



Why price pollution? A classroom experiment

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The problem

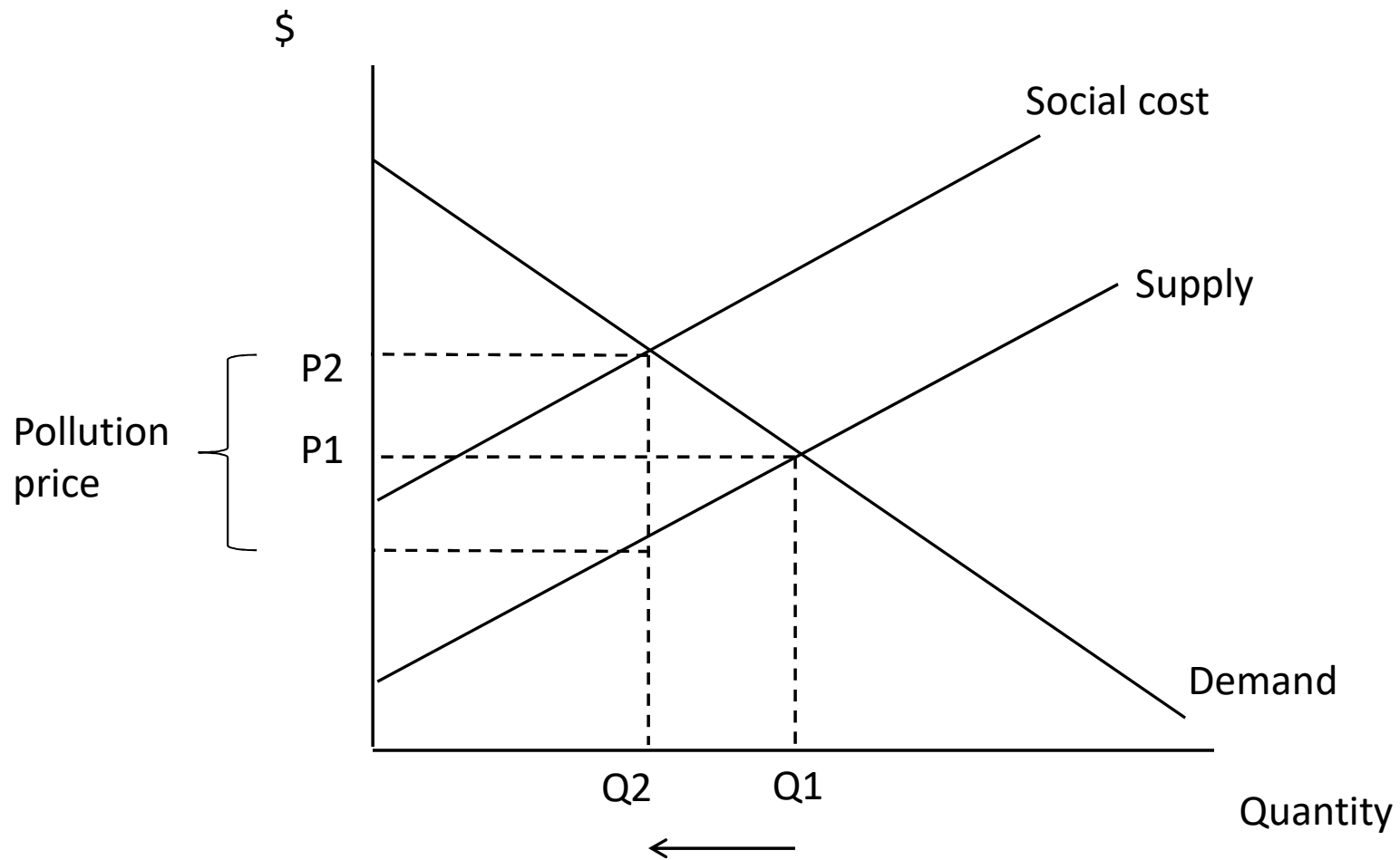
- Most pollution of air and water is an unintentional byproduct of market activity.
- Pollution policy alters market outcomes.
- Q: How to reduce pollution?



