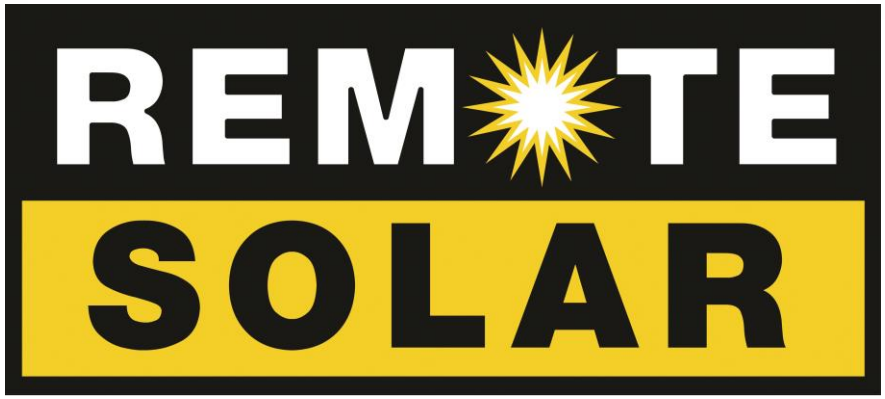


Solutions for the Oil Industry's Cathodic Protection Needs

February 8th, 2014

Remote Solar CPU

20 amp output @ 24 v

Remote Solar CPU

Overview

- Existing systems may be off a majority of the time, maintenance and battery replacement costs are too high.

Long-term goal

- Increase CP protection while reducing operating costs
- Current CP units are not protecting pipeline & well casings when off
  - Increase "ON" time to 95%.
- Reduce battery maintenance just to watering twice/ year
- Increase battery life to 15 to 20 years

Electronics

- We use state of the art gear and then over size it
- Controllers have MPPT and temp sensors at the batteries
- Low Voltage Disconnect is programmable
- GFCI and AFCI available
- Full Internet Monitoring ready (just add a modem)

Batteries

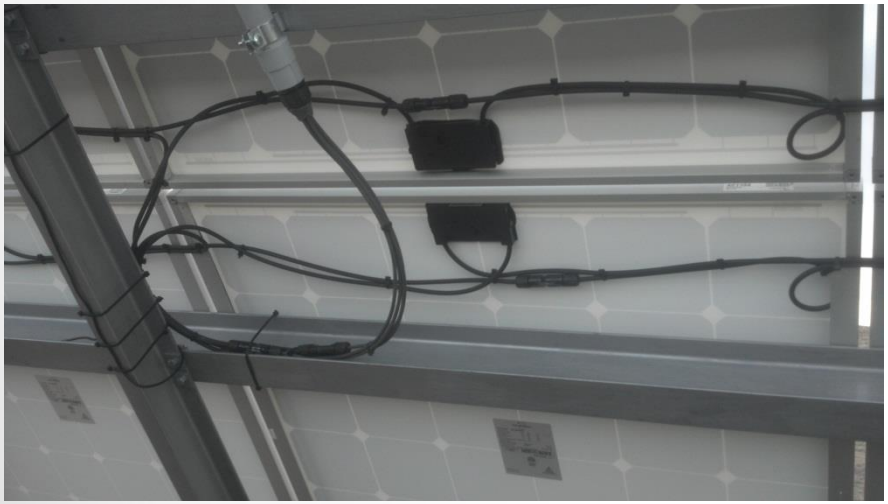
- Our HUP batteries last 2100 cycles at 80% discharge and have a 10 year warranty
- Trojan regular batteries only last about 700 cycles at 80% DOD and have a 2 year warranty

Modules

- SolarWorld modules are American made since 1977
- Mono-crystalline modules have best output in all weather and degrades the least over time

