

Extension Clean Energy Outreach

By Leigh Fortson, Renewable Energy Advocate

Issue 41

May 10, 2012

Special Solar Energy Edition



Solar Energy: Options, Cost, Benefits and ROI

Leigh Fortson

There are lots of good reasons for Coloradans to consider installing solar panels on their homes given all those sunny days we brag about. Even so, there has been a significant obstacle that's prevented many from obtaining a system. Expense. But here's the good news: that's changing!

My husband and I have wanted to install solar panels for years, but we just couldn't find enough change under the living room couch to purchase the system. Even with tax breaks and other incentives, it just wasn't feasible. Then we discovered the leasing option, and everything changed from there.

Here's how it works:

There are likely hundreds of solar companies throughout the state that now have the capability of working with PV system manufacturers and financing entities to offer solar leasing programs. We went with Syndicated Solar (www.syndicatedsolar.com) a company that offers services in Grand Junction and Denver. But there are many to choose from and it's a good idea to find the company that best meets your needs.

First, Brad, a consultant from Syndicated Solar, came to our house to assess the physical property and make sure solar power was a good match for our home. With constant southern exposure and no trees in the way, we knew it would work well. Brad then educated us about the difference between purchasing and leasing. For us it was a no-brainer. With no money down and only a \$250 refundable deposit to Xcel to prove that we were serious, we chose the leasing option.



Equipment arrived about a week before installation

make our lease payments rather than take an extended vacation in Hawaii. All good there.

In turn, Brad gave evidence of the solvency of the leasing company and the high quality of the panels. He provided pages of data backing up both and before long, both sides of this agreement were on board.

Our contract is easy to read and transparent. It explains everything in simple, readable terms, including the guarantee that we'll pay \$75 per month on our electricity for the next 20 years—no matter what happens with the market rate. This is a \$20 decrease to our current electric costs. We're pretty certain this rate will serve us well through the next two decades.



Finding a location and preparing for the electrical box.

Since it was up to Syndicated to properly design and install the system, they spent several weeks determining the best way to proceed. We were given a mock-up of what the system would look like, how many panels would be required for our needs, and where the operational electric box would be located.

We had to go through the typical credit check and overall financing approval for the panels because even though we weren't going to own them, the leasing entity needed to know that we were going to



I spoke to Brad today and asked him what he would suggest people do to ensure that they're getting a good and reputable deal on a leasing option. His advice:

- Ask for and call references, whether they're residential or commercial, to get the inside scoop on the company and to find out if they followed through and made good on their promises.
- Drive by any local systems that are already installed to make sure they're aesthetically appealing.
- Do your own research online to be sure the proposed agreement is on par with what other companies are offering.

- Be sure the agreement includes a guarantee from the leasing company (who owns the panels) that the system will hold up for the life of the agreement, and that they will repair or replace any panels that fail to do that.
- Make sure the solar company uses master certified electricians to handle the electrical installations, and PV installers who are certified with the North American Board of Certified Energy Practitioners.
- Be sure that the leasing entity will cover, through their own insurance, any weather damage to the panels. (This points to the fact that your own homeowners insurance should not be increased by adding solar to your home). Our panels were designed to withstand hail the size of quarters and 60 mph winds. This is fine for where we live, but may not work for all of Colorado.



- Watch for high penalty fees if you decide to sell your home. The system should be part of the overall sale of the house where the buyer can either continue leasing or buy the system outright.
- Make sure your roof will not need to be replaced any time soon. Ask the consultant what it would cost to take the system down if there is a necessary repair.
- Call your energy provider (i.e. Xcel) and make sure they're partnering with solar companies to create these relationships. Whether you purchase or lease, you'll still be on the grid and need buy-in from the power company. Not all of them are meeting their mandatory renewable energy requirements this way, so before you do anything else, check with them.

'Feet' are the first thing they attach to the roof

Solar technology is improving every day, and in another five years it will likely be superior to what we now have on our roof. That doesn't matter. The panels we have are good for 40 years and we simply won't need anything else. Plus we wanted to act *now* to do what we could to reduce our carbon footprint and save money.

Finally, Cary Weiner, CSU's clean energy specialist, and Kurt Jones, our solar point person, have created some invaluable calculation tools that can help determine whether purchasing a system is actually financially wise, and how long it will take to get a return on your investment. You can also discern if leasing will really save you money (a solar consultant might promise that it will, but Kurt's solar calculator can confirm or contradict that promise). To access the calculators go to: <http://www.ext.colostate.edu/energy/solar.html> and look under CSU Resources. I used this tool with Brad (nervously?) standing by my side to make sure that what he was saying was legit. In the end, he was so impressed with the calculator that he said he'd use it for his own business purposes.



