**Energy Conversions Homework/Class Work**

1. Convert the following: Refer back to these if necessary when answering word problems

1 year =\_\_\_\_\_ days 1 day = \_\_\_\_\_ hours 1 watt = \_\_\_\_ Btu

1 kilowatt = \_\_\_\_\_\_\_\_watts 1 megawatt = \_\_\_\_\_\_\_\_\_ watts 1 HP = \_\_\_\_\_\_ Btu

1. Two men are talking about their new cars with one another. One man was bragging that his new Porsche had approximately 450 horsepower. Another man was bragging about his Prius, which had the power of 381,000 Btus.
   1. How much horsepower does the Prius get?
   2. Compare this with the Porsche. How do the two match up?
   3. How many watts of power does the Porsche generate? Kilowatts?
   4. How much power is generated from the Prius after driving for 4 hours (express your answer in kWh).
2. Fremont is a rural community with 8,000 homes. The town’s energy is acquired from a coal-burning power company. Each home consumes about 10,000 kilowatt hours (kWh) of electricity per year. The cost of this utility is $0.12 per kWh.
   1. If the coal company is capable of providing 20MW of electricity, how many British Thermal Units (Btus) is that?
   2. How many kWh of electricity do all of the residents of Fremont consume in one year?
   3. How many kWh of electricity does one home in Fremont consume in 1 day?
   4. How much does it cost one resident of Fremont to power his/her home for 20 years?
3. I received my electric bill for the month of January, I owed $84.56. According to the bill, the cost of electricity for my apartment is $0.11 per kWh.
   1. How much power did I generate this month, in kilowatt hours?
   2. If my bill came back for the month of February and was $48.54, how much less power would I have used, in kilowatt hours?
   3. If the 30,000 residents of my town all used the same amount of energy as I did in the month of February, how much power would be generated, in kilowatt hours?
4. A group of entrepreneurs is suggesting that the residents of Palm Springs should rely entirely on wind power. A bill was passed that mandated 10 wind turbines be installed. Each wind turbine is capable of producing 1.5MW of electricity. The cost of the project is $2,500,000 dollars per wind turbine.
   1. How much does it cost to fund this entire project?
   2. How much electricity is generated in 2 hours by all 10 wind turbines (express your answer in kWh)?
   3. In order for power companies to break even, which should they charge the residents of Palm Springs per kilo-watt hour *(hint: combine your answers from A and B)*?