Alternative Power Sources

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Power Generation

Energy Storage

Off-grid Heating

Lighting

Solar Power

- Typically generated via a solar panel
- Sizes range from 10W - 350W
- Pricing from < $0.86 - $1.13 per Watt [Panel only]
- Typically 25 year 80% guarantees
- 78” x 39” x 1.25” @ 47 lbs

Solar Power

Wind Generator

- Variety of sizes for home use
- Becoming more common for home
- From $500+ for 400W
- Often come with a charge controlle

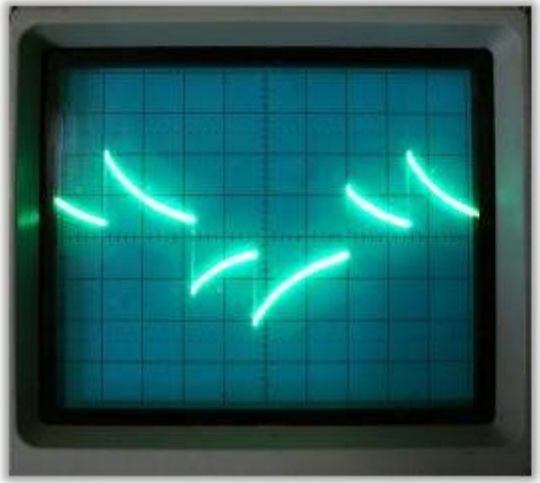
Charge Controllers

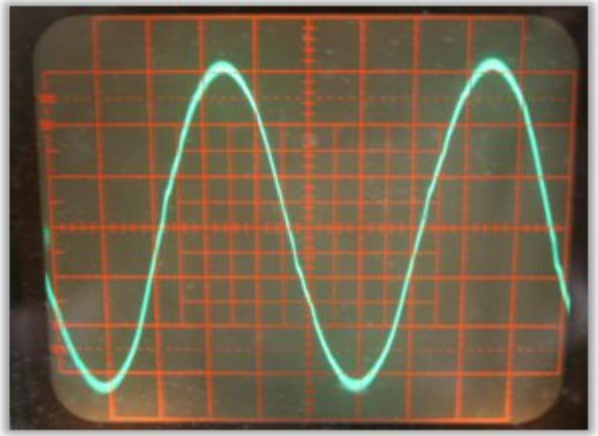
- Necessary for most panels to connect to / charge a battery
- From $20 and up
- Converts varying voltage and current from panel to a range of voltages
- Heavy Charge, Light charge, and Float are typical

Inverters

Convert battery or solar current / voltage to 110V / 60Hz

- “Pure Sine Wave”
- “Modified Sine”
- Capacity planning is important
- Range from 200W and up
- 400W for $25 — 7700W ~ $1500





Potential Problems with Modifed Sine Wave

- Laser printers, photocopiers, and anything with an electrical component called a thyristor
- Some fluorescent lights with electronic ballasts
- Some battery chargers for cordless tools
- Some furnaces and pellet heaters with microprocessor controls
- Digital clocks with radios
- Appliances having speed/microprocessor controls (like some sewing machines)
- Medical equipment such as oxygen concentrators

Batteries - Lead Acid

Batteries — Lithium-Ion

Batteries

Lead-Acid

- Deep-cycle batteries preferred
- 12V,24V,48V common
- Higher voltages necessary to efficiently use larger arrays
- Require maintenance - water level checking
- Commonly use about ½ available capacity

Lithium-Ion

- Tesla Powerwall / LG Resu
- Powerwall $5900 + Installation for 13.5kW
- Maintenance-free

Generators


HONDA
Inverter
EU2000i
HONDA


1500 STARTING WATTS
VATIOS DE ARRANQUE
1200
CHAMPION
MULTI PURPOSE


GENERAC

Generators

- Can run at night or on a calm day
- Relatively Noisy
- Require regular maintenance
- Sized from $200 / 1200W
- Oil changes, possible fuel treatment, and monthly starting recommended
- Manufacturers are often ‘optimistic’ on capacity
- Stated run times probably do not account for a heavy load

Off-grid Heating

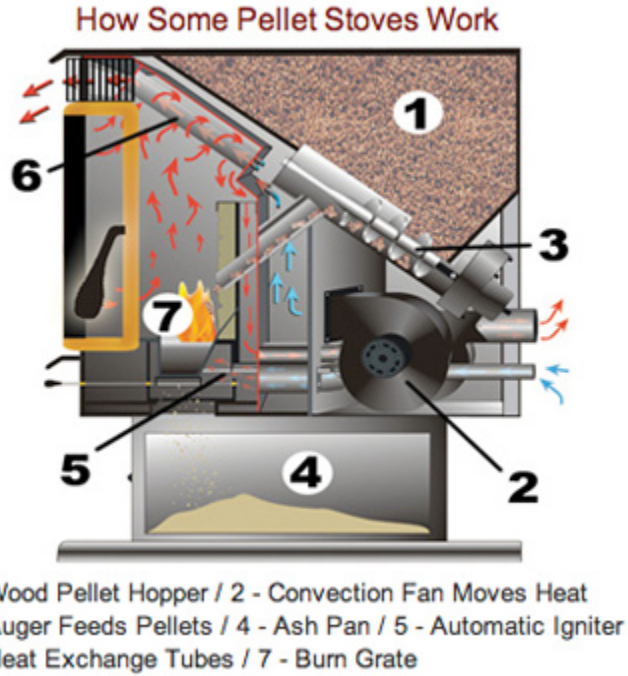
- Wood Stoves
- Pellet Stoves
- Propane
- Solar
- Electric

