

Solar Equipment

Prices for solar stuff is like playing the stock market. They change daily. A common sense approach has been taken. We only selected items with a 4star rating. My logic is simple, if it costs 40% of what a "Big Name" costs, we can replace it 2 ½ times. I also only relied on items where their ratings were from Over 100 reviewers. We will also want interchangeable items so that we only will require a minimum of parts. This paper is limited to solar power items. A separate paper will be provided for our water pumping solutions, which must be built, as well as our communications systems which will include satellite Internet, TV and wireless options. My design goal was to create a system where items could be added to the Micki's Dependant on requirements. This will allow us to keep costs to a minimum while providing a wide use of solutions. For example, the 75 amp charger and generator will only be required if there is no sun or by overuse. In this way, one of each of these items could be used to charge different Mickis. In the case of usage for fire crews, they would always be attached. Please note, these are just examples of their usage.

Upon further consideration and current pricing advantages I have changed the equipment from independent Inverter and Charger to a combined Inverter/Charger/Generator Auto Start. Additionally, the inverter proposed is of a higher quality offering not only 25% more constant usage, but 33% more demand load for initial surges from many high-load situations (6000 Watts). This will also provide constant power when load is heavy or there is no sun as when voltage drops to a minimum level, the generator will use the built in 4 stage charger to rapidly charge the battery bank. Even in situations where there is no sun, this offers a far more efficient solution as between 1 ½ to 3 hours of running the generator (estimate) should provide 24 hours of power. Lastly, this will ensure that the unit is as automatic as possible for both those not familiar with solar and possibly minimum unattended usage such as on top of a cliff during a fire, rebroadcasting satellite communications to other ground units.

Renogy 250 Watts 24 Volts Monocrystalline Solar Panel	\$239.99 @ Renogy (2 min)
Any Power 2000W PSW Inverter (6000 watt demand load) 4 stage AC Charger and Generator auto start	\$550.00 @ Manufacturer
Go Power 75 Amp "Quick Charger"	\$269 @ Solar Penny
MPPT 40 AMP Charge Controller w/monitor	\$170.00 @ Manufacturer
Cables, fuses and cut-offs	\$150.00 @ Bundled with items
Dometic LW3000 RV Digital Inverter Generator	\$676.00 @ AdventureRV.net
SW-38 Solar Water Heater Panel W/circulation pump	\$188.00 @ Amazon
Reverse Osmosis System	\$229.95 @ Amazon

Accessories

Small batteries are a necessity in remote locations. Rechargeable batteries and a charger for them is a cost effective means of providing renewable power to small, inexpensive devices.

Rechargeable Battery Combo	\$59.99 @ Amazon
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The Gem – The fly in the ointment

The Gem can be very costly for solar due to the very unusual 72 volt battery system. For example, we go from \$170 to \$675 just for the charge controller. This unusual configuration, according to the manufactures documentation, was to get more speed out of the Gem. Before spending what I estimate will be \$2000 - \$3000, I will write them to see if we can get the motor to work at 48 volts. When you get above 48 volts you run into a bunch of federal and state regulations as well as losing the availability of common parts availability.

Simply put, a small version of the Micki may prove a more flexible and less expensive alternative if I can't reset the voltage to 48 volts.

Gut instinct

The Gem was a bad purchase for the Forest Service. It s a matter of costs. #1 battery capacity. We have given it about 40% more. Charging/Breaking. Breaks are small, simple software change will both help with breaking and big-time (90% increase) help charging down hills which is the reality of life in the forest, at least this forest. We will probably gain more charging with this modification than Solar. A small Mini-Micky will handle the job of charging and providing electricity in a much more cost effective manner. Mini-Micki: \$1000 - \$1500.

My guess is that the Gems were bought as a “*cool electric car*” and then found to be unsuitable for forest use. I think we can make them very usable with limited modifications that can be done in the field. The one exception is the tire sizes. On our “*pickup*” Gem, the rear axle was not centered over the wheel openings. The front wheel wells are way too tight. These can be modified and I will do so on ours, to give a realistic estimate to what will be required.

We have to be very careful to not make a similar mistake. While solar sounds great, charging downhill increases will be far more effective, as will the planing of trips. For example, we will drive up to the Salt Springs dam, then down hill to the campgrounds, charging all of the way. Then back up the hill and plug into our “*green*” hydro-electricity.

When we need to do work, slide in the Mini-Micki and were off. Way cheaper, way more flexible. This should be a viable solution that is actually cost effective.