

1. Starting point:

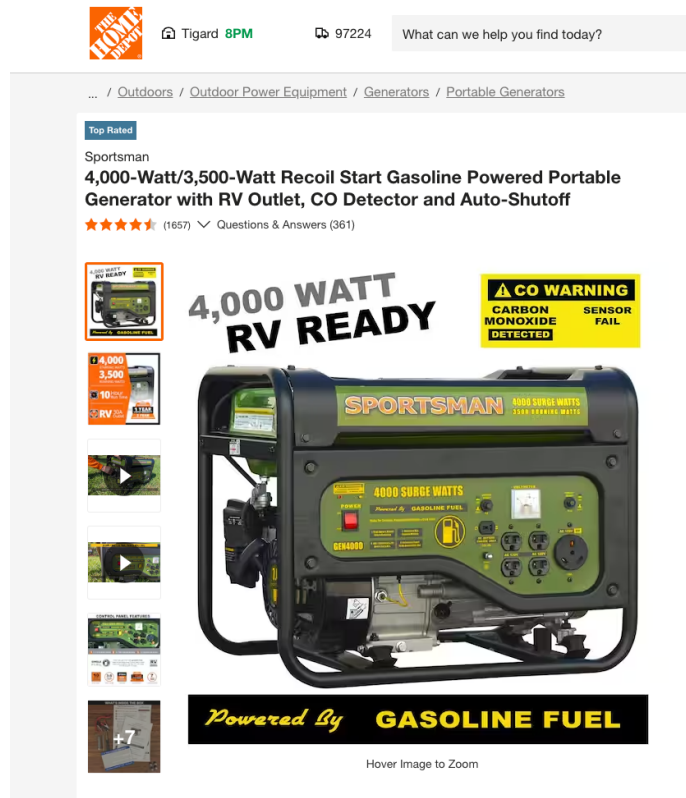
- a. Make a list of outlets, lights, appliances, & medical equipment that you absolutely need to power in a storm (essential loads)
- b. Get electrical demand for each essential load (available on appliance or website)
- c. **Beware:** any appliance that uses electricity to make heat (hair dryers, toaster ovens, coffee makers, microwaves, cook tops, crockpots, etc.) uses **LOTS** of electricity
- d. On main electrical panel – see which circuits power the essential loads.
- e. This data will help you determine how big a generator system you should ideally have.
- f. **Caution: Generators can't be set up inside house or garage.**
- g. Of course, budget consideration is next!

2. Solutions range in scale and price

Here are 3 solutions, but there are infinite variations depending on budget and need:

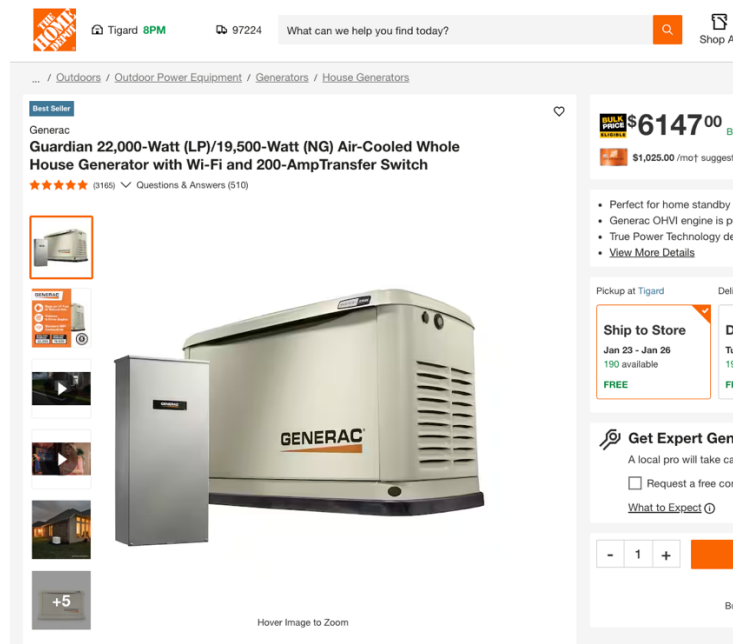
a. Low \$

- i. \$300+/- gasoline generator, 4000 +/- watt. Here's an example:



- ii. Extension cord/power strip
- iii. Plug in refrigerator, phone chargers, some lights

