Power for Heat & Light

- Scalable systems that are affordable to put into place and high enough quality to use if your planning goes out to 6, 12, or 24 months.
- Solutions that you can start using and getting benefit from BEFORE you need them.
- A simple trick that will let you turn “extra” beans and rice into usable electricity to run your gear.
When the grid goes down, you have 2 options...
   Use Less
   Make More
   “Off Grid” Power Costs a LOT of Money

Main Power Options
   Generator
   Solar/Wind
   Human Power

- Solar/wind take time and money—BIG warning in just a minute.
- Human powered generators need lots of man hours per week—
  I’ll show you one I DO like.
- Gas generators can be bought today or tomorrow and used
  immediately.
Run “Everything” vs.
Price and Weight

- Whole house 8-20kw generator costs $$$ + fuel problems.
- 3-8 kw generators aren’t easy for smaller or older people to maneuver.
- 2 kw generators weigh roughly 50 pounds, sip gas, and cost under $1,000.

What I Recommend

Red vs. Blue?

- High Quality
- Yamaha comes with more “goodies”
- Can both be run parallel for 2x output
  - Redundancy
  - Easier to carry
  - Spread out
  - You control fuel use
Add a 3rd Option...
- Relative newcomer
- Good reviews so far
- Stackable
- Significantly less expensive
- Limited/no dealer network

Another vote for Red or Blue
- Tri-Fuel Adaptors
- Gas, Propane, or Natural Gas
- Smells better
- CAN’T gum up
- Safely/legally store more and no pouring fuel onto a hot generator
- Propane-Generators.com
- GeneratorSales.com

Remember Carbon Monoxide
- 400 deaths & 20,000 hospitalizations per year
- WILL kill you before it “kills” the generator
- Use a plug-in CO detector at the generator
- AA CO detector from Amazon.com for under $20.
QUICK primer on solar

- Mono-crystalline, Poly-crystalline, Amorphous, or Thin film.
- Beware of 60 watt solar generators paired with “modified sine wave” inverters.
- We’re SLOWLY moving to solar...not cheap, easy, or fast.

How To “Turn Beans Into Electricity”

- Trade food for time pedaling your human powered generator.
- DIY and Done for you plans at PedalPowerGenerator.com

Adding Flexibility with Batteries

- Without batteries, you “use it or lose it”
- Lithium Polymer, Lithium Ion, or AGM are all great...but very expensive.
- We went with T-105 type 6V batteries by Interstate, Deka, and Alliance. They’re 200aH batteries. $100-$150 apiece
Charging the Batteries

- Must be maintained whether you use them or not.
- I charge and check water levels once a month.
- We use a 6/12 volt Schumacher AC charger (need to upgrade)
- Yamaha Inverter/Generators charge batteries directly.
- Controllers take DC from solar/wind/human power and use it to charge batteries

Inverters

- Convert 12 volt power to AC power
- Peak efficiency at 60-70% of rating
- Don’t use at less than ½ load
- Pure sine wave (good) vs. modified sine wave (not so much)
- 80-90% efficient is normal in stores. 90-98% is readily available
- Running load vs. peak load
- Multiple inverters vs. single inverter

Ways to Use Less Power

- Candles, Lanterns, and LED Lights
  - Christmas Tree Lights!
  - Headlamps & lanterns
- Refrigerator—insulation, empty space, limited access
  - Propane (RV refrigerator/freezer) $1000 & up (a trick in a minute)
  - Keep it full when the power’s on
  - Also consider using a deep freeze & cooler instead of a fridge
- Cook with the smallest possible appliance
More Power Savers

- Adjust clothing (thank you President Carter)
- Create micro-environments within your house (drain pipes)
- Solar cookers

Fresnel Lens Cooker

Satellite Dish Cooker
$300 Sun Oven from SunOven.com

Small Batteries
- We keep 50+ AA & AAA disposables on hand.
- NiMh Rechargables—Don't buy unless you see an mAh rating.
  - Sanyo Eneloop (new)
  - AmazonBasic
  - GP
- Lithium vs. Alkaline 2-3x longer with electronics
  - Lithium is lighter and has a 15 year shelf life
  - Lithium rechargeables ~$10

2 Parting Tricks
- Computer UPS systems (battery backup)
  - Especially ones with Automatic Voltage Regulation
  - When they die, open them up and replace batteries from Amazon or Radio Shack for a fraction of the cost!
- Consider a used RV
  - Water storage, generator, propane tanks, propane/120V refrigerator, A/C, deep cycle batteries, charge controller
    - For a few hundred to a few thousand dollars