48. (a) During one second, the decrease is potential energy is

$$-\Delta U = mg(-\Delta y) = \left(5.5 \times 10^6\,\text{kg}\right)\left(9.8\,\text{m/s}^2\right)(50\,\text{m}) = 2.7 \times 10^9\ \text{J}$$

where $+y$ is upward and $\Delta y = y_f - y_i$.

(b) The information relating mass to volume is not needed in the computation. By Eq. 8-36 (and the SI relation W = J/s), the result follows: $(2.7 \times 10^9\,\text{J})/(1\,\text{s}) = 2.7 \times 10^9$ W.

(c) One year is equivalent to $24 \times 365.25 = 8766$ h which we write as 8.77 kh. Thus, the energy supply rate multiplied by the cost and by the time is

$$\left(2.7 \times 10^9\,\text{W}\right)(8.77\,\text{kh})\left(\frac{1\,\text{cent}}{1\,\text{kWh}}\right) = 2.4 \times 10^{10}\,\text{cents}$$

which equals $\$2.4 \times 10^8$.