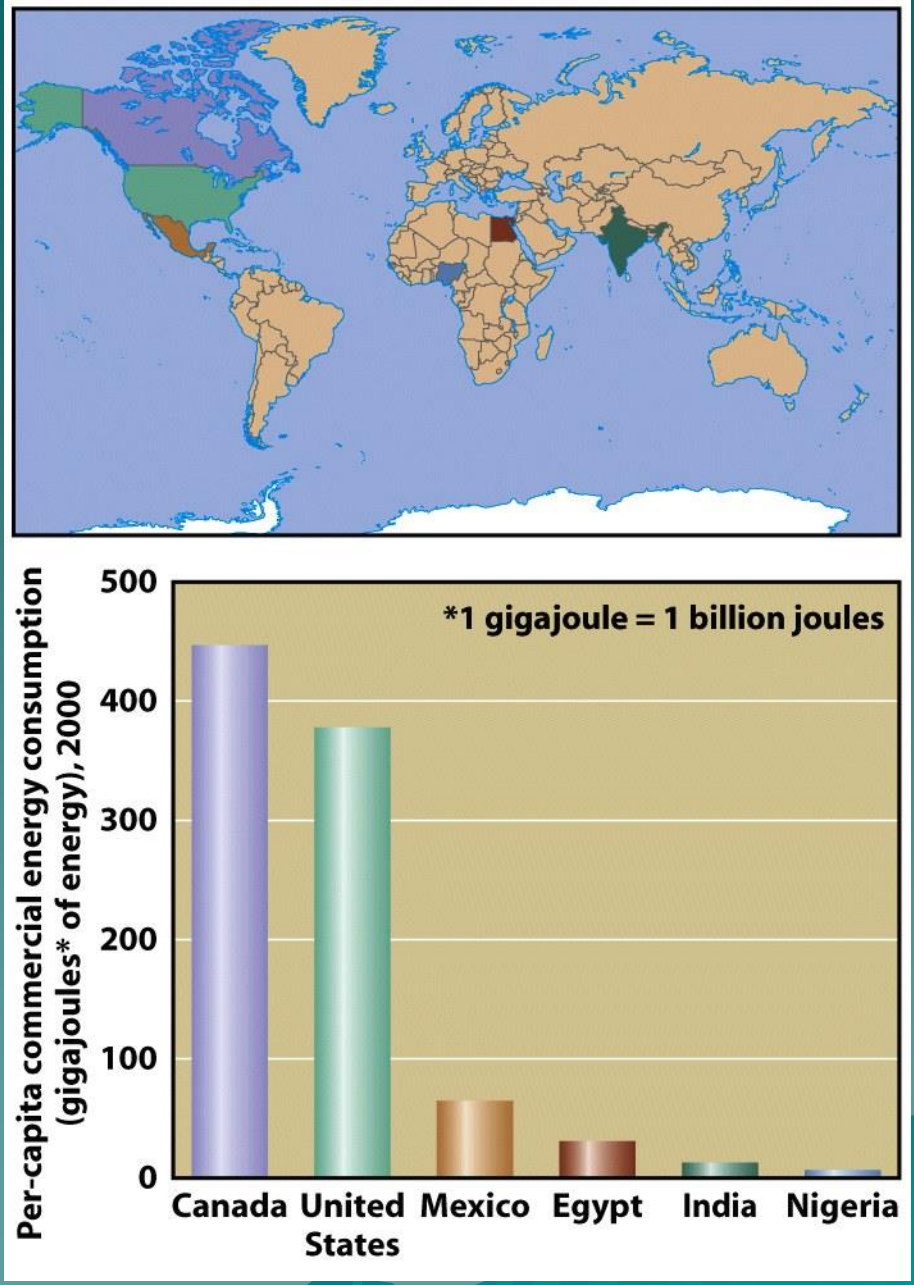
Fossil Fuel Formation

Fold Left Page in Half (Vertically)

Advantages	Disadvantages

- Per capita energy consumption of selected developed and developing countries



Fossil Fuels

- Composed of the fossils of prehistoric organisms that existed millions of years ago
  - Includes coal, oil (petroleum) and natural gas
- Non-renewable resource
  - Fossil fuels are created too slowly to replace the reserves we use.