Then they install 'rods'



Also, Cary is creating a solar leasing fact sheet that will go much deeper than this article about what to look for and how the financial end of leasing works. It should be available in a few months. Just keep checking the website above for that as well.



A certified electrician installs the electric control box)

It's been five months since our first meeting with Brad and it has taken until now before the panels were installed. (The installation itself took almost three days.) But it's worth the wait. Which we're still doing; now Xcel needs to pull some cosmic switch to activate the whole thing, but Brad is assuring me that this will be very soon. Even if it's not this week, as my husband and I sit in our back yard soaking up the rays, we know that pretty soon we'll be powering our swamp cooler, lights and appliances with that same hot, clean, sustainable energy. It makes us feel warm all over, and uncharacteristically patient.

Throughout this newsletter, you'll only see photos of the installation of our solar panels.

Will Lack of Funding Stall US Solar Market Takeoff?

Source: PV Magazine

Ever since the 1603 Treasury and Section 1705 loan guarantee programs expired last year, succumbing to what many characterized as premature deaths, renewable energy advocates have been inconsolable. And they haven't suffered silently. They continue to find ways to remind the U.S. Congress that the solar sector is not receiving the support it needs to build jobs and independence from fossil fuels, or to compete on a global scale.

What is more, they say the federal government is not offering the same level of backing to solar generation that it did to other major U.S. power players – all of which have taken a similar path to commercialization.

Now, a study conducted by the Howard H. Baker Jr. Center for Public Policy at the University of Tennessee–Knoxville, on behalf of the Solar Energy Industries Association (SEIA), shows that traditional energy sources, such as coal, oil, natural gas and nuclear energy, have all been backed by U.S. subsidies throughout the commercialization process.

Indeed, the study finds that the predecessors of such next-generation power sources as solar and wind generation continued to receive federal-level funding as they neared market acceptance and finally went mainstream – effectively removing market barriers, encouraging private investment, and enabling the energy technologies to reach maturity over an average period of 30 years.

With the proper incentives, the study, "Assessment of Incentives and Employment Impacts of Solar Industry Deployment," predicts that the U.S. solar industry could create 200,000 to 430,000 jobs nationwide by 2020.

"When it comes to government investment in new and emerging energy sources, solar is not unique," said Tom Kimbis, vice president of Strategy and External Affairs for SEIA. "The U.S. has a long history of incentivizing all sources of energy because access to reliable power is the lifeblood of economic development. Pursuing an all-of-the-above approach to our energy portfolio, including aggressively deploying solar energy, is the right policy choice and is critical for America's long term competitiveness."

Read more: http://www.pv-magazine.com/news/details/beitrag/will-lack-of-funding-stall-us-solar-market-takeoff_100006651/#ixzz1uDXD4avW



Nearing the end of day one of installation

Experts Talk Options for Going Solar

Source: bcdemocratonline.com

Farmers and ranchers already use solar panels to power electric fences, water wells and tank heaters. But two energy workshops held recently in Northeastern Colorado were designed to provide rural residents with information about how to make solar a bigger part of their energy portfolio.

While wind energy makes up a much larger portion of the state and federal renewable fuels standard so far, going solar is an increasingly popular option in sun-drenched states like Colorado.

“Why all the buzz? It’s creating a lot of jobs here in Colorado,” said Rebecca Cantwell, senior program director for the Colorado Solar Energy Industries Association based at Boulder. She spoke at back-to-back meetings in Holyoke and Fort Morgan coordinated by the Colorado State University Extension Service. “The fuel is free. And an aspect that is increasingly important in Colorado is that it doesn’t use any water.”

The commercial market for solar energy grew 127 percent in 2011, she said. When it comes to the installation of photovoltaic solar panels, Colorado ranks fifth nationally while New Mexico is fourth.

In addition, Colorado has some of the best solar thermal potential in the country. One system in the San Luis Valley uses mirrors to heat water that creates steam to run a turbine, she said.

Innovation is lowering costs and making installation quicker and easier, she added.

“I think in five years you’ll be able to go to Home Depot and buy a solar system you can plug in at your house. Well, maybe not completely, but close to it.”

To read more: <http://www.bcdemocratonline.com/news/x272283461/Experts-talk-options-for-going-solar>



Installing is very precise. It’s good to have people who know what they’re doing!

Valley Geothermal Resources Assessed

Source: MIT Technology Review

After a steady stream of bankruptcies, poor earnings reports, and canceled IPOs for clean-energy companies, this week [Solarcity](#) bucked that trend by announcing that it had filed the necessary paperwork with the U.S. Securities and Exchange Commission for an IPO.

