

task_f64r8g2jf4pdomfi_with_calculation

Student Group

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conversions, energy, power, area, chapter1 1

Exercise E16 Conversion: Energy, Power and Area

2. The number of solar panels and their size depends on the consumption of electricity. A car with an average 100~{\rm kWh} per day and an usable battery capacity of 60~{\rm kWh}. Solar panels produces per 1~{\rm m}^2 in average in December 0.2~{\rm kWh} over 1~{\rm m}^2. The car is driven 50~{\rm km} per day. The size of a distinct solar module with 460~{\rm W_p} (Watt peak) is 1.9~{\rm m} \times 1.1~{\rm m}.

Result:
$$N = 482.00 \text{ panels} \quad P_{\text{total}} = 220.92 \text{ kW}$$

.. What is the average power consumption of the car per day?

$$P_{\text{car}} = 20 \text{ panels} \times 460 \text{ W/panel} = 9.2 \text{ kW}$$

$$P_{\text{car}} = \frac{16 \text{ kWh}}{2 \text{ h}} = 8 \text{ kW}$$

$$N = \frac{P_{\text{car}}}{P_{\text{panel}}} = \frac{8 \text{ kW}}{0.16 \text{ kW/panel}} = 50 \text{ panels}$$

$$P_{\text{total}} = 50 \text{ panels} \times 460 \text{ W/panel} = 23 \text{ kW}$$

$$\begin{aligned} \frac{W}{l} &= \frac{16 \text{ kWh}}{100 \text{ km}} = 0.16 \\ \frac{W}{l} &= 50 \text{ km} \cdot 0.16 \frac{\text{kWh}}{\text{km}} = 8 \text{ kWh} \end{aligned}$$

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