

CASE STUDY

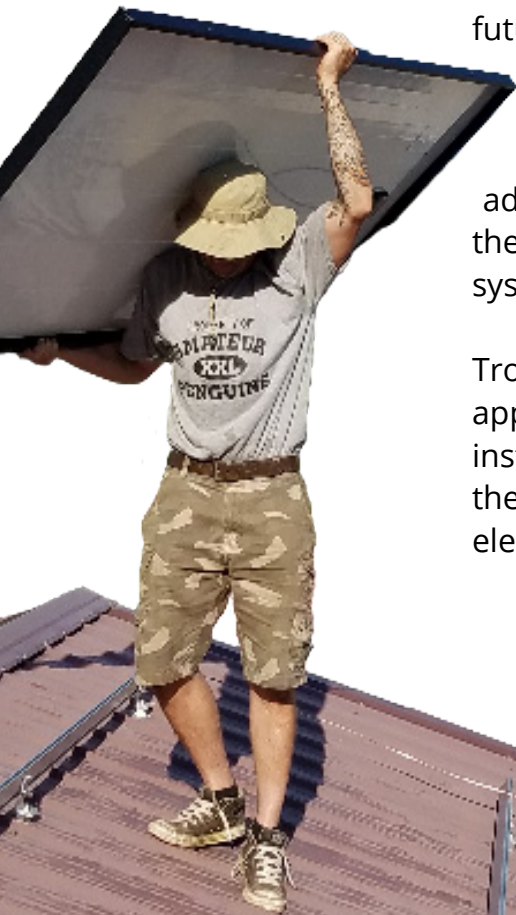
TROY & SUZANNE DIY HOMEOWNERS

Troy and Suzanne built their system in two phases. They started in 2014 with the goal of producing their own power, reducing their carbon footprint and leaving a better planet for future generations.

The project started with a 6.9 kW ground mount system in 2014, followed by the addition of a 4.2 kW rooftop array in 2017. In the future, they'll look to add batteries to their system for backup power during outages.

Troy's DIY background repairing cars and appliances prepared them to manage the installation process on their own, though they did call in an electrician to assist with the electrical hookup.

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Challenges

A large part of **West Virginia's energy infrastructure** (and job economy) runs on coal. In terms of renewable energy policies and incentive programs for going solar, they typically rank near the bottom of the list.

WV has **no renewable energy rebates**, tax breaks or regulations requiring the utility to facilitate solar adoption (aside from a basic net metering policy). Without incentives in play, Troy and Suzanne's friends doubted whether solar was a smart investment.

They also did not have the **budget** for a system that would offset 100% of their energy needs up front. They chose to get started with a smaller system that would deliver about 60% of their power, then pair a second array a few years down the line.

That helped mitigate the up-front cost, but also introduced **wiring complications** as the arrays were built about 350' apart. They needed help calculating voltage drop (a loss in



Solutions

Despite budget restrictions, design complications and a lack of local incentives, Troy and Suzanne were still committed to going solar. It would still be **cheaper than buying electricity** from the utility in the long run, and they were eager to generate their own power and achieve energy independence.

Convinced they could handle the **DIY Install**, they turned to Unbound Solar to source the parts and design the system. Our design and tech team helped guide them through the process:

“I can not imagine piecing out every nut and bolt, clamp or component on our PV system. Unbound Solar did an awesome job putting the pieces together, making the install a snap.”

In 2014, they purchased a 6.9 kW ground-mount system from Unbound Solar, which included:

- 30 Astronergy 250W solar panels
- 1 SolarEdge 7.6 kW HD-Wave inverter

The second system was a bit more complicated. They wanted to add a roof-mount array, but it would be built about 350' away from the first one.

With such a long wiring run, there were concerns about voltage drop—the loss of electrical potential due to resistance as current flows through the wires. The systems also needed to be designed to combine into the main breaker panel.

Troy and Suzanne returned to Unbound Solar for help integrating the two systems. Our tech team specced a **compatible add-on system** and provided an **electrical wiring diagram** to ensure the wires were properly sized for the 350' run.

In the end, they opted for a 4.2 kW roof-mount array to offset the remainder of their energy production:

- 16 Astronergy 260-watt solar panels
- 1 SolarEdge 5 kW HD-Wave inverter
- IronRidge roof mount racking with XR100 rails

In total, they spent \$24,892 on their solar project, including installation expenses. They received \$7,467 back from the 30% Federal Tax Credit for investing in renewable energy.

Results

After factoring the tax credit into account, Troy and Suzanne paid \$17,425 out-of-pocket to install their solar system. With both arrays in place, they have enough capacity to completely offset 100% of their energy usage every month.

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 West Virginia: **9.85 cents/kWh**

Monthly kilowatt-hour usage offset: **1135 kWh**

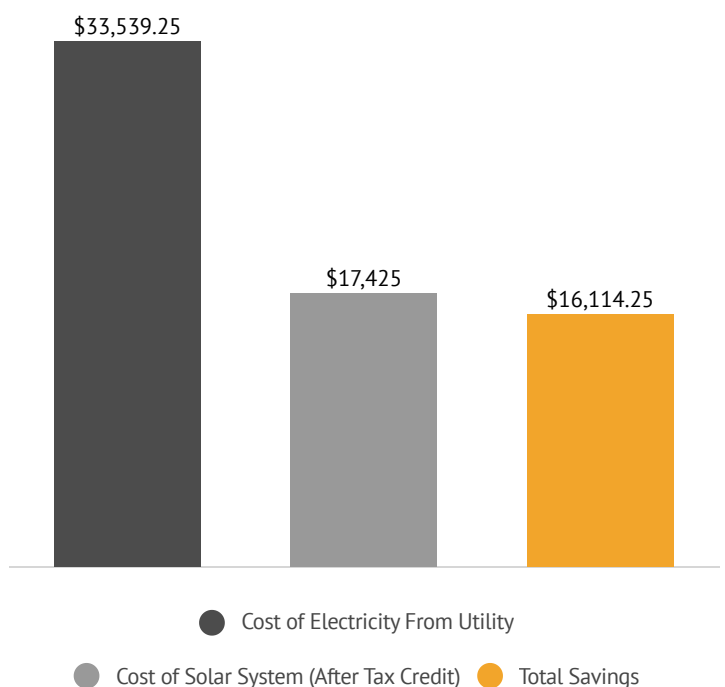
Since solar panels are warranted to last for 25 years, we can extrapolate energy usage and cost of electricity over 25 years to see how much it would cost to buy power from the utility:

$1135 \text{ kWh} \times \$0.0985 \times$
 $12 \text{ months} \times 25 \text{ years} =$
\$33,539.25

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

$\$33,539.25 - \$17,425 =$
\$16,114.25

In total, Troy and Suzanne will save \$16,114.25 on energy bills over the next 25 years by making the switch to solar.





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 »](#)

[Solar Panel Guide »](#)

[Racking Guide »](#)

[Inverter Guide »](#)

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