

task_f64r8g2jf4pdomfi_with_calculation

Student Group

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Exercise E15 Conversion: Energy, Power and Area

2. The number of panels and the length of the roof of a car (100 km) average 100 kWh and an usable battery capacity of 60 kWh. Solar panels produces per \$1 m^2\$ in average in December 0.2 kWh/m^2\$. The car is driven 50 km per day. The size of a distinct solar module with 460 Wp (Watt peak) is 1.9 m times 1.1 m.

Result:
$$N = \frac{460 \text{ (Wp)}}{1.9 \text{ (m)} \times 1.1 \text{ (m)}} = 20 \text{ (panels)}$$
 .. What is the average power consumption of the car per day?

$$P_{\text{car}} = \frac{60 \text{ (kWh)}}{20 \text{ (km)}} = 3 \text{ (kWh/km)}$$

$$P_{\text{car}} = 3 \text{ (kWh/km)} \times 50 \text{ (km)} = 150 \text{ (kWh)}$$
 Solution:
$$N = \frac{150 \text{ (kWh)}}{0.2 \text{ (kWh/m}^2\text{)}} = 750 \text{ (m}^2\text{)}$$

$$N = \frac{750 \text{ (m}^2\text{)}}{1.9 \text{ (m)} \times 1.1 \text{ (m)}} = 357 \text{ (panels)}$$

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

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