    (takes millions of years to form)

How Are Fossil Fuels Formed?

- 300 million years ago
  - Climate was mild
  - Vast swamps covered much of the land
  - Dead plant material decayed slowly in the swamp environment

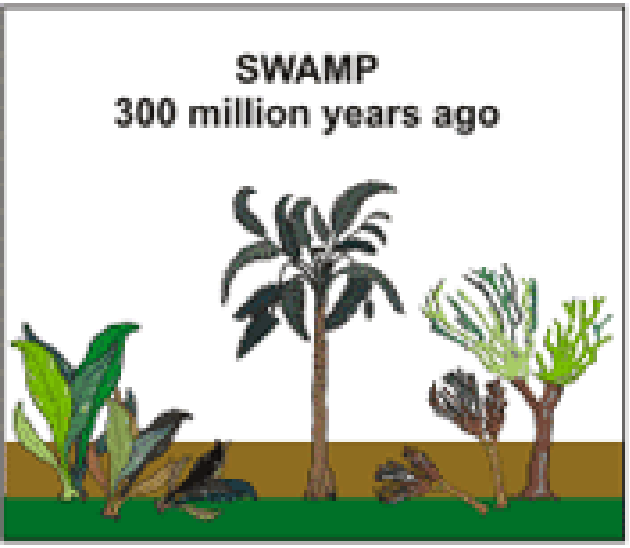
How Are Fossil Fuels Formed

- Coal
  - Sediment deposited over swamp plants
  - Heat, pressure, and time turned the plant material into carbon-rich rock (coal)

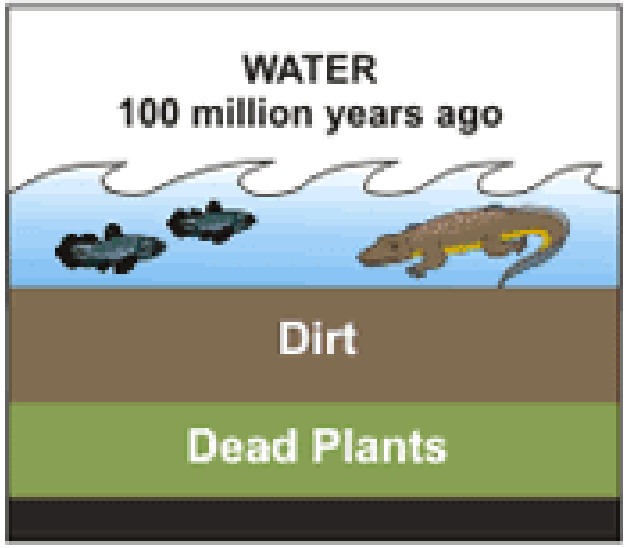
- Petroleum (oil) and Natural Gas
  - Sediment deposited over ocean plants and animals
  - Heat, pressure, and time turned them into petroleum and natural gas

Coal

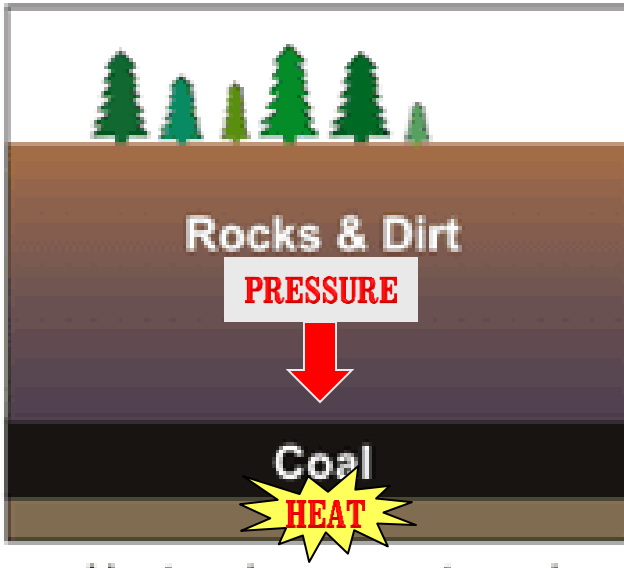
HOW COAL WAS FORMED



Before the dinosaurs, many giant plants died in swamps.