Wiring and Details

- Wiring done by experienced solar pros
- All Equipment grounded per NEC



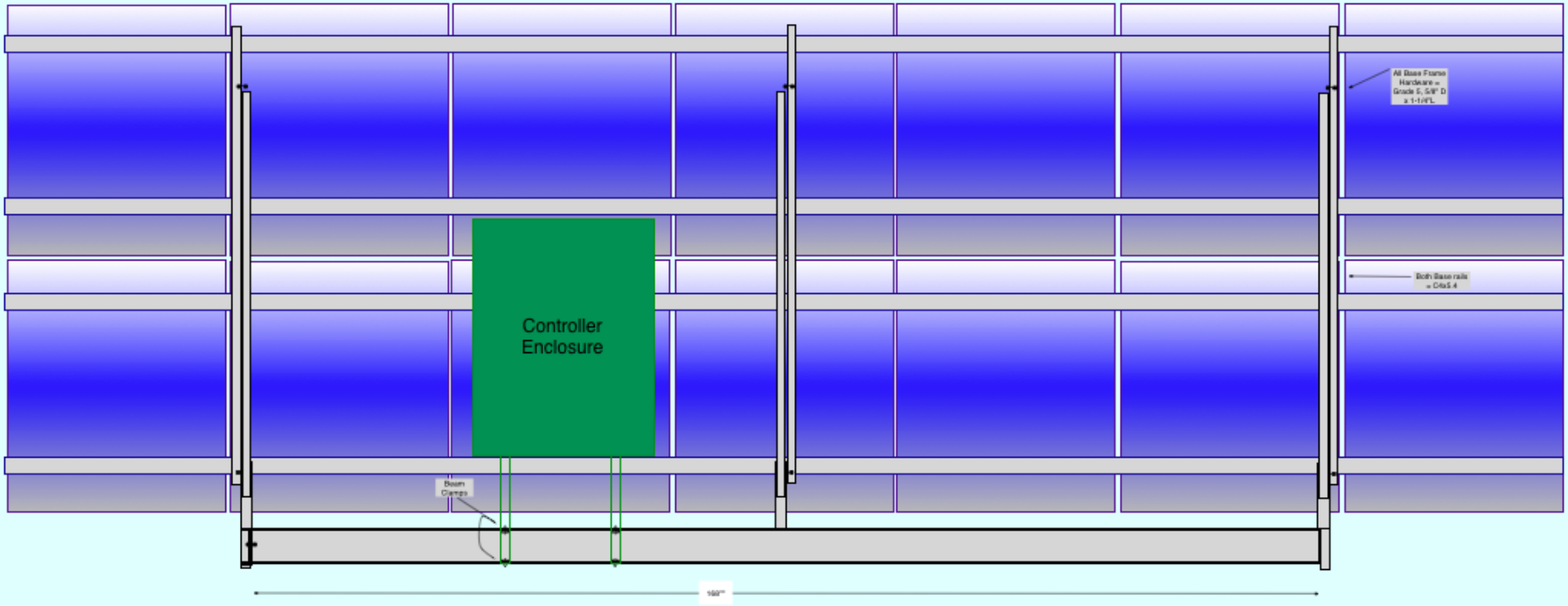
- All wiring secured, conduit sealed with gland nuts
- Enclosures filter ventilated with 4 fans