The key difference between Solarcity and many other clean-energy startups is that it isn’t trying to take on incumbents with new technology. It makes money by deploying existing solar technology with a novel approach to financing.

Solarcity designs, installs, and maintains solar-energy systems fitted to homeowners’ roofs. Instead of asking for a big upfront payment, it leases the systems. As the panels produce power, surplus electricity is sold back to the local utility. Combined with the savings that come from using less power from the grid, this will typically reduce the homeowner’s electric bill by enough to offset the lease payments.

Aided in part by a rapid drop in solar-panel prices over the past few years, this approach has been a success. A market flooded with cheap solar panels from Asia saw prices drop by 50 percent last year. That has eliminated profits for many solar-panel manufacturers, forcing some, including a number in China, to declare bankruptcy or go out of business. But installing solar panels remains lucrative, and when solar prices drop, that helps Solarcity’s bottom line.

The company's filing with the SEC isn't public, so its financial details aren't yet known. A recent analysis by GTM Research suggests that it's been quickly increasing its market share, claiming 6 percent of the residential installation market in 2010; and 13 percent of the market in 2011, "more than double the next biggest player," says Shayle Kann, managing director for solar at GTM Research.

Some other energy startups have recently adopted the strategy of working with companies that make conventional technology, rather than trying to compete with them. Innovalight, acquired recently by Dupont, originally intended to make its own solar cells using a novel silicon ink.



Connecting the electrical wires beneath the panels

But faced with stiff competition from conventional silicon-solar-panel manufacturers in China, it found a new application for its inks; when added to conventional solar panels, the ink can improve the panels' efficiency. So it sells its ink to solar manufacturers. Several other companies are developing technologies that fit neatly with existing solar-panel production processes. For example, Twin Creeks Technologies and 1366 Technologies are developing better ways to make the silicon wafers that form the heart of a conventional solar cell.

Most of the money being made in the solar industry doesn't come from making and selling solar panels. In the case of some small residential systems, solar panels account for only 20 percent of the overall cost of a system. The rest includes the cost of electricians to install the panels and hardware to connect the systems to the grid. Most of that money goes to companies like Solarcity. Indeed, some established solar-panel manufacturers, such as SunPower and First Solar in the United States, are looking to survive by not only selling panels, but also building the systems and selling the power.

Solarcity is finding ways to expand the market for existing technologies-mainly solar panels, but also equipment for improving efficiency and storing electricity. It also addresses one of the big challenges with selling solar-panel systems to homeowners-the high upfront cost-and that's allowed it to quickly increase its share of the residential solar-installation market.

The company is also innovative. It has developed new software management tools that allow it to manage thousands of unique installation projects, along with the large variety of permitting requirements, which vary between states, counties, and cities.



Crucially, Solarcity guarantees the performance of the solar-panel system, so homeowners can count on saving money. It has a similar program for commercial installations. It can afford to guarantee the performance because it designs the systems itself and has data on how similar installations perform. It also monitors the performance of the solar panels and sends out repair crews to keep them working.

As the largest residential solar-power installer in the U.S., Solarcity's scale gives it an advantage. But success is by no means guaranteed. For one thing, while it doesn't compete with conventional silicon solar-panel manufacturers, it ultimately competes with conventional

power plants, and it can only do that now because government subsidies offset some of the cost of solar-panel systems. Its dependence on state subsidies is the reason it doesn't operate in all 50 states.

However, subsidies seem uncertain as governments look for ways to cut costs; in some places, such as California, subsidies are already declining. As it approaches its IPO, the company's future may hinge on whether it can lower costs fast enough to outrun that decline, and survive without subsidies.



It's beautiful to the eyes that see the elegance of nature's energy

The Kickstarter for Solar Could Make You Money This Summer

Source: GigaOM

When I first wrote about Solar Mosaic, a startup that's been building a kind of Kickstarter around funding solar roofs, I was excited about their idea of leveraging crowd-funding to offset the large costs of solar rooftop installations. But the company is only just about to launch the truly disruptive part of its business: as early as this summer Solar Mosaic plans to start offering people a way to buy into rooftop solar panel projects, and make back a return on their investment over time.

Essentially for the investor it will be like buying the safe and predictable return of a mutual fund. The way it works is that a building owner will lease the solar equipment and enter into a contract for a fixed, low, electricity rate, commonly over about two decades. Solar Mosaic is working with solar lease providers like Sungevity, but Solar Mosaic is the one that organizes the crowd-funding of the money to get the solar rooftop installed. Once the project gets funded Kickstart-style, the rooftop solar panel installation process starts.