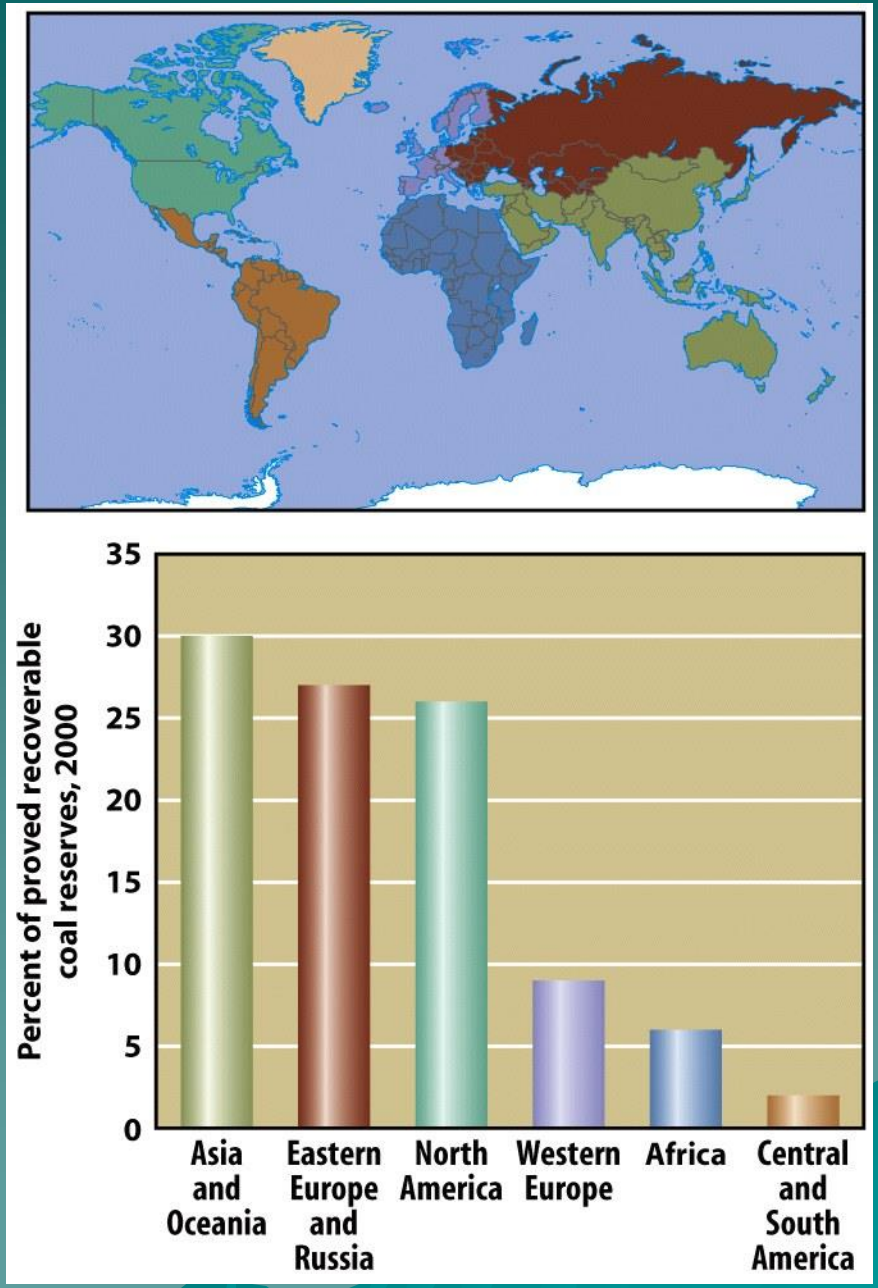
Over millions of years, the plants were buried under water and dirt.



