HS 232

Lecture 6 17th Jan 2025

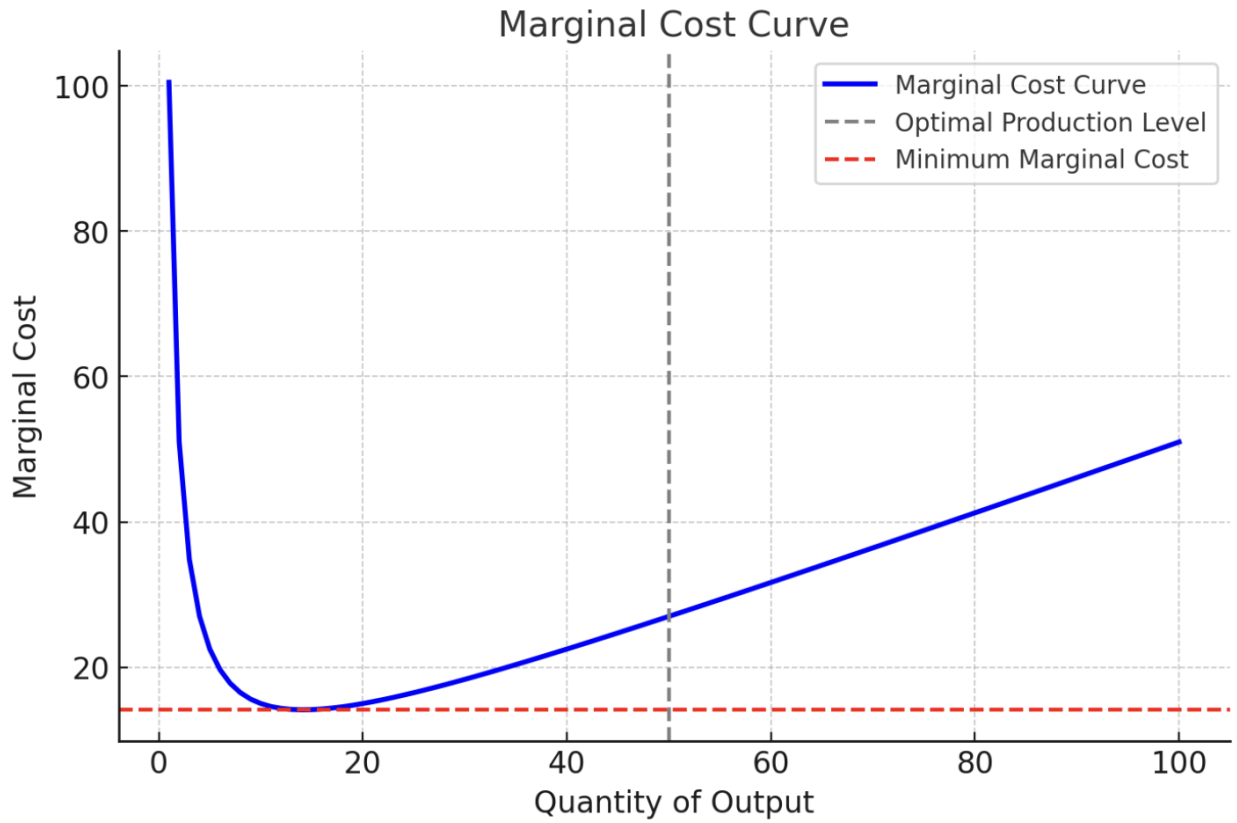
Externalities and Climate Change

Recap

- Externality – spillover effect
- Marginal cost and Total Cost
- Marginal Revenue and Total Revenue
- Social Marginal cost/ revenue Vs Private Marginal cost/ revenue
- Equilibrium conditions – MC= MR; MC must cut MR from below

