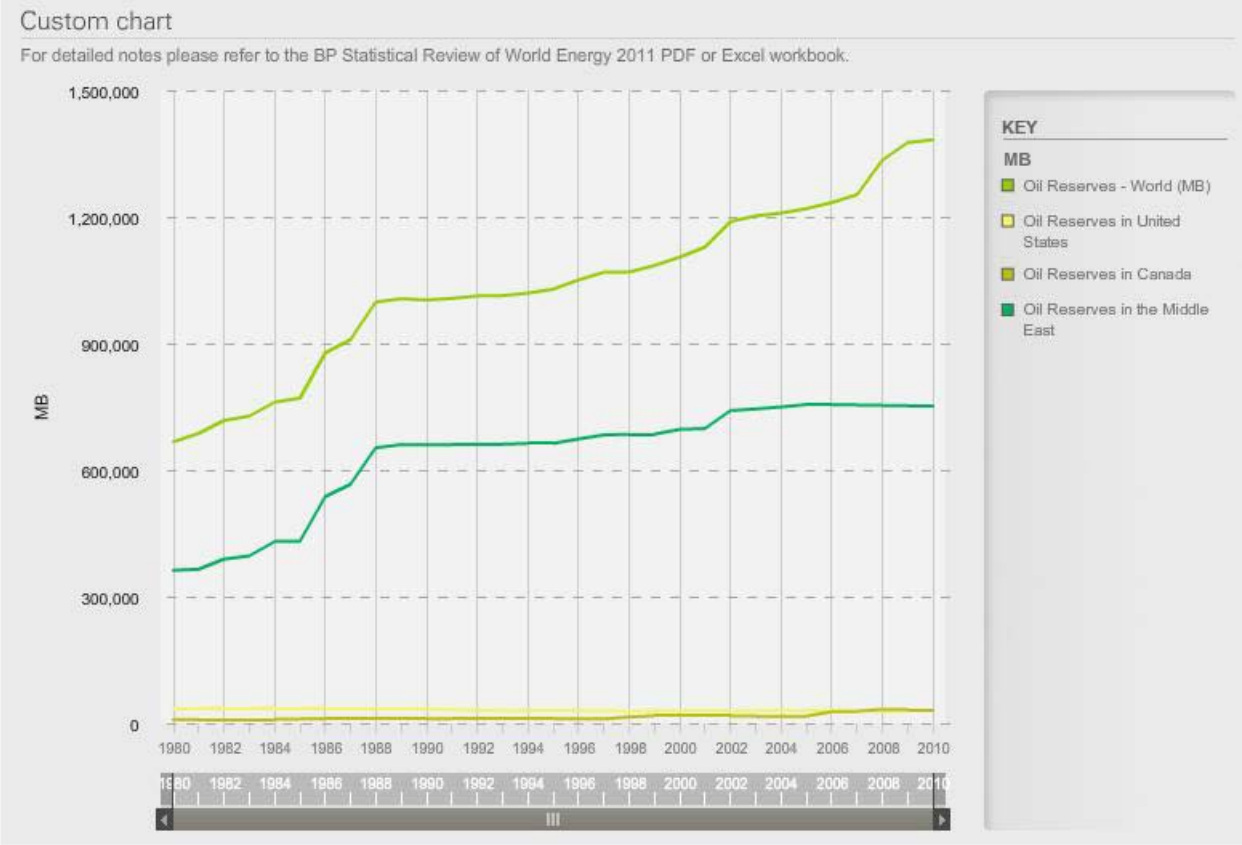
1. The *BP Statistical Review of Energy* website provides an enormous amount of valuable data on global energy reserves and consumption. To inspect data available for the current year, open the "Energy Charting Tool" open the tab for "oil" and answer these questions: (This tool may take some time to load; Under "Select View", you can toggle between the "Map" and "Table" view and under "Chart type" choose "Line" for an easier view of data. The "Select Data" tab allows you to load one or more different data sets onto the same chart.)

