

## 2024-05-14 Hamlet Net - Generators

### Announcements:

- Test Session Info
  - Next VE session is Saturday, May 25th in the Clover Building at the Boulder County Fairgrounds, and starts at 9 am. It is a PVET session, so there is no fee to test. For more info, and to pre-register, see the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- We have some volunteer opportunities available where you can help out LARC:
  - Photographer / videographer - record team activities and upload to web site / YouTube
  - Newsletter Editor - put together the monthly Splatter newsletter
  - Social media manager
- There are several Board positions that will be available in October. Currently, the Treasurer and Secretary are planning to make this their last year of service. If you are interested in serving on the board of a 501(c)3 non-profit, please consider running for one of these positions. The current members would be more than happy to "show you the ropes" during the year, so you wouldn't start with zero experience.
- Our sister club up in Nederland is looking for some help with events they are running. They have a weekly Monday night net with no predetermined agenda, so you can lead it however you want. They are also planning a Field Day site at Golden Gate State Park and are welcoming anyone who wants to participate. Finally, they are looking for operators for the Ned Gravel run on July 8th. They have signup links for all these events, so head over to their web site <https://w0ned.org/> for more information!
- You can start earning your 2024 membership or future renewal by acting as NCS for at least 5 nets this year. You can run either this Tuesday night net or the Thursday night net (or both). We have scripts available for both, so all you need is a good connection into the repeater, and somewhere to keep track of names and call signs as people check in. If you're going to be on the net anyway, why not save some dough at the same time! There are four free memberships available for 2023, so don't wait to get started!
- Chuck has set a goal for the Club of running at least one activity a month. This can be a hands-on construction activity, an operating activity like Field Day, a fox hunt, or a special event station. The goal is to get people together to have fun with amateur radio! We have multiple locations at our disposal, as well as lots of Club equipment, so if you have an idea for something you think others hams would like to do, please let us know, and if you're willing to run it, even better!

- The Club is also looking for presentation topics for 2024. If you have any ideas, or better yet, would like to present, please let Chuck know and we'll get you on the schedule!
- All club activities are open to anyone - members and non-members. If you have questions, ask them on a net or **send email to [elmer@w0eno.org](mailto:elmer@w0eno.org)**

**Presenter: Bryan, AF0W**

**Topic: Generators**

- LARC recently purchased a portable generator for club use, so we've been discussing the pros and cons of various devices

**Power**

- One of the main things to consider when selecting a generator is the power output capacity you need
- Generators are rated in watts - many household appliances (including amateur radio power supplies) are rated in amps
- **Can anyone tell me how to calculate DC power given current in amps?** (multiply voltage by amps to get watts - you can use the acronym PIE -> Power = I times E)
  - a. It's a bit more complicated for AC as you must take into account something called the power factor.
  - b. AC power is calculated by taking voltage multiplied by current multiplied by the power factor
  - c. For purely resistive loads such as a heater or an incandescent light bulb, the power factor is 1, resulting in the same equation as for DC power
  - d. For capacitive and inductive loads, the power factor is less than 1, and must be determined either through measurement or from the device specifications
- Some typical values for household appliances are:
  - a. 42 inch LED TV: 58-60 W
  - b. Ceiling fan: 60-70 W
  - c. Desktop computer: 100 - 450 W
  - d. Laptop computer: 50 - 100 W
  - e. Tablet charger: 10 - 15 W

- f. Freezer: 30 - 50 W
- g. Microwave: 1600 - 1700 W
- h. Samlex SM-1235 30 amp 12 volt power supply: 465 W maximum
- To figure out how many watts you require, add up all the values for the appliances you plan to run simultaneously to get a base load value, then get a "maximum load" value by selecting the intermittent (or permanently-on) device with the largest startup power draw, and add that to your "base load"
  - a. If not specified, you can estimate the starting wattage by multiplying the running wattage by 3
  - b. Once you have this value, you can get an idea of the capacity you will need for your generator
- Generators are rated in watts - for example, the Honda EU2200i is advertised as a 2200 watt unit
- As with amateur radio power supplies, there are really two ratings - a maximum rating and a continuous rating
  - a. In the case of the Honda, the specs read 2200 W max, 1800W rated
- Another brand we're looking at is Generac. They advertise "POWERRUSH ADVANCED TECHNOLOGY - Delivers over 50% more starting capacity allowing you to do more with less"
  - a. Some devices, especially those with electric motors, will have a higher start up current than their continuous running current
  - b. They are also capacitive or inductive devices, so they will have a lower power factor, which likely accounts for some of the "additional max power"
- Both Honda and Generac provide the capability to connect two generators together to double the power output, so this is an option if you grow to need more capacity
  - a. This requires a wiring kit to plug into both devices

