



Set 'em and forget 'em

SOLAR HARVEST: The largest continuous solar energy collection structure in Iowa was built this fall on the Van Kooten farm near Kellogg. This 220-foot-long, 60-kilowatt array of solar panels is on a berm on the north side of the farm. Another 60-kilowatt array is on the south side of the farm.

By TYLER HARRIS

SOLAR energy is providing electricity and a sustainable future for a family farm near Kellogg in east-central Iowa. Installed this fall, it's the largest privately owned solar collection system in the state.

Fitting two 60-kilowatt arrays of 202 solar panels on less than a third of an acre of land each is no easy task. This was the challenge Moxie Solar operations manager Tim Brodersen faced when installing the 120-kW system on Dean and Betty Van Kooten's farm. "Your goal is to get as many panels on the smallest footprint you can find," Brodersen says. "The challenge is finding a spot on the farm that's close enough to service to make the array feasible."

The system, installed by Moxie Solar of North Liberty, will power everything from the tunnel-ventilated hog barns to the grain-drying fans to the farmhouse. It will offset 100% of the energy costs for Dean and Betty, and their son, Joey, and his wife, Michelle.

On the south side of the farmstead, the Van Kootens had a calf shed from their bygone days in dairying. "Dean asked, 'If

Key Points

- The largest continuous solar structure in Iowa was built on a farm this fall.
- It will provide electricity and a sustainable future for this family farm.
- Installing the two 60-kW arrays required innovative use of available land.

we get rid of this building, would this be a viable spot for solar?" says Moxie Solar CEO Jason Hall. "By the time I went back a second time, they had already removed the building. I then knew they were very serious about moving forward with solar."

It turned out to be a favorable spot to pour the 120-by-80-foot concrete pad where four rows of solar modules now sit.

Innovative installation

After ruling out several other options on the north side, they found just enough space to fit a 220-foot-long array on an existing berm next to a containment pond for one of the Van Kooten hog buildings. "We had a berm to work with, and it happens to be facing south. It's a great location to put solar," says Brodersen.

Initially, this spot wasn't big enough to get the structure to fit with the standard array height of four panels. So, they had to build upward. "Usually, a solar array will only go four panels high," says Brodersen. "But we were able to go six high with a lot of design work and engineering." Because of the berm's location in front of the pond, and with a drop-off behind it, the panels couldn't be installed with machinery. "We made it work with just manpower and a lot of ladders and patience," he notes.

For a solar array, concrete and racking are installed first, followed by the modules, or panels, and the optimizers, then the wiring and inverters. From the modules, power goes to the inverters, which convert DC power into usable AC power before it is sent to the electric grid. Optimizers allow production on the modular level, so if one module is obstructed, it doesn't affect the rest of the array, "optimizing" the performance of the array.

These systems are considered mostly "set 'em and forget 'em" for customers. Maintenance is minimal once installed, and is completely handled by Moxie Solar. Together, the arrays are projected at a very strong 85% efficiency, but given the

right conditions, they can function at 95% or higher. The system doesn't "cap out" or limit peak performance opportunities on cool, sunny days. "It's fun for our customers and us to watch the power figures blow away the ratings," says Hall.

The system's power production changes depending on the time of year. Even in full sunlight, things like dust, leaves and other debris may reduce efficiency, especially during harvest when there's a lot of dust in the air.

"If it rains periodically, the modules pretty much stay clean on their own," Hall notes. "If it's been a dry, dusty year, we'll periodically come out and clean them."

The Van Kootens can monitor each individual module throughout the day by logging onto a SolarEdge account online or using an app on an iPhone or Android smartphone. "You're able to monitor on a minute-by-minute basis. So if there is a problem, you can look at your phone and be alerted if an inverter is acting up," Brodersen says. "Set 'em and forget 'em is pretty close to true."

■ For more on harvesting solar energy, see stories on pages 6 and 72.