Offgrid Heating — Wood Stoves

- No external power requirements
- Potential fire hazard
- Potential CO hazard
- Requires continuous attention to maintain fir
- Fuel is readily found

Offgrid Heating — Pellet Stoves

- Potential Fire Hazard (minimal)
- Potential CO Hazard (minimal)
- Requires Electricity (most models)
- Can run 24/7 within minimal effort
- Pellets must be purchased and stored



Offgrid Heating — Propane

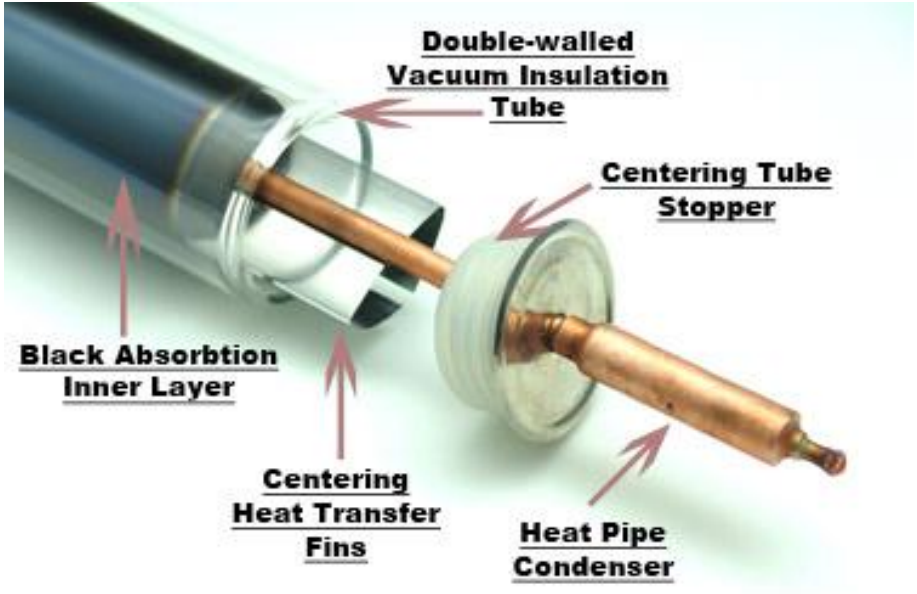
- Can run unattended
- Requires electricity (usually) to
- Potential CO Hazard
- Dependent on propane deliverie

Offgrid Heating — Solar

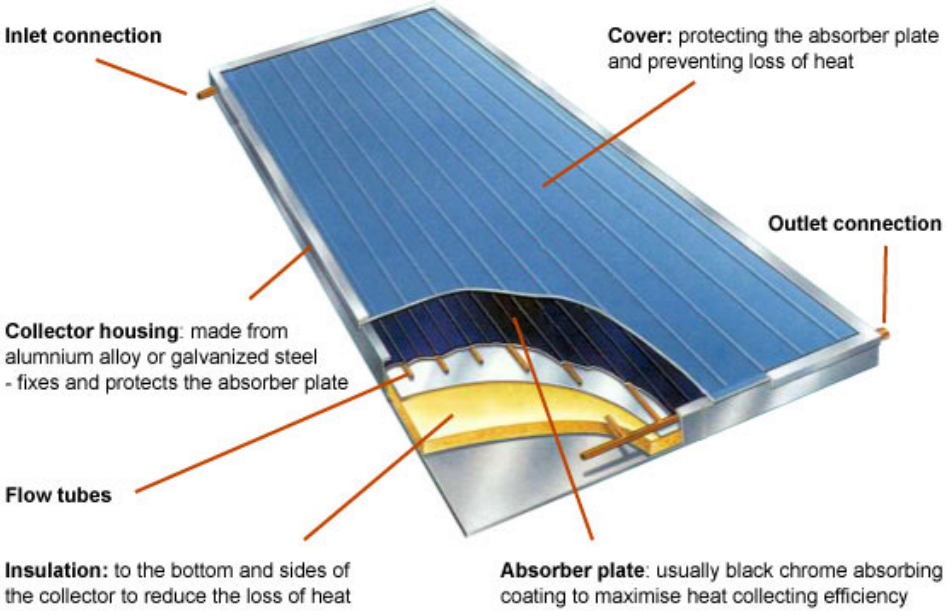
- Typically solar-hydronic heating
- Not usually a retro-fit option - best if designed in
- Some maintenance required to prevent freezing
- With declines in photovoltaic solar, may no longer be cost-effective

Offgrid Heating — Solar

Offgrid Heating — Solar



Offgrid Heating — Solar



Offgrid Heating — Electric

- Hydronic or Forced-air / Heat Pump
- Requires a sizeable off-grid electric capacity
- Very low maintenance
- Standard equipment
- Heat pump may function on less power

Offgrid Heating — Electric

Lighting

- LED lights are most efficient
- Now commonly available
- Long lifetime
- Available in 110V / 12V fixture varieties
- Look for 12V lighting to run from batteries more efficiently

Lighting - LED

Links

- http://wholesalesolar.com/ - They seem to be a good benchmark for pricing
- http://www.lightharvestsolar.com/ - A local supplier that has reasonable prices on kits and panels.
- http://amazon.com - General pricing comparisons for controllers, etc
- http://trojanbattery.com - Supplier of some of the larger batteries - their 6V series are very popular for solar installations
- http://www.backwoodssolar.com/ - Off-grid solar supplies