Source:

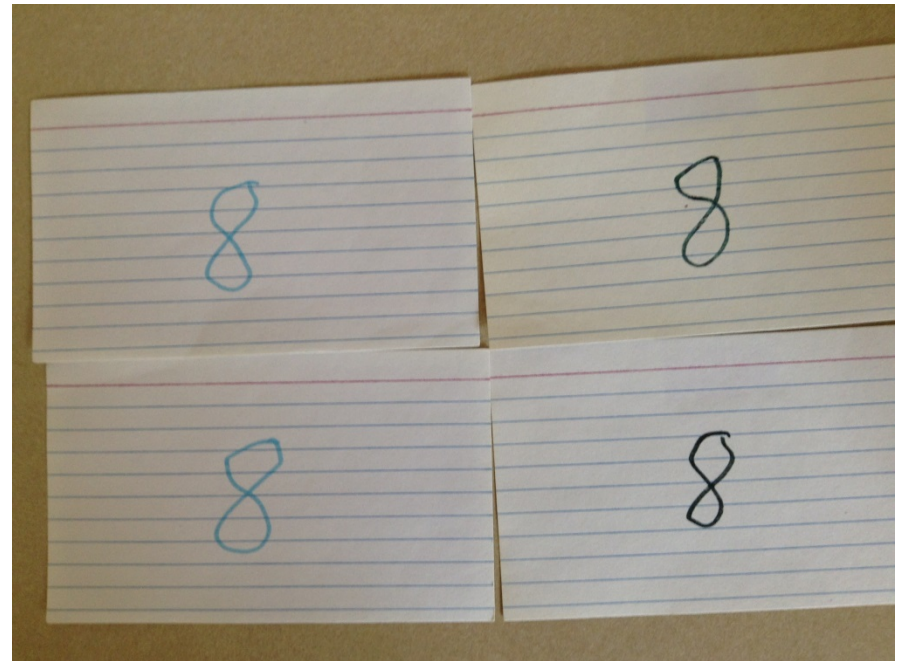
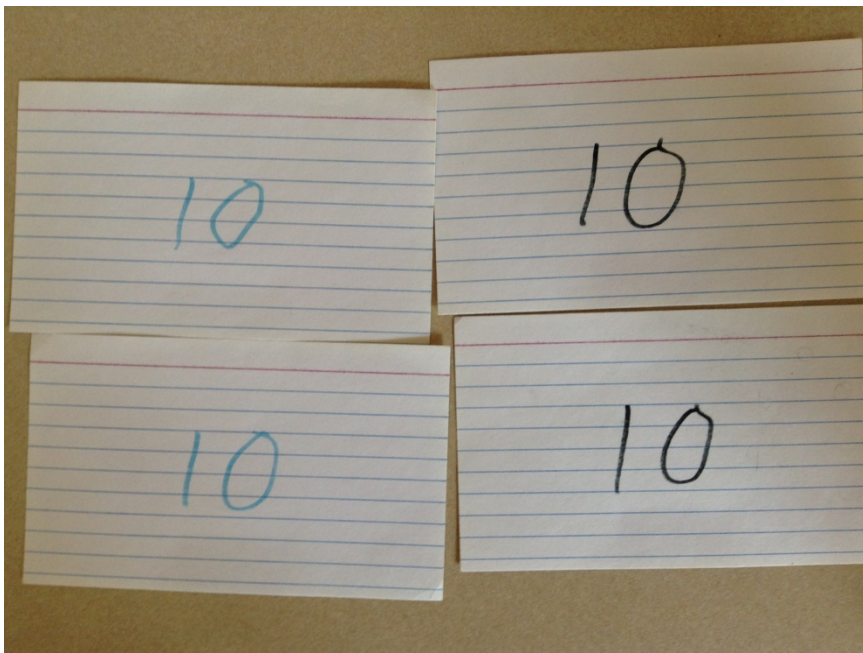
<https://www.scientopia.net/pollution/air>

The standard textbook treatment



Classroom Game

- Each team receives four cards, two black cards and two blue cards – I usually put a number on indicating team name.



Classroom Game

- Each team receives four cards, two black cards and two blue cards.
- 5 rounds.
- During each round, groups have to determine which cards to give up.
 - Each group begins with 200 points.
 - Each blue card you retain costs you -2 points.
 - Each black card you retain costs you 0 points.
 - For every blue card I collect, each group must take off 1 point from their score.

