

# 12 | Energy Production | Review

Name \_\_\_\_\_ Period \_\_\_\_\_

1. Rank the global sources of energy in order

1		31%
2		29%
3		21%
4		10%
5		5%
6		2%



2. How much coal must be supplied per hour to run a 500 MW power plant at 30% efficiency? (Specific Energy of coal is  $32 \text{ MJ kg}^{-1}$ )

3. Given a turbine having a blade length of 12 m, and a wind speed of  $15 \text{ ms}^{-1}$  find the power output if the density of air is  $\rho = 1.2 \text{ kg m}^{-3}$ .

4. At one particular location, the average power received from the Sun during a six-hour period each day is  $840 \text{ W m}^{-2}$ . The solar heater has an overall efficiency of 35%. It is required that, during the six-hour period, the solar heater raises the temperature of 140 kg of water by 25 K. The specific heat capacity of water is  $4.2 \text{ kJ kg}^{-1} \text{ K}^{-1}$ . Calculate the minimum effective area of the solar heater

5. The intensity of the Sun's radiation arriving at the Earth is approximately  $1400 \text{ W m}^{-2}$ . If the peak demand for entire US is about 800 GW ( $1 \text{ GW} = 10^9 \text{ W}$ ), what is the land area required if we could capture this energy at 100% efficiency?

6. A star has a radius of  $8.3 \times 10^7$  m and a surface temperature of  $7500^\circ\text{C}$ . Calculate the power it emits.
7. At what wavelength is the emitted radiation of the Sun maximized if it has a surface temperature of 5780 K?

8. Which process is more efficient?



9. Define Albedo and Emissivity
10. What are the 3 greenhouse gases with the largest effect on the earth's energy balance?
11. How do greenhouse gases affect the energy balance of earth?
12. What are the primary causes for the sea level rise?