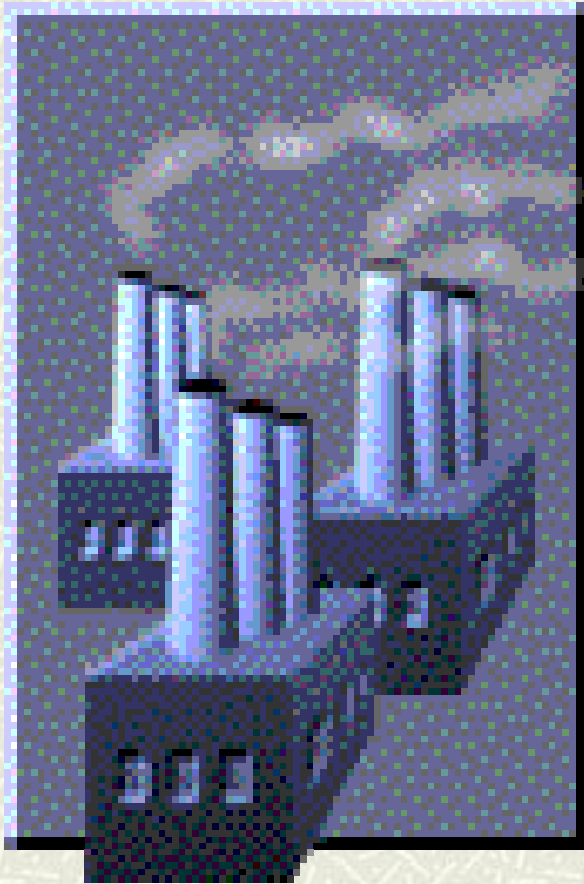# Emissions Trading

- The Economics of Emissions Trading

- The Market for Sulfur Dioxide Emissions

Introduction

Assignment of property rights and creation of a market for pollution contributes to achieve two results:

1. Efficient total amount of pollution is produced.

2. There is no way to reduce pollution without increasing production costs for firms.
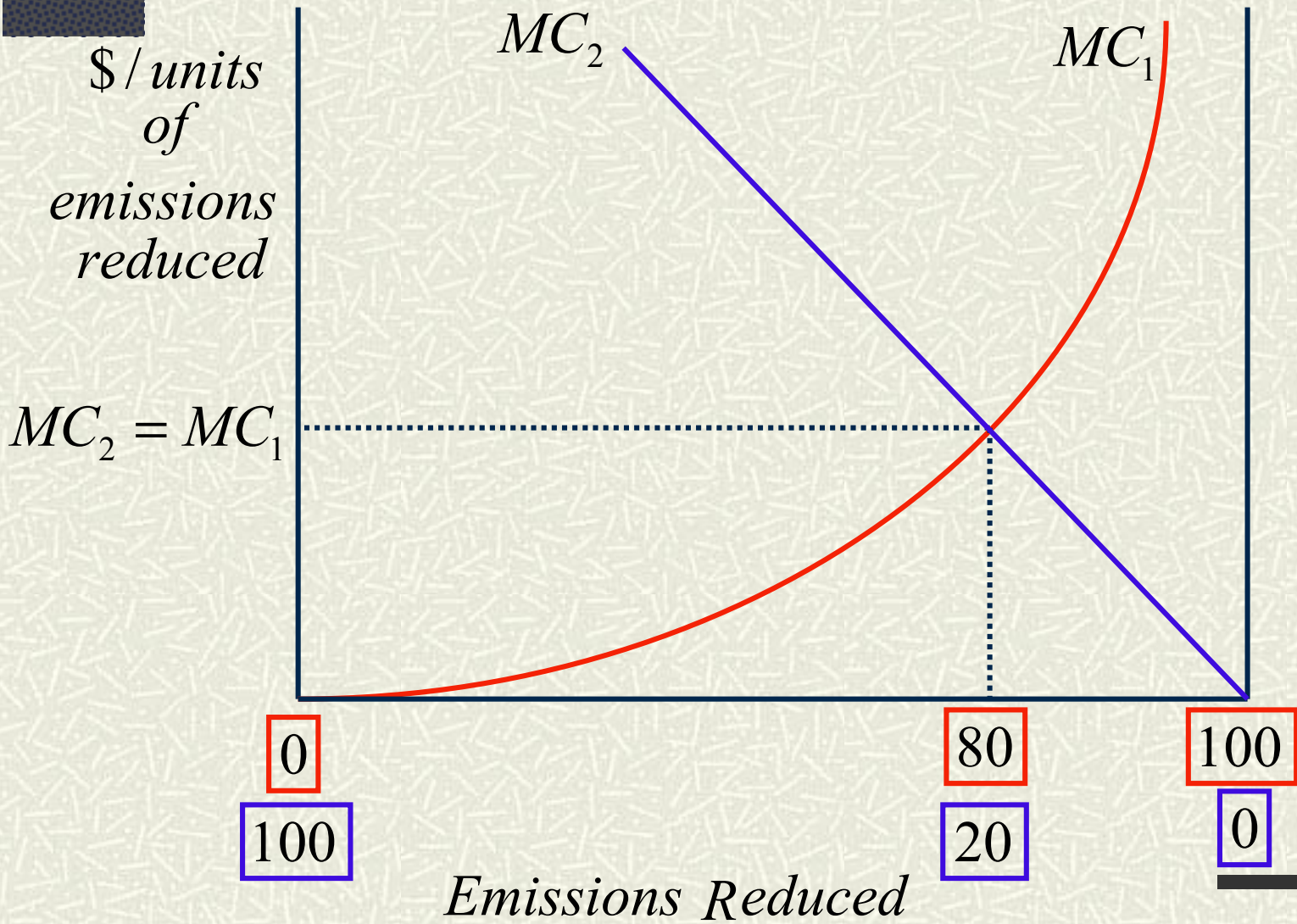
Introduction

