Sun-powered Water Source

Solar-powered pumps expand options for remote pastures.

by ***Barb Baylor Anderson,*** *field editor*

Many producers know the routine of hauling water to cattle all too well. University of Georgia researchers have been working with producers and others to make that chore a thing of the past.

"The mind-set has been that you can't get enough water from solar power to operate a pump to supply the need, but we are proving otherwise. We were approached by some producers a couple of years ago to work with them using solar power. With funds from a USDA Conservation Innovation Grant, we were able to pull technology off the shelf and demonstrate how solar could be used to provide water and be cost-effective," says Gary Hawkins, extension specialist and researcher who designed and installed the system.

David Allen, whose commercial cow-calf operation is located in Madison County in northeast Georgia, is one of those producers. Allen has several remote pastures, and running electricity to them to pump water is cost-prohibitive. Instead, either water had been carried to the pastures twice a day during the summer months, or the pastures were placed into hay production.

"Our best pastures were not being utilized to their capabilities for the cows," says Allen. "With the solar-powered well pump, we have saved on labor. For producers who want to expand their herds and graze more pasture, this is a cost-effective way to be able to do that."

Hawkins says Allen's system and others like it use solar panels to power an electric well pump. The solar-powered pumps supply installed watering troughs. Allen has a 1,500-gallon (gal.) storage tank in order to have water at night and on cloudy days. Hawkins says the storage tank replaces the need for expensive batteries that require maintenance. The system pumps about 6.9 gal. per minute, and will fill the storage tank on four hours of sunlight.

"Less than five hours of sunlight a day can be enough to keep water tanks full, keep cows out of streams and ponds, and limit any negative impact on water quality," says Adam Speir, Madison County Extension agent. "Well-fed troughs also offer producers a way to guard against drought, as that can dry up surface water and render some pastures unsuitable. In addition, cattle can have higher weight gains on fresh water rather than from surface water, so this can be a good risk-management strategy."

► **Left: "Less than five hours of sunlight a day can be enough to keep water tanks full, keep cows out of streams and ponds, and limit any negative impact on water quality," says Adam Speir, Madison County Extension agent.**

Chris Thomas says the solar-powered well pump has been the best alternative for his small commercial herd near Hoboken, Ga. He is too far from the coast for a wind-powered generator.

"It takes care of itself. On cloudy days, the battery backup works. We can run the solar-powered system all year round," says Thomas, who has a 48-volt system that can pump 2-3 gal. per minute into a 200-gal. pressurized tank. "We had to put in a deep well, which is a long-term investment that will not pay for itself overnight, but we have to have water in every pasture. It is hard for us to rotate pasture otherwise. One of the largest challenges to providing well water to pastures has been running electrical lines needed to power well pumps."

Where it could feasibly cost $20,000 to run an electrical line to a pasture, setting up the solar power stations costs between $4,000 and about $8,000, depending on the situation, says Hawkins. Solar-panel power stations can also be mounted on a trailer and moved from well to well, depending on the location of cattle.

"Our biggest challenge in switching to solar was having to drill a deep well," says Allen. "Ours is about 325 feet deep. Producers with a shallower access will have even better luck."

Allen's other challenge was unexpected.

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INNOVATIONS

"I learned the hard way your system has to be bull-proof. We run an Angus bull with our commercial cows, and he shattered one of the solar panels when he used it as a scratching post," he says. "Barbed wire was not enough to keep him away, so we ran a hot wire run by solar power around the panels and have a battery backup so the bull will stay away from them."

Hawkins has helped install pumps in Georgia, South Carolina and Alabama, but he says pumps are in use nationwide.

"The technology is applicable anywhere. There will be some differences in how the system is designed based on depth to water (groundwater or surface water), the height the pump has to move water uphill and daily sun hours," he explains. "We have found if the water elevation is too far below the final location of needed water (aquifer level too deep or surface water too far downhill), the volume of water from a DC pump may not be enough."

Hawkins recommends producers consult a local pump company dealer or extension agent to purchase a properly designed system for each unique situation. He has worked with SunRotor, Lorentz and Grundfos, but adds that other pump companies may have local dealers, as well.

"Producers can contact their local USDA-Natural Resources Conservation Service (NRCS) office for potential cost-share assistance through the Environmental Quality Incentive Program (EQIP). EQIP may be available to reimburse producers for a percentage of the solar-powered system," says Hawkins. "Extension agents can help determine the proper lift needed for a pump."

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Hawkins continues to work on solar-powered technology, including testing larger systems that require inversion from DC to AC power. He also is exploring solar irrigation on small plots. For more information, contact Hawkins at ghawkins@uga.edu or 229-391-2511.

Editor's Note: *A former National Junior Angus Association board member, Barb Baylor Anderson is a freelance writer and marketing specialist from Edwardsville, Ill.*