

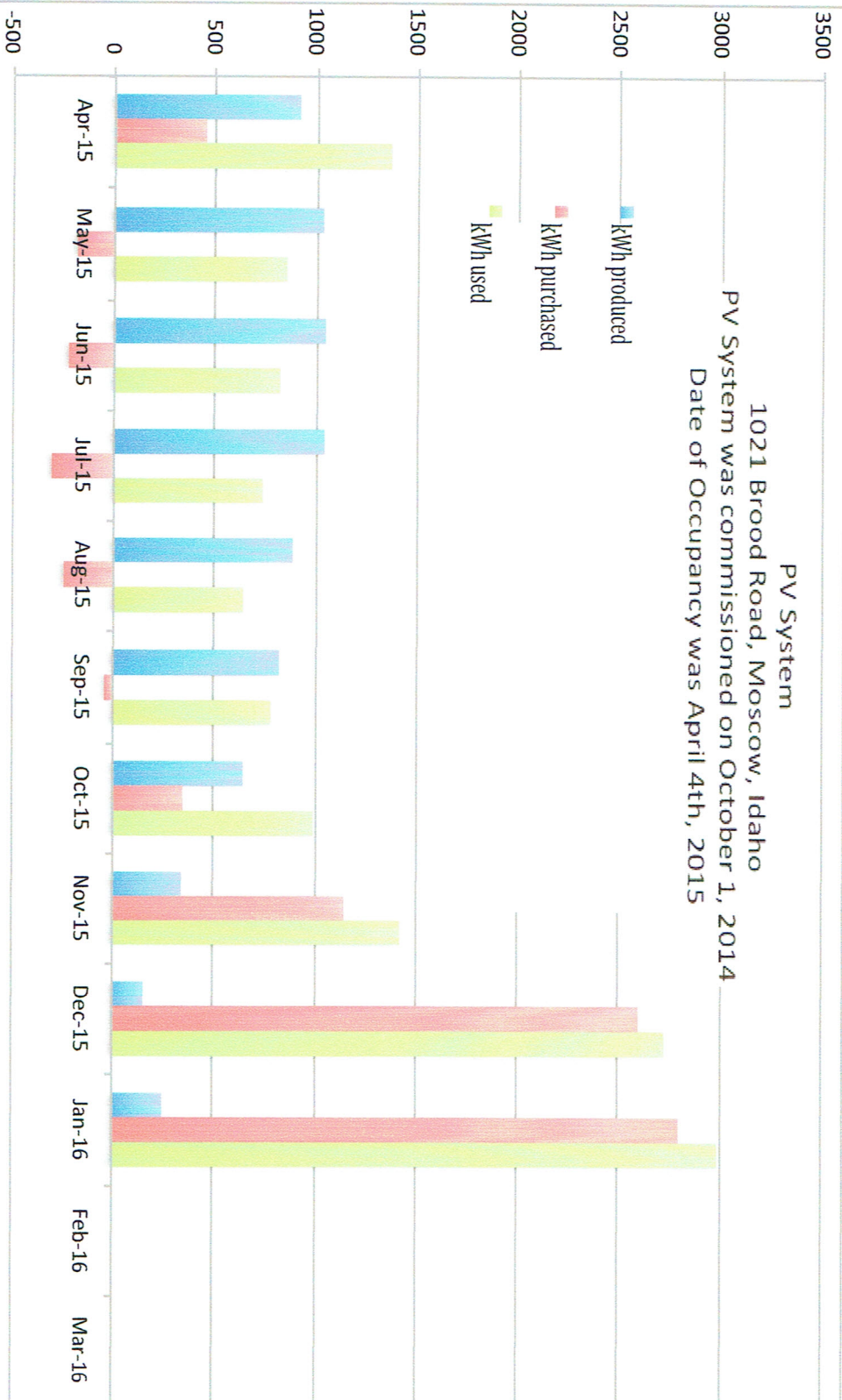
Solar Power

We have a 5.5 kW Photovoltaic Array on the southern facing part of our acre. It is mounted on a stand alone SunModo Ground Mount System fixed rack. It has 20 panels, each rated for 265 WATT, 60 cell, high efficiency mono crystalline PV modules. The PV panels are manufactured by LG and the inverter is a Sonny Boy SB 5000 TL US 22. and Siemens 200A Meter/Main loadcenter.

We are gird-tied so that the power is used by the house first and then sent back to the grid. The production is sent gratis. The power company is Clearwater Power Cooperative. When we produce more than we use in a monthly billing period, we pay nothing for power that month. We had five months in 2015 where we paid only our Cooperative dues; there were no power charges.