Solar rooftops are a surprisingly low risk investment. As Daniel Rosen, co-founder of Solar Mosaic put it in an article for us last month: solar loans are backed by a revenue-producing asset (electricity) and the building owners are just continuing to pay for the electricity that they are used to paying for day in and day out. There is little risk to investors that the building owners will default on their electricity payments, particularly since they are also saving money on their energy bills from day one. In addition the costs, timelines and returns for solar panels are pretty transparent as the technology has become increasingly commoditized.



Right now, banks are one of the major ways that solar rooftops get funded in the U.S. An installer like Solarcity (which plans to IPO soon) will raise a several-hundred-million-dollar fund from a bank to provide financing options like leases to building and home owners for solar panels. The bank can get a good return on the investment over time - some estimate 12 percent. Some corporations are starting to see the money-making potential of solar rooftops, too, and Google has created a \$280 million fund for Solarcity, and a \$75 million fund for Clean Power Finance. Warren Buffett is investing in these types of solar projects, too.

Solar Mosaic is looking to bring that money-making opportunity down to the everyday investor (including you and me). The big question will be how much of a return will investors and everyday people be able to make off of funding these projects?



Nick Allen, a Partner with Spring Ventures - Solar Mosaic's investor - told me last year that he thought the solar projects could one day provide something like a six-percent return, and the company could offer returns on one- to three-year notes. "How many people are happy with the one-percent return they get from their bank?" Allen explained to me, adding that the concept is "an exciting emerging asset class where people can invest money, create solar and do well." Solar Mosaic had planned to start offering this type of return in 2012, but the momentum has been accelerated because of the recently passed Jumpstart Our

Business Start-ups (or JOBS) Act. The series of six bills bundled together - which had the support of Google, Steve Case, Angel List and many others - makes it easier for startups to gain access to capital including crowdfund investing. Solar Mosaic was founded in October 2010 and funded by Spring Ventures and a group of angel investors.

Beyond the soon-to-be-launched money-making aspect of Solar Mosaic, solar seems to be the perfect application for crowd-funding. Like Kickstarter, lenders to projects are inspired by the project itself and want to have "skin in the game," as Allen explained it to me. The lenders are also motivated to engage with the project and promote lead generation. "Solar is viral, crowd funding makes it more so," said Allen.

I've experienced it firsthand. I bought a \$100 "tile" in Solar Mosaic's first five solar projects, which with \$350,000 and 400 investors (one "celebrity investor" gave \$250,000). As soon as the Oakland solar project that I helped fund got fully funded last month, I got really excited and sent the link to all of my friends. I think the idea of combining the crowd-funding model with solar rooftops and adding in the potential to make money could be truly disruptive.





The finished product!

Bits and Pieces

STATE ENERGY DATA RELEASE

State-level estimates of consumption, prices, and expenditures for wood and biomass waste through 2010. State-level estimates for wood and biomass waste for data year 2010 are available at SEDS Updates. Data highlights include the following:

- U.S. consumption of wood and biomass waste totaled 2.5 quadrillion Btu in 2010, a 5-percent increase from 2009. The top consuming States were Florida, Georgia, Alabama, and California.
- Prices of wood and biomass waste averaged \$3.45 per million Btu in the United States in 2010, a 5-percent increase from 2009. Prices ranged from \$1.73 per million Btu in Hawaii to \$11.93 per million Btu in Wyoming.

State-level estimates for retail electricity sales for data year 2010 are available at SEDS Updates. Data highlights include the following:

- U.S. consumption of retail electricity totaled 12.8 quadrillion Btu in 2010, a 4-percent increase from 2009. The top consuming States were Texas, California, and Florida.
- U.S. retail electricity prices averaged \$28.92 per million Btu in 2010, essentially the same as in 2009. Prices ranged from \$18.28 per million Btu in Wyoming to \$73.80 per million Btu in Hawaii.
- U.S. retail electricity expenditures totaled \$366 billion in 2010, a 4-percent increase from 2009. For 2010, the residential sector accounted for 46 percent of total expenditures, the commercial sector accounted for 37 percent, the industrial sector accounted for 17 percent, and the transportation sector accounted for less than 1 percent.

The State Energy Data System (SEDS) provides annual State-level estimates of energy consumption, prices, and expenditures by sector and energy source. A full set of State-level estimates for all fuels, all sectors, and all years through data year 2010 will be released by the end of June 2012.

News from Cary Weiner and other Current Events

CSU Clean Energy Specialist

(970) 491-3784

www.ext.colostate.edu/energy

Contact Cary if you have questions about the information below.

