

Crossing the Digital Divide Volume 23

“Clean Power”

by Joseph Feigon
for the Observer

Very few of us live without power. Some of us live with ‘off-grid’ solutions. Most people living in our part of California have a PG&E circuit to their house. Those living off-grid as well as those connected to a pole outside your home face similar challenges receiving clean, safe, and consistent power.

What power is: **Electric power** is the rate at which **electrical energy** is transferred by an **electric circuit**. Power is measured in watts (standard industry definition), one watt equals one joule/second.

Power can be direct current (DC), or alternating current (AC). Do a search on Nikolai Tesla and Thomas Edison for the history of public utilities. How one measures genius is a matter of perspective. Tesla’s discoveries in power creation and distribution are fundamental to the Internet as well as contemporary utility power grids. Thomas Edison gave us General Electric. One guy mastered physics, the other mastered market manipulation. Power comes in many forms.

Since we’re discussing “power” as a source of energy (to control devices, not people), we rely upon certain standards so that we can repeatedly use those devices which require power to operate. Off-grid, 12, 24, 48 volt DC are common; PG&E residential customers receive 120 or 240 volt AC.

Electronics and many appliances use AC or DC. Most DC devices receive power from an AC outlet plugged into an AC-to-DC adapter. AC powered devices can usually be plugged directly into the wall socket. Off-grid systems use an inverter to convert DC to AC. Systems and devices require power of sufficient quality and quantity to operate as intended. Quantity (how much power is used) becomes an issue when power generation is stored and subsequently discharged (solar systems/battery array). Quality is measured by the variances between intended and actual delivered quality, e.g., 120volt, AC, 60Hz. AC quality is determined by measuring/monitoring the power source.

The most critical issues to device safety and power:

- * Quality of Power
- * Availability of Power

Measuring and monitoring power before distribution to your devices can be accomplished with a quality Universal Power Supply (UPS). These units often include a battery component. The basic \$15 UPS/Power Strip provides limited protection from surges and brownouts (power delivered above or below 120v @ 60Hz). Slightly more expensive (\$50-\$200) UPS appliances will include a battery of sufficient size to power a limited number of devices for a finite amount of time. The best equipment will constantly monitor **and** adjust power so that the devices always receive clean power, regardless of power spikes, brownouts, or frequency modulation. Higher quality equipment is capable of supporting device shutdown should available power reserves deplete.

Protect your electronic valuables; keep them unplugged when not in use. Keep the “load” on your household circuits to a minimum (don’t plug a printer and microwave into the same circuit). Keep your computers on protected power.

If you have a UPS with a battery backup unit, and it’s older than two years, the battery needs replacement. Purchasing a new UPS requires some homework: number and type of devices, how long they must remain powered-on, what their power demands are.