

Case Study ID

98-0036



ENERGY OFFICE

Case Study Series

Tillers International Solar & Wind Demonstration Project “Energy Efficiency at its finest”

“At Tillers International part of our mission is to educate people about sustainable agriculture. We instruct our students that as they use the land they have the responsibility to avoid actions that cause unnecessary damage. Our focus is on animal powered farming techniques, primarily using cattle as oxen. But we also look for ways to incorporate modern technology into our teaching when it is appropriate.

We offer a class called Solar Applications for Small Farms in which students are taught the basics of solar energy. For this class we have assembled a simple portable water pumping system powered by photovoltaic panels. It has worked reliably, pumping water to flood a small demonstration rice paddy. Our experience with this pump suggested a solution to a long-standing source of environmental degradation of farmland.

Tiller’s rotational pasture system was designed so that the cattle can return daily to the barnyard to drink water from a stock tank. We use electrical energy from the utility company to power our well pump. But many farm pastures unfortunately are not located near power lines. Lacking a source of energy for pumping water, people have allowed their livestock to drink from streams and ponds. This results in pollution from urine and manure in the water and contributes to erosion where the animals walk up and down the banks. This damage also creates an eyesore and lowers property value for the owners.

We believed that a small alternative energy powered pump could be used to move surface water to a stock tank placed some distance from a stream or pond eliminating these problems. We applied for a grant from the Michigan Dept. of Consumer and Industry Services so that we could design, build, and display such a system at 1998 Earth Day events.

Our exhibit included a 75-watt photovoltaic panel, a charge controller, a 500-watt wind generator, fuse boxes, a recording amp hour meter, a water pump and storage batteries. The charge controller, amp hour meter, fuse boxes, and pump were connected on a display board and labeled. The wind generator and the PV panel were mounted on a short (7 foot) tower so that they would be easy to set up, transport, and see. We used a stock tank to hold the water that the pump would circulate. The PV panel was connected to charge the batteries but the wind generator was not. We planned to tie the blade of the generator in place so that it would not hit any of the spectators.

The first event that we attended was at the Kalamazoo Nature Center on April 18, 1998. Nature Center officials estimated the crowd at about 850 people. One week later, on April 25, we set up the display at the St. Joseph County Fairground for their Earth Day celebration, which was organized by the MSU extension service. The crowd was about 350 people. On July 7-9, Tillers International performed animal power demonstrations at the Michigan State U. Ag Expo. This is a major agricultural equipment trade show with dozens of exhibits, attended by over 20,000. We set up the solar/wind powered water pump display in a prominent place near the entrance to the Tillers tent. Although it was not the focus of our presentation, visitors noticed and in several cases tried to buy it.

The pumping system was set up at Tiller’s site in Kalamazoo as the final stage of the project. After a number of delays related to installing the wind tower, we were able to

get everything working in time for the Solar Home Tour on October 17th. The combination of the PV panel and wind generator has thoroughly charged the battery bank and we have actually had more power than we need to run the small pump that is the heart of the system. Our intent now is to add an inverter and use the surplus electricity to light two of our barns.

Tillers International was happy to be part of this Earth Day education project. Our experiences proved to us that there is a demand for information about small scale solar and wind powered systems. Everywhere we went the public had questions about how these renewable sources of energy worked. Tillers International will continue to offer its classes in alternative energy and educate people about the potential that it offers in areas that are not served by the utility power grid.”

Excerpts from the Final Report by John Sarge and Lou Villiare

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