Heat and pressure turned the dead plants into coal.

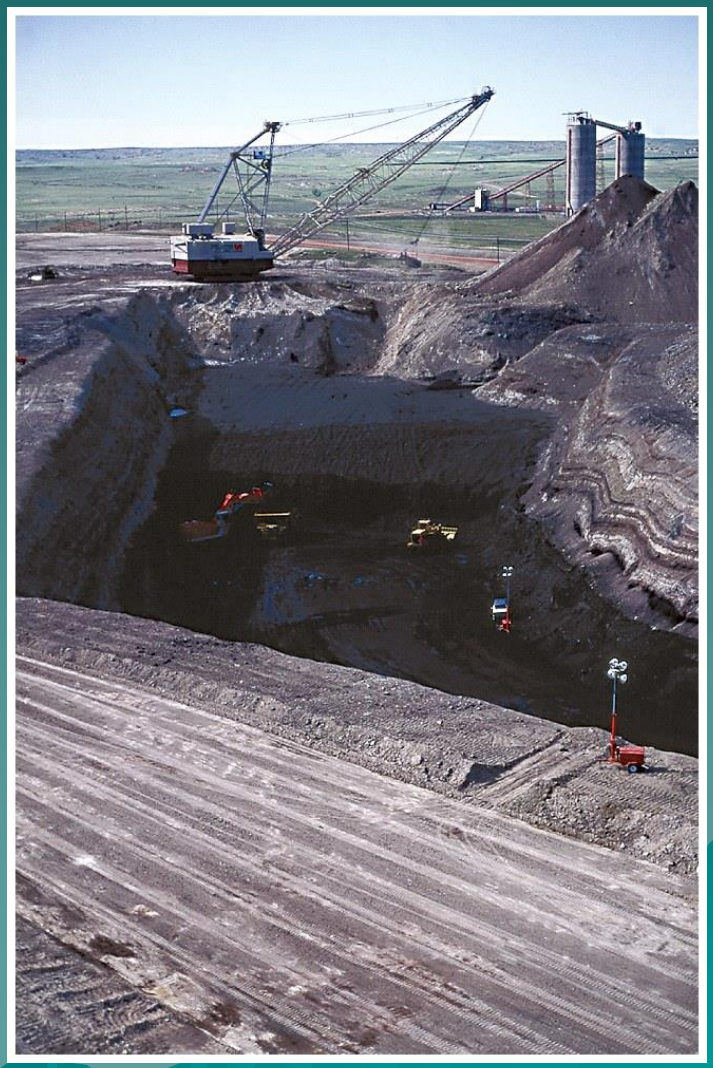
Coal

- US has 25% of world's coal supplies
- Known coal deposits could last 200 years
  - At present rate of consumption

