pentland gave an equally valid [reasoning](http://www.forbes.com/sites/williampentland/2013/08/31/barrons-takes-potshot-at-solarcity-misses-by-wide-margin/) (<http://www.forbes.com/sites/williampentland/2013/08/31/barrons-takes-potshot-at-solarcity-misses-by-wide-margin/>) in defense of SolarCity. No need to re-argue that here. Berger professes utmost respect for everything the SolarCity team has done to popularize distributed solar and move the industry toward a critical mass of adoption. He nonetheless insists that — because SolarCity has to spend so much more on overhead and low-margin installation services — “Sunnova will become profitable long before Solar City” and generate cash returns for investors.

Although the federal investment tax credit enables owners to write off 30% of the cost of system installation, and has truly spurred solar deployments, Berger says the time has come for Congress to get rid of the subsidy. In its place, he’d like to see a new law enabling the likes of Sunnova and NRG Yield to structure their long-lived, cash-generating solar assets as tax-advantaged master limited partnerships — the same setup as natural gas pipeline operators like Kinder Morgan. Being able to create MLPs would balance out the loss of the ITC, says Berger. The tax credit just encourages fraudulent cost inflation, says Berger. Get rid of it and soon it will become clear that solar can compete head-to-head.

To back up that thought, Bernstein Research notes that the installed cost of solar power has fallen from \$7.50 per watt in 2007 to just \$1.00 today, adding that “solar is cost competitive without subsidy in any market currently reliant on diesel, oil or LNG for power supply” — a potential market of more than 4 billion people. Furthermore, A study by Navigant found that by 2020 prices for unsubsidized solar power will be on par with utility-generated fossil fuel power (which is, of course, highly subsidized by dint of utilities’ regulator-guaranteed returns on capital).

By that time, Berger predicts, our country will be enjoying a solar power boom as big as America’s shale gas extravaganza, one that will not only help finally kill off coal, but also give homeowners the confidence that when thunderstorms knock out the powerlines we’ll still be able to keep our lights on.


So what do you think readers, is solar ready for prime time? If you’ve had solar installed on your home, tell us if you think it’s worthwhile.

How Much Energy Does Your iPhone (And Other Devices) Really Use?



iPad: \$1.50 per year

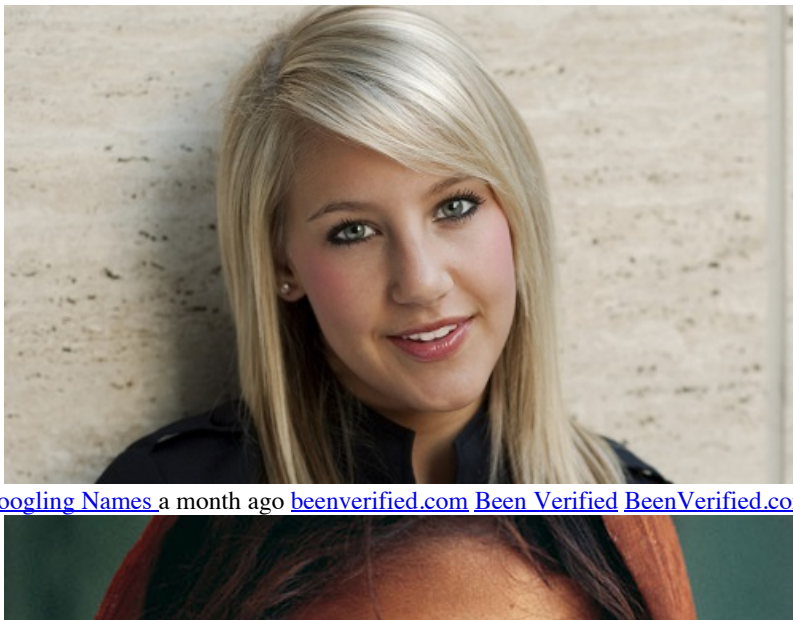
If you fully drain and charge your iPad every other day it will use about 12 kWh of electricity per year. Source: Electric Power Research Institute


 34 comments, 11 called-out

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