Use of $I = P/A$ Maximum energy received in one hour = $3.6 \times 10^{19} \mathrm{J}$ (1)	Question Number	Answer		Mark
$P = I \times A = (1100 \text{ Wm}^{-2}) \times (9.2 \times 10^{12} \text{ m}^2) = 1.0 \times 10^{16} \text{ W}$ $E = P \times t = (1.0 \times 10^{16} \text{ W}) \times (60 \times 60) = 3.6 \times 10^{19} \text{ J}$ (2) 12aii Calculates total energy usage in 2014 Or Calculates total energy received by solar panels in 1 year (1) Comparison of energies (hours with hours or years with years) to come to a correct conclusion. Allow e.c.f. from values in (a)(i) Possible comparisons: Total energy worldwide in 2014 Total energy received by solar panels 23800 TWh (in a year) 87,600,000 TWh (if using 24 hours) 23800 TWh (in a year) 43,800,000 TWh (if using 12 hours) 8.6 \times 10^{19} \text{ J} (in a year) 1.6 \times 10^{23} \text{ J} (if using 12 hrs) 9,8 \times 10^{13} \text{ J} (in an hour) 3.6 \times 10^{19} \text{ J} (in an hour) Example of calculation Total E worldwide in 1 year = 23,800 \times (3.6 \times 10^{15} \text{ J}) = 8.6 \times 10^{19} \text{ J} 8.6 \times 10^{19} \text{ J} / 3.6 \times 10^{19} \text{ J} = 2.4 (hours), so worldwide electrical energy consumption for 2014 would be produced in less than 3 hours 12b MAX 2 from: Sand(storms) reduce amount/intensity/energy/power of light (1) Sand(storms) absorbs/blocks/reflects some light (1) Sand(storms) reduces area of panel/desert (1) (2)	12ai			
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		Sand(storms) reduces area of panel/desert	(1)	(2)
Total for question 12		Total for question 12		