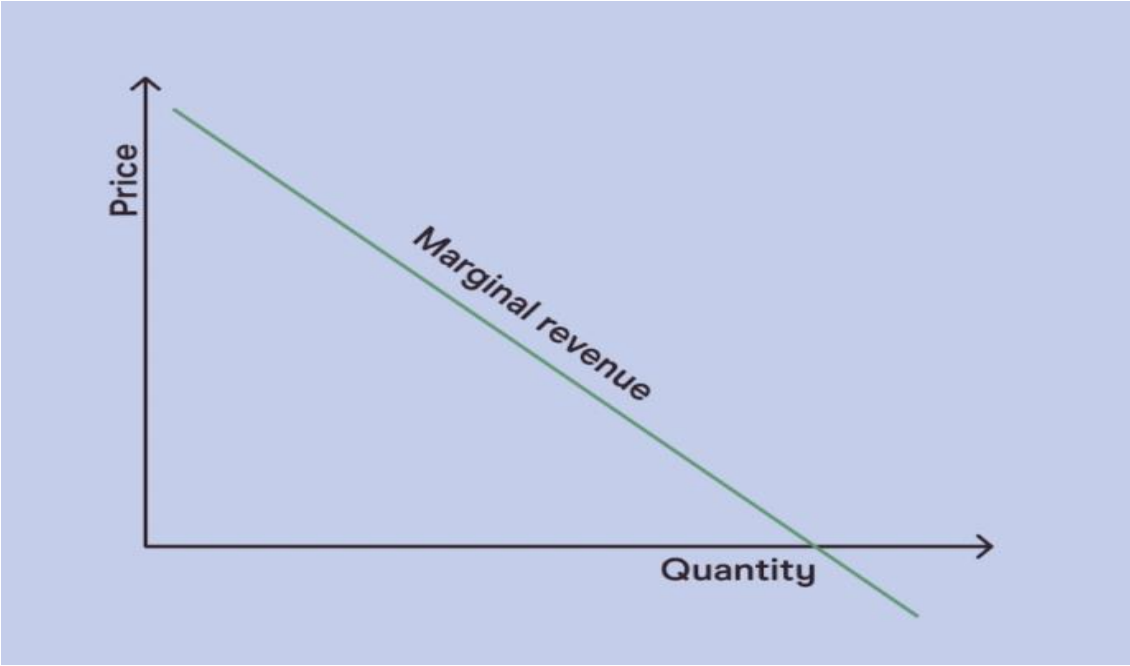
Marginal Cost Curve

Here is the marginal cost curve, which typically shows a U-shaped pattern. Initially, marginal costs decrease due to efficiencies in production, but as production scales up, they increase due to diminishing returns. The optimal production level often lies near the bottom of the curve, where costs are minimized

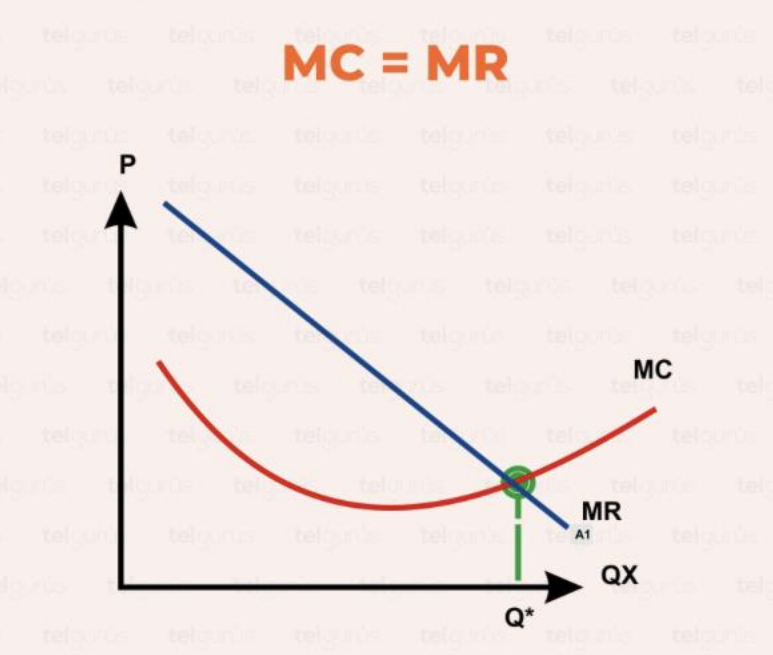


MR curve

- The marginal revenue curve is downward sloping and below the demand curve and the additional gain from increasing the quantity sold is lower than the chosen market price (there is often an economically inverse relationship between price and quantity)