Frame and Anchoring

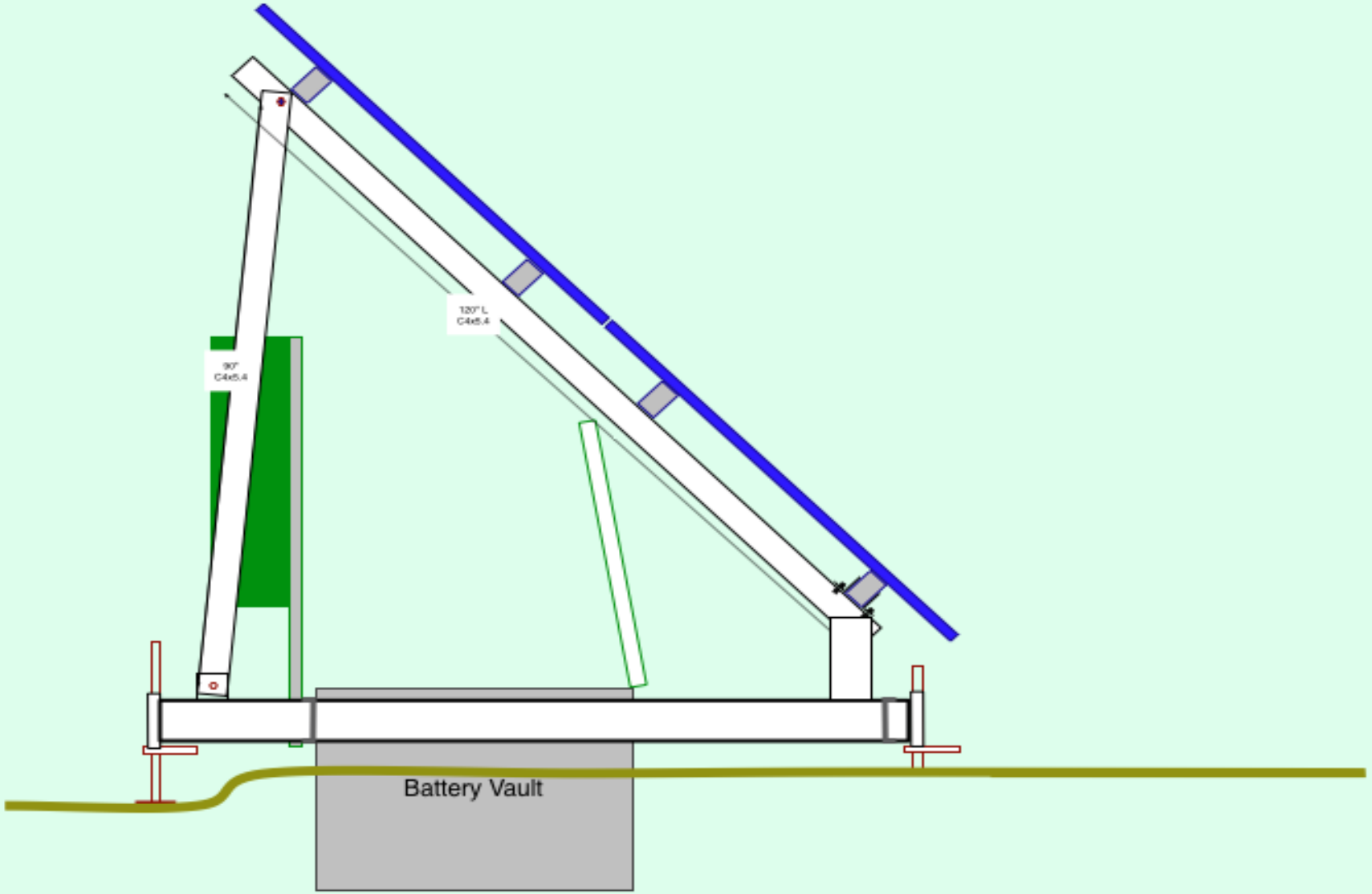
- Solarray systems are designed for 125 mph wind load in Wyoming
- Frame is solid steel and maintains its rigidity in high winds
- Ballasting, ground screws, and out riggers combine to achieve any wind loading needed

Scale: 1" = 20", 1 SQ = 4"

