

Northeast CERT Meeting Summary – Barbara and Christopher Reed Home Tour
2248 County Line Road, Nickerson, MN 55749
Thursday, October 18th, 2007

A HUGE THANK YOU to Barbara and Chris Reed for hosting our tour and to Minnesota Power for providing box lunches! Chris Reed is a NE CERT steering committee member and CEO of Reed Energy, Inc. Visitors on the tour saw solar PV array, moveable greenhouse, modified root cellar, and a wind turbine ...An excellent example of where sustainable energy and sustainable agriculture meet. Rather than recreate the wheel, the meeting notes present the home and systems descriptions that Barbara and Chris provided tour participants.

Meeting attendees included: Chris and Barbara Reed, Mark and Barb Lund, Ron and Carol Luoma, Ernie and Norma Holmstrom, Cindy and Terry Darwin, Robert Nowak, Mark Sagvold, Evangeline Moen, Allison Lindburg, Dan and Donna Flaherty, Paul Simonson, Isaac and Sheila Wolters, Bruno Zagar, Mike Mageau, Okey Ukaga, Jamie Juenemann, Nick, Mark Thell, Chuck Hartley, Ray Hatinen, Wendy Grethen, and Diane Rauschenfels.

Electric system

Off grid Solar PV and Wind

Size of System: 1,250 watts solar PV and 3000 watts wind

Year Completed: This site has been powered using renewable energy since 1981

System Components: 20 - 62.7 watt Kyocera solar panels mounted on a Wattsun dual axis tracker, 5000 watt inverter, 24 - 6 volt deep cycle 350 amp hour batteries , 3 kW World Power Technologies wind turbine on a 120 foot tilt up tower and a 10 kW propane backup generator. The security of the wind turbine is provided by Rusty the horse, assisted by Sugar and Honey the goats.

System Operation: This 3,400 square foot log home is not connected to the electric grid. The original system installed in 1981, featured a 1930's vintage 32 Volt Jacobs wind machine, a 3000 watt modified square wave inverter and used telephone batteries.

Electric use for the homestead is approximately 270 kWh a month. Approximately 50% of the electricity is generated by the wind turbine and 45% comes from the PV array. The remainder of the electric needs (5%) comes from a 10 kW propane powered generator.

The Reed home is currently heated with in floor hydronic heating using wood and propane boilers and a wood fireplace.

Benefits/Savings: The electric loads in this home are reduced by the use of efficient appliances, a root cellar and the extensive use of compact florescent lighting. Heating energy for the home has been reduced by over 50% by air sealing and re-insulating the entire roof area. The Reed home is located ½ mile from the nearest electric lines. The Reeds estimate that their renewable energy system has paid for itself when the cost of installing new electric lines is considered in the analysis. Future plans include a solar hot water heating system integrated with the wood and natural gas boilers for both domestic and space water heating.

Root Cellar

The root cellar was remodeled in 2007 to air seal and insulate the walls and ceiling and allow thermostats and fans to control the temperature. The fall of 2007 is the first season of operation for

this cellar. The walls and ceiling of the cellar are insulated to at least an R-60 value while the floor is left un-insulated. Unlike a traditional root cellar, this root cellar space has above grade walls to the south and an attached greenhouse to the west – not a good combination for using the ground as a constant cool temperature. By insulating to such a high level we hope to isolate the space from the south wall and greenhouse allowing us to use the concrete floor and ventilation system to cool and maintain a cool temperature.

The root cellar has three rooms to meet the storage conditions for different veggies. The first room is cold and humid with the optimum temperature being between 32 and 40 F and the optimum humidity being between 90% and 95%. This room is for apples, beets, potatoes, carrots, celery and others. The next room is cool and less humid with optimum conditions being a temp between 40 and 50 F. with humidity between 60% and 70%. This room is used for sauerkraut, garlic, onions, ripe tomatoes and others. The third room is an unused bedroom with the optimum temp being 50 – 60 F. and humidity between 60% - 70%. This room is used for squash, pumpkins, sweet potatoes, dry hot peppers and others.

Both the cool and cold rooms have a 44-gallon container of water used to moderate temperature and protect against freezing. The ventilation system is controlled by two thermostats. The first thermostat measures outside temperature and is set to turn on when this temp is below the set point (e.g., it is cold enough outside to cool the space). The second thermostat measures the temperature in the cold room and turns on when we need cooling in the room. Both thermostats must be satisfied for the duct fan to turn on. The temperature in the cool room is determined by adjusting the four dampers in the duct work.

A great book on root cellaring is “Root Cellaring” by Mike and Nancy Bubel. Another source of information we found useful is “Preserving Food without Freezing or Canning” by the Farmers and Gardeners of Terre Vivante – published by Chelsea Green.

Moveable Greenhouse

The moveable greenhouse was built in the spring of 2006. The hoop house is a standard kit which we purchased from Farm Tec. We designed a wood rail system that allows the hoop house to slide. The rail is twice the length of the greenhouse and is constructed of cedar and attached to the ground using two sets of hoop house foundation posts. The greenhouse is un-heated and used to extend the growing season for various crops. To illustrate how the concept works I will describe the operation of the greenhouse since construction. May 1 2006 tomatoes, peppers and melons are transplanted to the greenhouse. August 1 – September 15 various planting of cold tolerant vegetables are made in the bed that is not currently covered by the greenhouse. October 15, the hot loving plants are harvested and the greenhouse is moved to cover the bed planted in August. The “winter garden” is harvested until it freezes solid (late December) and is harvested again when the ground thaws (February). Last year we had lettuce until the end of November and started harvesting lettuce again in April. The lettuce and spinach you see in the winter garden are the 12th and 13th plantings of 2007. This is an experiment and we have only begun to learn what the possibilities are for this type of project. We are also experimenting with using a second layer of protection in the greenhouse. We tried this last year with limited success.

The original concept for this came from Elliot Coleman’s “Four Season Harvest” a must read for anyone considering this type of project.