# ClimTrans2050

## The Economic Dimension

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# The economic dimension

**What economic costs come along with a transition to a low carbon economy for a given level of functionality?**

Objective:

- Description of the provision of functionalities in economic terms
- Comparison across different technologies
  - different technologies may be used for the same functionality
  - which "breakthrough" technologies may substitute current technologies and at what costs?

# Stock and flow relations

To provide a functionality, two types of costs arise:

- Investment costs
  - Build up capital **stock** over time
  - Long term
- Operating costs
  - **Flow** (includes energy → emissions)
  - Does not add to capital stock
  - Short term

Investment costs and operating costs are connected…

# Stock and flow relations

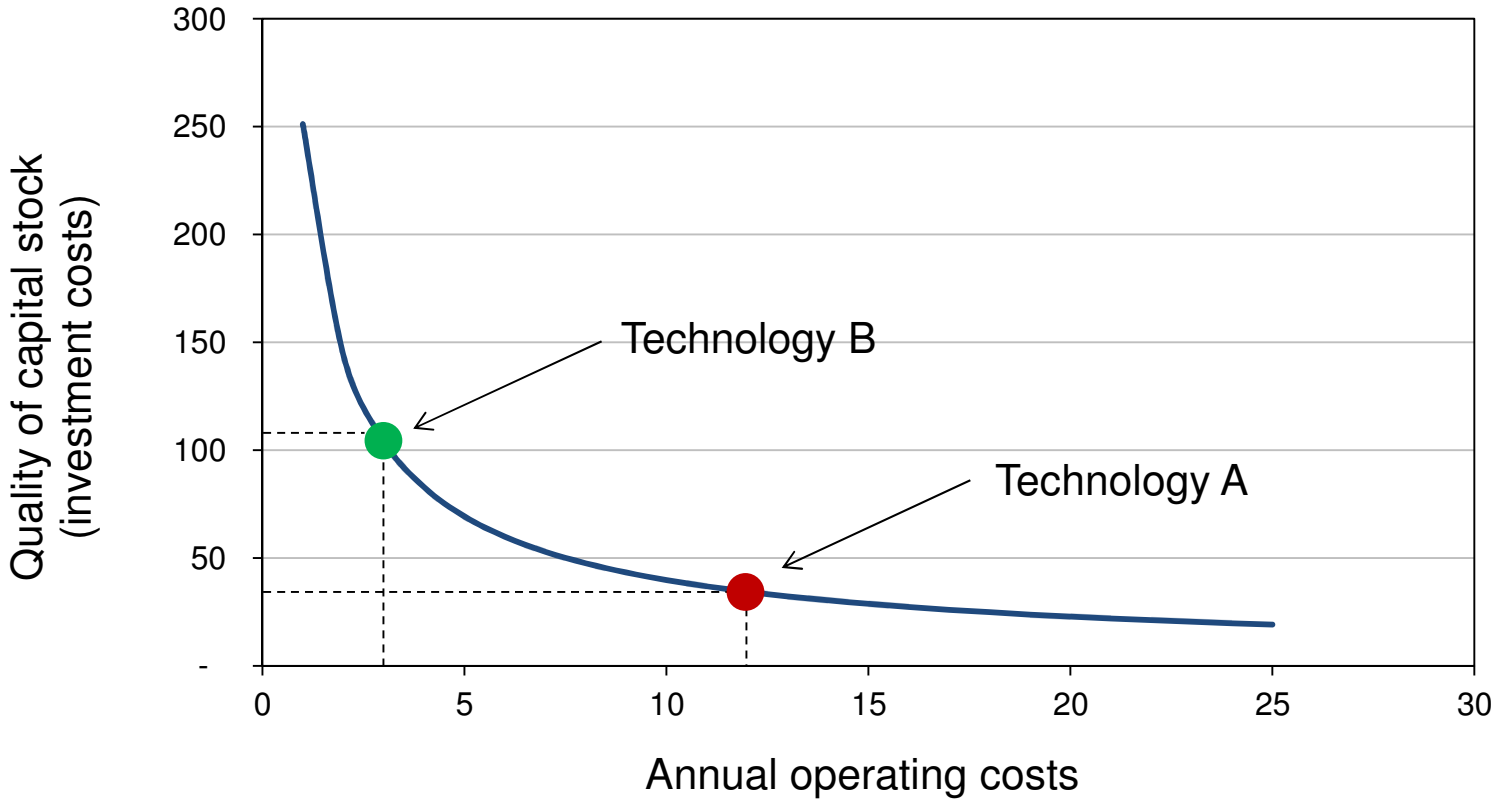
- The quality of the emerging capital **stock** determines annual operating costs and therefore energy **flows** and emissions

Examples:

- Zero or plus-energy buildings:
  high quality of buildings with low costs for heating
- High efficiency engines in vehicles:
  high quality vehicles with low costs per person-km

→ In many cases: net environmental gains in transformation to a high quality capital stock

# Stock and flow relations




Use technology **B** instead of **A** at lower annual operating costs, keeping the provision of functionality at a "sufficient" level

# Different economic perspectives

**User**

- Capture costs arising only to the beneficiary of functionality
  → user costs =
  annual investment costs (annuity) + operating costs p.a.

**Society**

- Includes externalities (e.g. social costs of carbon, particulate matter, noise, etc.)
  → social costs =
  annual social investment costs (annuity) + social operating costs p.a.

# Stock and flow relations

- Aim is
  - provide functionalities at specified ("sufficient") level
    → depends on factors like demographics, life-styles, institutions, spatial planning etc.
  - Reduce environmental impact
  - Do so at as low level of costs (user costs, social costs) as possible

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