



OVERVIEW

On a rural Iowa hilltop, overlooking 68 acres of green farmland, stand several towers ranging from 50 to 165 feet tall. The towers, and the radio antennae they support, are owned by Glenn and Vivien Johnson and are used for their amateur radio communications, popularly known as “ham radio.” It’s a hobby that Glenn is particularly passionate about. Combined, the ham radio and the homestead equate to an average annual electricity usage of 18,000kWh for the Johnsons.

Although connected to a stable grid, the Johnsons sought the peace-of-mind from reliable backup power for critical loads in the event of an extended outage, especially during the harsh Iowa winters. An award-winning ham radio operator, Glenn was especially concerned about outages interrupting his radio competitions, which can stretch to 48 hours. Although there was a portable generator, the Johnsons found it insufficient to meet their electricity needs.

To meet the Johnsons’ unique needs, Joel Teslow of Decorah Electric partnered with Brian Bakalyar of Werner Electric and OutBack Power to design a solar + storage photovoltaic (PV) electricity system.

CHALLENGE

- Provide backup electricity for critical loads during extended power outages
- Ensure clean, uninterrupted power for the Johnsons’ ham radio competitions
- Install a grid/hybrid system to offset energy use and take advantage of net metering to reduce electricity costs
- Design a system that supports remote management and troubleshooting of equipment

SYSTEM SPECIFICATIONS	
Location	Iowa, United States
System Power	22.5kW solar array
Components	<ul style="list-style-type: none">• (3) 8kW Radian inverter/chargers• (16) EnergyCell 200RE batteries• (2) 2-shelf IBR• EnergyCell 1600RE HC battery bank• MATE3 system display and controller• OPTICS RE monitoring
Energy Savings	~\$2,600 USD/year





SOLUTION

Teslow knew the key to achieving these goals was dependable energy storage with equipment that wouldn't interfere with radio signals, so he turned to Bakalyar at Werner Electric for product advice. Bakalyar recommended OutBack's award-winning Radian Series inverter/chargers and associated controls. He also suggested an **all-OutBack system for easier integration and maintenance.**

Because there are two separate buildings, with unique loads, Teslow and his team created two distinct build-outs. The main house includes the bulk of the electrical load—furnace, boiler, well pump, kitchen appliances and ham radio equipment. To serve this load, Teslow installed a 2-stack Radian system and an EnergyCell 1600RE high capacity battery bank, drawing on (4) 3.75kW top-of-pole mounted SolarWorld 250W poly solar panels.

For the barn and shop, Teslow installed an 8kW Radian inverter/charger and two 16 cell EnergyCell 200RE battery bank in (2) OutBack Integrated Battery Rack's that harvest and store energy from (2) 3.75kW top-of-pole mounts. This system powers general lighting loads and floor heat so water lines and the horses' drinking water does not freeze.

This system allows the Johnsons' to offset their utility electricity bill by \$2,600 per year. They are also taking advantage of Iowa's net metering opportunity, and expect to sell back to the utility more than their required load, netting them a \$0 electricity bill.

OUTCOME

- The system produces 30,000kWh and supplies sufficient backup electricity for critical loads in the homestead with three days' autonomy
- The Johnsons' sell back some of the solar energy they create; saving \$2,600 per year and resulting in a net zero electricity bill
- Uninterrupted electricity supports the Johnsons' ham radio communications and competitions
- The OutBack Power system provides remote system monitoring and control, reducing service calls and related maintenance costs for the Johnsons and Decorah Electric