The point of equilibrium



The conditions for a firm to be in equilibrium are:

- **Marginal cost (MC) equals marginal revenue (MR)**
- **MC curve cuts the MR curve from below**
- **MC is rising at the point of equilibrium**

Externalities: Definition

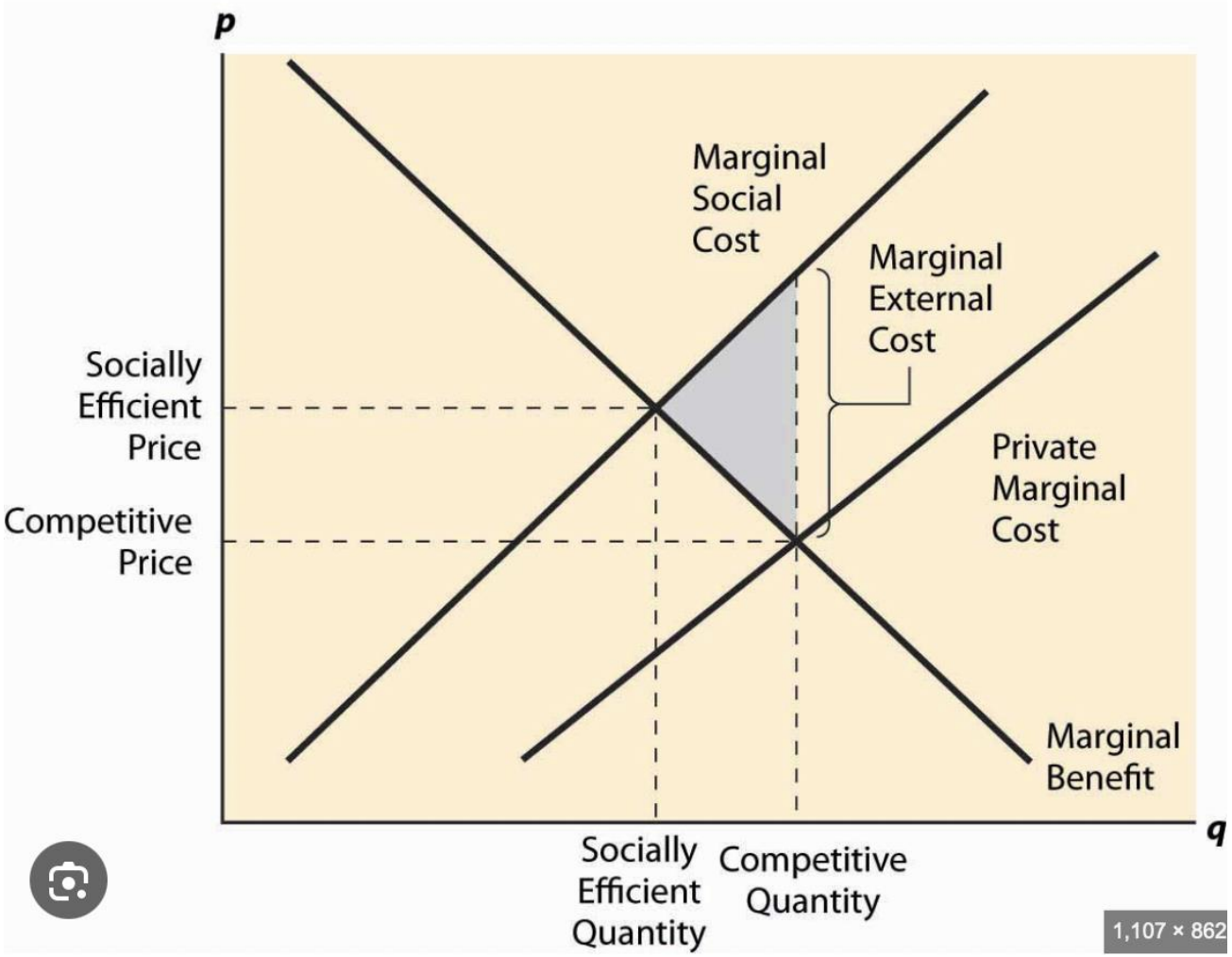
- External cost (benefit)
  - "A cost (benefit) of an activity that falls on people other than those who pursue the activity"
- What else is going on?
  - There is often no formal market for the cost or benefit in question
  - Private negotiation typically must occur to increase efficiency
- They are defined as **third party** (or spill-over) **effects** arising from the **production** and/or **consumption** of goods and services for which no appropriate compensation is paid.
- Externalities can cause **market failure** if the **price mechanism** does not take into account the full **social costs** and **social benefits** of production and consumption.
- **Private and Social cost**
  - Externalities create a **divergence** between the **private** and **social costs** of production.
  - Social cost includes all the costs of production of the output of a particular good or service. We include the third party (external) costs arising, for example, from pollution of the atmosphere.