Solarray Base Frame



BP Array Side View

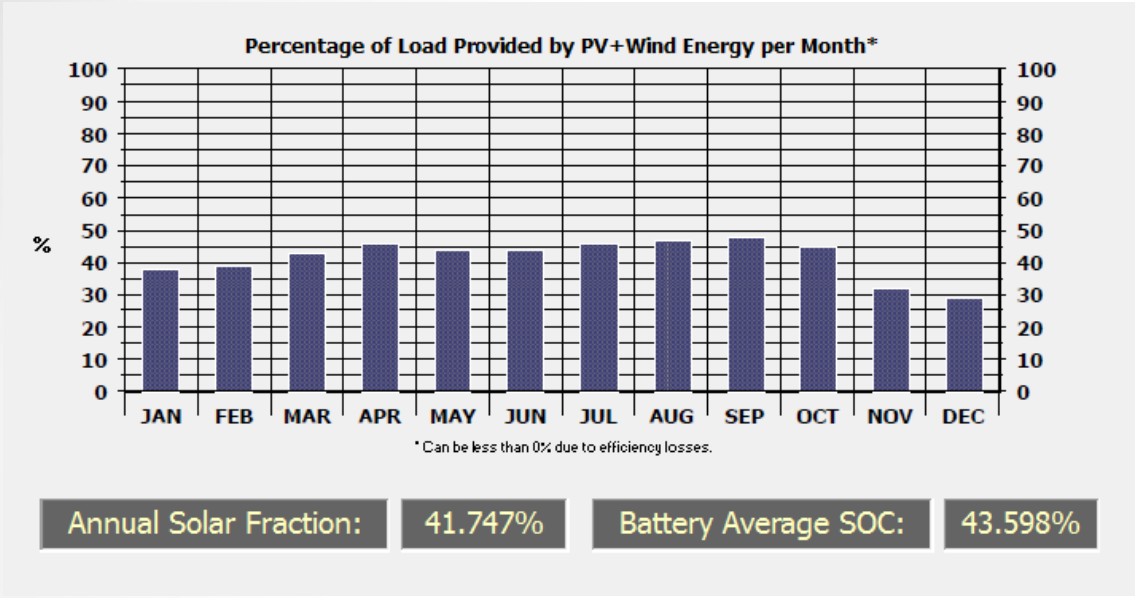


Performance Simulations

- NREL based solar design Software : PV-Design Pro.
- Uses exact module, battery, and controller performance data.
- Use hourly weather data based on 30 years History, from Rock Springs Airport, also looked at Casper, and Lander.
- Considers solar, wind, and air temperature.

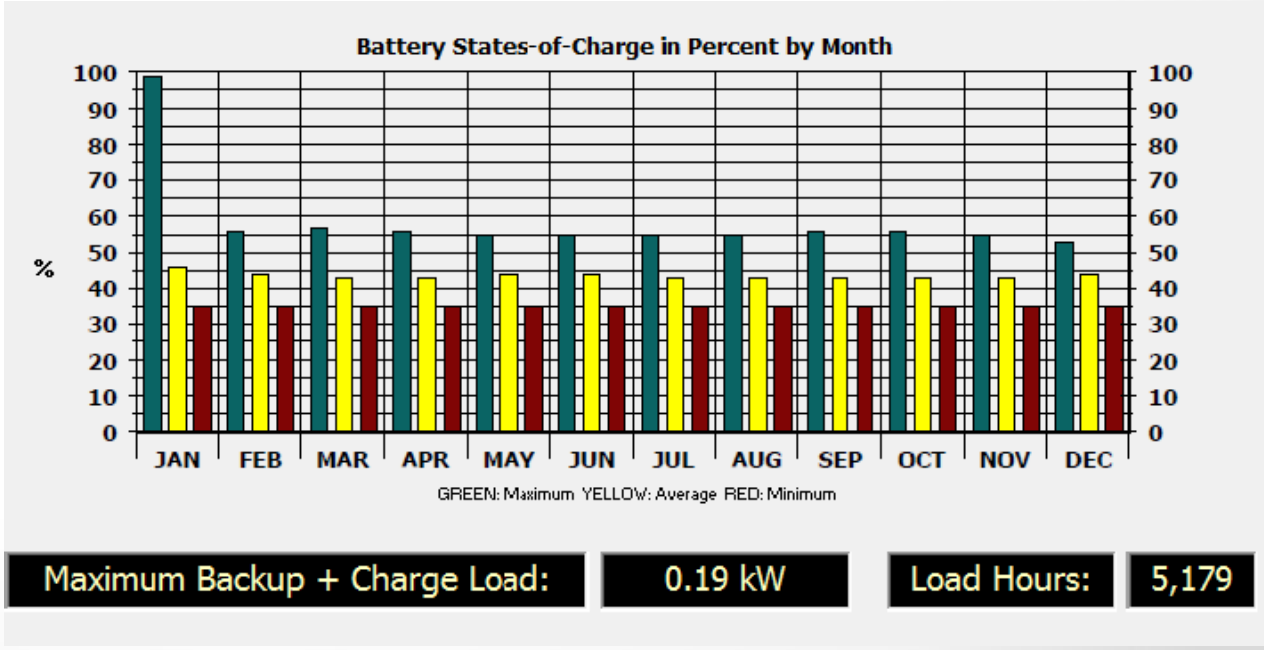
Other systems

(480 watt array, 8amp CP output)