- Suppose society has determined the total amount of pollution it is willing to tolerate.

- Next issue is: what is the most cost-effective way of achieving that target?

Cost Effectiveness: Example

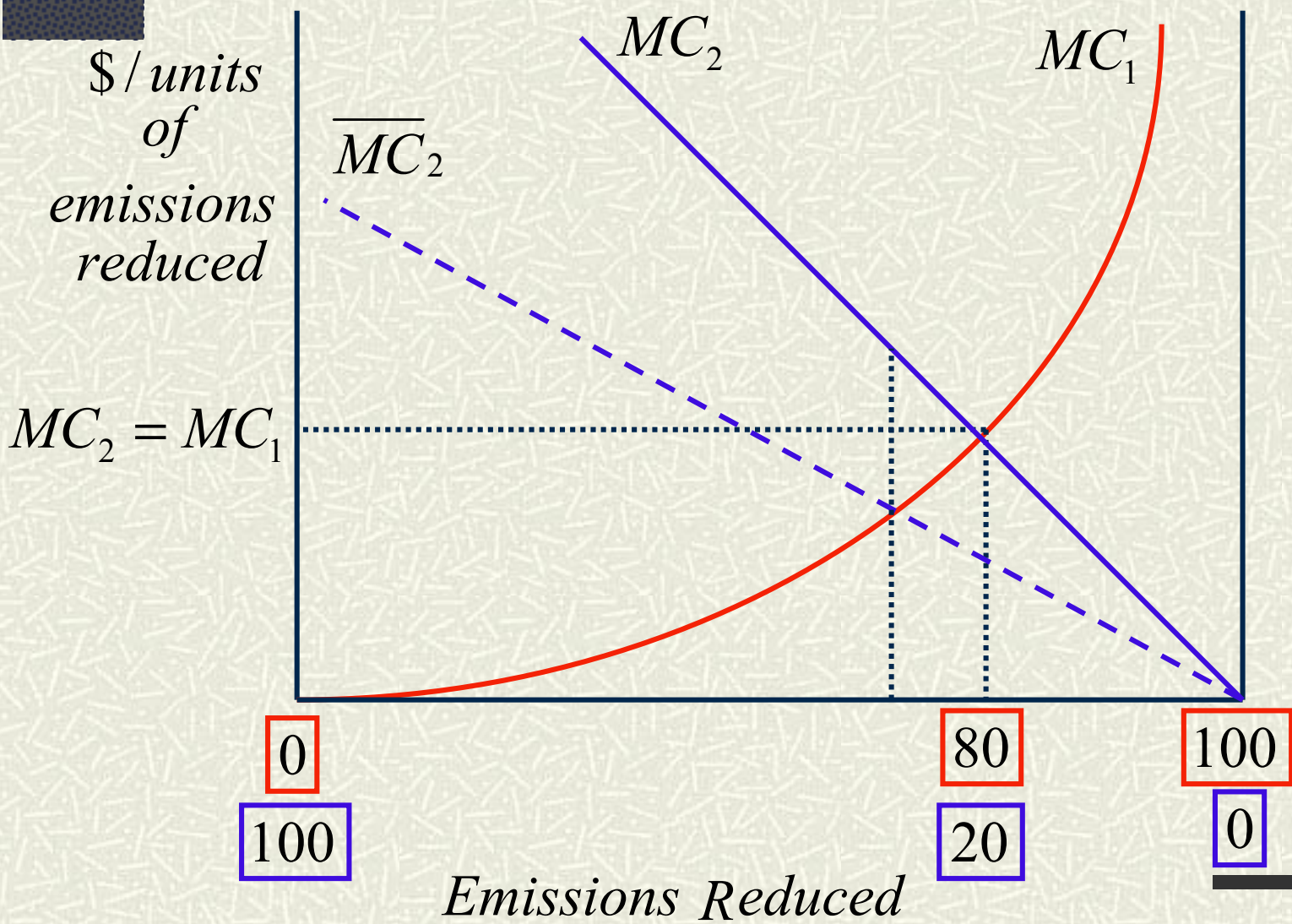- Two types of plants: "efficient" and "inefficient".

