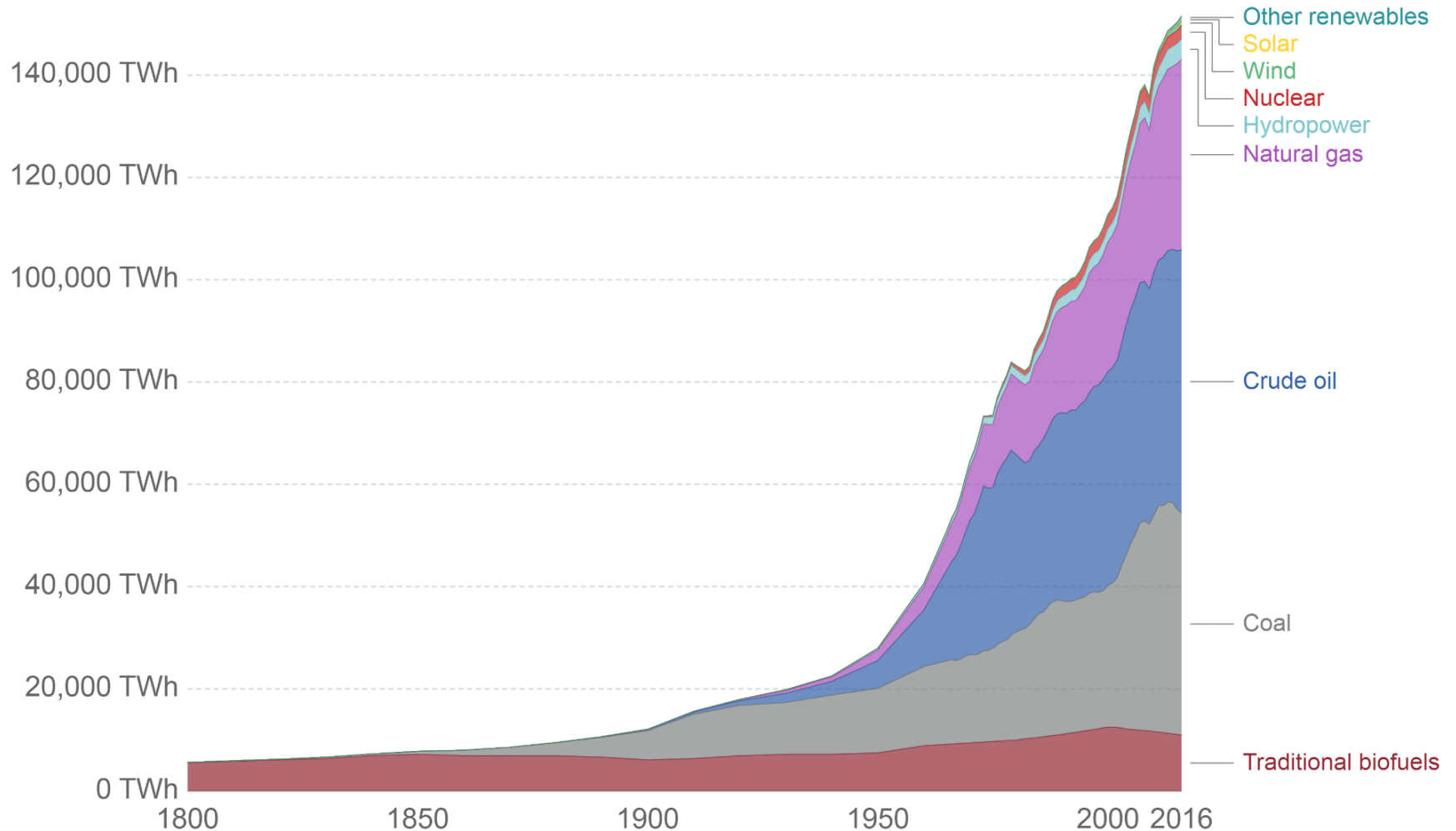


Environmental aspects of energy – introductory remarks

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Global Primary Energy Consumption, World

Global primary energy consumption, measured in terawatt-hours (TWh) per year. Here 'other renewables' are renewable technologies not including solar, wind, hydropower and traditional biofuels.



