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# **Introdução à Economia/Introductory Economics Exercícios**

**2021/2022, P2**

**6. Economia, ambiente e alterações climáticas/Economy,  
environment and climate change**

**6.1** Considering the figure below, classify the following sentences as True or False. Justify. (Adapted from CORE, The Economy)

Decision	How it affects others	Cost or benefit	Market failure (misallocation of resources)	Possible remedies	Terms applied to this type of market failure
A firm uses a pesticide that runs off into waterways	Downstream damage	Private benefit, external cost	Overuse of pesticide and overproduction of the crop for which it is used	Taxes, quotas, bans, bargaining, common ownership of all affected assets	Negative external effect, environmental spillover
You take an international flight	Increase in global carbon emissions	Private benefit, external cost	Overuse of air travel	Taxes, quotas	Public bad, negative external effect

- a. Bargaining between affected parties is always effective in reducing the inefficiencies caused by externalities.

False - Bargaining may not be effective when the number of people affected by the externality is very large. With climate change, those affected potentially includes everyone alive today as well as unborn future generations.

- b. The market price of pesticides is unlikely to reflect the full social cost of their use.

True - The market price will not reflect the additional costs imposed on downstream fisheries.

- c. Reducing air travel is an unfortunate and inefficient by-product of taxing flights.

False - Insofar as additional taxes reflect the social cost of air travel (due to emissions, noise pollution and so on), the reduction in air travel is economically efficient.

- d. Making polluters pay for the pollution they cause is one of the best policies to deal with negative externalities.

False – This policy is not one of the best because it can be unfair (polluters may be low-income workers) and ineffective (the profit may be greater than the cost of possible taxes).

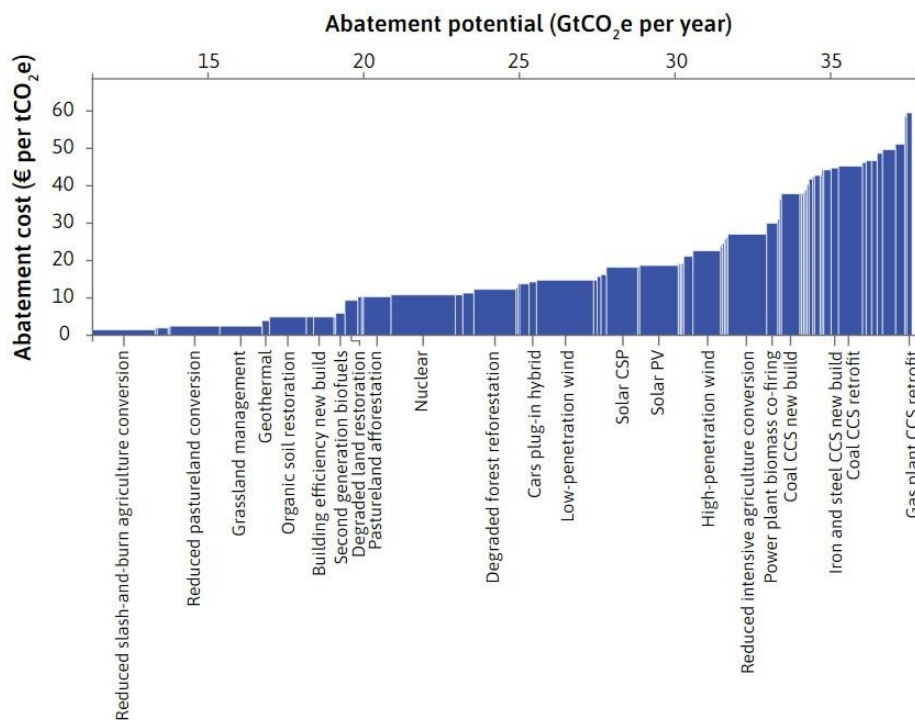
**6.2** What are abatement policies? Give some examples. (Adapted from CORE, The Economy)

Abatement policies are policies that limit the environmental damage. These policies have the objective of reducing pollution. Some examples are:

- Taxes on emissions of pollutants
- Incentives to use renewable sources of energy
- Banning or limiting the use of environmental harmful substances or activities

The amount of reduction in emissions caused by these policies is referred to as the quantity of abatement.

