Name of Engineer: _____ **Date:** _____

Powering Smallsburg Activity – Powering Smallsburg Worksheet

Instructions

The village of Smallsburg needs power. Smallsburg has a mall, a school, a sports stadium, and a hospital. Table 1 shows how much power each one needs.

Community Facility	Power Required (in MW, mega watts)
Mall	20
School	1
Stadium	10
Hospital	15
Offices/businesses	4

Table 1

Now that you know about the community of Smallsburg, complete the following questions.

Questions

1. Based on Table 1, how much total power (MW) does the Smallsburg power plant have to supply? _____

You can pick combinations of the power plants in Table 2 to add up to the total power needed in Question 1. Each power plant costs money, and some power plants give off emissions (pollution) and some do not.

You have **a total of $250** million dollars to spend.

Power Plant Type	Power Provided (MW)	Cost (million $)	Emissions Per/Year
Hydroelectric	10	40	None
	25	100	None
Photovoltaic	5	50	None
	25	250	None
Wind turbines	10	60	None
	25	150	None

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Power Plant Type	Power Provided (MW)	Cost (million $)	Emissions Per/Year
Nuclear	10	40	1 ton radioactive waste
	25	100	2.5 ton radioactive waste
Coal	10	20	80,000 ton CO_2, 200 ton SO_2, 6 pounds mercury
	25	50	200,000 ton CO_2, 500 ton SO_2, 15 pounds mercury
Advanced Coal	10	50	80,000 ton CO_2, 20 ton SO_2, 0.6 pounds mercury
	25	125	200,000 ton CO_2, 50 ton SO_2, 1.5 pounds mercury

Table 2

2. Fill in the table below with your power plant choices to power the necessary services listed in Table 1. (Note: You do not have to use all of the rows below.)

Power Plant Type	Power Provided (MW)	Cost (million $)	Emissions Per/Year

3. What is the total energy (power) production of your power plants? _____MW (Note: add up column 2)

4. What is the total cost of your power plants? $_____million dollars (Note: add up column 3)

5. Do your power plants give off emissions (pollution)? _____

   What might that pollution do to the community?

   _____

   _____

   _____

   _____

   _____

6. How much money do you have left, after buying the power plants?
   $_____million dollars

7. If you did not spend all the $250 million on power plants, what will you buy with the money left over (see Table 3)?

   _____

   _____

   _____

   _____

   _____

Improvement	Cost (million $)
Repair streets and sidewalks	20
Fund universities to research cleaner energy technologies	30
Double the number of teachers in all the schools	20
Make food free for the community	100
Nobody works on Fridays	40
Build large central park	20
Help fund a free medical clinic	10
Give money back to taxpayers	Remainder

Table 3