The DIY Home Energy Assessment tool has been peer-reviewed and published.

Go to: <http://www.ext.colostate.edu/pubs/pubs.html#energy>

Do-It-Yourself Energy Assessment Workshops – these will help people assess their specific home’s potential for cost effective energy efficiency improvements, as well as the feasibility of installing solar and wind energy. Everyone interested in reducing their energy costs and/or taking advantage of renewable energy is encouraged to attend.

Participants will receive training in using computer tools that will help them conduct an energy assessment. These tools will also help them analyze both the practical and financial feasibility of adding a renewable energy system to their home. There will also be up-to-date information on how to finance the up-front cost of these energy improvements. For more information: <http://www.ext.colostate.edu/energy/consumer.html>

Middle and High School Teacher Trainings – these are intended to train teachers, **4-H agents**, and environmental educators on how to use the 2nd edition of our clean energy curriculum. Participants will receive: training on how to deliver selected lesson plans on solar, wind, geothermal, and energy efficiency; lunch; a copy of the curriculum; a mini-kit; and access to additional resources. This new edition will be **aligned to 4-H life skills, projects, and STEM abilities** as well as academic standards for science, math, social studies, and advanced placement.

For more information: <http://www.ext.colostate.edu/energy/k12.html>

Colorado Energy Master – In Your County?

Our pilot offering of the Colorado Energy Master program (www.ext.colostate.edu/energymaster) was successful with 40 participants in 4 counties. We have developed a tentative schedule for fall of 2012 (September – November) and would like to expand to as many counties as are willing and able to participate. Please contact me soon if you would like to bring this great program to your county in the fall of 2012.

May 13 – 17

World Renewable Energy Forum, Colorado Convention Center, Denver

<http://wref2012.org>, (303) 443-3130

WREF 2012 will examine how renewable energy technologies address the world's economic, environmental and security challenges at every scale, from off-grid villages to gigawatt power plants. WREF 2012 will be the premier international renewable-energy conference of the year!

June 25-26

Grand Hyatt, Washington DC

Defense, National Security & Climate Change:

Building Resilience and Identifying Opportunities related to Water, Energy and Extreme Events

For more information: <http://www.ACCOonline.org/ccls/defense-june2012.html>

September 24-27, 2012

6th Annual Algae Biomass Summit

Sheraton Denver Downtown Hotel

www.algaebiomass.org

Especially for KIDS!!

The Biodiesel Education Program at the University of Idaho has created a seven-lesson curriculum to help kid's ages 8-12 understand the concepts of energy and renewable energy. The renewable energy focus of this curriculum is biodiesel.

The curriculum was written for 4-H clubs, but can easily be used by elementary school teachers as well.

The curriculum features hands-on activities such as an energy tour, a matching game, a fossil fuels timeline, a renewable energy model, and viscosity wands.

The Biodiesel Education Program is making this curriculum available at no cost.

See this link to download the student workbook and instructor's manual:

<http://www.uiweb.uidaho.edu/bioenergy/4-H.shtml>

The CSU Healthy Homes Partnership has posted a coloring book that can help children learn about energy saving and related issues. Go to:

<http://www.healthyhomespartnership.net/resources/Healthy%20Homes%20Documents/SAVING%20ENERGY%20IN%20MY%20HOME.pdf>

Resources:

Use the calculator at the [Colorado Carbon Fund](#) website and offset now!

Learn About Your Kilowatt Use

Twenty three Colorado State University Extension offices across the state are now offering Kill-a-Watt™ electricity monitors through a free loan program. The devices measure appliance electricity use and offer opportunities for Colorado residents to save energy and money. The meters are plugged in to an outlet and appliances are plugged into the meter. The meter then measures the appliance's electricity use and can project energy cost and use data over an hour, day, week, month, or year. Once meter users learn about how much a second refrigerator or "phantom load" costs, for instance, they may decide to take action to improve their bottom line.

<http://www.ext.colostate.edu/energy/killawatt/index.html>

Smart Energy Tips, a great online e-zine, can help you learn more about keeping your cooling and heating bills down, and your carbon footprint at a minimum. Go to: <http://www.smartenergyliving.org>

CSU Energy Website

To learn more about wind, solar, geothermal, and biofuels, visit our energy website at:

<http://www.ext.colostate.edu/energy>

Furthermore

Go to <http://hes.lbl.gov/hes/db/zip.shtml> and you can do an online calculation of your own energy use and carbon footprint. It's easy to use. Tell your communities about it.

Send me anything that's newsworthy that you're doing in the world of energy efficiency and renewables. We need to keep our colleagues up to date on what's going on in Extension and the value of our role.