The Carbon Game – Tutorial

This tutorial is extremely progressive and only intends to help you get easily into the multiplayer game. Do not think too much in the beginning, follow our advice and do not pay attention to the score (the best way to prepare yourself for the game is to try everything, even actions that you believe are mistakes… And of course, the scores will be reset)

You are responsible for managing a firm selling a good whose production emits CO2. You will play the same game against the same players on 3 completely separate markets: Actions on one market do not have any direct impact on the other markets. You can see these markets as parallel universes in which demand and production costs are the same, but environmental policies are different (this will be useful to compare outcomes of these policies). Note in particular, that goods produced on one market cannot be sold on other markets.

The timeline is separated into years. At beginning of the year, you have to choose how much to produce and what technology to use for that. Then, once every firm has decided how much to produce, production takes place and you have to choose the price at which you will sell your goods.

For pedagogic reasons and to allow you to correct potential pricing mistakes, you will play the "sales part" twice (but this does not correspond to any real-world situation). We call rounds these two sales sequences (for each round, the maximum quantity you can sell is equal to the total quantity you selected at the production stage).

Note that goods are perishable: what is not sold at the end of a round is lost.

1st year of the tutorial

Production choice

On the first screen, you must select production and technology on each market. Do not think too much for the moment, the goal is to get used to the interface. We will talk about costs next year.

airECONsim · Year 1 · Results · Edit Profile · *Player 1 (1) · Logout

Scores
*Player 1 (1) €50,000
Robot 2 (2) €50,000
Robot 3 (3) €50,000
Robot 4 (4) €50,000

Production Choice - Year : 1

Market 1 (Your competitors: Robot 2 (2) Robot 3 (3) Robot 4 (4) **)**

Goods	Technology	Production Cost (€)	Production + Distribution Cost (€)	CO2 emissions (tons) by Round
1200	Techno1	12000	48000	132

Market 2 , "80€ CO2 unit tax" (Your competitors: Robot 2 (2) Robot 3 (3) Robot 4 (4) **)**

Goods	Technology	Production Cost (€)	Production + Distribution Cost (€)	CO2 emissions (tons) by Round
1000	Techno1	10000	40000	110

Market 3 , "100 permits by firm and by round, 200€ penalty by CO2 ton above" (Your competitors: Robot 2 (2) Robot 3 (3) Robot 4 (4) **)**

Note On this market, CO2 emissions are regulated through emissions permits. Permit numbers displayed here are "permits **by Round**".

Type 1200, 1000 and 800 goods, produced with techno 1 for markets 1, 2 and 3. Validate and check your competitors' decisions on the next screen:

---

airECONsim · Year 1 · Results · Edit Profile · *Player 1 (1) · Logout

Scores
*Player 1 (1) €50,000
Robot 2 (2) €50,000
Robot 3 (3) €50,000
Robot 4 (4) €50,000

Production Choice

Year 1

Market 1

Team	Production by Round	Techno	CO2 Emissions by Round	CO2 cost by Round
*Player 1 (1)	1200	Techno1	132	€0
Robot 2 (2)	1055	Techno1	116.05	€0
Robot 3 (3)	1206	Techno1	132.66	€0
Robot 4 (4)	1247	Techno1	137.17	€0

Production each Round (Total 4708 goods)

*Player 1 (1)   1200 - Techno1
Robot 2 (2)   1055 - Techno1
Robot 3 (3)   1206 - Techno1
Robot 4 (4)   1247 - Techno1

Market 2 , "80€ CO2 unit tax"

Team	Production by Round	Techno	CO2 Emissions by Round	CO2 cost by Round
*Player 1 (1)	1000	Techno1	110	€8,800
Robot 2 (2)	1162	Techno1	127.82	€10,226

2

Sales Round

On the next page, you are invited to select your price on each market:

Once again do not pay too much attention to the data displayed here, just enter prices around €70 on each market and validate.

Check your sales results. Remember that goods are perishable: unsold goods are lost (here, 128 goods for team 1).

2nd sales round

We start a new round and play the sales phase once more (understand that we are only doing once more exactly what we did in the previous round. This is not supposed to represent any "real-world" phenomenon, it is just intended to allow you to correct potential mistakes) →once again, you have 1200, 1000 and 800 goods to sell on markets 1, 2 and 3.

It's up to you to choose your prices. If you want, you can go back and change your decisions at any time of the tutorial (Click on the button on the left of the screen). Also note that you can find all the past results, by clicking on "results" in the topbar.

For your information, if you and your 3 competitors all set the same price on a market, each firm will sell, on average:

Price	30	40	50	60	70	80	90	100	110
Sales/firm	1389	1280	1183	1096	1016	941	869	804	741

Price	120	130	140	150	160	170	180	190	200
Sales/firm	680	622	566	512	461	409	361	313	267

As you will see, products are slightly differentiated and customers have different brand preferences... (There is also some random in the customer's characteristics): The cheapest firm will usually not get the whole demand.

Also note that potential consumers "arrive" on the market one after the other: If a firm has few goods to sell and has a very low price, it will sell its goods very fast and consumers "arriving" later on the market will only be able to buy from one of the other firms (if they want to buy) .

2ⁿᵈ year of the tutorial

Scores are reset in year 2.

Now, it's up to you to decide how much to produce and what technology to use (remember that the quantity entered will be available once in round 1 and once in round 2).