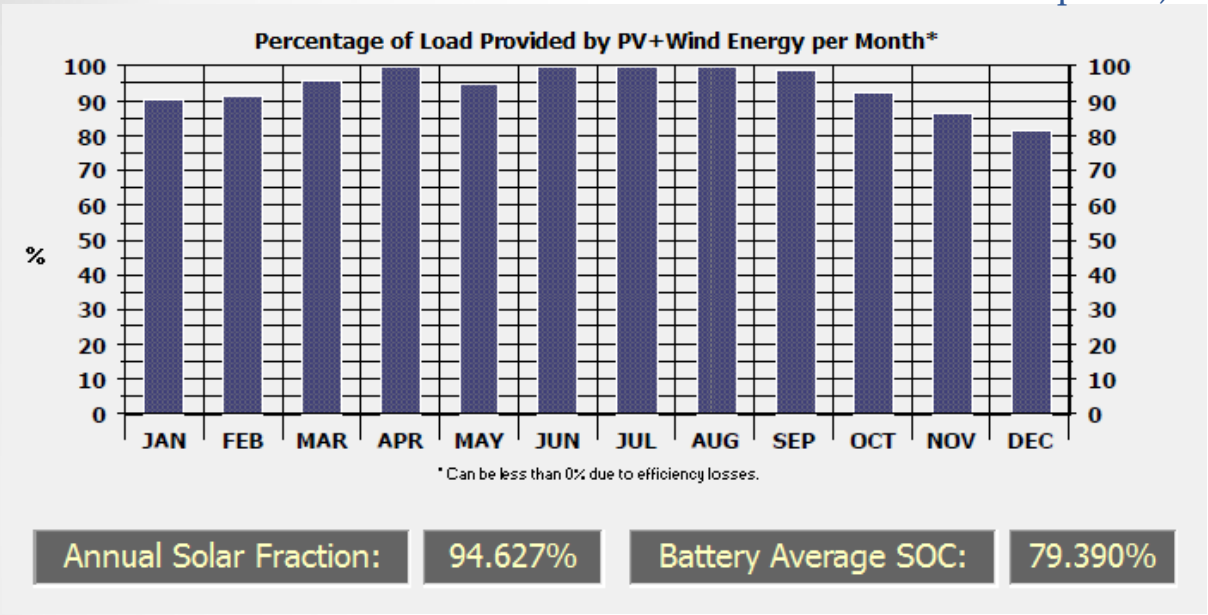
sized to less than ½ of the load

sized to charge less than 60% of battery capacity



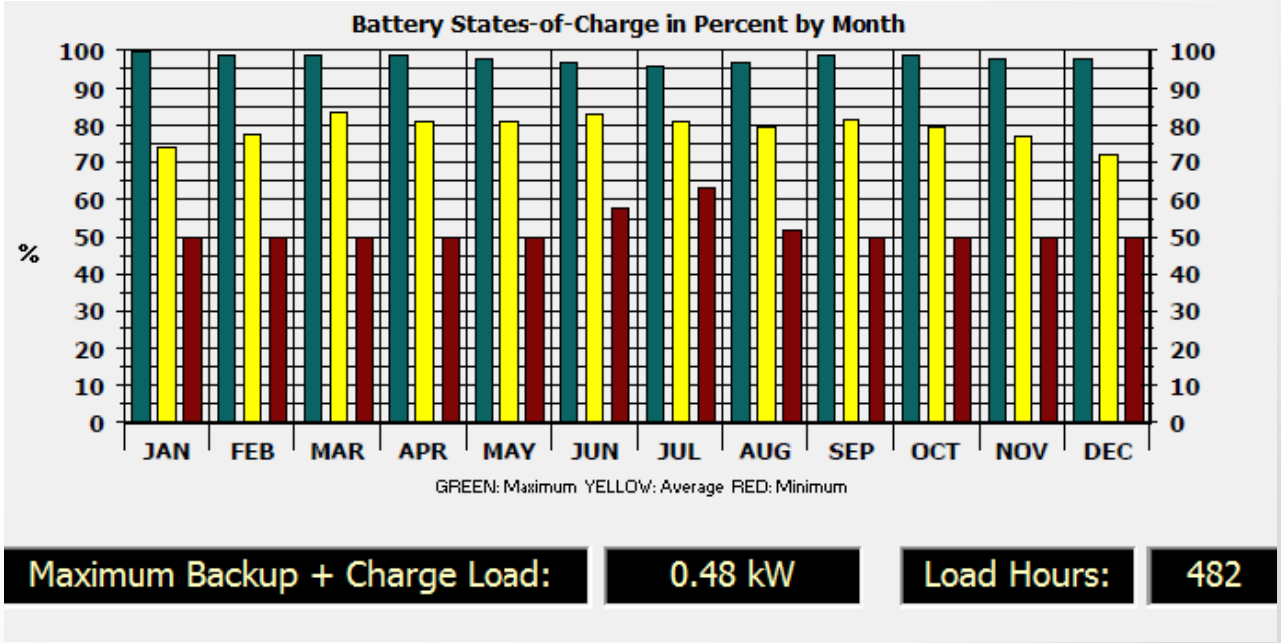
Remote Solar PV system

(2.55 kW PV only system installed 11/1/2012,
Plains Pipeline)



