

Environmental Trading Game Electricity Retailer

Your team manages a prominent local electricity retailer which supplies electricity on the local retail market. Previously, the electricity you have sold to consumers has been generated in coal-fired power plants. Supplying coal-fired electricity results in the release of significant amounts of greenhouse gases (GHGs). In the absence of restrictions on GHG emissions, all of the electricity you supply would be generated in coal-fired power plants. To reduce your emissions, you could either reduce your electricity production or generate the same electricity but looking at energy sources with lower carbon intensity. All of this incurs costs to you; therefore, the amount of electricity generated from coal determines your utility.

Profit Schedule

Coal fired electricity supplied	0	1	2	3	4	5	6	7	8	9
Profit from all electricity supplied	-\$10	\$0	\$7	\$17	\$19	\$23	\$25	\$26	\$27	\$26
Emissions	0	1	1	2	3	4	5	6	7	8

Scenario 1

How much coal-fired electricity will your firm supply if there is no control on greenhouse gas emissions?

Based on the production schedule above, decide on how much your firm will supply and on your cell phone, respond appropriately by entering the numbers in the table below

	Coal-fired electricity supplied	Profit	Emissions
Under no regulation			

The Government has decided to reduce levels of greenhouse gas emissions. You cannot emit more than 6 units of greenhouse gases. Given this limit, how much coal-fired electricity will you supply?

Based on the production schedule above and this new regulation, respond appropriately by entering the numbers in the table below

With regulation limiting emissions	Coal-fired electricity supplied	Profit	Emissions

Scenario 2

Now suppose that the Government implements a more flexible system where all emitters must cover their emissions with tradable allowances. One allowance covers one unit of emissions. You will receive 6 allowances. Now how much coal-fired electricity will your firm supply?

This time you may trade your allowances with the cement producer you are paired with. Negotiate to see whether you can achieve a higher level of profit by buying or selling allowances. Remember to note appropriate changes in your production and emissions levels.

Your total profit is the revenue from your retailing activities plus the revenue from selling allowances (or minus the price you paid). Respond appropriately by entering the numbers in the table below

Under an emissions trading system	Coal-fired electricity supplied	Allowances bought/sold	Allowance cost/revenue	Profit	Emissions

Scenario 3

On this occasion, the goal is to cooperate with your assigned company to be more ambitious in reducing emissions. Your company's shareholders do not accept profit less than \$20, so now your goal is to minimize emissions by complying with the requirement of this Utility. Since you are a friend of the operators of the other company, you must cooperate with them to buy and sell credits and thus reduce emissions as much as possible.

On this occasion, in the Emissions section, ask for the other company's emissions and add them to your own. Respond appropriately by entering the numbers in the table below.

Cooperation emissions trading system	Coal-fired electricity supplied	Allowances bought/sold	Allowance cost/revenue	Profit	Emissions

Environmental Trading Game Cement Producer

Your team is the operator of a large cement producer. The production of cement is a particularly GHG intensive process because of energy use and process emissions.

In order to reduce your emissions (because you are a responsible operator), you have already undertaken many initiatives. Any further reductions in GHG emissions will impose significant cost on your producer, such as shifting from fossil fuels or utilizing carbon capture technologies. These will, of course, result in lower levels of production and profit, but will reduce your level of GHG emissions.

Profit Schedule

Cement produced	0	1	2	3	4	5	6	7	8	9
Profit from cement production	-\$10	\$0	\$7	\$14	\$19	\$23	\$25	\$26	\$27	\$26
Emissions	0	3	5	6	7	8	9	10	11	12

Scenario 1

How much cement will your firm produce if there is no control on greenhouse gas emissions?

Based on the production schedule above, decide how much your firm will produce and respond appropriately by entering the numbers in the table below

Under no regulation	Cement produced	Profit	Emissions

The Government has decided to reduce levels of greenhouse gas emissions. You cannot emit more than 6 units of greenhouse gases. Given this limit, how much coal-fired electricity will you supply?

Based on the production schedule above and this new regulation, respond appropriately by entering the numbers in the table below

With regulation limiting emissions	Cement produced	Profit	Emissions

Scenario 2

Now suppose that the Government implements a more flexible system where all emitters must cover their emissions with tradable allowances. One allowance covers one unit of emissions. You will receive 6 allowances. Now how much cement will your firm produce?

This time you may trade your allowances with the electricity retailer you are paired up with. Negotiate to see whether you can achieve a higher level of profit by buying or selling allowances, allowing changes in your production and emissions levels.

Remember that your total profit is the revenue from your cement production plus the revenue from selling allowances (or minus the price you paid). Respond appropriately by entering the numbers in the table below

Under an emissions trading system	Cement produced	Allowances bought/sold	Allowance cost/revenue	Profit	Emissions

Scenario 3

On this occasion, the goal is to cooperate with your assigned company to be more ambitious in reducing emissions. Your company's shareholders do not accept profit less than \$20, so now your goal is to minimize emissions by complying with the requirement of this Utility. Since you are a friend of the operators of the other company, you must cooperate with them to buy and sell credits and thus reduce emissions as much as possible.

On this occasion, in the Emissions section, ask for the other company's emissions and add them to your own. Respond appropriately by entering the numbers in the table below

Cooperation emissions trading system	Cement produced	Allowances bought/sold	Allowance cost/revenue	Profit	Emissions