Score sheet

Team Number: _____

Game #1

<u>Round Number</u>	<u>Base Points</u>	<u>Blue Cards Retained</u>	<u>Blue Card Points</u>	<u>Total Blue Cards Disposed Of</u>	<u>Total Blue Card Points</u>	<u>Round Score</u>	<u>Cumul. Score</u>
0	200	1	-2 (=1×-2)	13	-13 (=13×-1)	-15 (=-2+-13)	185
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

Total Score Game #1 = _____

What usually happens?

- An example from the last time I taught this:
 - 15 teams
 - Round 1: 23 blue cards collected
 - Round 2: 25 blue cards collected
 - Round 3: 20 blue cards collected
 - Round 4: 18 blue cards collected
 - Round 5: 29 blue cards collected

How to talk about the game?

Concept

A private cost is a cost borne by the individual or entity making a decision.

An **external cost (EC)** is an uncompensated cost that an individual or firm imposes on others => known as a **negative externality**.

Social cost (SC) of a good or activity: the cost of production plus its external cost.

Market failure occurs when a market fails to be efficient.

In the Experiment

Private cost of playing a blue card? -1 point.

External cost of playing a blue card? -1 point x 14 other teams = -14 points.

-15 points for each blue card.

Score if everyone held blue cards? 180.

Highest score we saw? 85

How to talk about the game?

Concept

What if each team were responsible for the costs that their actions imposed on other teams?

What is the externality if each team were responsible for the costs that their actions imposed on other teams?

What would every team do if they were responsible for the costs that their actions imposed on other teams?

What score would have been achieved if every team retained each blue card?

In the Experiment

Private cost of playing a blue card? -15 points.

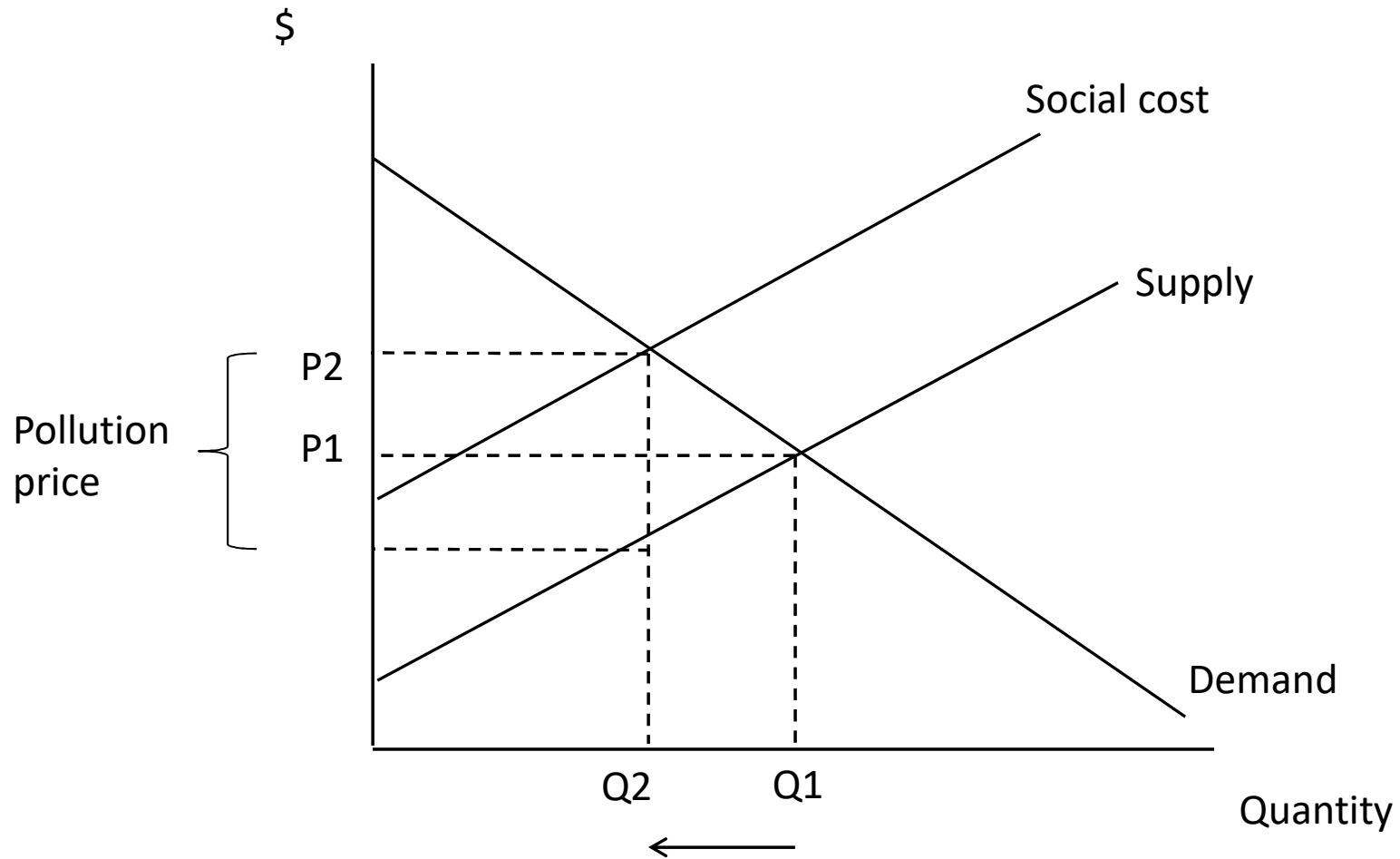
External cost of playing a blue card? 0 points.

