89. (a) The energy needed is

$$U_E = u_E V = \frac{1}{2}\epsilon_0 E^2 V = \frac{1}{2}(8.85 \times 10^{-12}\,\text{F/m})(100\,\text{kV/m})^2(10\,\text{cm})^3 = 4.4 \times 10^{-5}\ \text{J} .$$

(b) The energy needed is

$$U_B = u_B V = \frac{1}{2\mu_0} B^2 V = \frac{(1.0\,\text{T})^2}{2\,(4\pi \times 10^{-7}\,\text{H/m})}(10\,\text{cm})^3 = 4.0 \times 10^2\,\text{J} .$$

(c) Obviously, since $U_B > U_E$ greater amounts of energy can be stored in the magnetic field.