Planning for energy use in North Carolina

Background information: According to government statistics, the average citizen in North Carolina uses 14,325 kWh per year. World wide, the per capita use of energy is growing at a rate of approximately 10% each year. In this activity, you will explore the potential impact of combining population growth with increased energy consumption on the difficult task of planning for our future energy needs. You will use the Fathom file “Energy Use” to explore this topic.

1. The first graph in the fathom file shows the population of North Carolina from 2002 – 2011. Below the graph is a slider that controls the rate of an exponential function based on the 2002 state population of a little over 8,300,000. Use the slider to make the graph match the given populations as accurately as you can. What is the rate of growth for your graph?

2. The second graph shows the total North Carolina energy consumption based on population and the average yearly energy consumption given above. As you adjusted the rate of population growth in the first graph, the second graph also changed so that the energy consumption increased based on population growth. How closely does the second graph match the plotted points? Play with the first slider (r) and notice how both graphs change.

3. At this point, the second graph assumes that energy use stays the same year after year. The slider under the second graph allows you to control the rate of energy growth as the population grows. Slide the r1 slider to 10% (the average increase in world energy consumption) and comment below on what you see.

4. If you put the cursor on the graph and hold down the right click on your mouse, you will see the date and energy use. Use this feature to complete the chart below. Note, all values are multiplied by 1011, so in your chart simply record the decimal value to the nearest 1/1000.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| year/rate | 1% | 2% | 3% | 4% | 5% | 8% | -1% |
| 2004 |  |  |  |  |  |  |  |
| 2006 |  |  |  |  |  |  |  |

5. A negative rate of increase, of course, means you have a decrease in energy consumption. By what rate would the average energy consumption need to decrease in order for our total energy consumption to stay the same as our population increases. Discuss this finding with your neighbor.