- Each plant if unregulated produces 100 units of emissions in a year.

- EPA has target of cutting total emissions by 100 units (50%).

Cost Effectiveness: Example

$\$/units$
of
$emissions$
$reduced$

MC_2

MC_1

$MC_2 = MC_1$

| 0 | 80 | 100 |
| 100 | 20 | 0 |

Emissions Reduced

What If The Regulator Does Not Know?

$\$ / units$
of
$emissions$
$reduced$

$\overline{MC}_2$

MC_2

MC_1

$MC_2 = MC_1$

0		80	100
100		20	0

Emissions Reduced

Information and Incentives

Regulator (EPA): wants to meet pollution target in the most **cost-effective** way, i.e., by requiring more emissions reduction from more efficient plants.

Problem: Regulator does not have all the **information** it needs.

Information and Incentives

Managers of plants: have very good information on how costly it is to reduce emissions at their plants.

**Problem**: Managers do not have incentive to reveal their information.

Emissions Trading

- EPA states that each plant can legally produce up to 50 units of pollution.

- If a plant produces less than 50 units of pollution, it can obtain emission reduction credits. These credits can be bought and sold.

- E.g.: if plant 1 produces 40 units, it obtains 10 credits. Plant 1 can sell 10 credits to plant 2. Plant 2 can increase its pollution by 10 units.

