Homework 2

due Thursday, September 20, 2018

Quiz Date: Tuesday, September 25, 2018 during class

The quiz has one or more problems based on the assigned problems below

Reading:
Text: From Masters’ 2nd edition
   • chapter 7 (sections 7.1, 7.2, 7.4 and 7.5.1)

Solve the following problems:
Text: 7.1, 7.2, 7.3, 7.5

Problem 2: On the following page, you are given a diagram that represents the total energy flows for the United States in 2014. Study the diagram and answer the following questions:

1. How much energy (in quads) from natural gas was consumed in 2014 from the residential, commercial, industrial and transportation sector and how much for electricity generation?
2. How much energy (in quads) from coal and petroleum was consumed in 2014 for the residential, commercial, industrial and transportation sectors and how much for electricity generation?
3. Determine the inputs (in quads) and the outputs (in quads) of the electricity generation and comment on the efficiency of electricity production
4. How much energy (in quads) was used to provide energy services and how much was rejected? Comment on the overall efficiency of the energy usage in the US in 2014
Estimated U.S. Energy Use in 2014: ~98.3 Quads

Source: LLNL. 2015. Data is based on DOE/EIA-0035(2015-01), March, 2014. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant “heat rate.” The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated at 65% for the residential and commercial sectors 80% for the industrial sector, and 21% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410027