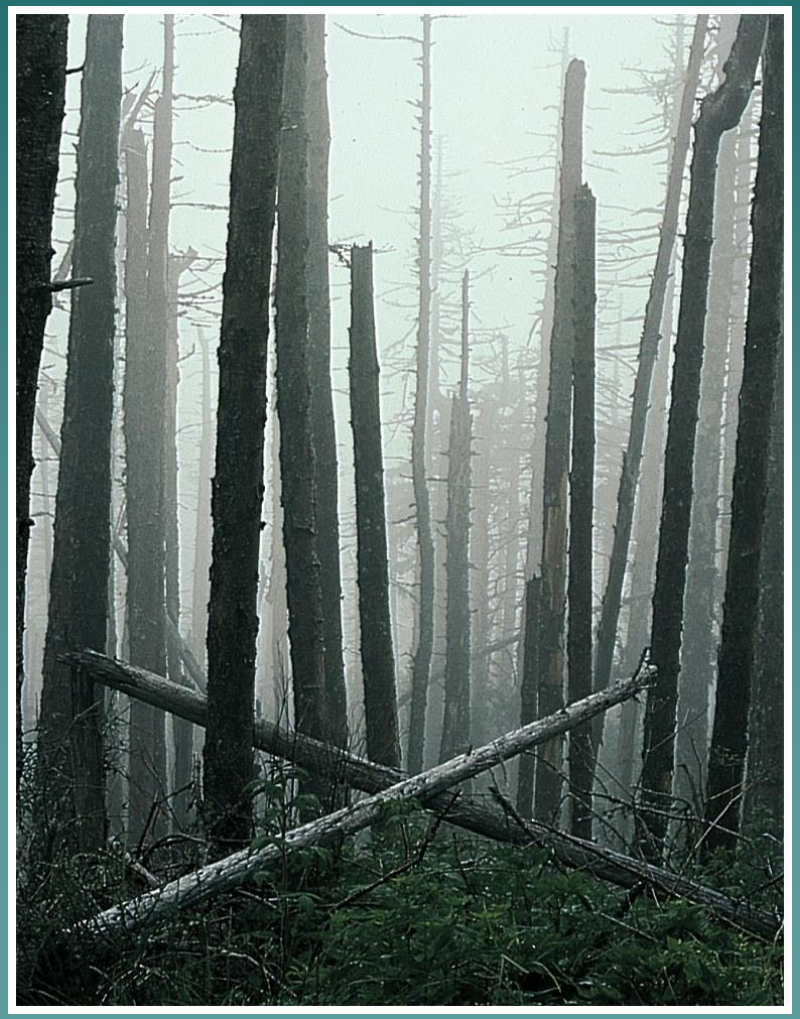


2 Types of Coal Mining

- Surface mining (right)
  - Chosen if coal is within 30m of surface
  - mineral and energy resources are extracted near Earth's surface by first removing the soil, subsoil, and overlying rock strata
- Subsurface mining
  - Extraction of mineral and energy resources from deep underground deposits

