Energy Practice Problems

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

$P = ?$

$t = 44\ minutes = 0.733\ h$

$$P = \frac{E}{t} = \frac{3.5\ Wh}{0.733\ h} = 4.79\ W$$

2) month: 22500 MWh
22500 000 kWh

1 house = 2100 kWh/month

$$\frac{22500\,000}{2100} = 10713.3$$

2014: 98.8 TWh / 12 months

8.23 TWh/month

$$\frac{8230000000 \text{ kWh/month}}{2100 \text{ kWh/month}} = 3.92 \text{ million}$$

Electromotive force = Emf = $\mathcal{E}$

$$\mathcal{E} = NABw$$

- w → angular frequency
- B → magnetic field strength
- A → cross-sectional area of coils
- N → Number of coils

5) $A = 8\,m^2$

$N = 80$ coils

$\mathcal{E} = 1200\,V$

$B = ?$

$w = 376\,rad/s$

$f = (3600\,\frac{rev}{m})(\frac{1\,min}{60\,s})$

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

$w = 2\pi f$

$= 2\pi(60\,\frac{rev}{s})$

$= 376\,rad/s$

$$\mathcal{E} = NABw$$

$$B = \frac{\mathcal{E}}{NAw}$$

$$= \frac{1200\,V}{(80)(8.0\,m^2)(376\,rad/s)}$$

$$= 0.0049\,T\ (?)$$