

So you want to charge by solar?

Options to solar charging

Really, there are 2 ways to charge your tractors from the sun.

- Grid Tie
- Off Grid

Grid tie notes

- Figure out how much power you use
- Contract with a solar power company to install an array
- Or install it yourself.

Grid tie pros and cons

Pro

- Easy to do.
- Even a small array (1kWh) can recharge your tractor.
- Excess power provides power to your home.
- Federal and State incentives make ROI much better.
- SRECs (Solar Renewable Energy Credits: You get 1 SREC for every 1000kWh energy produced) can really help the ROI.
- You can add a battery backup * and run if the grid is going or not.
- Lower or no power bills.
- Grid tie is your best bang for the buck.
- Can pay for its self in 5 to 7 years

Con

- Not all neighbors want to live next to solar panels. May be against HOA, deed restrictions, or whatever. Need to make sure you *can* install solar before you do.
- When the power lines go down, you lose power. Even on a sunny day.
- *Battery backup NOT included in state or federal incentives.

Off grid charging notes

- **Figure how much power you want to make**

Are you just going to charge your tractor?

Are you going to run an inverter? If so what do you plan on powering?

- **Plan on where you are going to put it**

Since you are not hooking it to the grid, the location of the array can be much more flexible

You can even use a single solar panel as a "solar shade" for your tractor

Or you can cover your shed/garage and keep your herd of tractors topped off at all times.

- **Are you qualified to install it?**

Really, if you can fix the wiring in your tractor, off grid solar should not be too hard.

In most cases you will still need a building permit.

Off grid charging notes pg2

- Can I charge my tractor while driving, or parked?

Why yes you can. A “Solar Shade”, or solar canopy would be an example of this.

A single panel to a charge controller can charge a set of batteries*

The Coolness factor is off the charts! 😊

* The star is a big one. There is a lot of planning and checking involved in using a single panel as a solar canopy. Panel wattage, voltage, the charge controller to use, wiring issues, parking issues (Have to park it outside, pretty much all the time), mechanical considerations (How to attach it to your tractor)

- If I charge off grid, what can I do with the extra power?

There lies the greatest question you need to ask yourself.

If your goal is just to recharge your tractor, and keep the batteries topped off...and you don't care about the excess power then you can put in a 1 to 2 kWh array, going to a good charge controller. Poof all done.

If your goal is to use every electron generated then you need to plan for it.

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- Uhm, OK, how do I use the excess power?

Good question, I'm glad you asked!

You can charge your tractors (I know, you know this already)

You can run an inverter and use that excess power to

- run a horse/cow electric fence
- Provide lights in a shed/barn/garage
- Run a well or sump pumps
- Pretty much anything that doesn't use too much AC power

Off grid pros and cons

Pro

- Easy to do.
- Even a small array (1kWh) can recharge your tractor.
- You can use it as a battery backup and inverter if the grid is out.
- Power out buildings

Con

- Not all neighbors want to live next to solar panels. May be against HOA, deed restrictions, or whatever. Need to make sure you *can* install solar before you do.
- More expensive
- Less ROI (Any excess power generated is lost)
- Won't help offset power bills
- May not ever pay for its self

How solar works

- For the sake of time I'll just give an overview

- Solar panels

Light comes from the sun

It strikes the panels

The panel contains some cool stuff that gets excited when hit by a certain band of light

When it gets all excited electrons are produced

The electrons leave the material and go into the wires as DC energy

- Charge controllers

The DC power goes into the charge controller and it is converted to the DC voltage needed by the batteries.

Basically a charge controller is a really smart DC to DC converter

How solar works pg2

- Inverters

An inverter is a fancy way of saying DC to AC converter.

There are 2 inverter types

- Rotary
- Electronic

Inverters can have different waveforms

- Pure SINE waveform

This is the best to use. All(?) rotary inverters are. **Some** electronic are.

Pure SINE is the best. You can use the power for anything without worry about damage

More expensive

- Modified/Square waveform

Not as good

Can damage some electronics that use the wave in the AC current as a timer

Some microwaves

Laser printers

Some computers, etc

They are dirt cheap. I have a used 3000w inverter I got for a sump pump during power outages

How solar works pg3

- Inverters cont

DC Input power

Inverters can be found for 12, 24, 36 and 48 VDC. (Higher input power can convert to AC power more efficiently)

The higher the voltage/wattage the more expensive it will be

The higher the ratted wattage the more stress on the batteries at full load. (A 4000w 12V inverter will use 600aH from a set of batteries. That's a lot.)

Inverter costs

The APS 3636 3600W constant, 7200W peak is now going for around \$900 (Pure SINE)

The Outback marine 32/36V inverter is going for ~\$2300 (Pure SINE)

A new 12VDC 5000w constant, 10000w peak inverter can be had for less then 400 (modified wave)

A new 12VDC 1200w constant, 2400w peak can be had for less then 100. (modified wave)

A rotary inverter is harder to find, and usually they are used, so the price will vary

Inverter uses

I have used mine to:

- Electric chainsaw, mig weld, run a plasma cutter and compressor

- In power outages run the TV, cable, fridge, lights, computers, etc for 14ish hours just off of one tractor.

Pretty much anything you could use household power for.

Closing thoughts

- Off grid isn't as regulated, and is user to put up.
- Grid tie is cheaper over all, and has a better ROI.
- Either is a good way to "go green"
- Inverters are good, but like the tractors each type has its job.

Questions

- No, really, I'll try and answer anything I can
- Why are you still reading this?
- Geesh, ask me a question already!
- Fine, just go to motor rebuilding class by Jeff and Nick then.

Contact:

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