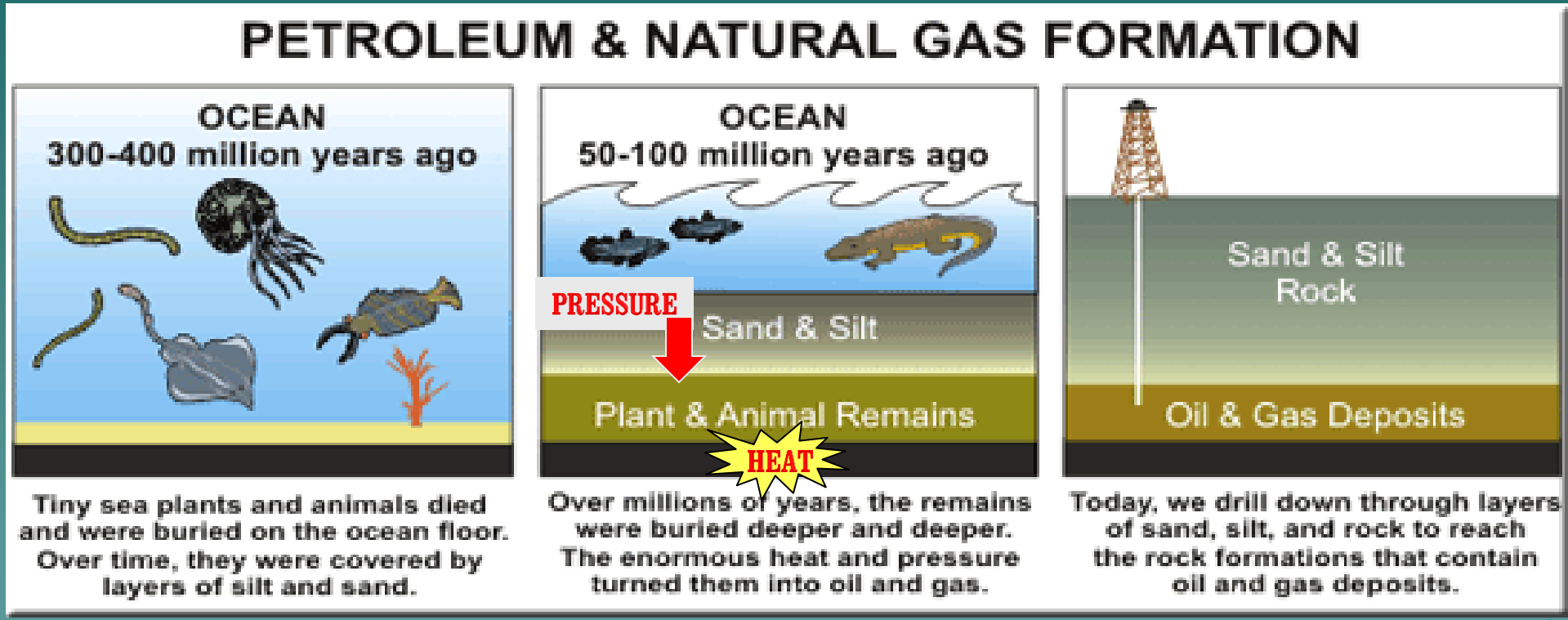


Environmental Impacts of Burning Coal



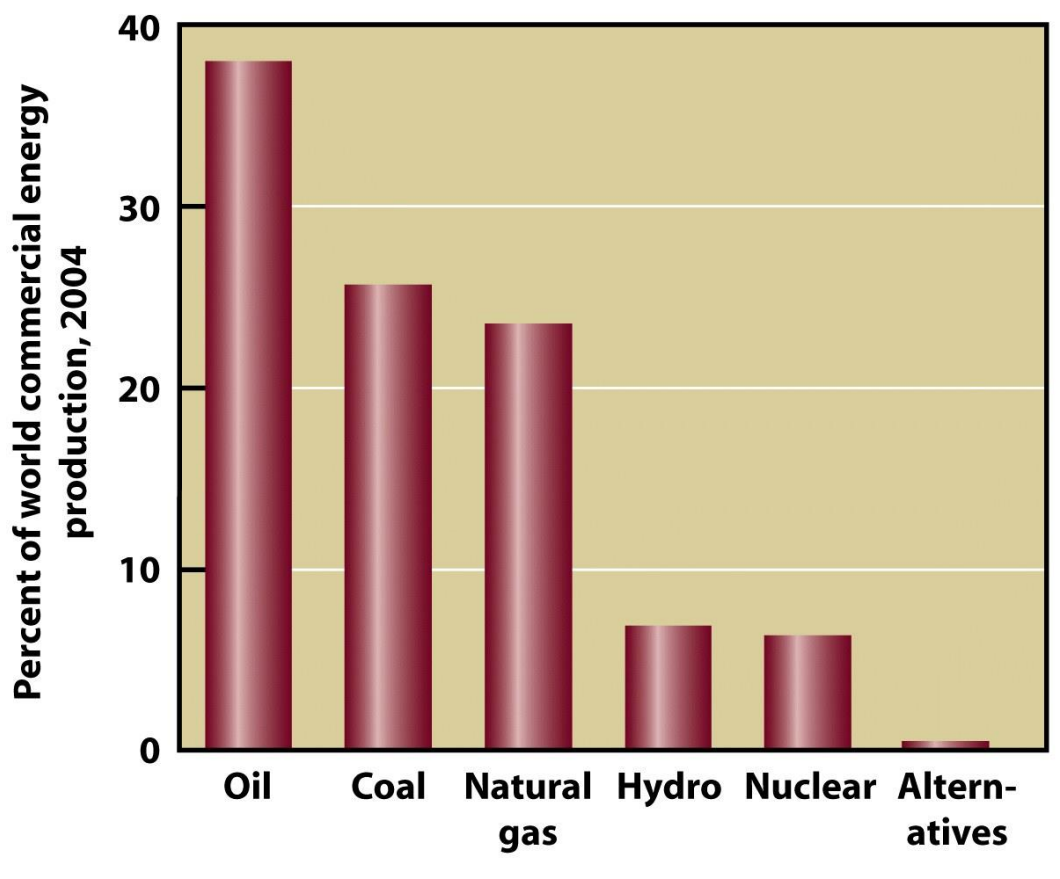
- Releases large quantities of CO_2 into atmosphere
  - Greenhouse gas
- Releases other pollutants into atmosphere
  - Mercury
  - Sulfur oxides
  - Nitrogen oxides
- Can cause acid precipitation

