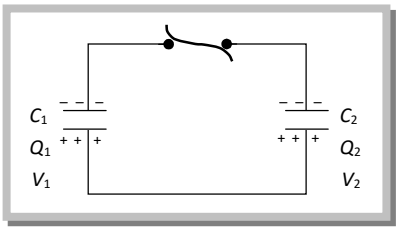
Redistribution of Charge between Two Capacitors.

When a charged capacitor is connected across an uncharged capacitor, then redistribution of charge occur to equalize the potential difference across each capacitor. Some energy is also wasted in the form of heat.



Suppose we have two charged capacitors C_1 and C_2 after disconnecting these two from their respective batteries. These two capacitors are connected to each other as shown below (positive plate of one capacitor is connected to positive plate of other while negative plate of one is connected to negative plate of other)

Charge on capacitors redistributed and new charge on them will be $Q_1^{'} = Q\left(\frac{C_1}{C_1 + C_2}\right)$,

$Q_2^{'} = Q\left(\frac{C_2}{C_1 + C_2}\right)$

The common potential $V = \frac{Q_1 + Q_2}{C_1 + C_2} = \frac{C_1 V_1 + C_2 V_2}{C_1 + C_2}$ and loss of energy

$\Delta U = \frac{C_1 C_2}{2(C_1 + C_2)}(V_1 - V_2)^2$

Note: Two capacitors of capacitances C_1 and C_2 are charged to potential of V_1 and V_2 respectively. After disconnecting from batteries they are again connected to each other with reverse polarity i.e., positive plate of a capacitor connected to negative plate of other. So common potential $V = \frac{Q_1 - Q_2}{C_1 + C_2} = \frac{C_1 V_1 - C_2 V_2}{C_1 + C_2}$.