- **SOCIAL COST = PRIVATE COST + EXTERNALITY**
- **SOCIAL BENEFIT = PRIVATE BENEFIT + EXTERNALITY**

Internalizing externality

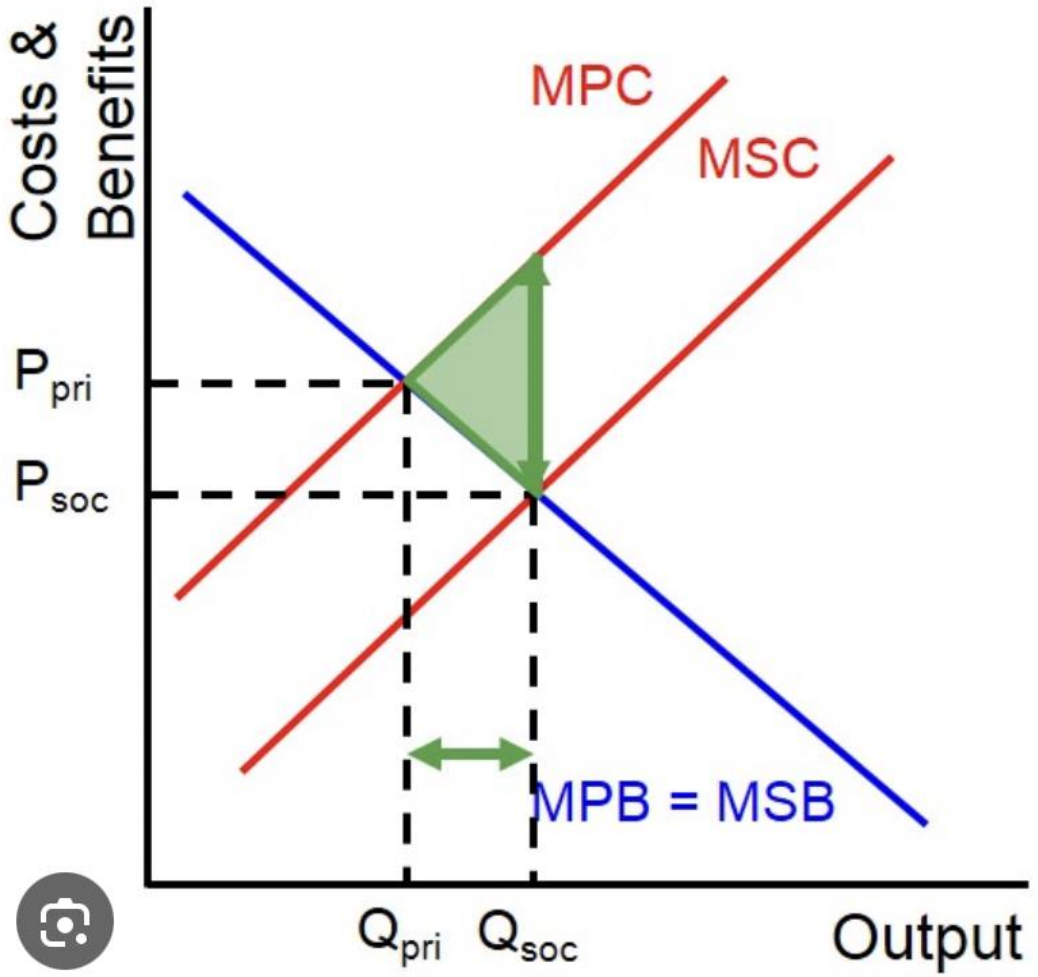
- The aim of internalization is to ensure socially optimal production and consumption patterns by enabling economic units to adapt prices and markets. State intervention or market-based instruments are possible approaches to improve the market performance
- There are basically two possibilities for the allocation of rights:
  - Model I: polluter-pays principle : The property rights are allocated to the party who is (potentially) affected by pollution. I.e., the polluter has to pay a compensation to the property-rights holder if (and only if) s/he restricts the holder's possibilities of production and/or consumption by causing an externality.
  - Model II: affected-party-pays principle : The property rights are allocated to the (potential) polluter. The (potentially) affected party compensates the polluter for avoiding the externality (Coase Theorem)