## Size

- Another thing to consider is the size and weight of the generator
  - a. These may be an important factor, depending on how and where you plan to use your generator

- We had a fairly large generator at Field Day this year - I think it was around 5000 or 6000 watts
- It was attached to a built-in cart with a handle and wheels, and I believe they needed a ramp and multiple individuals to load it into a pickup truck
- This would not be what you'd want if you were looking for something to use on POTA activations where you had to carry all your equipment from your vehicle to a park location, for example
- Of course, smaller generators also mean less power
- Some of the smaller generators like the Honda 2200i or Generac GP2200i appear to be about the size of a smaller cooler and have a single built-in carrying handle

### **Output Voltage**

- One thing you want to make sure of if you plan to operate any modern electronics such as computers or radios is that the voltage provided by the generator is "clean"
  - Honda advertises this as "clean power" while Generac calls theirs "True Power Technology"
- The inverter in a generator is what steps up the generated voltage to 120 volts at the generator outlets
- This so-called "clean power" will have a sine wave with consistent voltage and frequency to prevent damage to modern digital devices

### **Sound**

- Another consideration might be the sound produced by the generator
- One thing that will affect this is the engine - a 2 stroke engine will be louder than a 4 stroke engine (and it will also likely require you to mix the fuel with oil)
- If you are going to be operating in a campground, having a noisy generator will make you very unpopular quickly!
- If you plan to use your generator in an apocalyptic, Mad Max environment, then you don't want a generator that can be heard for many blocks, making you a target for thieves
- A noisy generator can also make operating difficult - I had some trouble picking out weak stations at Field Day due to the noise of the generator

- The Honda red-cased generators have a reputation for being pretty quiet - although I see Generac is advertising theirs as even quieter
  - Neither manufacturer lists sound dB ratings in their specifications, so you might want to look for Youtube videos comparing any generators you are considering
  - I did find a web page that listed the EU2200i generator at 48-57 dBA
    - dBA is an adjusted measurement of noise that takes into account the sensitivity of the human ear to the various sound frequencies which we can hear
    - 0 dBA is the threshold of human hearing (likely young human hearing!)
    - 40 dBA is a library or refrigerator running
    - 60 dBA is a normal conversation
- The generator we used at Field Day had a homemade "shelter" to try to muffle the noise, but I think it overheated when the enclosure was fully closed
- Keep in mind that many generators have multiple speeds for different power output levels
  - If your power requirements are such that you are at the upper end of your generator's capabilities, then be sure you look for sound comparisons when it is operating at top speed, and not unloaded.

## **Runtime**

- Another characteristic is the amount of runtime you can get on a single tank of fuel
- Since you should turn the generator off and let it cool before refueling, frequent refueling can interfere with your operations
- Refueling is also a labor-intensive and potentially dangerous operation, so again, limiting the number of refueling stops is good
- Of course, since generators can operate at different speeds depending on the loads placed upon them, your runtime may vary as well
  - The Generac iq3500 specs state a runtime of 14 hours at 25% load, and 9 hours at 50% load (I assume those are the two different running speeds)

## **Maintenance**

- As with any mechanical device, generators need periodic maintenance
- Be sure to follow the recommendations in your generator's manual so you don't wind up with an expensive doorstop!
- The Generac manual mentioned that all maintenance on emission-related items must be completed by licensed repair centers for the emission warranty to remain intact, so take a look at the manual before you buy to see if there are any limitations you do not want

