CASE STUDY

DAVE & SHER **DIY HOMEOWNERS**

Dave and his wife Sher worked with Unbound Solar to build a 6 kW solar system back in 2014. Five years later, Dave wrote a report for the Clean Water Action Council (for which he is a Board member) on the viability of going solar in frigid Wisconsin, the place he calls home.

Dave's report is reprinted with permission on our site, and this case study walks through the information he graciously shared with us.

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Challenges

"We know now that [solar systems] make sense in sunny California, but what about here in northeast Wisconsin?"

Dave and Sher live in De Pere, WI, a region that gets around **40 days of snow per year**. Dave had been keeping his eye on the falling cost of solar equipment, waiting for it to drop to a point where it would be a **sound investment** even in his harsh local climate.

With so much snow, they would have to commit to **routine maintenance** of brushing snow off the panels to keep them exposed to sunlight and producing properly. They were also concerned that short winter days would **hamstring production** and leave them without enough power to cover their needs.

Solutions

The primary goal during the system design process was to **mitigate production loss** caused by short winter days and snow cover on the panels. For that, we designed a system around the SolarEdge HD-Wave with **power optimizers**.

The power optimizers allow the system to monitor and optimize each panel's production individually. (With classic string inverters, a loss of production from a single panel negatively impacts the entire string.)

If a panel in their system is obstructed by shade, snow or other obstructions, the production drop is isolated, allowing the rest of the array to continue to **produce power as usual**. The optimizers help them retain production that would otherwise be lost on short, overcast winter days.

The next order of business was to make sure the system would be easy to access for snow removal. Fortunately, they live in the country and had room on their property to build a **ground mount array**.

The ground mount puts the panels at eye level, making

snow removal, a task that is both hazardous and tiring, easier – especially if you need to do it 40 times every winter.

Dave was curious about **trackers**, a type of mount that follows the position of the sun in the sky throughout the year to optimize production. But building a tracker that can withstand 90 lbs. of wind loading and 40 lbs. of snow loading was **too expensive for this project**.

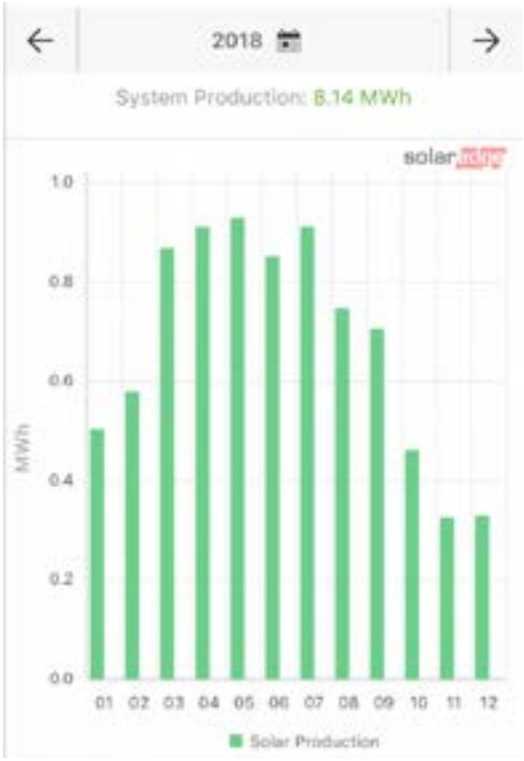
It's simply much **more cost-effective to add a few extra panels** to make sure you hit your target, which is the decision we went with here. We chose to stick with heavy-duty IronRidge XR1000 racking, which is designed to withstand heavy wind and snow loading.

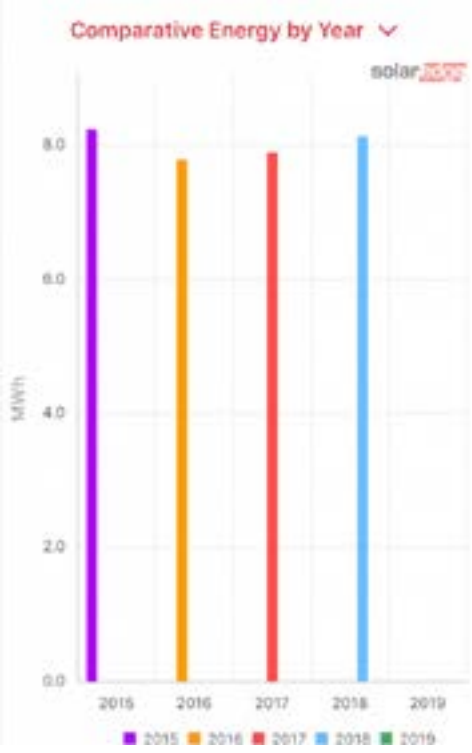
We ultimately settled on a design that included:

- 20 Astronergy 295W Solar Panels
- SolarEdge 6 kW Inverter With Power Optimizers
- IronRidge Ground Mount Racking With XR1000 Heavy-Duty Rails

Results

After building their system in 2014, Dave got back in touch with us in 2019 to share real-world production results from his SolarEdge monitoring portal. The graphs below show yearly production reports, as well as monthly production in





Nothing too surprising here. We can see that production peaks in summer, but dips below 50% output in the snowy months. The yearly production has been very consistent, right around 8 MWh per year.