- iv. **Pro's:** cheap, easy set-up, nothing to “install”, for a small added cost get a dual fuel generator that runs on propane and gasoline
 - v. **Con's:** noisy, must be refueled 2 or 3 times/day, carburetors can get gummed up if not properly maintained, power cord running through open doorway or window, house heated by burning wood
- b. Medium \$\$
- i. Honda Inverter generators (EU2200i) \$2300, 3600 watt or similar system
 - ii. Hutch mountain conversion kit (natural gas, propane, gasoline) \$620
 - iii. Transfer panel connected to main house panel \$350 + installation
 - iv. Powers home's furnace (natural gas), refrigerators, selected outlets and lights in house.
 - v. Requires “quick-connect” natural gas outlet (like for BBQ)
 - vi. **Pro's:** quiet, can run 24/7 during power outage without refueling (assuming natural gas not interrupted, can heat house if furnace is on natural gas)
 - vii. **Con's:** conversion kit must be permanently installed on generators, won't run entire house (limited # of appliances that heat by electricity)
- c. Expensive \$\$\$
- i. Whole house “standby generator”, \$6000 +++ and up, plus installation. Here's an example:



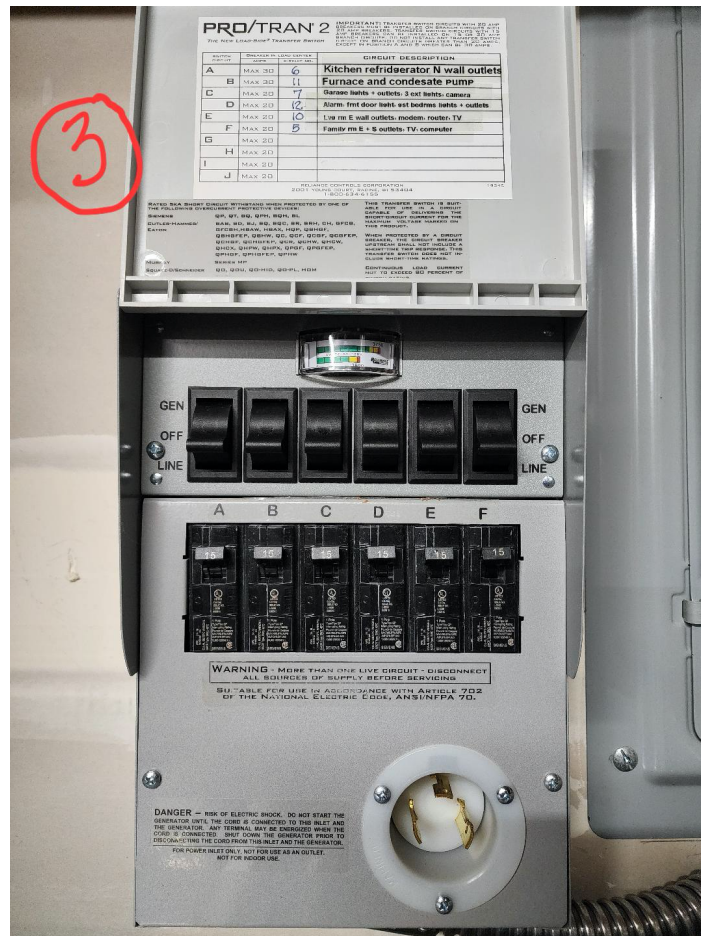
- ii. Includes automatic transfer switch – in outage, lights flicker for a second, then generator starts up – powers entire house.
- iii. Can run on variety of fuels
- iv. Once installed, it's ready to go
- v. **Pro's:** quiet, runs 24/7, powers entire house, no setting up components in the rain.
- vi. **Con's:** \$\$\$ (but probably adds to home value)