For each market, you have information displayed, reminding you about previous year's productions, prices, sales and profits (green bars).
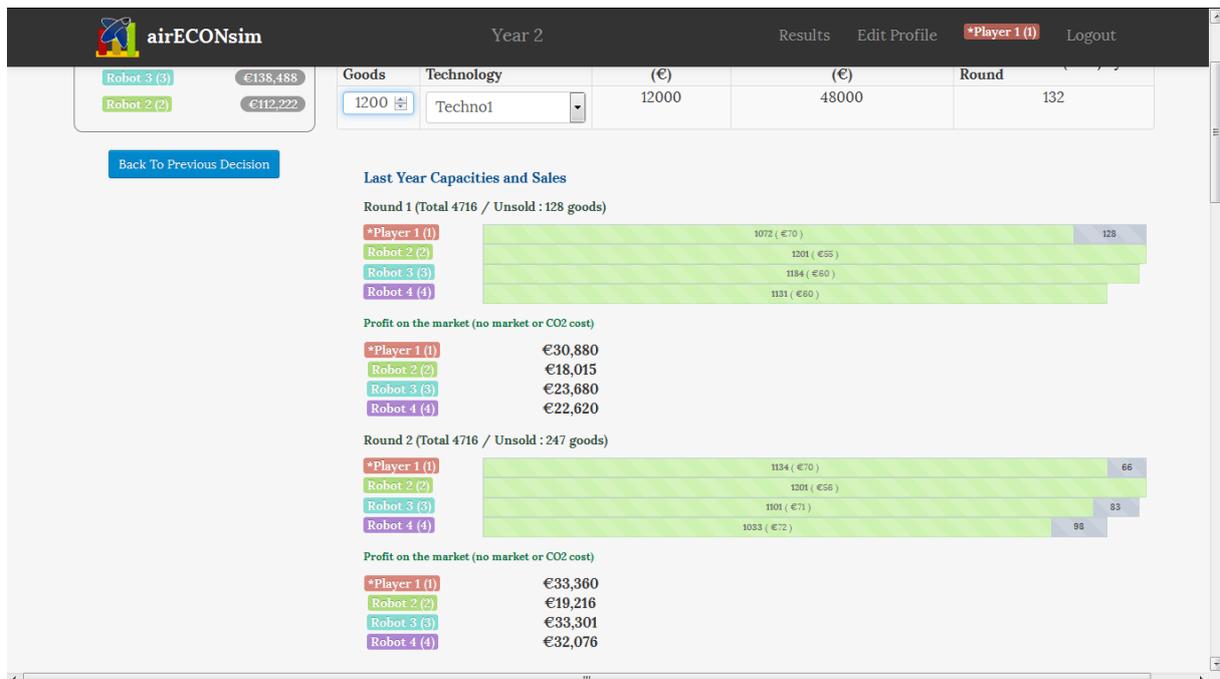
Each technology is characterized by a fixed cost, a unit production cost (paid even if the good is not sold), a unit distribution cost (paid only if the good is sold) and by CO_2 emissions. These costs are detailed at the bottom of the page:

Technology	Techno specific fixed cost (by round), F_T	Unit production cost, c_1	Unit distribution cost, c_2	CO_2 emissions (tons) per good produced
Techno1	€0	€10	€30	0.11
Techno2	€0	€20	€18	0.11
Techno1Eco	€1,000	€11	€33	0.09
Techno2Eco	€1,000	€22	€20	0.09

For example, if it uses Techno1Eco, a firm must pay a fixed cost F_T of €1000 (no matter how many goods are produced) each round. It will also have to pay €11 for each good produced, and then €33 for each good sold. Each **produced** good « emits » 0.09 tons of CO_2 (CO_2 emissions are hence completely determined by choices at the production phase).

And there is an additional €8000 fixed cost F on each market over which a firm is active (i.e. on which it produces more than 0), whatever the technology used.

So, if a firm is active on a market, produces q_P each round, and sells q_S during a round, it will bear a cost $F+F_T+c_1.q_P+c_2.q_S$ this round (plus potential extra costs for CO_2 emissions)

Finally, note that environmental policies differ on each market.

- Market 1 is a benchmark market, there is no environmental policy
- On market 2, there is a CO2 environmental tax equal to €80 for each ton of emitted CO2.
- Market 3 is regulated with (non-tradable) CO2 emissions permits. Each year, each firm receives 200 permits for free (that is, 100 permits for each round). With a permit, a firm can emit one ton of CO2 at no cost. If a firm emits more CO2 than it has permits, it must pay a penalty equal to 200€ for each exceeding ton of CO2. If it emits less CO2 than it has permits, it will keep unused permits for the following year (permits are displayed on the production choice page).

Here again, do not think too much about how to adapt your strategy to these policies, this will the subject of the game that you will play in a few minutes (with many different, more or less elaborate policies).

From now on, there will be no new feature in this tutorial. Just play until you feel you have understood the game structure and interface, and you are ready to start the real game against other human players.

Last remark, players sometimes consider that producing a lot and selling at a very low price is a good strategy. **Before the real game, try this strategy in this tutorial and see how and why this does not work. It is better not to start the game with huge losses!**

https://lud.io

IO games
Air Transport Economics game
Energy Economics game
CO2 Emissions and Environmental Policy game
…

https://twitter.com/EconomicsGames

https://www.facebook.com/EconomicsGames

https://plus.google.com/111687138740856767949

blog.lud.io