



Factoid

Q: What's the best kind of battery to use in an off-grid renewable energy installation?

A: The answer depends on how comfortable you are working with batteries, how long you hope the batteries will last, and your budget. A lower cost option is a **flooded lead-acid deep cycle battery** such as for golf carts. These can be a good "starter" battery for the backyard tinkerer, but typically only last four to five years, and require careful maintenance such as adding water and checking for corrosion. Higher end **industrial flooded batteries** cost much more but will last 15-20 years with proper maintenance.

A better option, for those who have seasonal property or don't want to worry about maintenance, would be **sealed VRLA (valve-regulated lead-acid) batteries**. The lead plates in these are surrounded with either gel or fiberglass, so they don't gas during normal charging, don't require adding water or equalizing, plus they won't leak or foul battery storage areas. They can tolerate smaller arrays, cold weather, and lower charge rates—and as long as they regularly reach and maintain a full charge, and are not overcharged—can last ten years.



Join us at the Minnesota Solar Tour Open House

**Saturday, October 1
from 10:00am – 12:00pm**

Zenergy is once again participating in the Minnesota Solar Tour scheduled for Saturday, October 1, 2011, from 10:00am-5:00pm. Join us at the newly remodeled WCTA/CNS office in Menahga between 10:00am-12:00pm for Caribou coffee—freshly brewed using power from the Zenergy Solar Trailer—refreshments, door prizes, and tours of our solar PV, solar thermal air, and solar water systems. New this year, we will also be demonstrating a remote solar water pumping system (see ad on reverse side).

For more information on the Solar Tour, which runs throughout the nation that day, visit www.MNSolarTour.org.



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Zenergy Featured Profile



Off-grid renewables may be less expensive than bringing in utility lines.

Spotlight on...Off-Grid Solutions

Off-grid living isn't for everyone, unless you have an unlimited budget for renewable equipment and batteries. Otherwise you must manage your energy use very carefully—selecting the lowest wattage appliances, and possibly waiting for a sunny day to do your high-energy activities. For an average household that already has grid power, we usually recommend keeping your grid connection as a backup. However, for remote settings where you would need to pay large amounts to run a utility line in, it often makes more sense to find an off-grid solution.

WCTA Remote Equipment Cabinets: This was the case for some of West Central Telephone Association's remote switching equipment. The electronics in the cabinets require a steady power supply, averaging a total of 2.8 kWh per day. While that might not seem like much, the challenge was that the Public Utilities Commission requires 99.99 percent reliability 24 hours a day/7 days a week from the equipment—there could be no downtime waiting for the sun to shine again!

The solution was a wind/solar hybrid system with batteries. The Xcel RDF fund* supported award-winning research to test a number of different configurations until the perfect

"sweet spot" of components and settings was found: approximately 1.7 kW of solar, 1 kW of wind, and eight 12-volt lead-acid batteries. The experience gained through this research enables the Zenergy team to help you find the perfect balance for your situation.

*Funding provided by customers of Xcel Energy through a grant from the Renewable Development Fund.

City of Hawley Lighted Sign: The city of Hawley was in the same boat when looking to place a lighted city sign on Highway 10. The cost to bring in utility power to the sign would have been impractical, so they contacted Zenergy to see if solar power was an option. After a careful site analysis, the Zenergy team designed a solution using just one 130 watt solar panel and three VRLA batteries. The solution had to be approved by the Minnesota Department of Transportation, who was hesitant at first as it was their first solar application. But after visiting the site, they agreed solar was the way to go. The system will quickly pay for itself even though, as a city, they weren't able to tap into the state and federal incentives. "We get many compliments on our signs. Being lighted with solar power was the right choice," said CJ Holl of the Hawley City Council.

Renewable Energy Funding Updates

Federal incentives:

- 30% federal tax grant—The 1603 federal business tax grant in lieu of credits program is scheduled to end December 31, 2011.
- The 30% federal tax credit for both residents and businesses will continue until at least 2016.
- The 100% federal first-year bonus depreciation for businesses reverts back to 50% in 2012.

Minnesota Rebate Programs: All programs (small wind, solar PV, and solar thermal) are fully reserved for 2011. It is unknown if there will be additional funding for 2012.

Xcel RDF programs: The \$4.6 million allocated to the Solar Rewards program for 2011 has been fully reserved; however, you can still apply for the 2012 funding cycle. \$2.2 million of that budget has already been allocated, so we suggest you apply soon! The Minnesota Bonus program runs on a different fiscal year and still has funds left for 2011. **The popularity of these programs shows that solar is really taking off in Minnesota!**

See www.dsireusa.org for more information on all funding opportunities.

How it Works ... Sizing an Off-Grid Solution

An off-grid solar solution (with no power at all from the utility company) will require a careful assessment to determine your needs and to properly balance the following possible components:

SOLAR CONTROLLER ○
Regulates the solar power going to your batteries. MPPT-style makes use of every watt possible. Make sure it can handle higher winter voltages!

BATTERIES ○
Not enough amp hours and you'll be running out of power each day. Too many with a smaller array and you won't be able to keep the batteries properly charged.



ENERGY NEEDS
The less you need here, the more you'll save on all other components.

SOLAR PANELS
Your "power plant." Must calculate in several efficiency losses along the way from wiring, inverter, shading, etc. to determine the true size you need. An off-grid home typically requires at least 3 kW.

GENERATOR
Noisy and very un-green, but can help keep costs down and convenience up by providing power on those days when you're running out of sunshine power.

INVERTER
If you're using standard AC power, you'll need to convert solar's DC to AC with this. Must be sized for maximum surge requirements (well pump, etc.).

Zenergy Master Electricians have the experience to calculate the right balance for you!

visit us online:
www.ZenergyGuide.com



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