Retain each blue card.

Score if everyone held blue cards? 180.

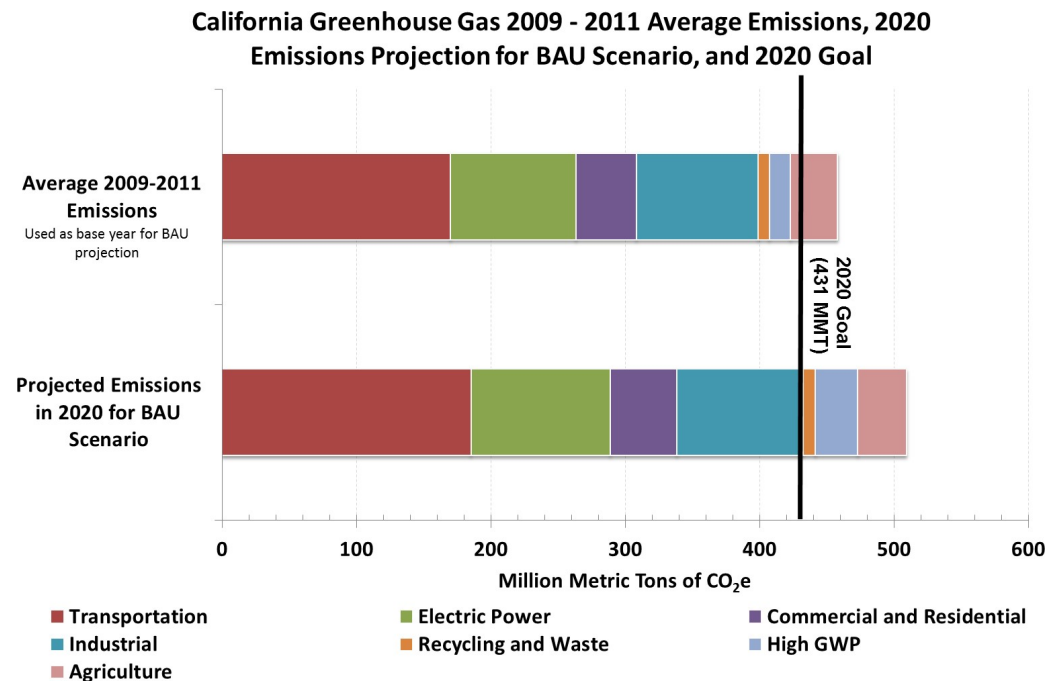
Highest score we saw? 85

The standard textbook treatment



California's Cap-and-Trade Market for Carbon Emissions

- Recent prices have been approximately \$13/ton of CO₂.
- The cap makes pollution scarce, the prices emerge from the trading.



Source: California Air Resource Board,
<https://www.arb.ca.gov/cc/inventory/data/bau.htm>

OSU's Environmental Economics and Policy Major

- Offered through the Department of Applied Economics.
- <https://agsci.oregonstate.edu/degree/environmental-economics-and-policy>
- B.S. offered either on-campus or online
- What do students learn?
 - How to analyze natural resource and environmental management issues by applying economic theories and tools.
 - How to use quantitative techniques to analyze economic data.
 - How to communicate economic analysis of environmental and natural resource issues.
 - They learn about pollution, biodiversity, land use, climate change, fisheries, forestry, and many other issues.



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