



# Case Study: Decorah Electric

OutBack Grid/Hybrid System with Energy Storage and OPTICS RE Monitoring and Control



## 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 18,000 kilowatt hours 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 Grid/Hybrid photovoltaic (PV) electricity system.

## System Specifications

- Location:** Northeast Iowa
- System Power:** 22.5kW Solar Array
- Components:** (3) 8kW Radian Inverter/Chargers, (16) EnergyCell 200RE Batteries, (2) 2-Shelf Integrated Battery Racks, EnergyCell 1600RE High Capacity Battery Bank, MATE3 and OPTICS RE Monitoring and Control



Werner Electric has a long and arduous vetting process when it comes to picking our vendors. We picked OutBack Power as the hands-down leader when it comes to grid-tied/battery backup and off-grid.”



**Brian Bakalyar**  
Werner Electric

The OutBack system is really going to be a win. With the MATE3, we can set parameters and use OPTICS RE to monitor the system and troubleshoot remotely, without sending a truck out. It’ll be a huge time and costs savings to not have to go to the site. Based on my experience with OutBack Power, I see no reason to ever use another vendor.”



**Joel Teslow**  
Decorah Electric

**SELLING**  
Solar 1.5kW  
Grid 0.1kW  
Load 1kW  
Generator 0.3kW

**OPTICS RE**  
FROM OUTBACK POWER



## Objectives

- 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

## 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.

The Grid/Hybrid 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.

## Benefits

- 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



*I associate ham radio operations with the motto: 'When all else fails...' meaning ham radio can always come through in a disaster, even when all other forms of communication are compromised or electrical power is unavailable. With our OutBack setup, we have assurance that no matter what happens to the grid, we can get by with electricity for the critical loads in both our house and our barn, and we'll still be able to communicate with anyone in the world."*

**Glenn Johnson**  
Homeowner