Source: Vaclav Smil (2017) and BP Statistical Review of World Energy

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State of the global environment

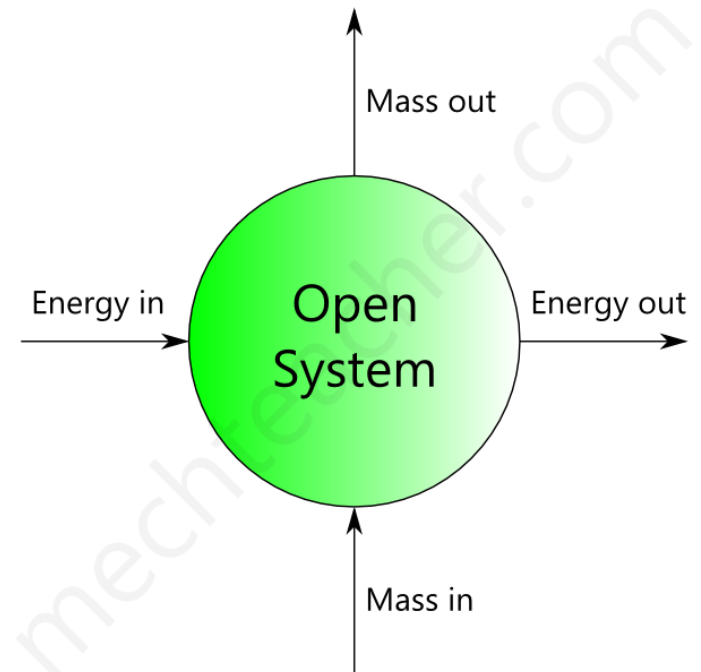
Five concerning trends:

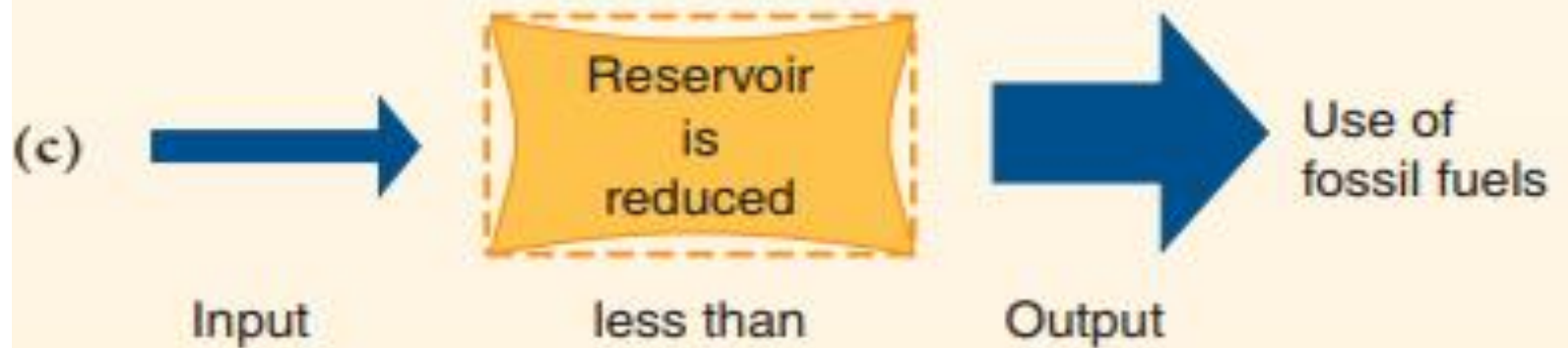
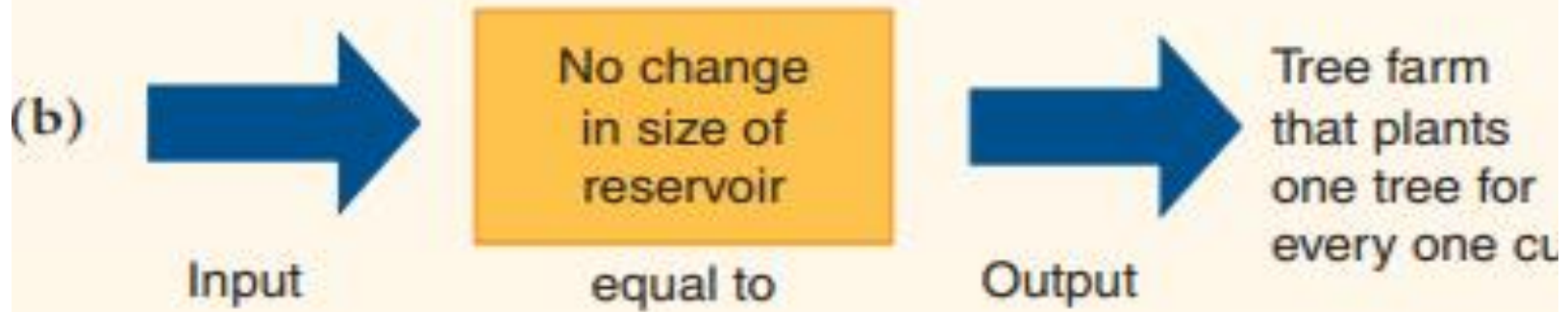
- 1) Population growth
 - 2) Economic development
 - 3) Decline of life support ecosystems
 - 4) Global atmospheric changes
 - 5) Loss of biodiversity (variety and variability of life)
-
- Fossil fuels facilitate these trends.

