

DIY Solar — Start Small, Scale Up

Some power is a whole lot better than no power. Start with a small setup and grow it when you're ready.

START SMALL
MEASURE FIRST
GROW WHEN READY

LEVEL 1 · START HERE

Power bank + small panel

Phones, radio, headlamps. No setup. Lives in the go-bag forever.

\$40–150

LEVEL 2 · PLUG & PLAY

Power station + folding panel

Adds lights, router, fan, CPAP, laptop. Look for LiFePO4, 500–1,000 Wh.

\$550–1,000

LEVEL 3 · DIY

Build your own kit

Panels + MPPT controller + LiFePO4 battery + inverter. Repairable and expandable.

\$650–1,100

LEVEL 4 · GO BIG

Bigger & wired in

Larger off-grid, plug-in "balcony" solar, or whole-home. Check local law first.

\$700 and up

Know your number — outage worksheet

DEVICE I CAN'T DO WITHOUT	WATTS	HRS/DAY	WH/DAY
e.g. Wi-Fi router	15	24	360
My daily total			

Watts × hours = Wh. Measure with a plug-in watt meter or a USB meter. Labels show the maximum, not what it really uses.

BATTERY SIZE

Daily Wh × days ÷ 0.8

Days = days in a row on battery alone. 0.8 = losses + not running flat.

My battery: _____ Wh

PANEL SIZE

Daily Wh ÷ (sun hrs × 0.75)

Sun hours: your ZIP at pvwatts.nrl.gov (TX avg ≈ 5.3). 0.75 = real-world losses.

My panels: _____ W



Keep it ready

- **Practice:** run your essentials on it for a weekend.
- **Monthly 5-min check:** charge, connections, no heat or swelling.
- **Storing:** 50–80% charged, cool and dry. Recharge every 3 months.
- **Write it down:** parts list + notes. Future you will thank you.

Four jobs in every setup

-  **Catch — panels.** Expect 70–80% of the label. Avoid any shade.
-  **Control — charge controller.** Get MPPT, with room to add a panel.
-  **Store — battery.** LiFePO4. Use a battery monitor, not voltage.
-  **Use — outputs.** USB/12V first. Pure sine inverter for the rest.



Safety non-negotiables

- **Fuse right at the battery.** Always.
- **Thick enough wire;** when in doubt, go up a size.
- **Match ratings** on fuses, connectors, and switches.
- **Hook up battery first, panels last.** Cover panels while working.
- **Inverter to the battery,** never the controller's load terminals.
- **Read the datasheet.** Not your memory.

Don't wait for perfect. Get **some power** working.

My first step this week: _____