Externality (Negative) – Shifts in costs (Variable cost)



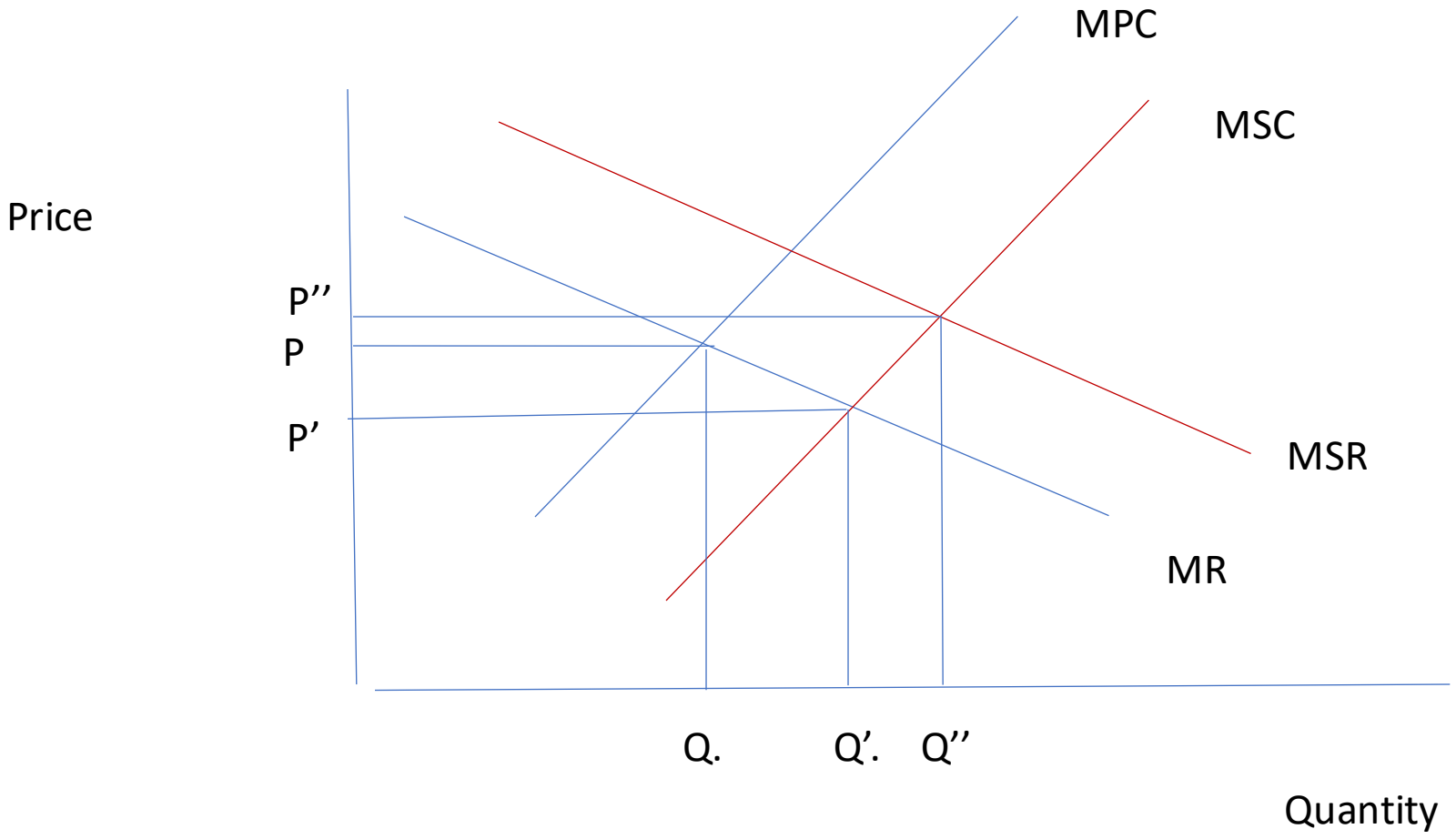
PMC < SMC
PMB> SMB

Externality (Positive) - Shifts in costs



PMC > SMC
PMB < SMB

Shifts in MC and MR both due to increase in demand or production



What is a public good? – market fails

- a **public good** is a good that is both non – excludable and non - rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.
- Property rights are not clearly defined - leads to market failure (DD and SS does not determine the price)
- Externality and public good – e.g., streetlight (too expensive to internalize it)
- Internalizing externality – include externality into cost of production or in prices – (subsidies – positive; taxes – negative) quantity that is above/ below the socially desirable level

Market failure

- Market failure refers to a situation defined by an inefficient distribution of goods and services in the free market. In an ideally functioning market, the forces of supply and demand balance each other out, with a change on one side of the equation leading to a change in price that maintains the market's equilibrium.
- In a market failure, however, this balance is disrupted.
- When markets fail, the individual incentives for rational behavior do not lead to rational outcomes for the group. In other words, each individual makes the correct decision for themselves, but those prove to be the wrong decisions for the group as a whole.

Climate change – an environmental externality

- Nicholas Stern (2008, p.1) states, that "Greenhouse gas (GHG) emissions are externalities and represent the biggest market failure the world has seen."
- Global pollution creates global bad – borne by all – a negative externality
  - an **externality** is the cost or benefit that affects a party who did not choose to incur that cost or benefit
  - adopt policies that "internalize" an externality
