Economics and Environmental Decisions: What are the issues?

Outline

- What is Environmental Economics? How does it contribute to environmental decisions?
- Economic applications
  - Benefit-Cost Analysis
  - Cost Analysis
- Pros and cons of these methods with respect to environmental issues
- Shallow Buried TRU: Issues with respect to cleanup versus leaving waste in place

How do we make good decisions?

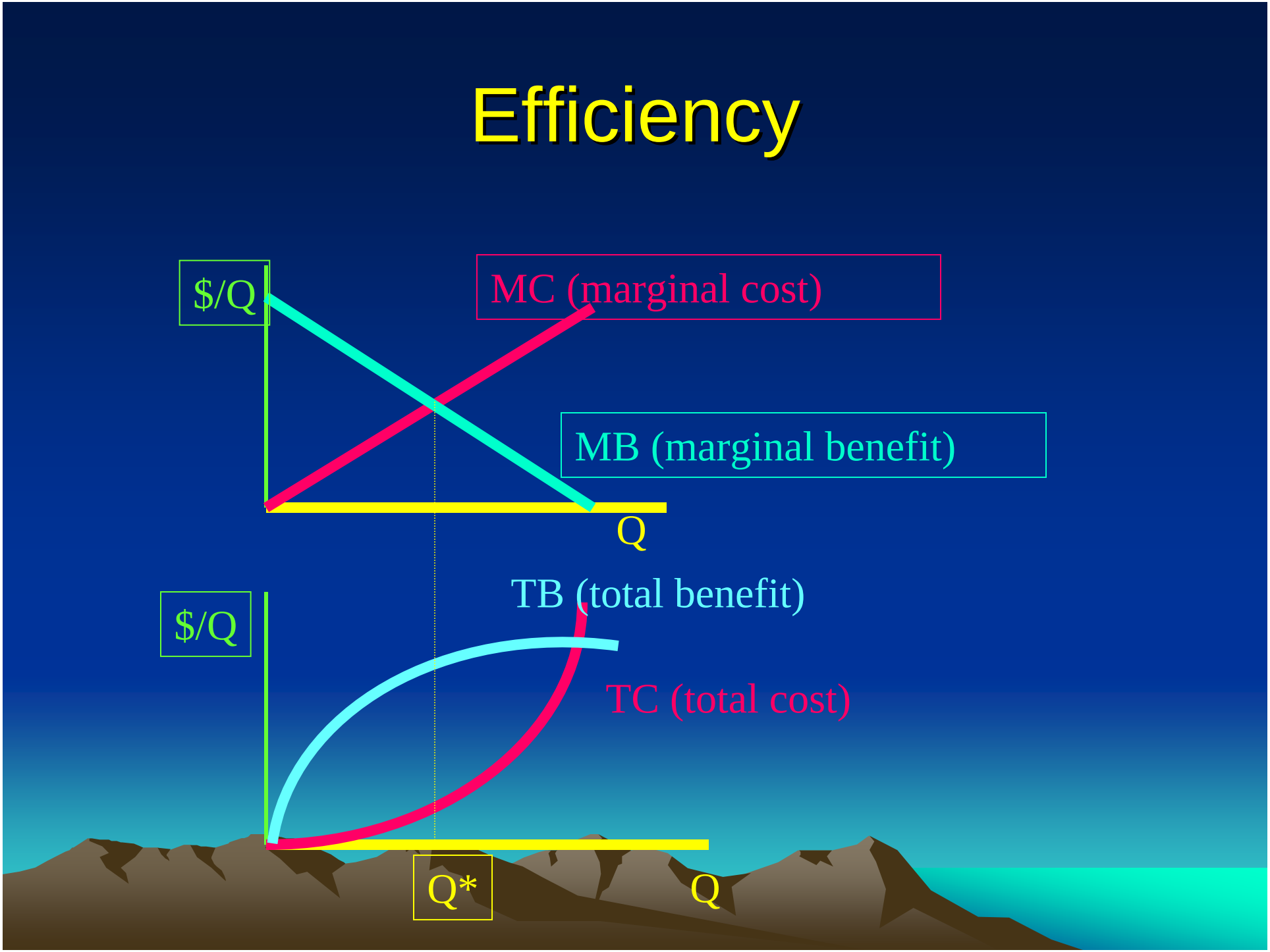
How do we make good decisions?

- Science
- Public
- Risk
- Ethics
- Economics

DEFINITIONS

- **Economics** - allocation of scarce resources
  - land, labor and capital
- **Microeconomics**
  - Consumer theory
  - Producer theory
- **Environmental Economics** - Use of economic theory to study solutions to environmental problems
  - applied Microeconomics

Efficiency


$/Q
MC (marginal cost)
MB (marginal benefit)
Q
$/Q
TB (total benefit)
TC (total cost)
Q*
Q

Economic Analysis

- Benefit-Cost Analysis

  Compare benefits and costs

  - Individuals
  - Firms
  - Public Investment
  - Requirement for some federal agencies

- Cost Analysis

  Same benefits, so compare only costs

Benefit-Cost Analysis

- Ex ante Analysis

  Used to study proposed projects

- Ex post Analysis

  Used to study resource damage

Ex ante Analysis

- Identify either a future project or group of projects
- Identify all impacts
- Value all of these impacts
- Calculate the net benefits
- Make a choice
  - Stokey & Zeckhauser (1978)

Ex post Analysis

- Identifying the affected categories
- Estimating the physical relationship between the pollutant emissions and the damage caused to the affected categories
- Estimation responses by the affected parties toward averting or mitigating some portion of the damage
- Placing a monetary value on the physical damages
  - Stokey & Zeckhauser (1978)

Research Issues

- Economic Analysis

  Time frame - Discount rate/Inflation rate

  Valuation issues

Criticisms of Benefit-Cost Analysis

Debate between philosophers and economists: Large gap between efficiency and intergenerational equity approaches.

Debate between risk experts and economists: Question assumptions economists make about optimal decision making and human behavior.

Debate among economists and scientists: about the meaning of a benefit value of $0 for 100 years or greater in the future when making decisions on waste disposal and cleanup issues.

Why are these controversies pertinent to radioactive waste management and cleanup issues?

- Long time horizon make a comparison of total benefits and total costs difficult.
- Scarce resources and competition for resources at different cleanup goals and locations.
- Science, legal and policy changes overtime lead to different disposal practices.

TRU waste

- Pre 1970 – shallow buried
- Post 1970 – stored waste or waste from cleanup activities to be sent to WIPP
- Post 1970 - TRU in the trenches, 102, 55-gallon steel drums with classified TRU materials disposed at Area 5, 229 Ci, 30 m3 (Bruce Crowe presentation, Dec. 2006)

Shallow Buried TRU waste at DOE sites (Peterson, et al. 2002; DOE 2000)

Facility	Volume (m^3)	Activity (Ci)	Decay Corrected Activity (Ci) to 2006
Hanford	75,800	67,800	60,000
INEEL	36,800	634,000	297,000
LANL	8,620	21,000	21,000
NTS	**21**	**229**	**152**
ORNL	570	6	6
SRS	4,530	21,900	18,500
Total	**126,000**	**745,000**	**397,000**

Issues

- Short term - budget issues
- Long term - future generations