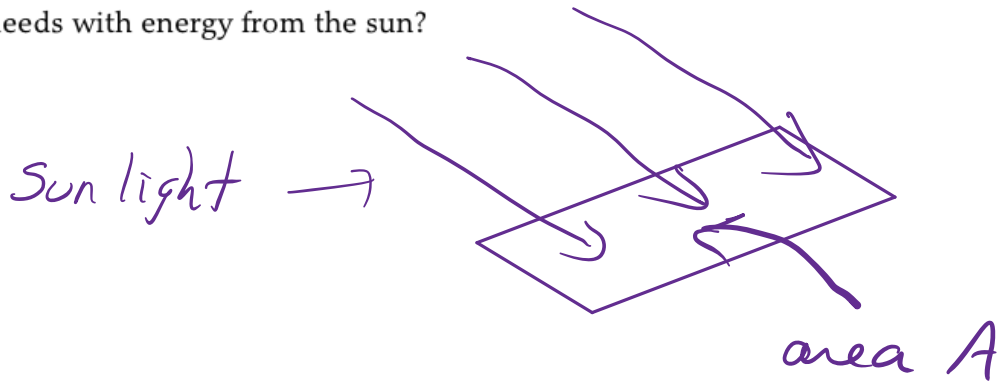


36. ||| Solar cells convert the energy of incoming light to electric energy; a good quality cell operates at an efficiency of 15%. Each person in the United States uses energy (for lighting, heating, transportation, etc.) at an average rate of 11 kW. Although sunlight varies with season and time of day, solar energy falls on the United States at an average intensity of  $200 \text{ W/m}^2$ . Assuming you live in an average location, what total solar-cell area would you need to provide all of your energy needs with energy from the sun?

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$$I = 200 \text{ W/m}^2 = \text{average incoming intensity}$$

generated power. want  $P = 11 \text{ kW}$ .

$$P = e I A$$

where  $A = \text{area}$  and  $e = 15\%$ .

$$A = \frac{P}{e I} = \frac{11,000 \text{ W}}{(0.15)(200 \text{ W/m}^2)}$$

$$A = 367 \text{ m}^2$$