- But there is no mechanism to internalize CO2 emission

The challenge of climate externality

- First, it does not matter where it is produced, its effects are global.
- Second, most impacts are long-term.
- Third, there is still a great deal of scientific uncertainty and lastly, the effects are probably extensive and irreversible (Stern, 2008, p.2).

Reducing GHG – positive externality – problem of free riders

Time inconsistency - making decisions that make sense and are optimal at one point of time but might not be optimal at another point of time.

Domestic politics problems

Climate change – an environmental externality

- Climate change is a classic economic problem – allocating scarce resources over time given knowledge of preventable economic damage in the future.
- Global pollution creates global bad – borne by all – a negative externality
- No mechanism to *internalize* CO2 emission
- Further CC is a public good issue too
  - a **public good** is a good that is both non – excludable and non - rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.
- Time frame is – intergenerational
- Scale – Global
- Future – highly uncertain

Economics and Climate Change

Climate change debate has been dominated science and politics, but economics has started playing an important role - efforts to understand and cope with climate change

Estimation of climate change damage plays a major role in framing adaptation and mitigation strategies

Economics is very closely related to climate change and has contributed in both negative and positive ways

Economic growth and GHG emission

Negative :

- Economic growth and development – GHG emission – negative influence on climate change
- Industrial revolution – coal-based energy – driving force – GHG emission

Positive :

- Possible solution to many aspects of climate change problem
- Cost benefit analysis of mitigation projects – for realistic policy options