Requirements of the course

System theory

- Framework to study the systems.
- Set of components that function together to act as a whole.
- Separated by spatial and temporal boundaries.
- Natural or man-made.
- Open vs. closed systems.
- Earth as a system.





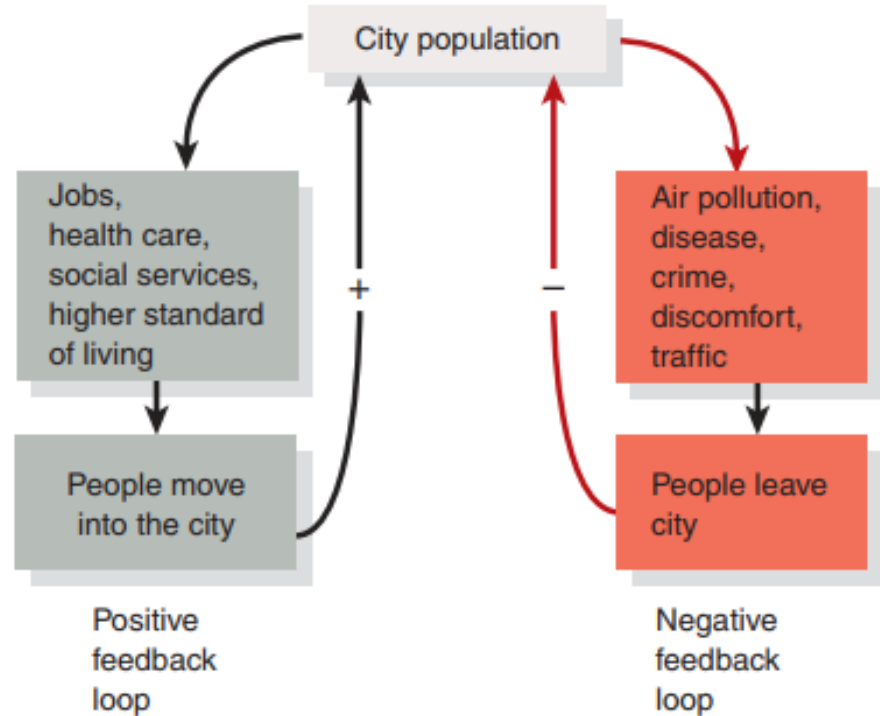


Human population in large cities (feedbacks)

Feedback – when output of the system also serves as an input, leading to changes in the state of the system.

Systems tend to dynamic equilibrium, from time to time disrupted by natural and human-induced disturbances → changes over time.

Positive/negative feedbacks.





Source: Česká
televize

Sources

- Mechteacher.com: Thermodynamic System and its Types
- Botkin, D.B.; Keller, E.A.: Environmental Science: Earth as a Living Planet.