

AAIG Final Report
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I received the AAIG for a project entitled "Solar Power for Hoophouse Insulation and Irrigation". My land and farm are off the electrical grid. The water needs of my home and market garden depend on a combination of generator and solar power. The generator keeps my 2000 gallon cistern filled from a well and the solar charges the battery system that powers the various pump systems for home and vegetable washing station. Gravity is my source of irrigation pressure with a simple drip system.

When I ordered my greenhouse in 2009 I immediately imagined a solar panel in front of it with a battery bank inside. The obvious reason was to power a water system, but as I thought about it I realized that there was more that a simple system could do. The inflation fan for the greenhouse came to mind and I then wrote up my proposal for this grant.

I proposed to use the abundant daylight hours available in the spring to power my greenhouse inflation fan. Later, the panel and battery system could fill a cistern to store and warm irrigation water to be delivered to the beds by a gravity drip system. I hoped the added insulation of having two layers of film inflated would make extra early plantings and extra late harvests possible in an unheated greenhouse.

The system I put together was smaller than initially proposed in the grant application. Budget concerns and a feeling that I might be overdoing it by using two 400 amp/hour 6v batteries for a tiny inflation fan were the reason for this.

I purchased and installed:

- 1 90 Watt solar panel
- 2 85 ah 12V batteries
- 1 charge controller
- 1 175 Watt inverter

This was my power station and would supply AC and DC current to my greenhouse. At first, this would only be the fan and water pump. For the rest of the project I purchased and installed:

- 1 500 gallon cistern
- 1 Jabsco water pump
- 1 roll of T-tape with components for a drip set up

I put my project to the test in 2010. The bright skies of spring failed to appear and the inflation fan, tested in April, May, June, and July exhausted the battery system in around 10 days. The battery bank was effective at keeping my cistern full and kept up easily through the cool, moist season.

The growing season in the high tunnel was a good one. I concluded that an insulated layer was not giving me much advantage in an unheated structure anyway, and after July I gave up on the fan. The pump system worked great however and I've since thought of a number of other uses for the power source that I have installed. Running timers for irrigation is one idea. Ventilation fans on sunny days is another. Another interesting possibility would be to use the heat at the peak of the greenhouse during a sunny day to

warm the soil by the circulation of the air through eight inch tubes buried beneath the soil. This is a process used by Tim Meyers of Bethel.

Many uses for a “little” electricity exist for the greenhouse and market garden off the grid. As it seems unlikely that Homer Electric Association power will find our farm in the near future, I plan to keep experimenting with this small system. I’d like to add one more panel and one more battery as a first step and try moving some of that heat from the peak of the greenhouse down into the beds using the sun’s energy.

As an off the grid grower, I also want to say that gravity is an important storage tool for the energy expended in pumping. In combination with a drip irrigation system, it has made life much easier for us in the vegetable beds. Thank you for the assistance you have provided in advancing our Alaska Grown endeavours.

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