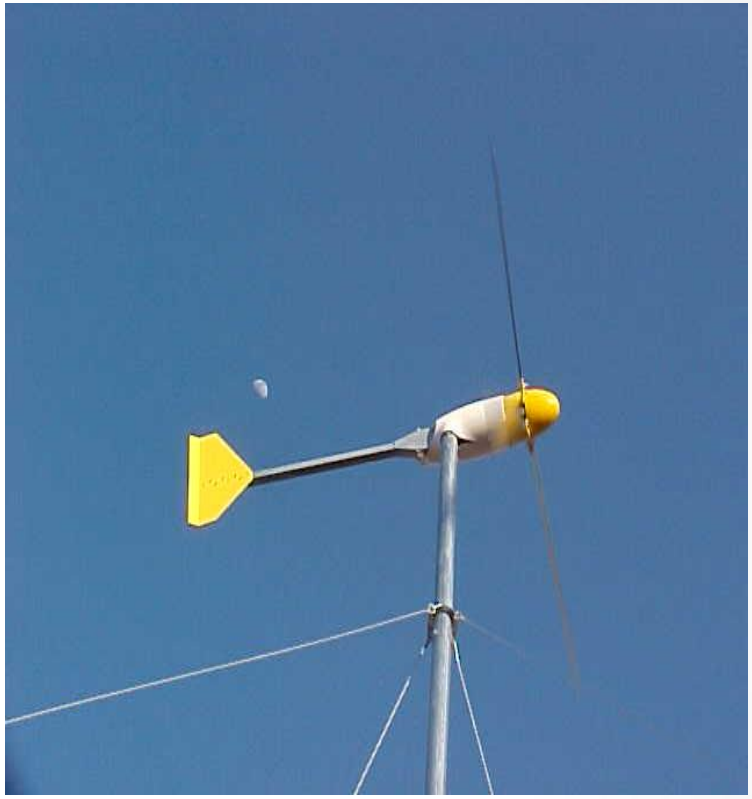
sized to meet load 95% of the time

sized to fully charge battery



Wind Power

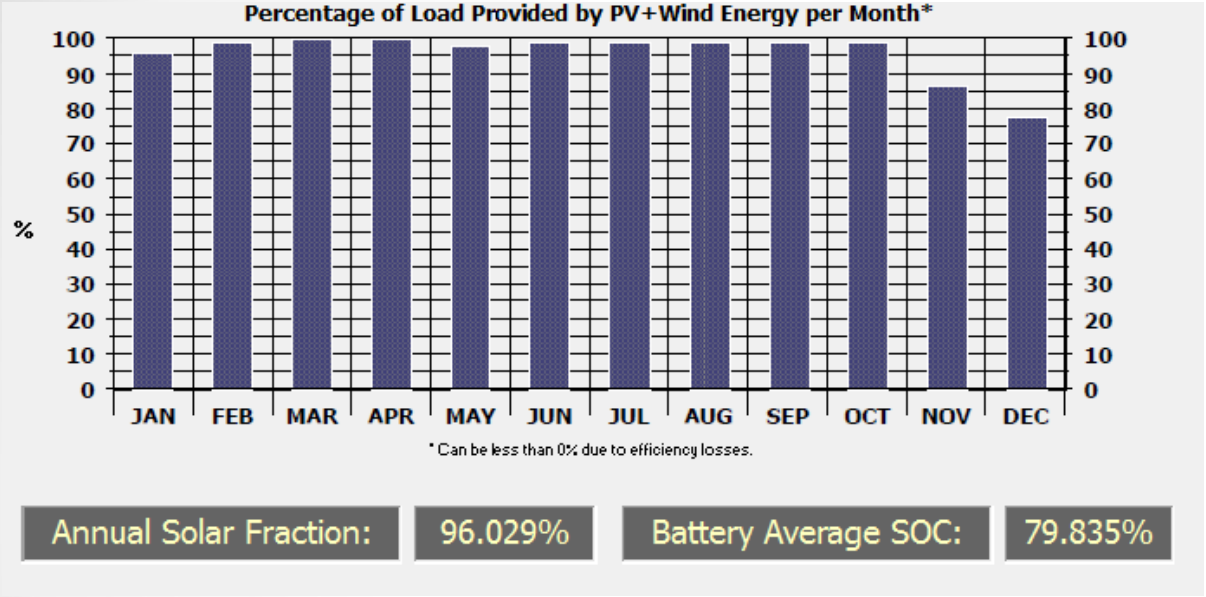
(1kW Bergey wind turbine system)



