

Homework # 4; due Wednesday, March 14

Reading: Chapter 5 of Boecker and Grondelle's *Environmental Physics*

11. Normally, solar panels are installed on roofs of buildings oriented in a particular direction that can be defined by the angle of the normal to the panel to vertical, and the angle between the projection of the normal on a horizontal plane and the direction towards North (this is called *heading*).
 - a. How would you orient the solar panel in Berkeley, CA?
 - b. A fancy system would rotate the panel in the course of the day, so that its surface remains normal to the direction towards the Sun. Roughly estimate the gain in collected solar power that such a system would represent compared to a stationary panel in part (a).

12. Suppose that solar panels become very inexpensive, and we cover all the deserts with high-quality solar panels optimized to absorb all incoming light and convert 30% of its energy into electricity.
 - a. How much electricity will we be producing on average? How does this number compare to our global energy demand?
 - b. Estimate the effect of this on global temperature. Assumed that this does NOT affect the greenhouse-gas concentrations, and neglect the feedbacks (which, as we know, are very hard to account for).