3. Important concepts:

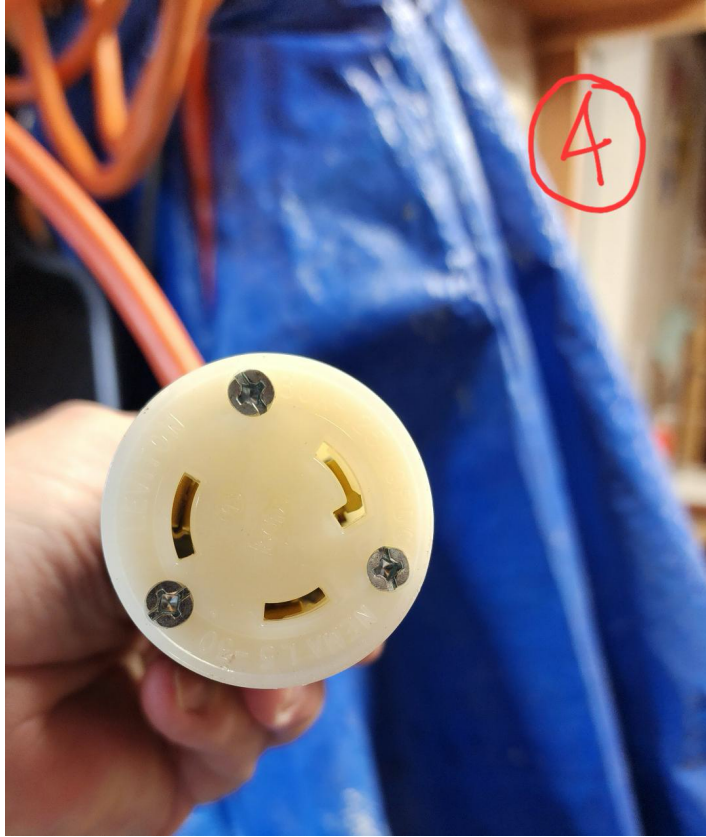
- a. Any generator system must be isolated from PGE “line” power to protect workers fixing outages.
- b. Gasoline fuel – some special issues:
 - i. Cheapest generator solutions run on gasoline (but there are some that run on propane and/or natural gas as well.)
 - ii. Limited shelf life of stored gasoline and any remaining in generator (12 months +/-)
 - iii. Gasoline in carburetor can gum up over time – requiring rebuilding/cleaning (not fun when it’s freezing and raining and parts aren’t available)
 - iv. Danger of storing flammable fuel
 - v. Roads may be unpassable, making trips to gas station difficult

4. My system – the middle \$\$ option

- a. Components:
 - i. 6 circuit transfer panel (must be installed by electrician)



- ii. Power cord with twist-lock plugs (#10 gauge, 3 wire)



- iii. Honda EU2200i and EU2200i Companion inverter generators



- iv. Patching cables (comes with Companion Gen.) to connect the 2 generators



- v. Hutch mountain natural gas/propane conversion kit



vi. Quick connect to home's natural gas system:

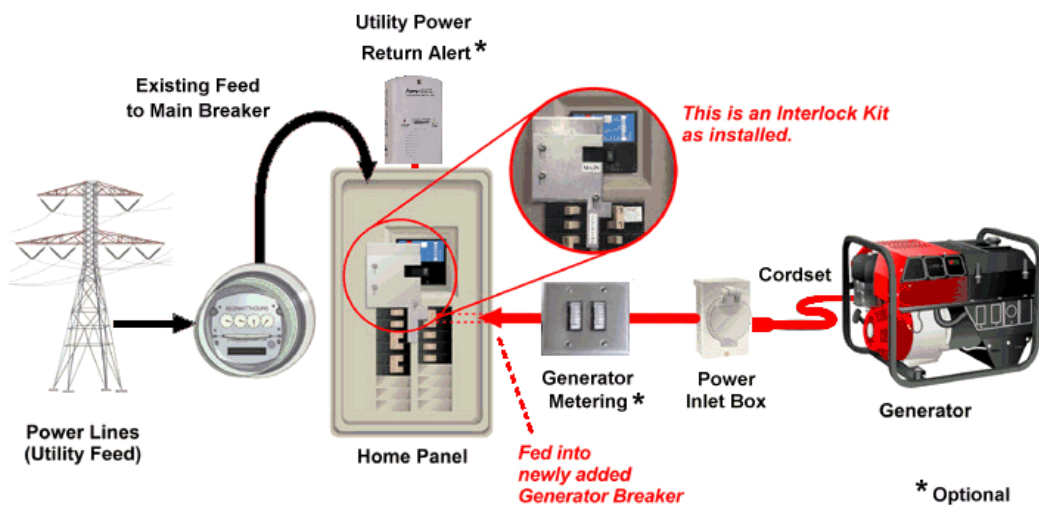


vii. My system looks like this:



b. Options

- i. Upgrade to a 10 circuit transfer panel so system powers more lights and outlets
- ii. Rather than a transfer panel with circuits, install a **manual transfer switch** that connects to the home's main panel. This way, the generator is able to power any circuit in the home (just not all at the same time). This gives more flexibility than a transfer panel, but requires awareness of what loads are turned on to avoid overloading the system and blowing breakers. Note: if I had to do this all again, I'd install this manual transfer switch instead of the 6 circuit transfer panel. Here's a schematic of how the manual transfer switch (or, "interlock kit") works:



