Power Outages: Keep Your Refrig Cold and The Family Warm Using Your Car as a Generator

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May the 4th

May The Fourth Be With You

Tonight's Topics

- Importance of having power backup plans (plural).
- Who this solution might be for.
- Powering your refrigerator to prevent food spoilage.
- Powering your house furnace for warmth.
- Short video demonstrations.
- Small mod to your furnace power switch.
- What worked for me and what didn't.
- Parts needed (with links).

Importance of Backup Plans

- As DSWs, we're always preparing for an emergency.
- What's the weakest link? (preferred way of thinking)

- More frequent need to have an alternate way of getting power.
- Even better to have a multi-layered backup power strategy.
- The grid's reliability has gone down significantly in recent years. More vulnerable than previously thought.
- Solar, generator, whole-house batteries. Our 2kw Yamaha portable gas generator hasn't been needed for years.

Who This Might Be For

- One alternative way to power your important things (refrig and home), using something we all have, a car.
- Who don't have or want a gas generator.
- Single-purpose backup solutions have significant downsides.
- Want a simple way to save their food during a power outage.
- A cost-effective way to keep the *whole* house/family warm.
- Maybe for a friend or relative who had food spoiled or suffered during a past outage.
- Want redundancy in backup power plans. In a pinch.
- For when the "fit hits the shan."

Avoid These Situations

Recent Storms

- Extreme winds caused repeated & wide-spread power outages.
- Some didn’t lose any power, some for 3.5 days!
- One of the best “dress rehearsals” we could have had (major inconvenience without casualties).
- A thin line between a 24-hour inconvenience and a very serious issue if it lasts more than a couple of cold nights.
- Experts say to expect more extreme/wild weather fluctuations for the foreseeable future.
- Upcoming summer’s fire season, even without a drought, will also likely result in large-scale power outages lasting days.

Disclaimers

- For educational purposes only.
- Effective solution for some but don't try this unless you're comfortable.
- Most is easy but one step requires some basic house wiring knowledge.
- Hire an electrician if not comfortable with rewiring a wall switch.
- Refrigerator may need to be moved, plugged into an extension cord instead of the wall.
- I, CARES, nor Cupertino is responsible for any damage or harm of any kind, should you decide to try this.

Powering the Furnace

Temporarily wired for proof of concept.

Powering the Refrigerator

How To Do This

- Temporary use, only during the outage.
- Car's battery & inverter are used to create AC power for critical home appliances (furnace & refrigerator).
- Why not just run off of a battery alone?
- Properly-sized *Pure Sine Wave* inverter converts car's DC to house's AC power.
- Bring AC power from the inverter to the appliance(s) via a long extension cord. Ideally close the hood if safe to do so.
- Periodically run car engine to keep the battery healthy.
- Hybrid and electric cars can be used too. Monitor input voltage.
- Allow furnace to finish cool-down before turning off inverter.
- Disconnect inverter from battery when not using it, even if off.

Intermittent Duty Cycles

- Start engine first before turning on the inverter.
- Can power the appliances w/out the car running but not recommended for long periods.
- Run car as needed to keep the refrigerator cold and the family warm.
- Run the car and inverter for an hour or two at a time, locked, and in the driveway.
- CAR MUST BE PARKED OUTDOORS TO AVOID CARBON MONOXIDE BUILDUP IN THE GARAGE.
- Safety first!

Initial Power Consumption Spike

- Refrigerators and furnaces require high power during initial start-up, then moderate levels.
- Our 8 years old LG is rated for 445 watts consumption. Resting: 10 watts, Max: 564 watts.
- Our 25 years old 80k BTU high-efficiency house furnace consumption: ~600 watts while running. Initial, very brief current is hard to measure, but significant. Saw 1500 watts briefly, likely much higher.
- Furnace blower motors briefly need up to 5x more current initially during startup. More than refrigerator compressors.

Parts Needed

- Inverter (minimum of 600 watts for refrig only, Pure Sine Wave type, direct connection to car's battery via alligator clips).
- Extension cord (long enough to reach your refrigerator or furnace from the driveway, garden variety, 14 AWG).
- Furnace combo switch/outlet.
- PC-type power cord.
- Switch modification, for furnace to run from the new outlet ($0 if DIY, to whatever an electrician charges for ~1 hour).

Size of Inverter Needed

	8 years old LG refrigerator (rated 445 watts)	80,000 BTU High Efficiency House Furnace (25 yrs old)
600 watt inverter (peak rating of 1200 watts, likely over-rated)	**Yes**	**No**
1000 watt inverter (peak rating of 2k watts, likely over-rated)	**Yes**	**No** (startup motor surge is still too high)
1500 watt inverter (peak rating of 3k watts)	**Yes**	**Yes**

Furnace blower motor's initial current draw is > than my refrigerator compressor's.

Links to the Parts

- Combo switch & outlet ($12)

- 14 AWG PC power cord ($7, thinner 18 AWG works but not recommended)
- 50 foot extension cord ($14)
- 600 watts Pure Sine Wave Inverter (for refrig only, ~$100)
- 1000 watts Pure Sine Wave Inverter ($128)
- 1500 watts Pure Sine Wave Inverter (refrig or furnace, $217)

Summary

- Reasonably priced, effective way to keep the family warm and the food cold during an outage.
- Solution doesn't just sit there in the garage 99% of the time, taking up precious space. Significant for me.
- No need to store, stabilizer, cycle gas, and run generator 2x year. Higher reliability of your car's engine since it's used regularly.
- Longer run time due to larger gas tank. 2 cars = redundancy!
- Not vulnerable to stormy weather.
- Not a single-purpose solution. Use the inverter also for roadtrips, camping, emcomm deployment, etc.
- Workable solution, so I'm getting rid of my Yamaha gas generator.

Sleep Better At Night

Thank you

Any Questions?