

Energy Stored in Capacitor



Charging a capacitor requires work.

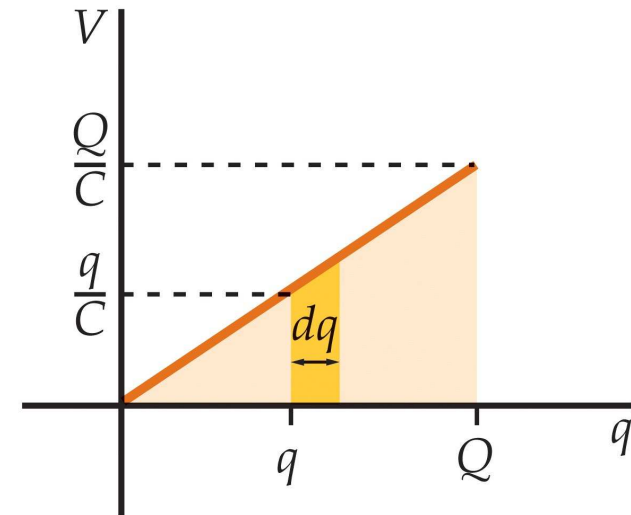
The work done is equal to the potential energy stored in the capacitor.

While charging, V increases linearly with q :

$$V(q) = \frac{q}{C}.$$

Increment of potential energy:

$$dU = V dq = \frac{q}{C} dq.$$



Potential energy of charged capacitor:

$$U = \int_0^Q V dq = \frac{1}{C} \int_0^Q q dq = \frac{Q^2}{2C} = \frac{1}{2} CV^2 = \frac{1}{2} QV.$$

Q: where is the potential energy stored?

A: in the electric field.