

An Off-grid Hybrid Solar and Wind System is installed for a Passive Solar Home on a KY Farm

Recently an elderly couple owning a farm in Eastern Jefferson County in KY chose to become totally self-sufficient from the power company by utilizing passive and active renewable energy sources from the sun and wind. When the couple began plans to build a house on their large plot of land, they realized that using traditional energy provided by the power company would be costly since the building site was well off the road. In addition, the requirement by the power company for an easement in order to install the power lines would greatly reduce the value of their land, break up the property, and lead to land loss.



The couple decided to utilize passive solar and active solar photovoltaic (PV) systems as well as harvest wind energy to meet their energy needs. SunWind Power Systems (<http://sunwindpowerinc.com/>) was employed to install the hybrid solar and wind systems while Watrous Associates Architects (<http://www.sunearth.net/>) was employed to design the passive solar home. Jeremy Coxon of SunWind Power provided a load analysis and worked in conjunction with architect, Gary Watrous to minimize energy consumption for the solar passive home.

Additionally, the appliances in the home are highly energy efficient in order to reduce the energy load requirements and increase efficiency. For example, the SUN FROST refrigerator is highly efficient and normally cuts energy consumption by 80% in a home using utility power. While a normal refrigerator consumes approximately 90 kWh per month, a SUN FROST refrigerator can typically consume 15 kWh per month. As you can see, such an appliance is vital and important for reducing load and leads to fewer solar panel requirements thus decreasing cost for such a system.

The off-grid PV system consists of panels mounted to a pole and panels mounted to the roof-top of a building housing the battery bank for the system. In combination, the solar PV arrays provide 4 kW of energy. In addition, wind power can be harvested from a 1.8 kW Skystream, wind turbine installed on the building site located on top of a wind knoll. This hybrid system relies on a battery bank to store energy generated. When there is not enough sun or wind power to fill the batteries, a stand-by generator automatically kicks on to supply the power. The battery bank is housed in a building that was designed to architecturally compliment the home.



Preparing the foundation for the wind
Turbine tower



Pole Mount Solar PV Panels

The combination of highly energy efficient appliances, a passive solar design along with installation of a hybrid solar and wind system has allowed this couple to achieve energy independence for their home.