FSC 401
Exam 2
(due midnight 11/20, in Angel drop box)

Be sure to work individually and take maximum advantage of information already available on the class web site or with the help of google.com, www.eia.gov, etc.). Document all your work: attach computer files, state clearly and justify your assumptions, and provide references (e.g., complete URLs) where needed. Read the problem statements carefully and be sure to address explicitly EACH ONE of the questions in them.

1. Environmental effects of fossil fuel technologies (35%)

The world will gather in Paris in a few weeks to see whether binding targets can be determined for greenhouse gas emission reductions by both industrialized and less developed nations. (a) To evaluate the prospects, first analyze how successful at least two important countries were in meeting their Kyoto Protocol commitments. (b) Then construct a graph, or graphs, that clearly show(s) (i) the statistics of world's greenhouse gas emissions over the last few decades, (ii) the levels that would have been reached if the average 7% reduction (verify!) had been achieved in 2012 with respect to the 1990 emissions, and (iii) the projections based on the average commitments that are expected to emerge from the Paris summit (more or less ambitious than the Kyoto Protocol?). (c) Finally, propose one or two concrete measures (e.g., increase in efficiency of world's power plants, more aggressive switch to renewable fuel technologies) that would be necessary to meet the quantitative commitments anticipated in b(iii) above.

2. Nuclear fuel technology issues (30%)

Prepare a suitable graph that compares the past trends and current production of electricity in the world and the United States from nuclear, hydro and non-hydro renewable resources. Briefly discuss the implications of these trends for (i) global climate change, (ii) nuclear proliferation, and (iii) storage of nuclear waste.

3. Renewable fuel technology issues (35%)

Wind-based electricity appears to be poised for significant worldwide contribution in the coming decades. To gain confidence in such predictions, it is important to clearly document its past trends and present situation. Therefore, do the following: (i) Prepare pie charts for the USA and the world that compare an early year (e.g., 1990) to the most recent production statistics. (ii) Compare the growth rates in the USA, the world and one additional 'emblematic' country. (iii) Comment on the contents, especially the quantitative ones, of at least one recent media report that addresses the issues analyzed in (i) and (ii).

LRR3@psu.edu (11/16/2015, 19:50)