

ENERGY PRACTICE PROBLEMS

- Equations:

$$P = \frac{E}{t}$$

$$E = Pt$$

$P \rightarrow$ Power [kW]

$E \rightarrow$ Energy [kWh]

$t \rightarrow$ time [h]

- $(Emf) = NAB\omega$

$Emf \rightarrow$ electromotive force [V]

$B \rightarrow$ magnetic field [T]

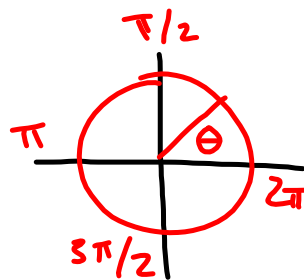
$N \rightarrow$ number of coils

$\omega \rightarrow$ angular velocity [rad/s]

$A \rightarrow$ cross-sectional area of coil [m²]

- $\omega = 2\pi f$

$f \rightarrow$ frequency (Hz = 1/s)



$$\begin{aligned} 1) \quad P &= \frac{E}{t} \\ &= \frac{0.0035 \text{ kWh}}{0.73 \text{ h}} && (44 \text{ min}) \left(\frac{1 \text{ h}}{60 \text{ min}} \right) \\ & && = 0.73 \text{ h} \\ &= 0.0048 \text{ kW} \\ &= 4.8 \text{ W} \end{aligned}$$

$$2) \quad 22,500 \text{ MW} = 22,500,000 \text{ kW}$$

$$\# \text{ houses} \quad (22,500,000 \cancel{\text{ kW}}) \left(\frac{1 \text{ house}}{2100 \cancel{\text{ kWh}} / \cancel{\text{ month}}} \right) \left(\frac{720 \cancel{\text{ h}}}{1 \cancel{\text{ month}}} \right)$$

$$\# \text{ houses} = 7.71 \text{ E } 6$$

Calculations for Poster:

$$E = P t$$

$$= [\text{your power plant kW}] \left(\frac{720 \text{ h}}{1 \text{ month}} \right)$$

$$= \text{~~~~~} \text{ kWh/month}$$

$$\# \text{ houses} = \left(\text{~~~~~} \frac{\text{kWh}}{\text{month}} \right) \left(\frac{1 \text{ house}}{\text{~~~~~} \frac{\text{kWh}}{\text{month}}} \right)$$

↳ 3 calculations:

- Summer maximum: 2500 kWh/month
- Yearly average: 1250 kWh/month
- choose a number from a group member's power bill