

task_f64r8g2jf4pdomfi_with_calculation

Student Group

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Exercise E1 Conversion: Energy, Power and Area

2. The number of panels and the length of the solar panels for a (defect) car (with a peak power of 100 W) over 100 km per day? and an usable battery capacity of 60 kWh. Solar panels produces per 1 m² in average in December 0.2 kWh/m². The car is driven 50 km per day. The size of a distinct Solar module with 460 Wp (W_{peak}) is 1.9 m × 1.1 m.

Result

Solution

$$W = 100 \text{ W} \quad \text{and} \quad W_{\text{peak}} = 460 \text{ W}$$

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

$$A = \frac{W \cdot t}{A_{\text{panel}}} = \frac{100 \text{ W} \cdot 100 \text{ km}}{1.9 \text{ m} \cdot 1.1 \text{ m}} = 479.45 \text{ kWh/panel} \\ \text{solution} \quad \frac{479.45 \text{ kWh/panel}}{2.1 \text{ m}^2/\text{panel}} \approx 228.31 \text{ kWh/m}^2 \rightarrow 20 \text{ panels}$$

$$\frac{W}{l} = \frac{16 \text{ kWh}}{100 \text{ km}} = 0.16 \text{ kWh/km} \\ W = 50 \text{ km} \cdot 0.16 \text{ kWh/km} = 8 \text{ kWh}$$

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