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The extended drought across Kansas this year has cattle operations scrambling to find and secure water resources. Ponds and creeks across the state have been drying up and are being replaced with groundwater sources such as springs and wells. Windmills have been the traditional method for developing groundwater for many years now, but a relatively new technology is becoming more and more popular. That technology is solar.

Solar pumps come in many makes, models, and sizes. A typical solar pump installation will have three components: solar panels, an electronic pump controller, and the pump itself. It is important that these components are compatible with each other. Most reputable solar pump suppliers provide the complete system that will work as intended.

Solar panels (also called Photovoltaic panels) harness the sun's energy to create a voltage that can be used to operate the pump. Panels will produce at least some energy anytime the sun hits them. However, it is important to note that the solar panel will generate its peak energy rating only for part of the day. This peak sun energy is roughly six hours per day in the summer, but reduced to about four hours per day in the winter for northwest Kansas.

Also important is panel angle. Panels are typically set at an angle that matches the latitude of the location if intended to be used year-round. For summer use only, the panel should be set 15 degrees flatter than the

latitude; winter, 15 degrees steeper. This will ensure the panel receives the maximum amount of sunlight available for your location. Sun-tracking mechanisms are available but have not become popular mostly due to cost and maintenance concerns.

The panel mounting structure must be adequate to withstand all the environmental stresses that Kansas weather brings. Stands must be built heavy enough to withstand high winds. Panels and electrical components must be protected from the sun, ice, and snow. Panels must withstand hail, ice, and wind storms. Several panel suppliers warranty their panels against hail damage. The use of an existing structure to mount a solar panel is not usually recommended. Panels can be heavy, and the load may be more than an old roof or windmill can withstand.

The electrical controller regulates the electric power input to the pump and provides electrical protection and switching. Controllers prevent the widely varying power that comes from solar panels from damaging the pump's electric motor.

The pump comes in two basic types: diaphragm pumps and helical shaft pumps. Both types are submersible and normally run on DC power, but some helical pump systems can also be set up to run on AC. Several different pump voltages are available. The general rule of thumb is if the array consists of four or more panels and they are located more than 50 feet from the pump, a higher voltage pump should be considered.

Choosing the correct size solar system for your location can be confusing. Please contact your local Natural Resources Conservation Service office or conservation district office located at your local county U. S. Department of Agriculture (USDA) Service Center (listed in the telephone book under United States Government or on the internet at offices.usda.gov). More information is also available on the Kansas Web site at www.ks.nrcs.usda.gov. Follow us on Twitter @NRCS_Kansas. USDA is an equal opportunity provider and employer.
