Will Solar Ever Work?

An investigation into the murky politics of America’s renewable-energy-powered future, with a little help from a solar evangelist.

To Killian McDonald, heaven is a “football-field-sized roof with a 10-degree tilt, facing south toward the sun.” A twenty-seven-year-old with unruly eyebrows and the easygoing timbre of a genius surfer bro, McDonald is what you might call a solar evangelist. He seemed destined to get strapped into the “solar coaster,” as he calls it, when he enrolled in an environmental science class in high school. “We made biodiesel out of used oils from the local pizza joint that made VW engines sing,” he says. “We learned about fuel in dumpsters and electricity in sunlight, megawatts of power in waterfalls. It made me the worst kind of tinkerer, which is the one who cares most about repurposing and rebuilding stuff that has been discarded, trashed, or simply overlooked.” Now McDonald works for Sungevity, an Oakland, California–based solar company that evaluates homes and businesses for photovoltaic panels, then provides a local installation team that drives over to mount them.

With America’s dependency on fossil fuels slowing toward stagnancy, there are few industries more packed with potential than solar. And McDonald, after spending seven months “sweating in a big hat and avoiding scorpions” in the fields of Thailand, where he rehabilitated soil by pyrolyzing corn cobs into charcoal, jumped on board. Upon returning to the States, he spent four

“There will come a time when the tech, labor, and financing are advanced enough for everyone to get on the bus,” says Sungevity quality assurance specialist Killian McDonald.
months on rooftops learning how to install photovoltaic panels for Grid Alternatives, a nonprofit that provides solar for low-income families. Now at Sungevity, McDonald couldn’t be more optimistic about the future of solar in America. He looks at countries like Costa Rica that say they’ve gone completely green, and U.S. cities like Burlington, Vermont, that are making the same claim, and remains convinced that America’s full transition to solar power can be measured in months rather than decades.

There is, however, a “but” to solar’s progress that even optimists like McDonald acknowledge. Solar may be the future, but there are enough roadblocks for homeowners—practical, financial, legislative, and otherwise—that “people should be careful to understand their needs.” This is a somewhat ominous warning. Fortunately, there are ways to confidently determine whether solar is in your future, and if that future is now.

You can start by calling someone like McDonald, who before his recent promotion to an office job at Sungevity’s Oakland headquarters worked as a home-energy auditor for a year. This means, if you were to call Sungevity about switching to solar energy, he would arrive at your home with a ladder, a tape measure, and a resolve to evaporate your utility bill. Usually he’d begin in the attic, searching for critical information that could reveal whether your home’s structure would support the weight of solar panels. “Okay, the lumber is Douglas fir No. 2,” he’d think, running a hand along a rafter, “with 2 x 4s at twenty-four inches on center.” Sturdy wood, spaced only two feet apart: good.

Next, McDonald would climb onto the roof to check its sun exposure and shingles. If there were obstructions, “then he might need to have a conversation” with the homeowner about cutting down tree branches or removing regrettable roof ornaments. He’d gotten so familiar with shingles that he’d practically become a roof whisperer. “I’d think, how many layers am I standing on? How sun-baked are they?” he says. “If I lift the lip of a shingle and underneath it’s much darker than what’s exposed to the sun, then it’s pretty old and subject to cracking and leaks. If it feels bouncy and squishy, and it feels like there’s not a whole lot of grit, that’s a problem too. That means the roof had serious wear.” In these cases
McDonald would likely recommend reroofing before any solar panels were bolted on. Otherwise the risk of the roof cracking or leaking would be “a huge liability” for everyone.

This is where the promise of solar panels becomes clouded by particulars: Utility bills can be expensive, but are they worthy of reroofing the house? According to Clean Power Research, the average solar household in America will save more than $20,000 over the next two decades, but residential solar systems run upward of $25,000. And that doesn’t include any of this reroofing business.

“For a while there was this view that solar was reserved for the wealthy,” McDonald says. “But the industry has gained so much traction recently because so many more Americans can afford it through new financing options.”