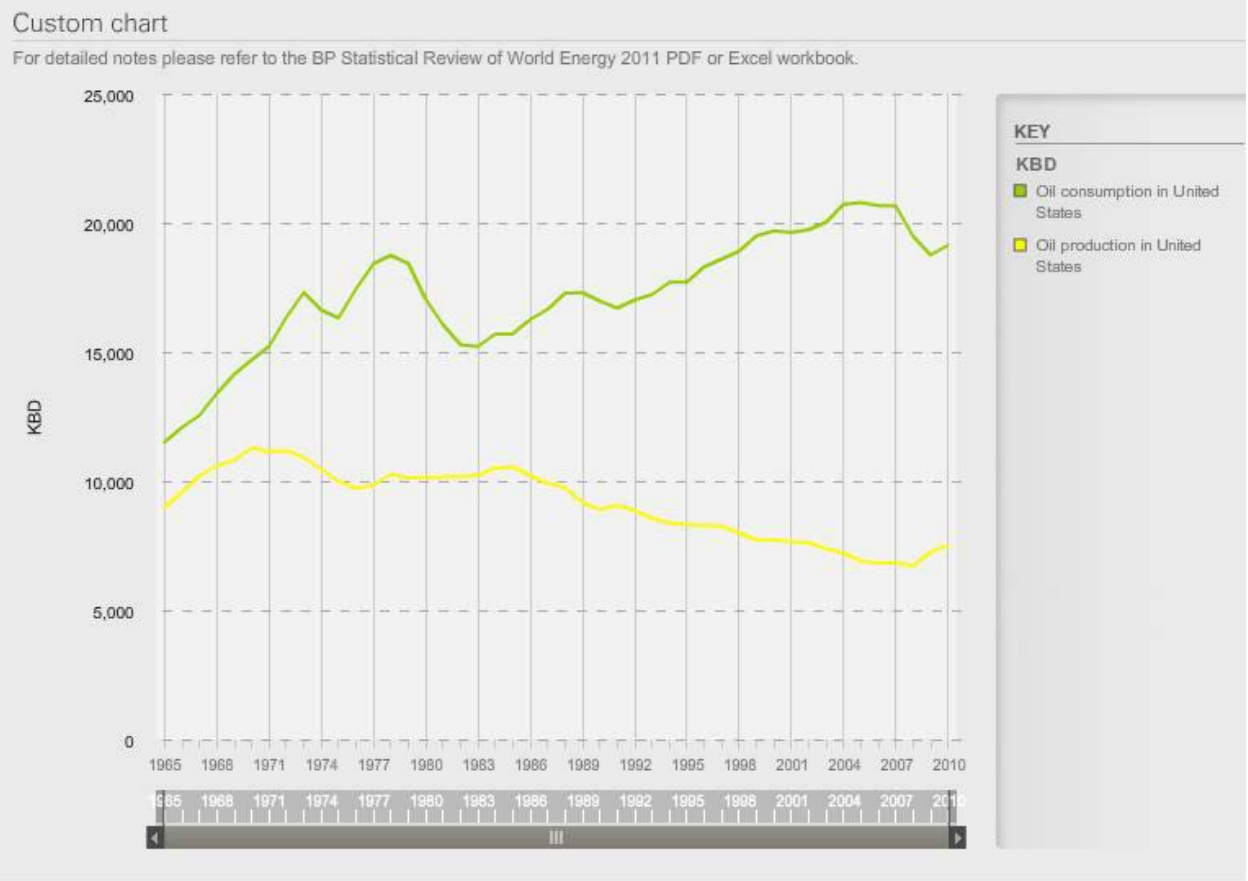
   a. As of 2010, how many billion barrels of oil are included in the "total world proved reserves"?
   1,383,000 (1.38 trillion barrels)
   b. What percentage of the 2010 global "proved oil reserves" belong to the Middle East region?
   752 million barrels of 1.38 trillion barrels globally = 754/1383 = 54%
   c. What has happened to the United States proved oil reserves between 1980 and 2010?
   decreased from ~36.5 billion barrels to ~30.9 billion barrels
   d. What has happened to Canada's proved oil reserves between 1980 and 2010?
   increased from ~8.7 billion barrels to ~32 billion barrels
   e. In what year did USA oil production peak and with what rate (KBD = thousand billion barrels / day)? In what year was oil production at its lowest and with what rate? What is the rate for the current year?
   11.3 million barrels/day in 1970; 6.7 million barrels/day in 2008; 7.5 million barrels/day in 2010
   f. How much has Canadian oil production increased since 1980?
   It has nearly doubled, from 1.76 million barrels/day in 1980 to 3.34 million barrels/day in 2010
   g. At the peak year for USA oil production, how many barrel/day were consumed by the U.S. and what percent of this amount was met by domestic production? In 2010, how many barrel/day were consumed by the U.S. and what percent of this amount was met by domestic production?
   In 1970, the U.S. consumed 14.7 million barrels/day and produced 11.3 million barrels/day, so 11.3/14.7 = 77% of this was produced domestically (23% imports). In 2010, the U.S. consumed 19.1 million barrels/day (*down from 2007!*) and produced 7.5 million barrels/day, so 7.5/19.1 = 39% of this was produced domestically (61% imports).
   h. In what year did China's oil consumption exceed its production? Has oil production peaked in China? What percentage of China's current oil consumption do they import?
   In 1993; their oil consumption matched oil production (~2.8 million barrels/day) Oil production is currently at ~4 million barrels/day and still increasing slightly. With a 2010 consumption rate of 9.1 million barrels/day and production rate of 4 million barrels/day, China produces 4/9.1 = 44% of its oil domestically and so must import 66% of its oil.
   i. According to the BP data, what is the relationship between the rate of global oil production and consumption?
   The rates are almost equal. Interestingly, consumption exceeds production!

