

LESSON PLAN: Mercury Emissions

Teacher Handout: Instructions

To begin this lesson, write the information from each of the 12 plants below on index cards and distribute them to the students randomly. Explain to students that these index cards are "Cap and Trade" Power Plant Cards. There are 12 different plants. Two or more students may have the same power plant as long as they are not in the same group.

Plant #	Age (years)	State	Coal type (blend)	Plant emissions (Lb/ton)	Operating Costs (\$)
1	70	PA	Anthracite / bituminous	113	925
2	55	KY	Bituminous	108	900
3	40	WV	Bituminous / subbituminous	92	850
4	25	KS	Bituminous / subbituminous	88	900
5	10	TN	Bituminous	107	925
6	2	CO	Bituminous / subbituminous	94	950
7	65	TX	Lignite	134	925
8	50	OH	Bituminous / subbituminous	85	900
9	35	TX	Lignite	140	850
10	20	IL	Bituminous	104	900
11	15	VA	Bituminous / subbituminous	95	925
12	5	TX	Lignite	131	950

Assumptions:

1. New plants have high operating costs because they are paying off construction bonds.
2. Older plants have high operating costs because they have high maintenance and repair expenses.
3. All coal that is burned has a constant amount of mercury in it. This is not always true. The amount of mercury in coal varies substantially from mine to mine, coal seam to coal seam.
4. Lignite coal has a low average mercury content (USGS data) but low heat content. Therefore, more tons are burned and a larger amount of mercury is emitted.
5. All numbers represent the average production of 1 megawatt-hour of electricity.
6. The cost of improving emissions at a power plant is constant. That is, eliminating the first pound of mercury costs the same as eliminating the 100th pound of mercury. The Law of Diminishing Returns is ignored to make the calculations simpler.
7. There are an infinite number of buyers and sellers for emissions credits and the price never changes.