“It is our experience that the system produces more energy than we consume from February through June, holds its own July through October, but fails to deliver enough power during the short, cloudy days of November, December, and January.”

Dave and Sher's system was sized to offset 90% of their electrical needs, and it is currently covering 93% of their usage. To make up the remainder, the system is tied to the grid through a net metering agreement with their utility company.

Under the agreement, they feed power from their system into the grid, which is credited to their account with the utility. They can use this credit to draw power from the grid at any time. It works a lot like a bank account, with deposits, withdrawals, and a balance of energy credits to their name.

This agreement is what enables solar owners to use power when the sun isn't out. At night, or during winter when the system is under-producing, they can collect on the energy they produced and fed into the grid during those sunny summer days.

So given their results to date, was solar a sound investment? Let's do the math...

In total, they spent $13,153 on their solar project, including installation expenses. They received $3,945 back from the 30% Federal Tax Credit for investing in renewable energy.

After factoring the credit into account, Dave and Sher paid $9,208 out-of-pocket to install their solar system.

So how does that compare to buying electricity from the utility? Let's look at the numbers:

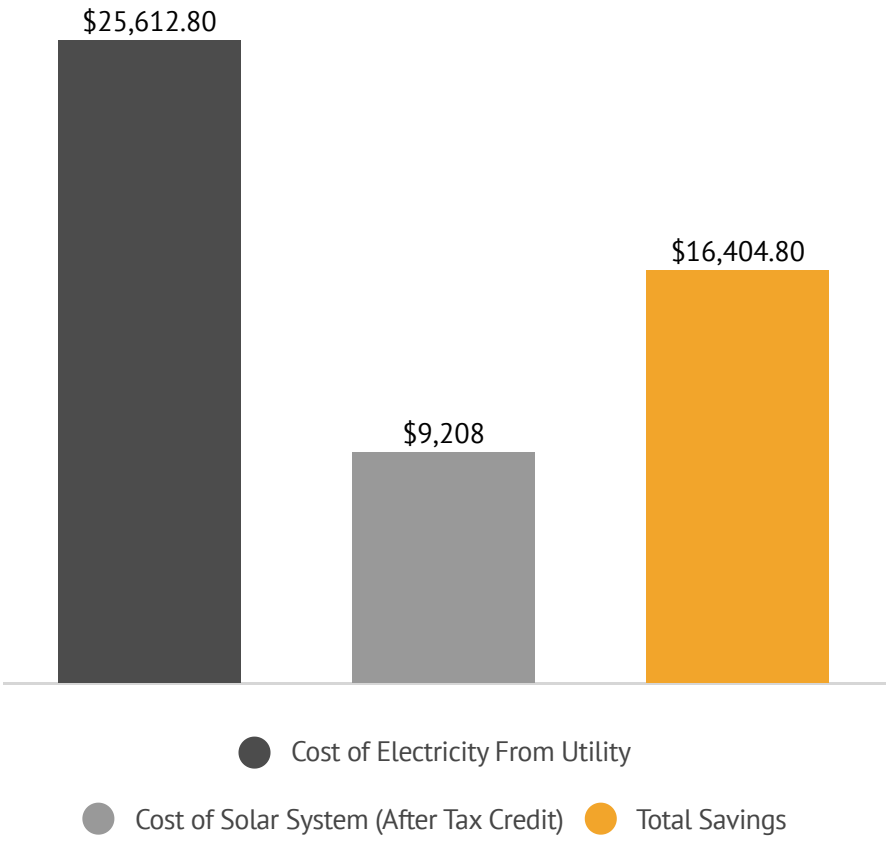
System Cost (after Federal Tax Credit): **$17,425**
Cost of electricity in Wisconsin: **12.8 cents/kWh**
Monthly kilowatt-hour usage offset: **667 kWh**

667 kWh x $0.128 x 12 months x 25 years = $25,612.80

Subtracting the cost of the solar system reveals how much Troy and Suzanne saved by going solar:

$25,612.80 - $9,208 = $16,404.80

Even taking into account the significant decline in production during the snowy season, Dave and Sher's solar system saves them more than $16,000 on energy bills over



It's Your Turn!

Interested in going solar?

Unbound Solar has been designing systems since 2002. We've shipped over 100 megawatts of solar to date, with an emphasis on off-grid systems.

Learn more about DIY Solar and sign up for the DIY Solar Workshop!

If you're ready to get started with sizing your system, call us at **1-800-472-1142**, or Request a Quote online today. And check out some of our educational resources to get started:

Getting Started Guide »
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