Emissions Trading

$$MC_2$$

$$MC_1$$

$/units of emissions reduced

10

$$MC_2 = MC_1$$

4

| 0 | 50 | 80 | 100 |
| 100 | 50 | 20 | 0 |
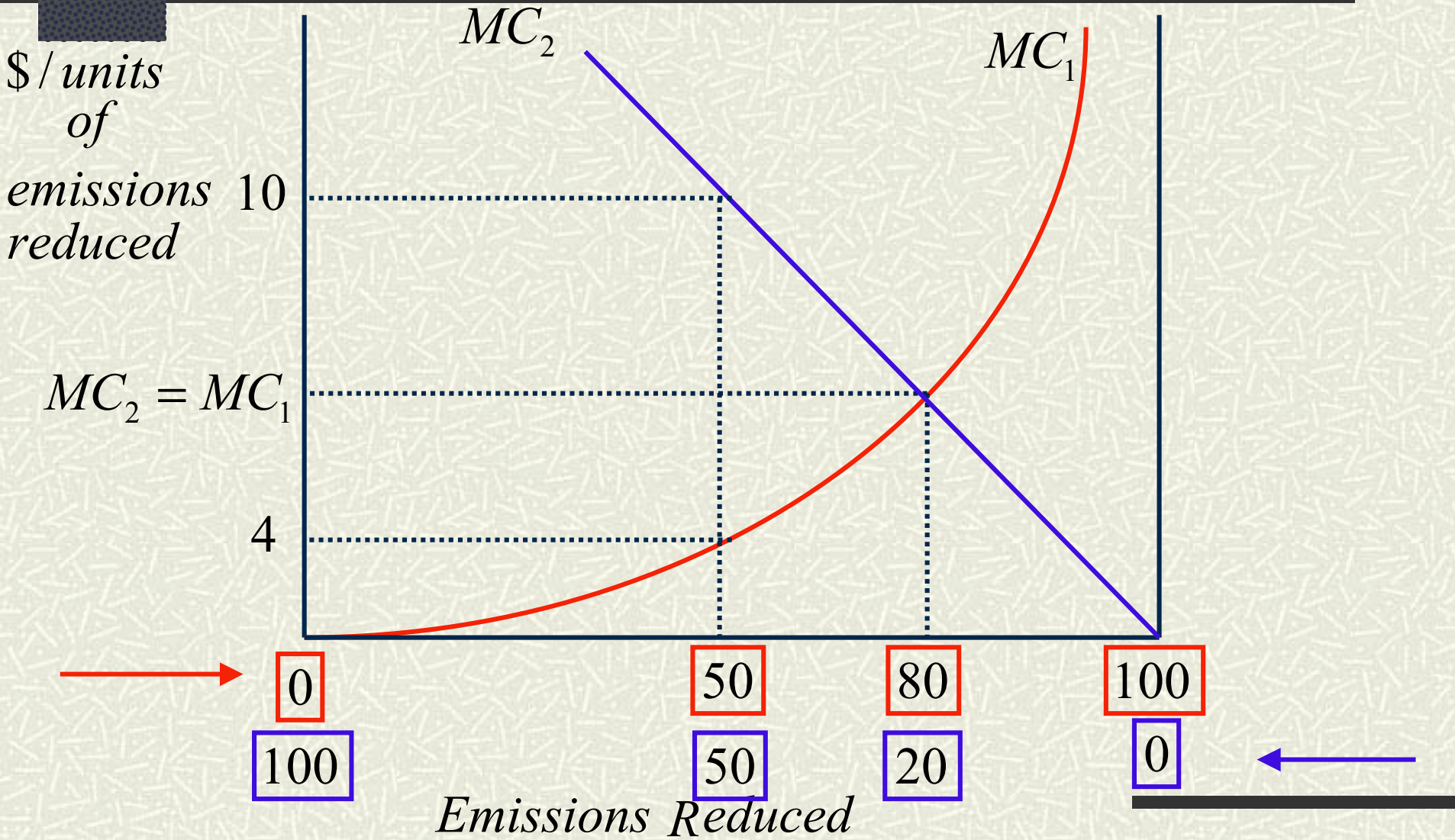
Emissions Reduced

Emissions Trading

- Plant 1 obtains 30 emission reduction credits by reducing emissions by 80 units.

- Plant 1 sells these credits to plant 2.

- Plant 2 can therefore reduce its emissions by less than 20 units, instead of 50.

Emissions Trading in Practice

- Clean Air Act Amendments in 1990: adoption of large-scale use of tradable permit approach to pollution control.

- Amendments focus on control of emissions of sulfur dioxide produced when coal and oil are burned in electric utility boilers.

Emissions Trading in Practice

- Target: reducing yearly emissions of sulfur dioxide by 50% in 2000 with respect to 1980 levels.

- EPA distributed (for free) property rights for emissions among existing plants.

- At the end of each year, a plant has to show that its emissions are not greater than its property rights.

Emissions Trading in Practice

- Property rights can be traded among plants without restrictions on the form of trades: bilateral private trades, auctions, etc.

- Key issue: does the market achieve goal of allocating pollution rights efficiently?

Emissions Trading in Practice

Recent research shows that:

- Initially (early 1990s), few private trades of pollution rights.
- Mid-1990s: volume of private trades increased dramatically, from 130,000 to almost 12 millions per year.
- Significant reduction in transaction costs.

Emissions Trading in Practice

Recent issue:

- In the US "inefficient" plants are located in the Midwest.

- Weather carries pollution back East (Adirondacks).

- New York state has forbidden its utilities from selling pollution rights to Midwestern plants.