
Battery powered Systems.

Time is the critical parameter, in a battery-powered system. Unlike ac-powered grid systems, where supply voltage varies within a specified range and the availability of rated current is unlimited in duration, a battery can only supply power for a finite length of time before it requires recharging or replacement. In addition as the battery discharges, the greater the current drain, the greater the drop in battery voltage.

The key to designing an efficient battery-operated system, is to maximize battery life by minimizing the current drawn by the circuit, especially the continuous "quiescent current" and if necessary, to maintain the voltage supplied to the load at a constant level during discharge by using some form of regulating circuit between the battery and the load.

Before designing a battery-operated system, it is important to understand the environment, requirements, and operating conditions under which the system will be used. This will allow the designer to determine what type of battery should be used (for example, primary or secondary), and how often the batteries would need to be replaced or recharged.

Battery selection for an independent power system will be influenced by the following: system voltage, individual battery size, number of banks, performance, long period service before replacement, and all other factors already mentioned in section 2.1 above [Kevin95]. Total system voltage can be achieved in various ways, with 2-, 6-, and 12 volt batteries connected in series, parallel, or series-parallel. One must also remember that rated ampere-hour or reserve capacity of a battery is quite different from the amount of energy one can actually store or retrieve on daily basis. Deep-cycle or hybrid deep-cycle battery life can be extended if only discharged to about half of its rated capacity, or 50% charge. [Kevin95] pp 207. The charging sources for such batteries could be from renewable charging sources like PV cells, wind, water powered generators, or from engine-driven charging sources like a portable DC charger, an AC-DC battery charger, portable generator or gen-set or an alternator driven by an engine that may be in the environment where such system is integrated. Referring to section 2.1 the batteries suitable for use are lead-acid, nickel cadmium, nickel metalhydride and lithium-ion.