   See belowfor plots of these data

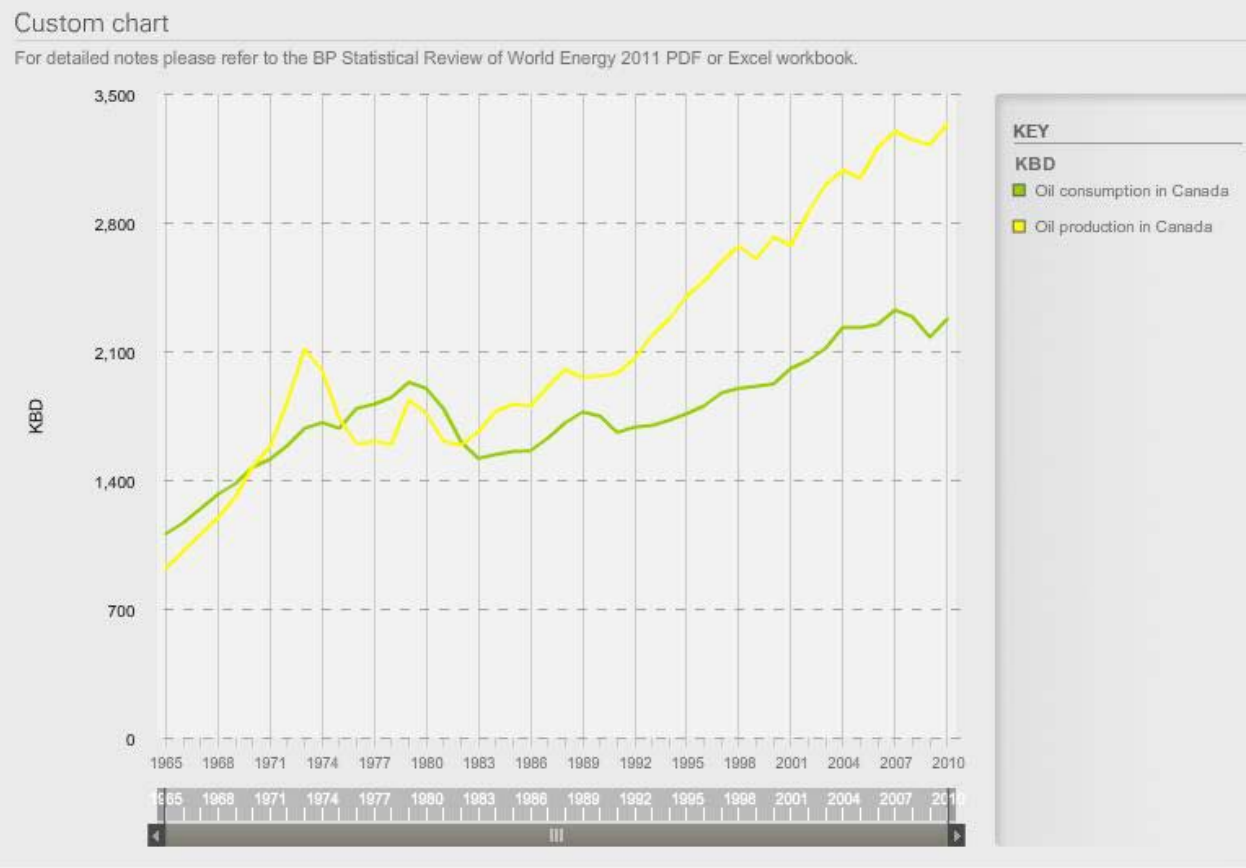
World, Middle East, U.S. and Canada oil proved reserves 1980-2010