Petroleum (oil) and Natural Gas



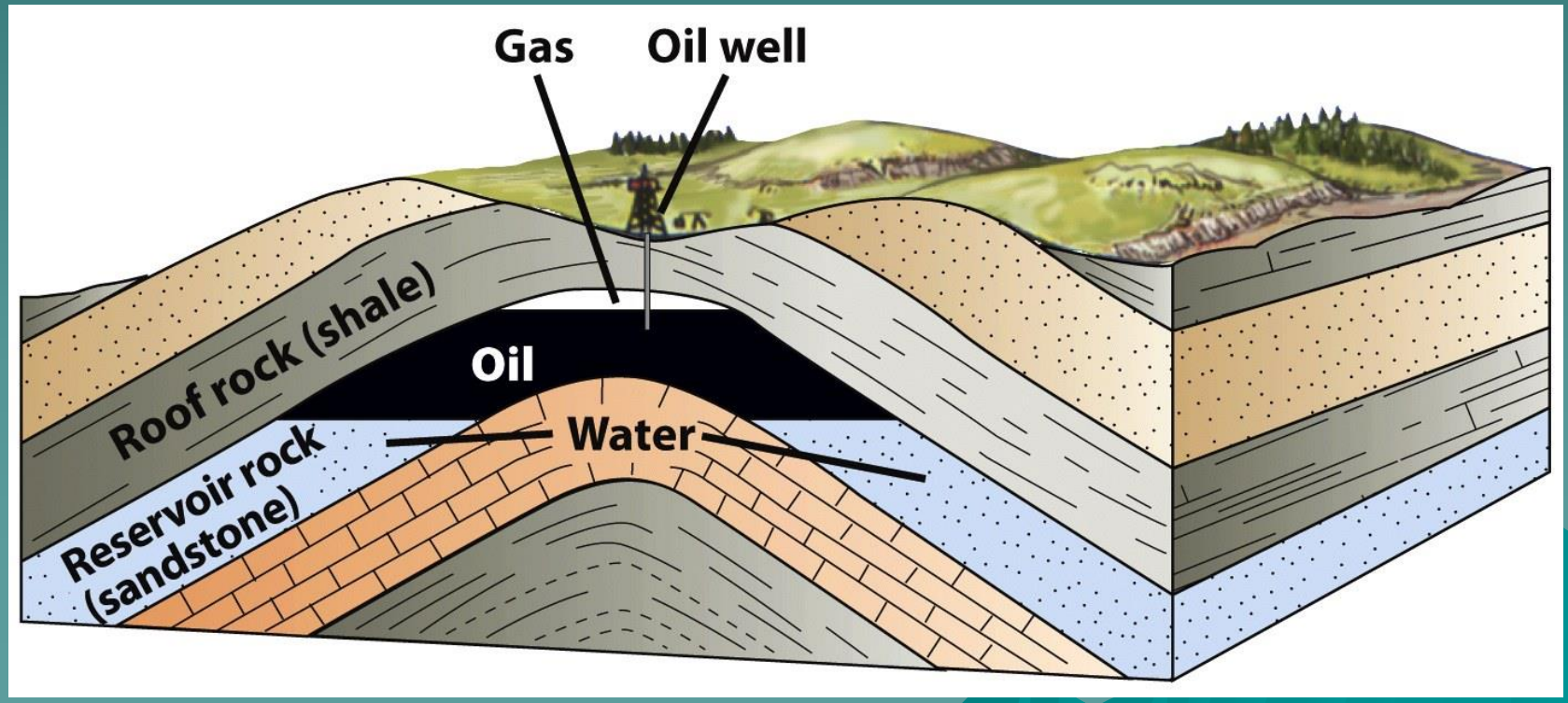
Oil and Natural Gas

- Oil and gas provide 60% of world's energy
  - They provide 63% of US's energy



