



All Creatures Under the Sun

My Solar Powered Barn

Penny Loeb
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Angel the donkey enjoys her solar powered barn.

In the winter of 2002, I decided to build a small horse barn on the two acres I own behind my house in Great Falls, Virginia, a semi-rural area near the Potomac River. One day, as I was making one of numerous daily walks between my house and the construction site, it dawned on me—why not use photovoltaics to power my little barn?

I have been committed to renewable energy since 1977 when the fuel oil bill hit US\$1,500 a season at my mother's 200-year-old colonial in Dutchess County, New York. I took a course on energy sources at the state university at New Paltz (where the state's first Green Party mayor recently took office). Eight years later, just before the federal renewable energy tax credits expired, I built a passive solar house, with a roof full of solar hot water panels for space heat and domestic hot water. I also installed a wind generator on a very windy hillside. It all worked quite well, but I had to sell the house when my career took me to northern Virginia in 1993.

When we were searching for a new home, the one we liked best already had solar hot water panels. I would come to discover that this northwest corner of Fairfax County has dozens, maybe hundreds, of homes with solar hot water, courtesy of those tax credits. In fact, when the panels had to be moved this year for a new roof, the very same contractor who did the original installation showed up to move and then reinstall the panels. The system, which hadn't been checked in 10 years, still works perfectly.

I didn't do a lot of research on the photovoltaics for my barn. I just searched the Web for companies in the Washington metro area. At first, I thought it would be too expensive. The first company I called quoted approximately US\$10,000 for an AC system. That was too much for a 24 by 36 foot (7.3 x 11 m) structure with two horse stalls, a tack room, and feed area.

DC System

But a few days later, I realized that maybe I could do with just a DC battery setup. This time, I tried Atlantic Solar Products in Baltimore, Maryland. In about a week, Mike Howell came to look at the barn, and within days I had a price. Most important, Atlantic would be able to install the system.



Tut, a retired racehorse and great grandson of Secretariat, stands under a solar powered fluorescent light and ceiling fan.

The proposal included two, 60 watt BP Solarex panels. I would have an 18 watt fluorescent light in each of the two stalls, the tack room, the feed room, and the aisle. There would be an 18 watt light outside on one side and a 36 watt light on the other. The lights would be on four circuits, each with a one hour timer switch. The sealed, maintenance-free battery would be installed in a metal box above the door in the feed area. The battery would support the lights for ten days without sun. Components cost US\$1,910, and installation was US\$880.

Mike and his associate, George Stulock, came early on a morning in the middle of May. Installation took about six hours. Since the barn has no ceiling, they put 2 by 4s across the rafters as bases for the lights. Heavy-duty wire was run from the panels to the battery and from there to the lights. They were finished by 3 PM, so they could get on the Beltway around Washington and back to Baltimore ahead of the god-awful, rush-hour traffic.

Adding Fans

I was very content until July approached. Then came the second hottest summer in the last century. I e-mailed Mike: Could we install DC-powered fans? He and I both found the same vendor on the Web—fanworks.com. RCH Fanworks builds the most commonly used DC-powered

