



Flipping Physics Lecture Notes:
Work to Move a Charge in an Electric Field in Electron Volts
<http://www.flippingphysics.com/work-charge-electron-volt.html>

If a charge is moved from point A to point B via an external force, the external force does work on the charge, that changes the electric potential energy of the charge. And, as long as there is no change in the kinetic energy of the charge, that work equals the charge of the charge multiplied by the electric potential difference the charge went through: $W = q\Delta V$

A unit of energy often used for very small amounts of energies, like one would use in atomic and nuclear physics, is the electron volt (eV). An electron volt is defined as the energy a charge-field system gains or losses when a charge of magnitude e (the elementary charge or the magnitude of the charge on an electron or proton) is moved through a potential difference of 1 V:

$$W = q\Delta V \Rightarrow W_{eV} = (1.6 \times 10^{-19} C)(1V) = 1.6 \times 10^{-19} C \cdot V \quad \& \quad C \cdot V = C \cdot \frac{J}{C} = J$$
$$\Rightarrow 1eV = 1.6 \times 10^{-19} J$$

I consider the electron volt to be a misnomer because it sounds like a unit of electric potential (volts), however, it is a unit of energy. It also refers to a positive amount of energy, even though the electron is negative. Be careful of that.