***PRACTICE PROBLEM #4*:** West Fremont is a community consisting of 3,000 homes. A small coal-burning power plant supplies electricity for the town. The capacity of the power plant is 12 megawatts (MW) and the average household consumes 8,000 kilowatt hours (kWh) of electrical energy each year. The price paid to the electric utility by West Fremont residents for this energy is $0.10 per kWh. The town leaders are considering a plan, the West Fremont Wind Project (WFWP), to generate their own electricity using 10 wind turbines that would be located on the forest ridges surrounding the town. Each wind turbine would have a capacity of 1.2 MW and each would cost the town $3 million to purchase, finance, and operate for 25 years.
1 MW = 1,000 kW

(a) Assuming that the existing power plant can operate at full capacity for 8,000 hours per year, how many kWh of electricity can be produced by the plant in a year?
(b) At the current rate of electrical energy use per household, how many kWh of electrical energy does the community consume in one year?
(c) Compare your answers in (a) and (b) and explain why you would or would not expect the numbers to be the same.
(d) Assuming that the electrical energy needs of the community do not change during the 25-year lifetime of the wind turbines, what would be the cost to the community of the electricity supplied by the WFWP over 25 years? Express your answer in dollars per kWh.
(e) Identify and explain TWO environmental benefits to West Fremont of switching from coal to wind power and TWO environmental costs to West Fremont of switching from coal to wind power.