Albert Chan, a Stanford and MIT graduate who is part of a growing sector of passionate young intellects flocking to the clean-energy-research industry, has an opinion on those options. He says that over the past few years financial innovation has been “one of the biggest trends in solar.” Since 2010 the cost of residential-solar-panel installation has dropped 45 percent, in no small part due to full-service companies like Sunrun, SolarCity, and McDonald’s Sungevity, which allow customers to lease solar panels for zero dollars down and a small monthly payment that’s still notably cheaper than most utility bills. The companies also provide professional monitoring and maintenance for the panels themselves, which, to be fair, typically require nothing more than a garden hose to spray off accumulated dust.

But the guarantee of professional upkeep offers peace of mind when it comes to more complex technical issues.

The potential downside to leasing solar panels, however, is that it makes homeowners ineligible for the juicy energy investment tax credit (ITC), a federal tax break that covers 30 percent of solar-installation cost. Often hovering around $10,000 in value and capable of being carried forward if it’s not entirely used in a single tax year, the ITC is a major reason that solar installation has exploded by 1,600 percent since the credit was instituted in 2006. Leasing proponents defend their model by claiming that the value of the tax credit is absorbed by the solar installer and then passed along to the customer via cheaper prices. But then, of course, they would.

“Owning the system on your roof is how you maximize the economic benefits of solar,” says Eric White, a former investment banker in the fossil-fuels sector who became disillusioned by the market’s trail of negative economic and social repercussions. White’s response was to cofound Dividend Solar, where he used his financial expertise to develop a hybrid financing model, one that allows homeowners to claim the ITC while also avoiding up-front installation costs. Dividend’s financing model offers
the benefits of leasing (no up-front cost, peace-of-mind performance guarantees) while still allowing homeowners to own their system and the tax incentives that come with it.

With three financing models available, surely it’s time for everyone to clear the roof and praise the sun god, right?

Yes and no. Potential solar buyers must keep close watch on the health of the ITC, set to expire December 31, 2016. Solar advocates are fighting for the credit’s renewal with particular desperation because its loss could reverse solar’s national momentum. According to the Solar Energy Industries Association (SEIA) projections, loss of the credit could cause a 57 percent decline in solar installations in 2017.

And then there’s “net metering,” a solar-energy process allowed in forty-four states that has enormous financial impact on the homeowner. To understand net metering, you must first understand (or, in my case, come to terms with) the fact that going solar doesn’t mean you’ve gone off the grid. You’re still very much connected to your local electrical company, and while this news is disappointing for us rogues hoping to live off the fat of the land like modern-day Steinbeck characters, it can have positive implications for solar owners for two reasons. First, it means you still get electricity during storms and at night (though being grid-bound does mean that during local power outages you’re as much in the dark as your neighbors). And second, being connected to the grid means that during peak sunshine hours you can actually feed excess energy back into the system. This, technically, is what net metering is: Your electric meter spins backward in triumph as you sell back to the utility any surplus energy your panels generate. Not only that, you sell your power at retail price—if energy costs twenty cents per kilowatt-hour in your neighborhood, then you sell it to your utility at that same rate. You can’t actually profit off your rooftop power plant, but you can, with enough sunshine, zero out your electricity bill.

It won’t surprise you to learn that utility companies are not fans of net metering, and that they’re fighting it on a legislative level. Their argument—and it’s not without merit—is that solar users are essentially free riding off the utility grid. “Net metering is controversial,” Chan told me. “You have the solar advocates and homeowners saying, ‘I bought a kilowatt-hour at a certain price. If I’m selling it back I should get that same price.’ But then you have the utilities saying, ‘Look, that kilowatt-hour includes the cost of maintaining an electrical grid, so the actual electricity generated is half that price, with the other half being the price of maintenance.’”

Because net metering offers major financial benefits to solar users, it’s become the primary target for utilities trying to clamber out of the so-called utility death spiral, a phenomenon to which most homeowners are unwittingly tethered. Essentially, as more homes and businesses switch to solar—and, according to SEIA, that’s happening at a staggering rate of one every 2.5 minutes—utilities must compensate for the revenue loss by raising prices on their remaining customers, a hike that in turn encourages those very customers to switch to solar, thus beginning the cycle again. As a result, fossil-fuel-based utilities have found themselves in a battle of survival against an opponent that won’t burn out for some five billion years.

