USDA—Natural Resources Conservation Service

CSP—Conservation Stewardship Program

Renewable Energy Sources to Power Grazing Watering Systems

A CSP On-Farm Pilot Project

Alternative energy powered livestock watering technologies such as solar pumps, nose pumps and RAM pumps, have great potential in Pennsylvania.

When used individually or in combination to supply the water needs in a rotational grazing system these tools provide multiple benefits for the agricultural producer and the environment. They help increase forage production and its utilization which could help improve profitability of the business. They will also reduce the use of fossil fuels and its associated air pollution effect.

This Pilot Project

is a Conservation Stewardship Program (CSP) enhancement and consists of the installation, monitoring and publicizing of the results obtained.

It will last two years and requires the installation of at least one renewable energy technology. The producer will conduct three events to publicize the project to other producers.

Start Date

The pilot project needs to be scheduled to start within the first three years of the CSP contract.

Participant Share

The participant is responsible for all aspects of installation and implementation of the project.

A solar submersible pump like the one on the photo, is another proven technology that can help reduce the use of energy coming from fossil fuels. Water is pumped from a well to a storage tank and from there it moves to the water troughs by gravity.

Renewable Energy Sources That Could be Demonstrated

Sun - Solar Pump: Solar powered pumps Run on direct current (DC) supplied by a solar panel. The panel contains photovoltaic (PV) cells that convert light into electricity. These cells are arranged into modules that form the panels. The electricity is transmitted to either a floating pump or a submerged pump. Floating pumps are used to pump water while they float over a stream, pond, etc. The submersible pumps are used to pump water from a deep water source such as a well. Since the PV cells are expensive and solar power is limited to the day hours manufacturers strive to produce very efficient pumps. Panels must be install and oriented to maximize the capture of the sun light. A solar tracker may be used to automatically move the panels to face the sun as it moves during the day/season. For night time or cloudy days the system can be equipped with battery backup or a storage tank provided with capacity to supply the water demand for a few days.

Animal Power— Nose Pump: For small herds and grazing fields located near a stream or a surface body of water a nose pump will work well. It is called a nose pump because the pump is manufactured for the animal to use its nose to pump the water. The pump is built of a heavy metal for better anchoring and has a small bowl in front that receives the pumped water. The pump can lift water up to about 20 feet for fairly short distances. The animals pump water a stroke at a time via a piston/valve arrangement by pushing the plunger back during drinking. Only one animal can access it at a time so maybe depending on herd size having more than one pump could be beneficial.

Water Power— Ram Pump: A ram pump is a simple, motorless device for pumping water at low flow rates. It uses the energy of flowing water to lift water from a stream, pond, or spring to an elevated storage tank or to a discharge point. It is suitable for use where small quantities of water are required and power supplies are limited, such as for household, garden, or livestock water supply. A hydraulic ram pump is useful where the water source flows constantly and the usable fall from the water source to the pump location is at

For efficiency in production an conservation the above technologies need to work in combination with other components such as pipes, tanks, water troughs and fences as part of a prescribed grazing system. The USDA – Natural Resources Conservation Service (NRCS) provides technical assistance for the planning and implementation of the systems. For more information contact your county USDA-NRCS office or the following NRCS grazing specialists:

Dan Ludwig—Southeast Pennsylvania

Timothy Elder—Northwest Pennsylvania

Theresa Krall—Northeast Pennsylvania

James B. Harold, Jr.—Southwest Pennsylvania

Jana Malot—State Grazing Specialist

Suzette Truax—Central Pennsylvania

For the installation of the project the producer may use financial assistance coming from other sources but not from USDA programs.