Week 1: Human impact

Human impact on water and energy resources

ESM 102 Winter 2015

I = P A T

- Impact
- Population of consumers
- Affluence or consumption
- Technology is the tools and processes used

Consumption has two types of impact

- Reduction in the available resource
  - Using water from a limited source
  - Burning fossil fuels
- Side effects from consumption
  - Depleting stream flow that leads to injury to fish
  - Emission of pollution from fossil fuels
    - CO2
    - Hg, SO4, etc

Water consumption in the USA

Ag = 40%

Elect = 40%

Pub = 12%

Ind = 6%

Dom = 1%

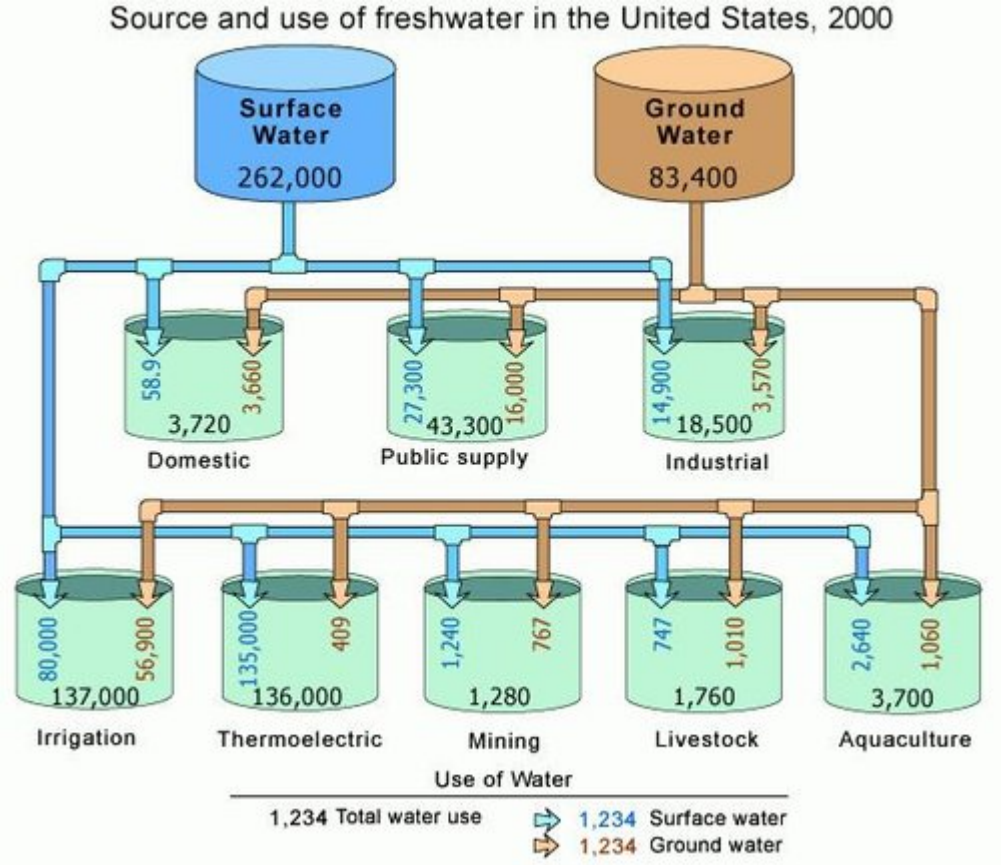
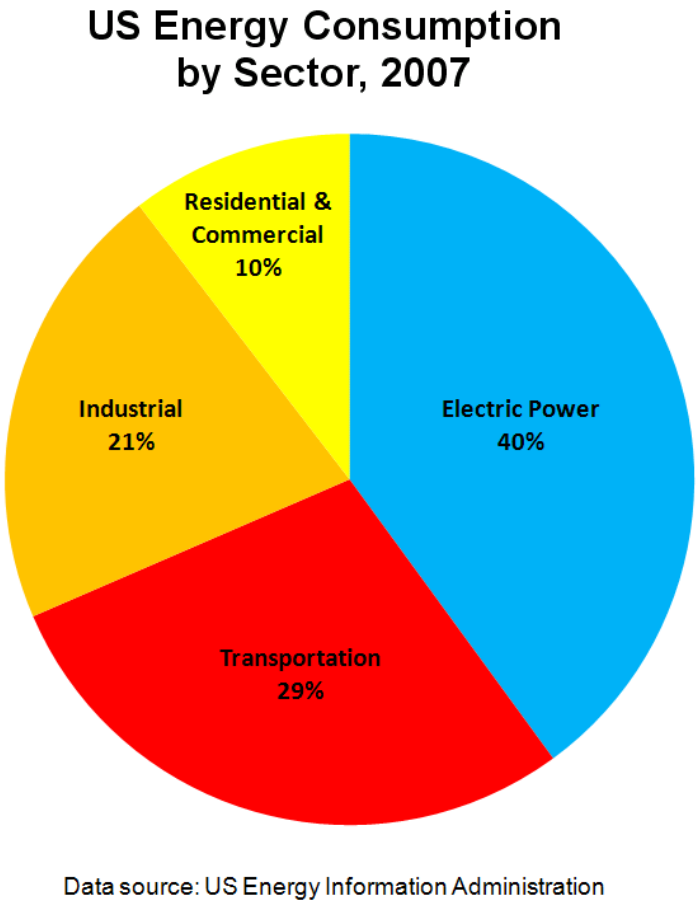


Image from http://www.eoearth.org/view/article/152861/

Energy consumption in the USA



- Residential and commercial is only 10%
- Energy sources
  - 73% of total energy comes from fossil fuels
  - 9% from nuclear
  - 8% from renewables

Other impacts

- Water consumption
  - Stream flow depletion
  - Water pollution from use
  - Shifting ecosystems (by changing water delivery)
  - Others?
- Energy consumption
  - Pollution
  - Indoor pollution
  - Social structure depends on energy
  - Others?

An important role of scientific studies is to determine what these side-effects are. Rigorous studies follow leads and explore unknown areas.

Some people don't have enough water and/or energy

- Almost 1 billion people in the world don't have access to sufficient drinking water
  http://www.unwater.org/water-cooperation-2013/water-cooperation/facts-and-figures/en/
- Nearly 3 billion people cook over woodstoves
  - (http://www.cleancookstoves.org/our-work/the-issues/environment.html)

“Appropriate” technology can help

- Innovations that help people
- Provide clean renewable sources of water and energy
- Minimize negative impacts
- Useful for
  - Developing regions
  - Sustainable communities
  - Disaster preparedness or response