Energy Practice Problems

1) $E = 0.0035\ kWh = 3.5\ Wh$

$t = 44\ minutes = 0.73\ h$

find P

$$P = \frac{E}{t} = \frac{3.5\ Wh}{0.73\ h} = 4.79\ W$$

2) $22500\ MWh = \frac{22500000\ kWh}{2100\ kWh/month}$

10714.3 houses

Electromotive force (Emf) ($\mathcal{E}$) = Voltage

$$\mathcal{E} = NABω$$

- N → number of coils
- A → cross-sectional area of coils
- B → magnetic field strength
- $ω$ → angular frequency

4) $P = 650\ MW = 650\,000\ kW$

$I = 400\ kA$

$V = ?$

$$V = \frac{P}{I} = \frac{650\,000\ kW}{400\ kA} = 1625\ kV$$

5) $\mathcal{E} = NAB\omega$

$$B = \frac{\mathcal{E}}{NA\omega}$$

$$= \frac{1200\ V}{(80)(8\ m^2)(377\ rad/s)}$$

$= 0.0049\ T$ (?)

$\omega = 2\pi f$

$= 2\pi (60\ rev/s)$

$= 377\ rad/s$

f has to be in rev/s

$f = 3600\ \frac{rev}{min}\left(\frac{1\ min}{60\ s}\right)$

$= 60\ \frac{rev}{s}$