In Wyoming, Wind makes the most energy in December and January, when Solar is at a minimum

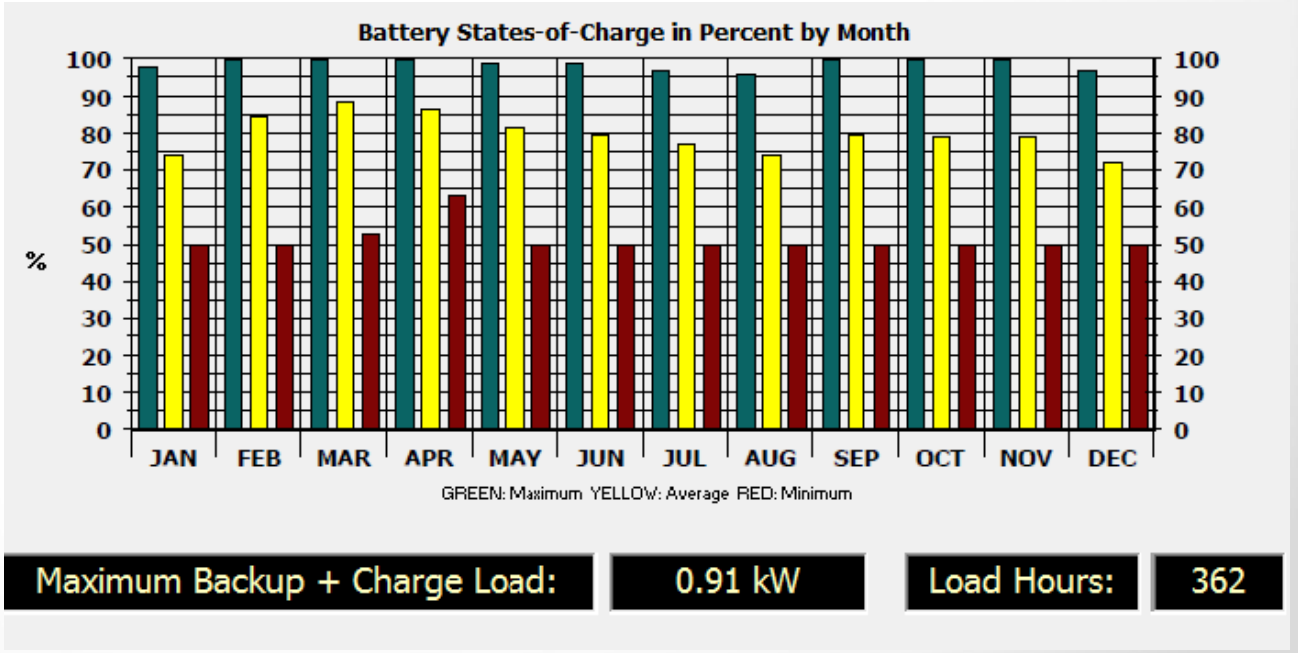
PV & Wind System

(3.57 kW PV + 1 kW wind turbine system)



sized to provide 38 amps at 24 volts output, 96% of the time

sized to fully charge battery



Remote Solar Expertise

- Designed and Installed 264 solar systems to date.
- In business since 1997.
- Designed and built many large scale CP units since 2007, that are deployed in Colorado, Wyoming, and Utah
- Managed projects up to 25 Mw, $80 million.
- 3 NABCEP Certified PV Installers on staff