### **Other Features**

- There are many other options or considerations you can look at, such as:
  - a. Electric start (which while nice, does require a battery and adds weight)
  - b. Fuel conversions - for example, to power your generator off of propane
    - This can be handy as propane can be stored long-term without degrading, unlike gasoline
  - c. Bluetooth operation - not sure why you'd want this
  - d. Spark arrestors or mufflers which meet standards are required in some locations
  - e. USB charging ports
  - f. Metering for things like wattmeter, runtime remaining, status, and hours on engine
  - g. CO monitors which can shut down the generator when elevated levels are detected
  - h. If you are planning to run higher amperage devices like a window air conditioner, look for a generator with a 30 amp locking outlet

### **Safety Concerns**

- There are a number of safety issues you should be aware of when operating your generator
- Be sure to operate the generator where there is plenty of ventilation - do not run it inside your house or garage, for example, as dangerous levels of carbon monoxide can result in death
- Keep the generator dry, and operate it only in dry locations to prevent electrocution hazards

- Be sure to turn the generator off and let it cool down before refueling so any spilled fuel does not ignite
- Store the fuel for your generator in an appropriate container and store it away from the generator
- Have a fire extinguisher handy
- If you cannot plug appliances directly into the generator, make sure your extension cords are rated for the amperage you will be drawing through them
- Never use a cord with plugs on both ends to connect your generator to your household wiring - this can be deadly for electric workers who are trying to restore your power, and will likely damage your generator when the power does return
  - a. In fact, such cords are referred to as "suicide cords" because of the danger they pose
  - b. Stores such as The Home Depot and Lowes sometimes have signs near the plugs advising customers not to construct such cords
  - c. There is also the danger of touching the live exposed prongs on the opposite end of a cord plugged into a generator
  - d. If you do want to energize your home's electrical wiring, you need to install a transfer switch which will disconnect your house (and generator) from the incoming utility wiring
- Do not overload your generator as this can cause it to overheat and become damaged

## Summary

- A generator can be a very useful device both during power outages as well as allowing you to operate in locations without utility power
- There is a dizzying array of possible generators - and even more devices and issues if you want a whole-house, standby generator, but hopefully this has given you some food for thought if you are considering the purchase of a generator.

## Questions:

- **The question for the week is:** Do you have a generator - if so, what kind, and what do you use it for? If not, is this something you are considering, or do you really not have a use for one?
- **In my case,** I don't own a generator, but have thought about getting one off and on. I use a CPAP machine at night, and will not be getting a good night's sleep if the power

fails! I'm not sure if I would use a generator while operating - I think I'd perhaps just get a lithium iron phosphate battery that would allow me to run for a few hours.

**More Info:**

- Generac IQ3500:  
[https://www.generac.com/specialpages/portables/product-specific/iq3500\\_camping](https://www.generac.com/specialpages/portables/product-specific/iq3500_camping)
- Honda generators: <https://powerequipment.honda.com/generators>
- Honda - How to Choose a Generator:  
<https://powerequipment.honda.com/generators/how-to-choose>
- Honda - Parallel Generator Operation:  
<https://powerequipment.honda.com/generators/generator-parallel-capability>
- Generac portable generators:  
<https://www.generac.com/all-products/generators/portable-generators>
- A Guide to Choosing the Right Backup Generator for Your Home:  
<https://www.familyhandyman.com/article/choosing-the-best-power-generator/>
- How to Choose the Right Size Generator:  
<https://www.consumerreports.org/generators/how-to-choose-the-right-size-generator-a4942266454/>

**Backup Questions:**

1. What hobbies do you have other than ham radio? Do you (or could you) use ham radio in these hobbies?
  2. Share an "a-ha" moment you had with amateur radio?
- If you have ideas for net topics or general meeting topics / presenters, please let us know! Tell us on a net, or send email to [k0itp@w0eno.org](mailto:k0itp@w0eno.org)

**Email to [elmer@w0eno.org](mailto:elmer@w0eno.org)**

1. K0ITP - Chuck - Firestone
2. AF0W - Bryan - El Paso via Echolink
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**End: 7:50pm**