**6.3** The figure below shows a global greenhouse gas abatement curve, defined as the abatement in 2030 compared with ‘business as usual’, produced by McKinsey in 2015. The width of each bar indicates potential abatement measured in gigatonnes of CO<sub>2</sub>, while the height indicates the cost of abatement per tonne.



Classify the following sentences as True or False. Justify. (Adapted from CORE, The Economy)

- a. Nuclear energy has a higher potential to abate emissions than reforestation of degraded forests.

True - The nuclear bar is wider, indicating greater abatement potential.

- b. Solar energy should be preferred to nuclear power in the abatement of greenhouse gas emissions.

False - Solar energy is indicated in the diagram to be less efficient, in terms of abatement per euro spent. There may, however, be reasons unrelated to efficiency (such as safety) that justify preferring it to nuclear power.

- c. Nuclear power produces more abatement per euro spent than Solar energy.

True - The 'Nuclear' bar is shorter than the 'Solar PV' or 'Solar CSP' bars, indicating a lower cost of abatement per tonne.

- d. Geothermal technology has a very low abatement potential and therefore should never be adopted.

False - The abatement potential is relatively small, but the cost per tonne abated is very low. It will therefore likely form one component of a least-cost mix of abatement opportunities.

- e. Gas plant CCS should be a priority technology to adopt.

False – It has small abatement potential and the highest abatement cost.

**6.4 Explain what is a cap-and-trade policy. How can Governments apply this policy?**  
(Adapted from CORE, The Economy)

A cap and trade is a policy that combines a legal limit on the amount of emissions with an incentive-based approach to assigning the abatement required to meet this legal limit among firms and other actors.

The government sets the total level of abatement required: this is called the 'cap' and it constitutes the 'quantity' side of the policy. Then, the government creates permits: the number of permits issued limits total emissions to the size of the cap. After that, the government allocates permits: they can be given to the firms operating in industries emitting the pollutant, or they can be auctioned to polluting firms by the government. After the allocation of permits to companies, they are traded: for some firms, polluting is very profitable and abatement costly. They will buy permits from other firms. Firms that produce little pollution or have low costs of abatement may have excess permits, which they can sell. Trade occurs until the gains from trade are eliminated. The firms submit permits to government to cover their emissions: For each tonne of emissions produced, firms are required to provide one permit to the government. Ideally, government monitoring ensures that firms cannot cheat, and any firms caught violating the law are penalized with large fines.

**6.5 Recall question 1.11 in which we defined common resources. Why do common resources get used more than is desirable from the standpoint of society as a whole?**

Tragedy of the Commons: refers to a situation in which individuals with access to a shared resource (also called a common) act in their own interest and, in doing so, ultimately deplete the resource, neglecting the well-being of society in the pursuit of personal gain. Thus, this leads to over-consumption and ultimately depletion of the common resource, to everybody's detriment. Solutions to the tragedy of the commons include the imposition of private property rights, government regulation, or the development of a collective action arrangement.

**6.6** Explain the discounting dilemma and its importance for addressing the environmental impact of economic activity in terms of climate change. How is technological progress used in this debate?

The discounting dilemma has to do with how much we should account for the future, in terms of costs and benefits. Abatement costs will be borne by the present generation, but the benefits of a successful abatement policy will be enjoyed by people in the future, many of whom are not yet alive. In turn, benefits of non-abatement are enjoyed by current generations, at the expense of future ones. Uncertainty about technological progress leads to the fact that people in the future may have either greater or lesser needs than we do today. If, as a result of continuing improvements in technology, they are richer (either in goods or free time) than today's people, it might seem fair that the benefits they will receive from the current policies are not valued as highly as today's costs.