Physics and Mathematics of Sustainable Energy
Homework Six
Due June 3, 2011

1. Suppose it is -10 C outside and your thermostat is set at 15 C. By what fraction would your heating bill decrease for that day if you set your thermostat to 13 C instead?

2. Suppose you live in a house that is a cube. The side of the cube is 10 meters. Assume the air in the house changes once every hour, and that the overall R value for the house is 10. Suppose it is 0 C outside and you would like the inside of your house to be 20 C. Estimate the amount of energy needed for heat on this day. Express your answer in kWh and BTUs.

3. Take a look at the US energy flowchart at `http://tinyurl.com/3gzgte2`. Convert the following quantities into kWh per person per day:

   (a) Total energy use

   (b) Total solar energy

   (c) Total electricity generation

   (d) Total solar electricity