

# Cap and Trade Game

## Introduction

Acid deposition, commonly known as acid rain, occurs when emissions of sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) react in the atmosphere with water, oxygen, and oxidants to form various acidic compounds. In response to concerns about the impacts of acid deposition, the U.S. Congress established the Acid Rain Program under the Clean Air Act Amendments of 1990.

## Cap and Trade

The Acid Rain Program used a market-based cap and trade mechanism that sets a permanent cap on the total amount of sulfur dioxide that may be emitted by electric power plants nationwide. Existing power plant units generating greater than 25 megawatts and all new units are part of the program. Beginning in 2000, SO<sub>2</sub> emissions were capped at 9.5 million tons (compared to emissions of 17.3 million tons in 1980), and in 2010, the final cap is set at just under 9 million tons. Sulfur dioxide allowances are the currency used to comply with the requirements. One allowance unit equals emission of one ton of sulfur dioxide. Unused allowances can be traded or sold at the annual U.S. EPA auction conducted at the Chicago Board of Trade. Anyone can purchase these allowances.

## The Game

The goal is for a power company to get enough SO<sub>2</sub> allowances to build a new power plant unit. There is no “winner” other than improved air quality and less acid rain.

1. One player represents the new power plant and four other players have game cards with amounts of emissions and ways to reduce emissions.
2. Begin the game with the challenge: There is a need for a new power plant that will require 5,000 SO<sub>2</sub> allowances. The new power plant has up to \$3 million available to purchase these allowances. What will each of the other power plants do to help?
3. Before the trading begins, Power Plants A through D should total their first round SO<sub>2</sub> allowances that they would like to sell and assign a price to each SO<sub>2</sub> allowance.
4. To start, Power Plant A makes an offer of how many SO<sub>2</sub> allowances are available and the price. You may want to suggest a range of \$200-\$800. (At the 2004 U.S. EPA auction, bids ranged from \$107 to \$300 per allowance with the minimum selling price of \$260. By 2005, allowances were trading for over \$700 each on the open market.) The new power plant can accept the offer or move on. Continue with Power Plants B, C, and D. Continue the sequence through Round Two or until 5,000 SO<sub>2</sub> allowances are available for the new company. Companies A, B, C, and D total the money they made on selling allowances.
5. Each player shares his/her game card with the others. Discuss the results as a group. Was the new plant able to get enough allowances? At what price? How much did each company make? Compare results with other groups who played the game.

Source: U.S. Environmental Protection Agency. *Acid Rain Program*. Retrieved June 25, 2005, from <http://www.epa.gov/airmarkets/arp/>.