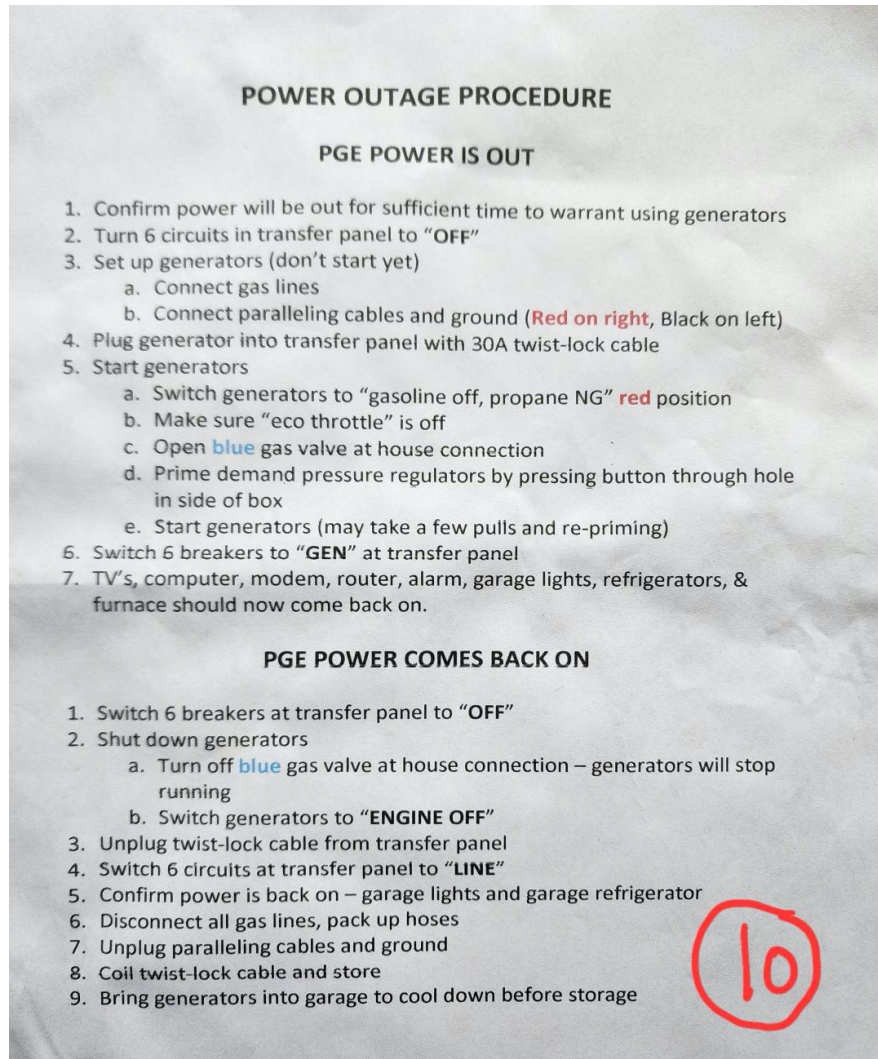
- iii. Install a 30-Amp twist lock receptacle outside house so power cord doesn't have to go through doggie-door or window, or outside door.
- iv. Install another natural gas quick connect in side yard, to move generators away from living area/bedrooms.

5. Other considerations

- a. Buy a portable battery/jump starter/USB charger/air compressor (\$200 - \$300)



- b. Propane has indefinite storage life and can be safely stored (useful if natural gas service is interrupted)
- c. The Honda EU2200i generators are “inverter” generators – that means they provide very stable and clean electrical current that’s safe for running a computer, tv, and other sensitive electronics.
- d. Running the Honda’s on propane requires changing the carburetor jets (very easy to do – takes about 2 minutes)
- e. Consider noise impact to neighbors when location generator.
- f. Cover generators to shield from rain/snow
- g. If gen powers gas furnace, make sure electric condensate pump is also powered.
- h. Create a “start up and shut down sequence check list”



- i. Feel free to call/email me if you have questions: 213-761-3865, durkeechris@yahoo.com