

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).

Recently, a viable alternative to fossil fuel generated electricity has emerged, namely a large wind farm. Purchasing electricity from the wind farm will reduce the emissions caused by your retailing activities; however this electricity is more expensive than the coal-fired alternative. Therefore, increasing the proportion of wind generated electricity will reduce your overall profit, but lower your emissions. In the absence of restrictions on GHG emissions, all of the electricity you supply would be generated in coal-fired power plants. Assume that the TOTAL amount of electricity you supply remains constant across scenarios; only the mix between coal-fired and wind generated electricity varies.

Profit Schedule

Coal fired electricity supplied	0	1	2	3	4	5	6	7	8	9
Profit from all electricity supplied	-\$10	\$0	\$7	\$14	\$19	\$23	\$25	\$26	\$27	\$26
Emissions	0	1	1	2	3	4	5	6	7	8

Scenario I

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 fill in the table below.

	Coal-fired electricity supplied	Profit	Emissions
Under no regulation			

Scenario 2

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, decide on how much your firm will supply.

With regulation limiting emissions	Coal-fired electricity supplied	Profit	Emissions

Scenario 3

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 aluminium smelter 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).

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

Scenario 3a

Do you think that you can do better? Try trading with a different group.

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

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Aluminium Smelter

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

In order to reduce your emissions (because you are a responsible smelter operator), you have already undertaken many initiatives. Any further reductions in GHG emissions will impose significant cost on your smelter, such as shutting down one of your pot lines. These will, of course, result in lower levels of production and profit, but will reduce your level of GHG emissions.

Profit Schedule

Aluminium produced	0	1	2	3	4	5	6	7	8	9
Profit from aluminium 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 aluminium 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 fill in the table below.

	Aluminium produced	Profit	Emissions
Under no regulation			

Scenario 2

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 aluminium will you produce?

Based on the production schedule above and this new regulation, decide on how much aluminium your firm will produce.

With regulation limiting emissions	Aluminium produced	Profit	Emissions

Scenario 3

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 aluminium 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 aluminium production plus the revenue from selling allowances (or minus the price you paid).

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

Scenario 3a

Do you think that you can do better? Try trading with a different group.

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