The approach of the utilities has been to shift the conversation about solar power away from its positive environmental impact (an argument utilities cannot win) and toward net metering’s negative social impact. The American Legislative Exchange Council (ALEC), a powerful nonprofit organization composed of conservative state legislators, has been particularly vocal on this front. In a net-metering reform proposal, ALEC points out that, because solar power is mostly adopted by wealthy households and because selling energy back to the grid forces utilities to pass the financial burden on to their remaining customers, net metering is, ultimately, a “regressive tax subsidizing the rich and neglecting the poor.”

The proposal cites a California study that “reported that customers who do not install net metering will be paying an extra $1.1 billion in shifted costs annually by 2020.”

Some solar advocates, in a counterattack to accusations of social inequity, have taken steps to promote energy equality. Grid Alternatives, the company Killian McDonald worked for before hooking up with Sungevity, is one of many organizations that donate and install solar-panel systems for low-income communities in the U.S. and abroad.

Still, the utilities, backed by ALEC and a powerful fossil-fuel lobby, have plenty of political clout. Several states have recently passed legislation to reduce solar incentives. In 2013 the Oklahoma House of Representatives passed an ALEC-backed bill that allowed utilities to charge an additional fee to new solar-equipped homeowners. In Arizona, renewable energy opponents tied to ALEC have run an ad campaign accusing solar advocates of taking advantage of elderly residents on fixed incomes. A bitter debate over net-metering practices ensued. In just the past few years the policy push

Solar-panel engineer Albert Chan (above) and Dividend Solar cofounder Eric White (below) are both personally invested in the success of the solar movement.
For each solar proponent there are dozens of electrical linemen hanging from the millions of century-old utility poles hammered deep into American soil.

for additional solar surcharges has spread to over half of the forty-four states that allow net metering.

Because so much of solar’s financial value depends on a state’s net-metering policy, it’s critical to understand whether and how fees are enforced. This isn’t easy. The landscape of solar politics is constantly in flux. One reliable resource is SEIA’s website, which has an informative, up-to-date section on each state’s solar policies.

Once you know what policies are in place, a simple test of whether solar is right for you is to check if your home has at least two of the following conditions: (1) lots of sunshine, (2) favorable state solar policies, and (3) expensive fossil-fuel electricity.

So, yes, this means you can reap solar benefits even if you live in a state with little sunshine. Eric White says that New York is one of the fastest growing solar markets in the country, which makes sense given the state’s solar-friendly initiatives. Governor Andrew Cuomo made a nearly $1 billion commitment to NY-Sun, a program designed to facilitate a statewide transition to renewable energy. Combine those policies with New York’s high electricity prices and the switch to solar is economically profitable despite a lack of year-round sunshine.

When coupling solar incentives like the NY-Sun program with the instability of fossil-fuel prices, you can understand why many energy experts see the widespread adoption of solar as a near-term inevitability.

“Fossil fuels are extremely volatile in terms of pricing, and shake around all the time,” McDonald says, “whereas solar is a nonmoving, very stable source of energy that you are the local provider of.”

McDonald has a point: Fossil fuels are ephemeral, and the sun isn’t going away anytime soon. But given the legislative muck surrounding solar, it’s not hard to wonder how stable an industry can be if its financial health is so firmly bolted to the ever-shifting whims of government.

The greatest hope for the solar industry may lie in the determination of its employees, who think of their work not as a job but as a cause. They believe renewable energy is the future simply because without it, the earth itself may not have much of a future.

Right now on thousands of roofs across America there are solar proponents like Killian McDonald looking up at the sun to project its path. But for each McDonald there are dozens of electrical linemen who are hanging, literally and figuratively, from the millions of century-old utility poles hammered deep into American soil.

The change will be gradual and it will be long, but it is moving in a single direction. You likely won’t regret the decision to go solar in twenty years, when photovoltaic panels are as cheap and ubiquitous as cellphones, and some new country is hoarding, price gouging, or fighting everyone else over oil. The sun has about five billion years left in it. And it belongs to everyone.

**SUNSHINE STATES**

Best (and worst) net-metering practices by state, according to data compiled by the Interstate Renewable Energy Council and Vote Solar.

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**ILLUSTRATION BY STEVE SANFORD**