The length of days has more effect on our power production than fluctuations in our usage. As the winter solstice approaches our hours of sunlight diminish the production. There is room to mount an additional series of PV panels if we determine that we cannot achieve zero-energy goal in summer production times after a year or two of data with our current system and energy conservation measures.

PV System
1021 Brood Road, Moscow, Idaho
PV System was commissioned on October 1, 2014
Date of Occupancy was April 4th, 2015



We have a Rheem Solar Hot Water System (SHWS) mounted on the east-facing attached garage roof to supplement the 80 gal electric water heater. Two solar collectors, two circulating pumps, an integrated heat exchanger and digital controller, expansion tank, pressure gauge, mixing valve and non toxic propylene glycol heat transfer fluid constitute the system. (Future plan is to install a midline meter to see what the actual savings of electric are from the SHWS.)

Shop/Barn Area

There is one main power meter installed at the barn. From there, we have two panels, one in the shop and one in the garage of the house. At this time we cannot separate the house usage from the impacts of the Shop and water usage. An immediate project is to install a monitoring system to separate the power usage from the house and shop/barn and determine more accurately the usage for each area. The well and pressure tank are on the shop/barn side for monitoring.

Recently we installed an electrical heater in the shop (December 14). From the daily data collected from the electrical meter for December, the average daily electrical usage went from 63 kW to 109 kW, an approximate 60% increase.

Several variables were factors, most importantly the weather as most of the neighbors had a 40-50% increase in usage. A steep dive in the temperatures resulted in December being colder than normal with the daily high temperatures in the 20 degree range for several weeks. Several nights dipped into the zero range as well.

The Shop heater is a Comfort Zone CZ220 Heavy Electric Utility Heater. 5000 Watts, 20.9 AMPS. It replaced several small space heaters used only when someone was working in the shop. The Utility Heater has a thermostat and runs when needed to keep the area at 60 degrees. The Shop is a 25 x 30 insulated room with a 10 foot ceiling. So the heater was working half of the month of December and had some extra work to warm the entire space and contents to the 60 degree mark.

Additional plans include the purchase of an electric rechargeable vehicle. The house garage is wired for an electrical outlet to accommodate a plugged-in all-electrical vehicle.

Landscaping improvements:

We have a one acre fenced yard in the middle of our twenty acres of land. For at least 100 years the parcel had been farmed with crops ranging from corn to wheat to lentils. In 2003, it was entered into the Federal CRP (Crop Reduction Program) and planted with grasses. The 19 acres now has a Forest Stewardship plan, sanctioned by the Idaho Department of Lands; additionally, we have reapplied to the CRP for 17.5 of the 20 acres and will find out in the Fall of 2016 if we are accepted. If accepted we will do limited tree planting on the steep, erodible slopes while maintaining the grasses and weed control. If we aren't accepted we will pursue a reforestation plan for larger sections of trees.

We are concentrating on the one-acre around the house and the shop/barn. It is fenced to encourage large animals to wander past rather than through the yard, protect our pets, and establish a limit for the landscaping. The goal is for low maintenance, native landscaping with minimal water usage. We have a solar-powered interior gate opener mounted on the road on the east side of the one-acre fence to open and close the entrance remotely. It is designed to keep our pets in and other animals out, especially at night.

Gravel surrounds the majority of the house and barn for fire prevention and low water requirement. Our region is fortunate to have multiple gravel pits within eight miles so gravel is economical and a sustainable point in that it is local.

The front yard landscaping is done with annuals and vegetation close to the house on the north (front facing) side only. Drought resistant plants such as Shasta daisies, thyme, lavender, and ornamental grasses border paths of stepping stones. There is one drip-line raised flowerbed with day lilies and peonies on the west side designed to catch rainwater coming off the eaves of the house/garage. There is no lawn to eliminate both the mowing and the watering requirements. There are no gutters or downspouts on the house thus eliminating gutter maintenance. The eaves extend 5 feet and the drip line slopes away from the house. The gravel minimizes problems of mud in transitioning weather conditions and allows for ease of vehicle movement and parking.

A wildflower garden and a vegetable garden face to the east of the driveway and parking areas. This space is allocated for daffodils, summer wildflowers and berry cultivation. A separate fenced vegetable garden ensures rabbits and other little critters are not burrowing among the vegetables.

Outside of the acre, shrubs are planted down the long driveway to develop into a snow break for the road. Struggling to grow are cinquefoil, wild cranberry, red twig dogwood, boxwood, Siberian Pea, cotoneaster, hardy lilac, burning bush, and huckleberry bushes. With the wildlife in the area, we are getting a limited survival rate even if advertised as deer resistant. A limited number of evergreens are also in the mix. All plants are chosen for their low maintenance and drought resistant qualities.