POWER

$$Power = \frac{Work}{time}, \qquad \mathrm{P} = \frac{\Delta \mathrm{W}}{\Delta t}$$

- **W** may be mechanical work, or work done by a battery driving an electric current.

- In this definition, ***Work*** can also be replaced with ***Heat***. That will be thermal power rather than mechanical or electric one.

- Units of power are Watts [W]: 1W=1J/s (Joule per second)

POWER IN ELECTRIC CIRCUIT

$$Power = Current \times Voltage, \qquad \mathrm{P} = I \cdot V$$

Homework 23

1 liter of gasoline in US costs 1 $. When the gasoline is completely burned, it produces 30 MJ/l (Mega Joules per liter). 1 kWh (kilowatt * hour) of electricity costs 0.10$.

Based on this information, what is more cost effective – the conventional car or an electric one. Efficiency of a conventional car is roughly 25% (i.e. only 25% of heat released by a fuel converts to work). Efficiency of an electric car (taking into account the losses due to charging/discharging of a battery) is about 70%.

How much would one save (in relative terms, i.e. %) by switching from gas to electric vehicle? Neglect difference ion a price of the car and maintenance.