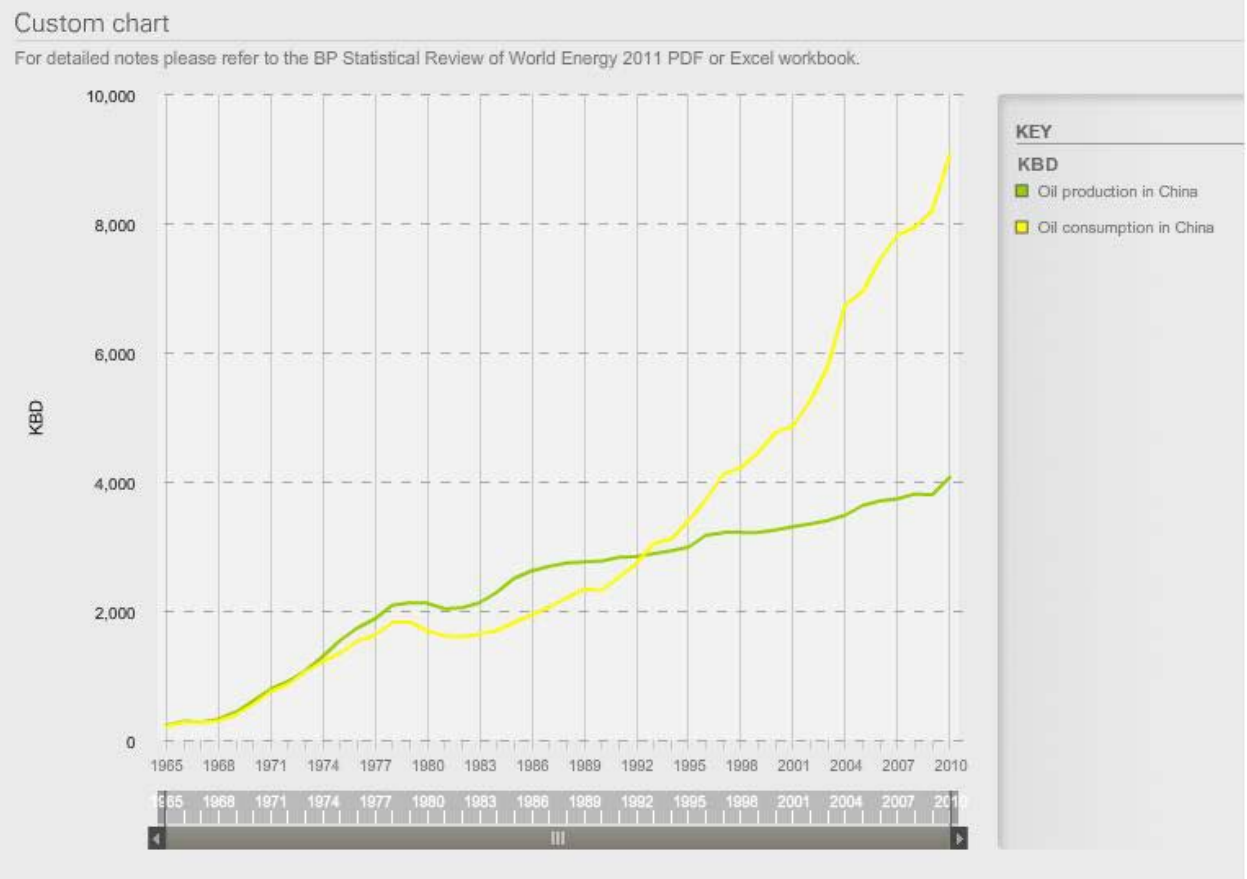
U.S. oil production and consumption 1965-2010



Canada oil production and consumption 1965-2010



China oil production and consumption 1965-2010



World oil production and consumption 1965-2010