



FIELD BRIEFING

Personal Backup Power Strategies

From a radio operator's perspective

The station is only as good as the power behind it.

HOURS

Finish the net

DAYS

The realistic target

WEEKS

Fuel, solar, a plan



WHY THIS MATTERS

A dead radio is not a communications plan

01

The station is the power

The rig, the antenna, and the operator only work if something is feeding them. Name the power path before you name the frequency.

02

First 72 hours are narrow

Served-agency and personal needs are voice, text, and situational awareness — not whole-house comfort.

03

Short outages hide the failure

A few hours are common and forgiving. Multi-day outages expose fuel, noise, carbon monoxide, and interconnection mistakes.

04

Layer it on purpose

What runs for hours. What runs for days. What can be sustained for weeks. Do not buy the weeks solution to solve an hours problem. Do not assume that one solution solves all problems.



STEP ONE

Name the mission before you buy anything

TIER 1

Non-negotiable

HF/VHF station, or a handheld plus charger
Phone, and a way to charge it
Lighting
CPAP, oxygen, or other medical gear
Sump or well pump, if that is the failure

TIER 2

High value

Refrigerator, or a cooler plan
Modem and router, if the ISP is up
A way to heat food
Furnace blower, or a safe heat plan

TIER 3

Comfort

Extra lights and fans
Television
Coffee
Shop tools
Nice. Not the plan.

TIER 4

Whole house

Water heater, range, dryer
Central air and electric heat
These own the watt budget
Usually a standby generator

Entertainment is optional. Communication and one cold box are not.
Whole-house is a different budget, and a different permit path.



STEP TWO

Pick a duration, then match the tool

A few hours

Finish a net. Keep phones alive.

Existing radio battery, jump pack, or UPS. No generator required.

A couple of days

The realistic target for most operators.

Deep-cycle or LiFePO4 bank, plus a way to recharge it.

A couple of weeks

Fuel storage plus solar, or a neighbor and club plan.

Gasoline alone rarely covers this without resupply.

Hybrid that works: battery for the quiet overnight period. Generator or solar for daytime recharge.



STEP THREE

Do the watt and amp-hour math first

Watts = volts × amps

A 100 W radio is not 100 W from the battery. At 13.8 V, 100 W output is roughly 17–22 A on key-down.

Energy is amp-hours

A 30 Ah pack can supply 1 A for 30 hours, or 15 A for 2 hours, before losses. “A battery” is not a plan.

Duty cycle changes the problem

A 5 W handheld net check-in is not 100 W SSB ragchewing. Size to how you actually operate.

Depth of discharge

Plan lead-acid and AGM to about 50% if the battery must survive repeated events. LiFePO4 can be planned much closer to rated capacity.

AC loads have two numbers

A fridge may run at 100–200 W and surge several times that. Budget both running watts and starting surge.

Inverters are not free

Budget about 10–15% extra for conversion loss, and remember the inverter itself draws idle current.



STEP THREE

Common loads, sized the way operators actually use them

Load	What usually covers it	Watch for
Phone, 2 days	10,000–20,000 mAh power bank	Keep it off the station battery
Handheld, 2 days	Spare packs, or a larger pack with a charger	Local repeater duty, not high power
100 W mobile, weekend	50–100 Ah LiFePO4, or a pair of deep-cycle AGMs	Modest duty cycle, plus a charge plan
Fridge, 2 days	Often 1–2 kWh per day	Generator, or a large battery-plus-solar job

A spare battery does not run a refrigerator. Treat the cold box as its own job.



Name the chemistry. Charge voltage is not interchangeable.

Flooded lead-acid

Cheap, forgiving of abuse. Vents hydrogen, needs water, spills. Fine in a garage. Poor at the operating position.

AGM

Sealed, common in go-kits, heavier per amp-hour. Absorb about 14.4–14.7 V. Float near 13.5–13.8 V. Never a lithium profile.

Gel

Sealed, and easy to ruin with a high absorption voltage. Use only a gel profile.

LiFePO₄, 4 cells

Nominal 12.8 V. Full near 13.6–14.4 V. Holds voltage until near empty. Charge 14.2–14.6 V. Needs its own BMS. Lighter, more cycles, higher cost. Many will not accept a charge below freezing without a cutoff or heater.

Other lithium, 3S / 4S

Poor direct match to a 13.8 V radio. 3S sags too low. 4S can peak too high and damage a rig. Leave these in tool packs and power banks unless regulated.



Practical rules for the station battery

VOLTAGE WINDOW

Most mobile rigs want about 13.8 V $\pm 15\%$, roughly 11.7–15.9 V. A pack that sags under key-down below the low end will fold back power or reboot.

KEY-DOWN TEST

Measure voltage on transmit, not at rest. Resting voltage lies.

Separate the loads

One battery for the radio. A separate small pack for phones. Do not let the family phone drain the station.

Protect the path

Fuse at the battery. Use the correct wire gauge. Keep a voltmeter you trust.

Store to the chemistry

Store lead-acid full. Store LiFePO₄ partially charged if it will sit for months, and check the maker's storage note.

A battery needs a charge path

Without one, it is a one-event device. The recharge plan is part of the battery.



The bridge between a battery and the house

Inverter, not conventional

Quieter, more fuel-efficient at light load, and usually the right choice for a radio site.

