

Generating Electric Potential Energy

In most cases, first the charge is separated (+ here and – there) and secondly you allow the electrons to flow (= electricity!)

#1 – Wet Cell – Historically significant but not used today. A metal / acid mix reacts and deposits more electrons on one electrode than the other. (connected by conductor)

#2 – Dry Cell – same idea as above, but encased and has paste not liquid. Charge separate at each end of battery .

#3 – Electromagnetic generators – move a conductor in a magnetic field and you induce a force on electrons.

#4 – Piezoelectricity – pressure on quartz crystals produces small electric potential difference. The reverse is true (apply current and it vibrates predictably)

#5 – Thermoelectricity – couple 2 metals strips together at both ends. If there is a difference in heat at each end, a current can be induced.

#6 – Photoelectricity – light of great enough energy can liberate an electron. It is free to move.

Resistance – copper wire has very little resistance so electrons move along just fine.

A) Heater: When they encounter a heating coil (in a heater), there is resistance to electron flow. There are other atoms in the way and energy is transferred to them via collisions. This ‘heats up’ the element.

B) Light bulb – energy transferred to filament atoms (tungsten). At high enough temperature, energy also released as light energy.

** See phet simulation →

http://phet.colorado.edu/simulations/sims.php?sim=BatteryResistor_Circuit

This should be a link on the website – see Electromagnetism Unit.