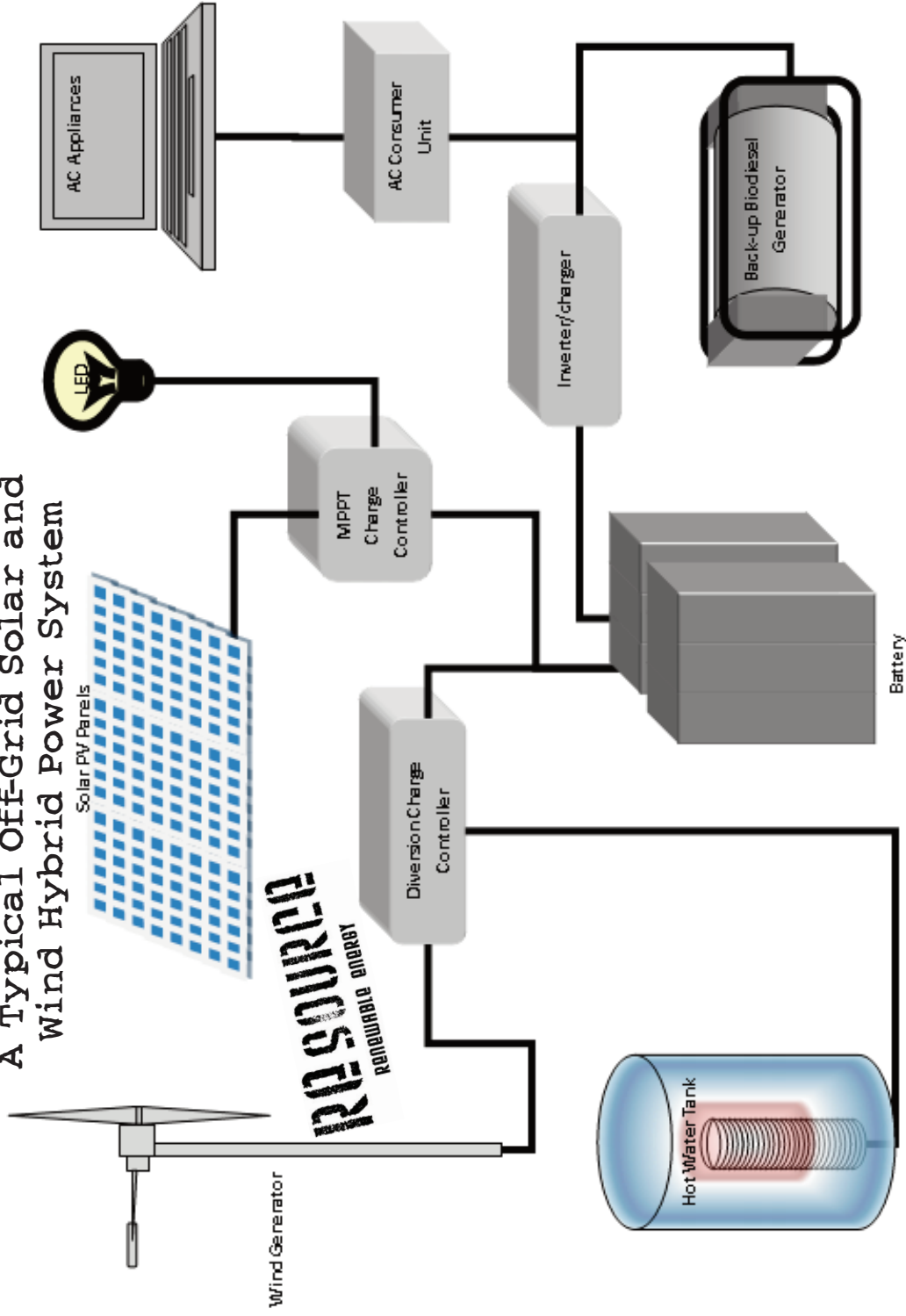


A Typical Off-Grid Solar and Wind Hybrid Power System



What do all the bits do?

Wind Turbine - Converts kinetic energy in wind to mechanical and then electrical energy in the form of wild AC (frequency dependant on rotor speed). Most smaller turbines have a rectifier which converts the wild AC to DC.

Diversion Charge Controller - Converts wild AC to DC to charge batteries. When they are full the excess power is diverted to a dump load, usually a heating element that can be used to heat space or water.

Solar Photovoltaic Panels - Converts sunlight to DC electrical energy.

Maximum Power Point Tracking Charge Controller - Takes the power in watts from the panel by tracking the voltage at which the maximum power is available; and puts the power into the batteries at parameters set at optimum values.

DC Loads - It is wise to use small DC loads such as LED lights as power is lost on the power conversion. LEDs are all DC, so using LEDs on AC means converting the power twice; a waste. However DC is no good at distance so AC should be used for long cable lengths.

Batteries - The heart of any off-grid system, they store energy in DC. As the same amount of power being generated by the wind or sun cannot be used instantly it must be stored for later use. Another way to store energy would be to pump water up a steep hill when there was extra power and release through a hydro turbine when the extra power was required; this is called pumped storage.

Inverter/Charger - Converts stored DC energy from battery to AC for household appliances and small power tools. Some can also charge the battery bank from a back up generator.

Back Up Bio-Diesel Generator - Source of renewable AC power to charge the batteries or help run high loads such as washing machines and large power tools. Can be wired to sensor on inverter/charger to start automatically for uninterrupted power.

AC Consumer Unit - The same as the consumer unit in any house on the power grid. All AC power feeds should be protected as well as large DC fuses on all connection to the batteries. If you're not sure... put a fuse in!

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