**TIM 155: Problem Set 1**

Spring 2017

Due Thursday, April 13, beginning of class.

1. Take a look at “Indicator 4” table on pdf p. 202 (document p. 177) of the *World Water Development Report (Water and Energy), 2014* (vol. 2). *Per capita* means “per person.”

1.a Notice that the units of Indicator 4 have been left off. It’s a safe bet they are SI units (that is, metric) because this is a UN-sponsored agency. Determine what you think the correct units are. Do so by examining other tables (e.g., Indicator 6) and doing some math to compare data between the tables. Note: you get points for showing HOW you got your answer, not just for the answer itself. (1 point)

1.b Now notice that for every region except Europe, total actual renewable water resources per capita are currently going down and projected to drop further. What is the reason for these projected trends? Provide some data that demonstrate this trend for one of the regions. (1 point)

2.a Read the article “As appetite for electricity soars the world keeps turning to coal,” by Todd Lindeman, Ted Mellnik and Will Englund, found at <https://www.washingtonpost.com/apps/g/page/world/as-appetite-for-electricity-soars-the-world-keeps-turning-to-coal/1842/> . Then read the article by David Roberts, “The global coal boom finally seems to be winding down,” found at <http://www.vox.com/energy-and-environment/2017/3/21/14988436/global-coal-boom-decline>. How consistent and/or inconsistent with each other are these articles? Use data provided in the articles themselves or from the data sources cited in the articles to explain the trends and what they mean. Based on your analysis, would you change the title of either article? Explain. (2 points)

3. Look on pdf p. 4 (document p. 7) of the USEIA *Annual Energy Outlook 2017*, at the total energy consumption figure. Also look at pdf p. 6 (doc p. 11) for total energy production. On the right you will see in black the “Reference” case, surrounded by six other cases. Each case has its own projection of total energy consumption/production, matched by color. Let’s assume that the publisher of this volume feels there are too many cases and that only three can be retained and presented in the document. Which of the three would you retain and why? Be sure to explain what each of the three retained cases are and why they should be presented instead of the others. If you wish to consult and reference other figures in the volume, that is fine. (1 point)

4.a Look at pdf p. 22 (doc. P 16) of “Estimated use of water in the United States in 2010,” published by the US Geological Survey (USGS). The state-by-state data at the bottom of Figure 2 is presented by the state’s location, west-to-east. Suggest two other ways to order the state-level data that you think are better. For each explain how the alternative ordering would visually reveal patterns and therefore more insights about the data. (1 point)

4.b Now turn to pdf p. 52 (doc p. 46). Figure 13 shows water withdrawals by source (groundwater and surface water) and population growth. Figure 14 shows water withdrawals by use categories (irrigation, etc.). Population growth has been steady over the decades shown. Describe the trend in water withdrawals over the same period. What are the two main drivers of reductions in water withdrawals between 2005 and 2010? In other words, which two uses shown in Figure 14 have changed the most over that 5-year period? (1 point).

4.c The text explains (a few pages earlier) what has happened in those sectors during the 2005-2010 time period to cause the major reductions in water use. Summarize in your own words what these changes were. Given these drivers, do you believe the same trends continued during the period 2010-2015? Explain why and possibly provide data (from a different source) to support your reasoning. (1 point)