Size to the job

A 1–2 kW inverter unit covers a radio, charger, lights, and maybe a fridge if surge is managed. Larger portables cover most of a house except resistance heat, an electric dryer, and an electric range.

Fuel is part of the plan

Gasoline needs rotation and stabilizer. Propane stores far longer and is the better “couple of weeks” fuel. Dual-fuel is a useful compromise. Diesel is a great choice if cost allows.

Runtime claims assume a partial load

Plan on less than advertised by the manufacturer. Test with the loads you will actually run.

Outdoors only

Away from doors and windows. Exhaust pointed away. Never in a garage, even with the door open. Carbon monoxide kills after the power is “back on” in people’s minds.

Good fuel

Keep a newer quality fuel can with fresh or preserved fuel and a schedule. Not a can from grandpa’s shed. Bad fuel can be your worst nightmare in a critical situation.



Waveform is a radio problem

Pure sine is ideal for radios, chargers, CPAP, modern fridge controls, and anything with a switching supply. Modified sine can run simple resistive loads. It heats motors and chargers, hums in audio, and can refuse to operate some electronics. A line filter does not turn modified sine into pure sine.

Standby generator

Whole-home units produce clean power through a synchronous alternator. Multi-pole rotors and a precision stator induce the wave. Governors and AVRs lock speed near 60 Hz. Generac Support cites THD under 5% on these units — safe for sensitive electronics.

Conventional portable generator

Engine speed drifts. Frequency and voltage sag or spike when appliances cycle. Basic capacitors or simple AVRs manage average voltage. They do not smooth waveform distortion or high-frequency noise.

Inverter portable generator

Modified wave AC is converted to DC, then inverted back to a stable 60 Hz pure sine wave. This is the portable class that avoids the poor waveform of a traditional open-frame portable units.



Getting generator power into the house

01

No interconnection

Heavy outdoor cords to the fridge, a lamp, and a battery charger. Lowest risk, and enough for many two-day plans.

02

Listed transfer method

A listed inlet plus a manual transfer switch, or a listed breaker interlock kit matched to that panel. Utility and generator cannot be on together.

03

Standby with an ATS

Permanently installed generator and automatic transfer switch. Best if cost is not the limit. Still needs fuel service, exercise, and a permitted install.

DO NOT

**No suicide cord.
No dryer-outlet backfeed.**

A double-male cord, or a generator plugged into a dryer outlet, can energize the service drop. Lineworkers treat that line as dead. It can weld breakers, start a fire, or destroy the generator when utility power returns. It is a code violation.

A ham license is not an electrician's qualification.



This tier solves comfort. It does not replace the radio battery.

Two architectures

A portable on a listed interlock, versus a permanently installed unit with an automatic transfer switch. Both still need a transfer method. Neither is a cord through a window.

Fuel for unattended start

Natural gas or propane if it must start on its own. Diesel where a long runtime matters. Electric heat, dryer, oven, and central air often require load shedding even on a whole-house unit.

Ownership, not a purchase

Exercise schedule. Battery in the start circuit. A service contract. A generator that has not been run is a rumor.

The minute it is down

Refueling, a fault, or a maintenance window still leaves the station dark unless the radio has its own battery. Standby does not retire Tier 1.



Solar and hybrids, quiet enough to operate on

01 Same bank, added input

A panel, an MPPT controller set to the battery chemistry, and the bank that already runs the radio. Quiet. No carbon monoxide. It recharges while you operate.

02 100–200 W is a station

That much panel is meaningful for a radio position. A fridge needs much more, or a generator doing the heavy recharge.

03 The hybrid pattern

Battery carries the night. Generator or solar restores the bank by afternoon. Do not ask one layer to do every job.

04 Match the profile

Charge controllers and inverters must match the chemistry. A lead-acid profile on LiFePO₄, or the reverse, shortens life.



A template, not a rule

01

Hours

Radio on its own battery. Phones on a power bank. One LED light. No generator required.

02

Days

50–100 Ah of the right chemistry. A pure-sine inverter large enough for the charger and one small AC load. Cord-connected fridge if needed. Fuel for one recharge cycle.

03

Weeks

Dual-fuel, propane, or diesel generator. Listed inlet and interlock. Stabilized or long-store fuel. A solar input to the radio bank. A written load-shed list so the generator is not asked to run the dryer.



A plan that has not been run is not a plan

01

Label the profile

Every battery and every charger, marked with the chemistry it is set for.

02

Test under load

Twice a year. Starting a generator with no load does not count.

03

Net on battery

Once a quarter, so the voltage sag is not a surprise on the night you need it.

04

Date the fuel

Rotation date on the can. Stabilizer is not a substitute for a calendar.

05

One page in the kit

What runs. What stays off. Inlet breaker sequence. Who has the electrician's number.

06

Train the household

How to start it, what can and cannot be powered, and the safety rules. A CO alarm if a generator is in the plan.

TAKE THIS HOME

A battery with no charge path is a one-event device.

Name the mission

Communication and one cold box. Comfort is a different budget.

Match the duration

Hours, days, weeks. Budget and layer for the mission.

Do the math

Amp-hours, duty cycle, surge, and inverter loss — before the purchase.

Transfer, interlock, or cords only

Know the plan, have the supplies, And execute.

Install the interlock before the storm. Improvising one in the dark is the failure this briefing is written to prevent.