

Name: _____

Block: _____

Air Pollution Allowance Trading Game

Introduction

This game introduces you to pollution abatement measures based on free market trading of pollution allowances. For this game, you will be divided into groups of four with each person representing an industry subject to a fictitious air pollution allowance trading system. You will be given a set of facts and conditions and be required to make a series of decisions in order to comply with environmental regulations. Each person will represent a public utility that emits air pollution; however, the amount each can emit is limited by the government. You will be penalized for exceeding air pollution limits. Your goal is to participate in the cap-and-trade system in a manner that will allow you to increase your profits from year to year.

Under an allowance trading system, large stationary sources of air pollution, such as power plants, receive a certain number of “pollution allowances” for a specified period of time, based on local clean air standards. The permits are allocated to the sources according to their historic fuel consumption and emissions rates. Allowances are in units of pollutant emitted, so a polluter will use up its allowances as it pollutes. The key to the system is that these allowances may be traded between sources, or may be “banked” for use in the future. At the end of the period, each source must have enough allowances to balance its emissions for that period; otherwise a penalty on each excess unit of pollution is imposed.

For each round of the game you will be given a certain number of air pollution allowances. If you don't need all of your allowances, you can sell them or save them for future use. You may also decide to purchase pollution reduction technology. Technology units cost \$4000. Each unit provides 1000 tons of annual pollution reduction. Technology units reduce pollution beginning in the year they are purchased and will continue to provide pollution reduction in subsequent rounds.

GAME RULES

- 4 rounds of trading (or play until time is up)
- Pollution allowances are distributed at the start of each round
- A pollution allowance permits 1000 tons of pollution
- Extra allowances may be bought or sold, or saved for use in future rounds
- Penalties = \$1 per ton in excess of allowances
- Pollution reduction technology costs \$4000 per unit. Technology reduces pollution by 1000 tons per round. Technology is permanent.
- An industry (person) can not emit less than 5000 tons per round.
- Each industry (person) starts with \$6000.

The first step is to decide who in your group will be Person 1, Person 2, Person 3, and Person 4. Keep in mind that larger companies have more pollution, but greater annual income than smaller companies.

Person 1: You are a mid-sized coal-burning power plant. Based on current projections, you will **emit 10,000 tons** of pollution annually in the coming four years. Your annual income is \$2000.

Person 2: You are a mid-sized coal-burning power plant. Based on current projections, you will **emit 10,000 tons** of pollution annually in the coming four years. Your annual income is \$2000.

Person 3: You are a small coal-burning power plant. Based on current projections, you will **emit 7,000 tons** of pollution annually in the coming four years. Your annual income is \$1000.

Person 4: You are a large coal-burning power plant. Based on current projections, you will **emit 14,000 tons** of pollution annually in the coming four years. Your annual income is \$4000.

Game Play Worksheet

Every player receives 10 pollution allowances for the first year. The number of pollution allowances you will receive in the remaining three years is unknown. Remember, the goal of the game is to make the most money through the trading and saving of pollution allowances.

| | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| STEP 1: Record the projected annual pollution emission (each person will be different –see info above) | _____ tons | _____ tons | _____ tons | _____ tons |
| STEP 2: Decide if you want to purchase pollution reduction technology (refer to game rules; be sure to pay for your technology) | _____ reduction units purchased | _____ reduction units purchased | _____ reduction units purchased | _____ reduction units purchased |
| STEP 3: Record your revised annual pollution emission (if you bought pollution reduction technology – the reduction is good for all remaining years in play) | _____ tons | _____ tons | _____ tons | _____ tons |
| STEP 4: Will the number of pollution allowances you have cover your yearly pollution? If so, you may sell pollution allowances or save them for future rounds. If you don't have enough allowances, you will have to buy them or be forced to pay a penalty. You MAY NOT buy them from the bank or government – only from another company (player). Individually determine your strategy. | | | | |
| STEP 5: Time to buy/sell allowances as needed. | | | | |
| STEP 6: Each industry (person) must turn over used pollution allowance permits to the government (put them off to the side so they are no longer part of the game) | | | | |
| STEP 7: Did your annual pollution emission exceed your pollution allowance? If so, pay your penalty (\$1 per ton in excess of allowances). You may need to take out a loan from the bank and pay it back at the end of the game (if you go into debt). If this is the case, your group needs to record how much money the bank loans each person on a piece of paper. | | | | |
| STEP 8: Ms. Coleman will inform you how many pollution allowances you have for the next year. After you find out the number of allowances from Ms. Coleman, continue with game play. | | | | |

Conclusion Questions:

1. Which person (industry) ended up with the most money after four years? Describe this person's strategy.
2. Explain what happened when the government increased the pollution allowances per industry in Round 2. Why is this not a good strategy for a cap and trade program?
3. Should banked allowances be included as part of a groups profit? Explain.
4. At the beginning of the game, Person 3 was in the best position. Did he/she maintain the lead? Why or why not?
5. Person 4 was in the worst position at the start of the game. How did Person 4 fare? Why?
6. Compare Person 1 and 2, who began on even footing. Did one do better than the other? Why?
7. Describe the emissions trading system established by the Clean Air Act in 1990 for the United States. (HINT: Pages 80-81)
8. What are TWO negatives of cap-and-trade programs? (HINT: Page 81)
9. Describe the emissions trading program operating among European nations. (HINT: Page 82)