

Energy and fuels

- **Energy** = required in
 - domestic heat
 - electricity (light and cooking)
 - industrial processes (services)
 - farming/agriculture
 - transportation
- = increase our standard of living
- = **heartbeat of the economic world** ⇔ economic development would not occur without energy

- **Developed countries:** >80% of the electricity is generating by **fossil fuels:**
 - *Coal*
 - *Oil*
 - *Natural gas*
- => fossil fuels are main energy sources
- => *major contribution to air pollution*
 - e.g. Europe energy production

- **Economically LDCs:** major part of energy is generated by **biomass:**
 - (fuel)wood
 - volcanic activity
 - geothermal energy

Energy sources

- The *demand* for energy is *increasing* but the *resources* are *shrinking*.
- By the late 1980s, experts estimated that the world oil reserves were enough for 50 years' consumption.
 - *What would happen then?*

■ Our population needs new resources and more efficient use of resources...

- **Non-renewable energy sources** – those which have only a limited supply. They cannot be replaced within a human lifetime.
 - e.g. coal, oil, natural gas
- **Renewable energy sources** – resources whose supply can't be exhausted. They can be replaced within a relatively short period of time.
 - e.g. biomass (wood), wind, geothermal heat, sun, tidal
- **Fossil fuels** – a fuel made from the remains of living organisms that has taken millions of years to form. Burning of these fuels contributes to CO₂.
- **Alternative sources of energy** – do not pollute the atmosphere. Increasingly importance to our future energy needs.
- **Biomass** – burning of organic material (wood, animal dung).

Generating power

Main types of power plants/stations

- Coal-fired power stations
- Oil-fired power stations
- Gas-fired power stations
- Nuclear power stations
- Hydro-electric power stations

Coal-fired power stations

- Built on/near coalfields ⇔ coal is costly to transport.
- Large amounts of water needed to produce steam to drive the turbines => usually located along large rivers or by coastal estuaries.
 - e.g. Ostrava region, Upper-Silesian basin (PL)

Oil-fired power stations

- Located in sheltered coastal inlets with deep water to allow entry for large oil tankers or found close to oil refineries (convert the crude oil into heavy fuel oil)

- Oil brought there by oil tankers or pipelines.
- Recent EU fuel policy: no further oil-fired power plants will be built.

Gas-fired power stations

- = more popular nowadays
- Located mainly to places with easy access to gas piped from central extraction sites, e.g. North Sea
- Since 1991, many gas-fired power stations have been built ⇔ many coal-fired switched from coal to gas as their preferred energy source.

Nuclear power stations

- Built on flat, stable land with easy access to water ⇔ cooling the nuclear reactor.
- Located away from major population centres for safety reasons.
- Require good transport conditions/links to allow easy transportation of raw materials (uranium + plutonium) and waste products.
- = very efficient and relatively cheap production
- = not polluting the air directly (only water vapour)
- but potential problems (difficulties) with nuclear waste disposal.

How and where can we store that nuclear waste?

Hydro-electric power stations

- Located mainly in upland (mountain) areas ⇔ high rainfall provides a constant supply of water.
- Narrow valley with strong and impermeable rock are ideal for dam construction.

Keywords

- energy generation, economic development, fossil fuels, biomass, geothermal energy
- (non-)renewable/alternative energy sources, energy efficiency, coal-/oil-/gas-fired power stations, nuclear and hydro-electric power plants
- coalfield, turbine, river estuary, crude oil, heavy fuel oil, oil tanker, pipelines, nuclear reactor/waste, air pollution, dam