Tech Specs

System Overview

System type: Off-grid PV

Location: Great Falls, Virginia

Solar resource: 4.5 average daily peak sun hours

Production: 12 DC KWH per month average

Photovoltaics

Modules: 2 Solarex SX-60U, 60 W STC, 12 VDC

Array: 120 W STC, 12 VDC

Array disconnect/overcurrent protection: terminal block with 15 A fuses

Array installation: Zomeworks GMSOL2 ground mount, south-facing, 60 degree tilt

Balance of System

Charge controller: SunSaver, SS10L, 10 A controller with LVD

Battery: Concorde PVX-12105, 12 VDC, 105 AH at the 24-hour rate

System performance metering: Bogart Engineering TriMetric 2020

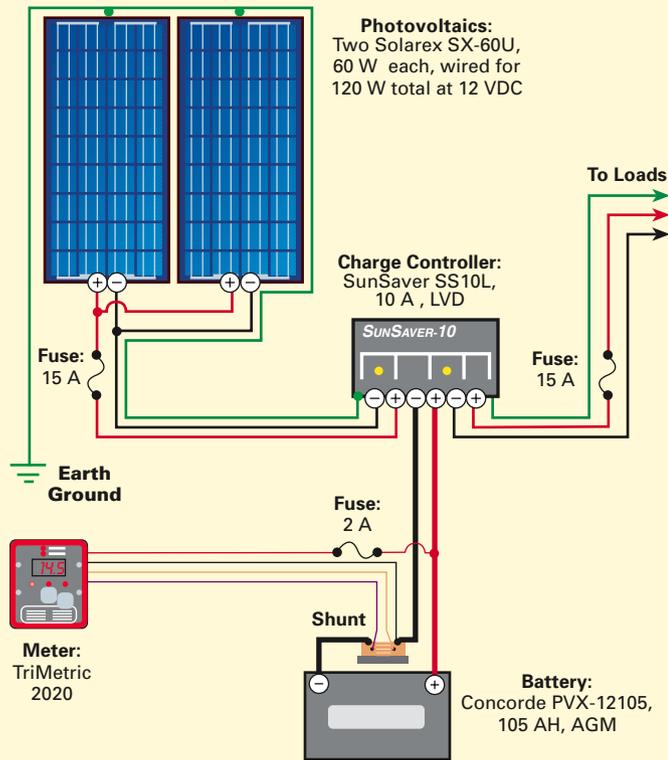
ceiling fans. Three fans cost US\$462 (one in each stall and one in the aisle), and installation by Atlantic Solar would be US\$65 an hour.

This time, George came by himself on July 3, just as the ghastly heat and humidity rolled in. In three hours, he was finished. Luckily, he went off to buy me a new fluorescent light, and I tested the fans. Oh lord, they didn't seem to send out any cool breezes. I looked at the ceiling fans in the house and determined that the ones in the barn were spinning backwards. George agreed—something was amiss. Must need to reverse the polarity, he thought. But we wanted to be sure. I tried calling the company. The owner's son answered and said that his dad was at the laundromat. Fortunately, Foster Hankins called back just as George was leaving. Yes, it was the polarity. The change took about a minute.

The fans work great, and I even left them on 24 hours many days last summer. Only once or twice did the load of the fans and lights drain the battery low on a string of cloudy days. The battery level indicator light warned me to shut something off.

The solar-electric system has been running for a year. I have only one small complaint. I found that the fluorescent lights dimmed somewhat on really cold days. Switching from GE to Phillips brand solved that problem. The blacksmith, who shoes my horse, would like AC power for his equipment, but he is grumblingly making do.

Loeb PV System



Note: All numbers are rated, manufacturers' specifications, or nominal unless otherwise specified.

Solar Option

Running electricity from the house would have cost at least as much as installing the solar-electric system. A second breaker panel would have been needed for the barn.

The barn uses approximately 59 KWH a year for lights and about 14 KWH for the fans. This adds up to a tiny savings of about US\$7 on my utility bill. The real savings came in avoided installation costs of conventional electricity. The rewards come in burning a little less fossil fuel—electricity in Northern Virginia comes mainly from coal.

I would highly recommend this system to anyone building a small barn or shed for animals, especially if it is a distance from any house or utility source. Conestoga Buildings, the company that built my barn, constructs about 700 barns and sheds a year in the mid-Atlantic region. I am hoping it, and other barn companies, will inform their customers about the solar option.

Access

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Atlantic Solar Products, 9351-J Philadelphia Rd., Baltimore,
MD 21237 • 800-807-2857 or 410-686-2500 •
Fax: 410-686-6221 • mail@atlanticsolar.com •
www.atlanticsolar.com

System Costs

Item	Cost (US\$)
Installation	\$880.00
2 Solarex SX-60U, 60 W modules	620.00
Outdoor floodlight, 36 W	201.00
Battery enclosure	167.00
Outdoor floodlight, 18 W	162.00
TriMetric AH meter with shunt	160.00
5 Indoor lights, 18 W	158.25
Concorde PVX-12105, 105 AH battery	150.00
Zomeworks GMSOL-2 mount	108.00
4 Twist timers	100.00
SunSaver SS10L, 10 A controller w/ LVD	56.92
Output wiring kit	20.91
Module wiring kit	5.45
Total	\$2,789.53

RCH Fan Works, 2173 Rocky Creek Rd., Colville, WA 99114 •
800-529-6306 or 509-685-0535 • Fax: 509-684-5199 •
info@fanworks.com • www.fanworks.com

Conestoga Buildings, 202 Orlan Rd., New Holland, PA
17557 • 800-544-9464 or 717-355-9170 •
www.conestogabuildings.com

Good cost comparison of DC solar-electric systems to the
costs of extending utility lines •
www.mme.state.va.us/de/chap7c.html

Good basic primer on solar energy •
www.randtel.com/general/basic-solar-help.html

