

WHAT IS VOLTAGE?

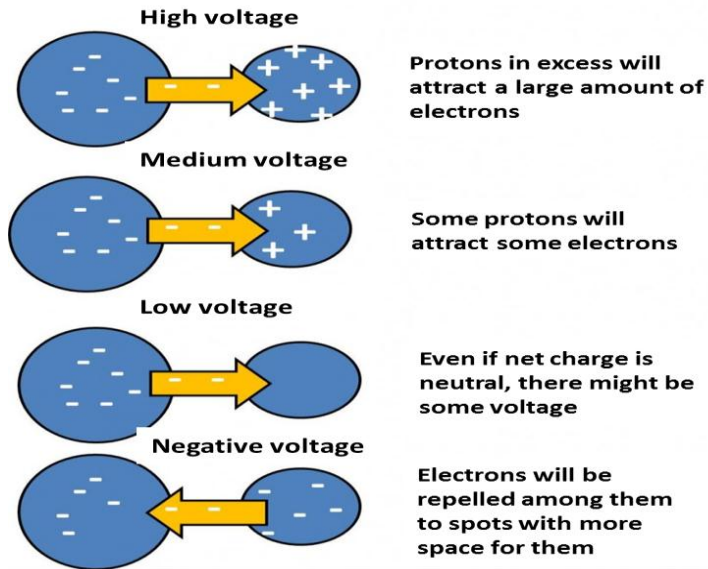


Voltage or “potential electrical difference” is a comparison of energy that a charge experiences between two locations in space.

To understand this concept more simply, consider a material with an electrical charge of more electrons than its atoms can sustain (negatively ionized) and a material devoid of electrons (positively ionized).

The voltage is the difference in the amount of energy between these two bodies, whereas if both points establish a contact and a flow of electrons occurs, transferring energy from one point to another, because electrons (negatively charged) are attracted by protons (with positive charge), and in turn, the electrons are repelled from each other by having the same charge.

Differences in net charges to explain voltage



From an atomic viewpoint, voltage measures the energy required to energize an electron and move from its original position to another atom in the given point.

From the point of view of a static electric field, is the work to be printed per unit charge to move between two points.

The voltage between both ends of a duct is calculated based on the total energy required to move a small electrical charge through that conduit divided by the magnitude of such charge.

The voltage can be caused by (1) static electric fields, (2) by electric current through a magnetic field, (3) by magnetic fields which vary within time or (4) by a combination of the three of them.

It is measured in volts or joules coulombs and is symbolized as ΔV) and can represent either the energy source or energy loss, used or stored.

The instruments for measuring voltage can be voltmeters (measuring the current through a fixed electrical resistance), potentiometers (balancing the unknown voltage against a known voltage in a bridge circuit) and the oscilloscope.



The common voltage of a car battery is 12 volts (Direct Current) and a lamp battery is 1.5 volts. The voltage required to move a locomotive is between 12 kV and 50 kV (AC)

Energy companies commonly provide electric currents voltages from 110 to 120 volts (AC) and 220 to 240 volts (AC). The electrical voltage of transmission lines used to distribute electricity from power generating stations can range from 110 kV to 1200 kV (AC).

Electric current is the accounting of the number of electrons moving in a circuit and is measured in amperes. With the amps and volts you can determine the power consumption of a device, which is measured in watts per hour.

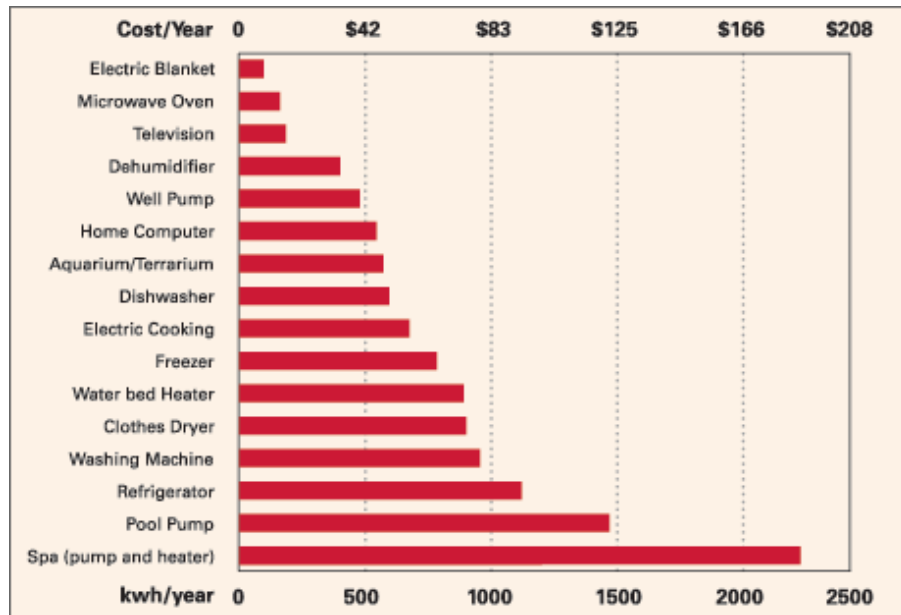
The electric meter outside your house will measure the amount of electricity flowing into your home so the power company can measure it.



If you connect for instance a heater, you can measure the amount of current flowing through the cable connector at 10 amperes, which multiplied by 120 Volts will give you a 1,200 watts consumption. If you connect a light bulb and it absorbs 0.83 amperes, $(0.83 \text{ amp} \times 120 \text{ volts})$ is a 100-watt bulb.

If you leave the heater connected for 1 hour, then you will consume energy by 1.2 kilowatt-hours of energy.

If the electric company charges \$0.10 dollars per kilowatt-hour, then the power company will charge \$0.10 dollars for every hour you leave the heater connected.



Source: <http://www.artinaid.com/2013/04/what-is-voltage/>