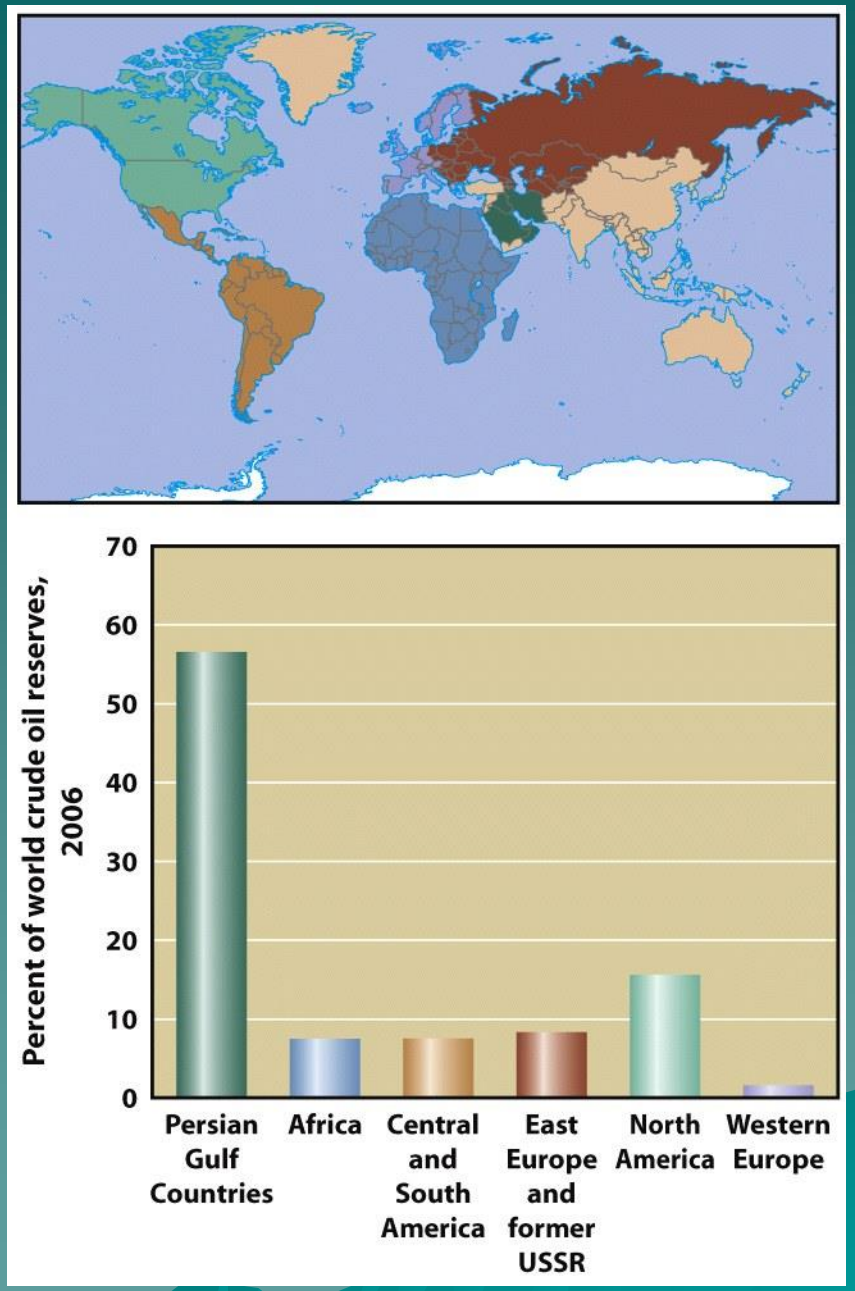
Oil and Natural Gas Exploration

- Oil and natural gas migrate upwards until they hit impermeable rock
- Usually located in structural traps



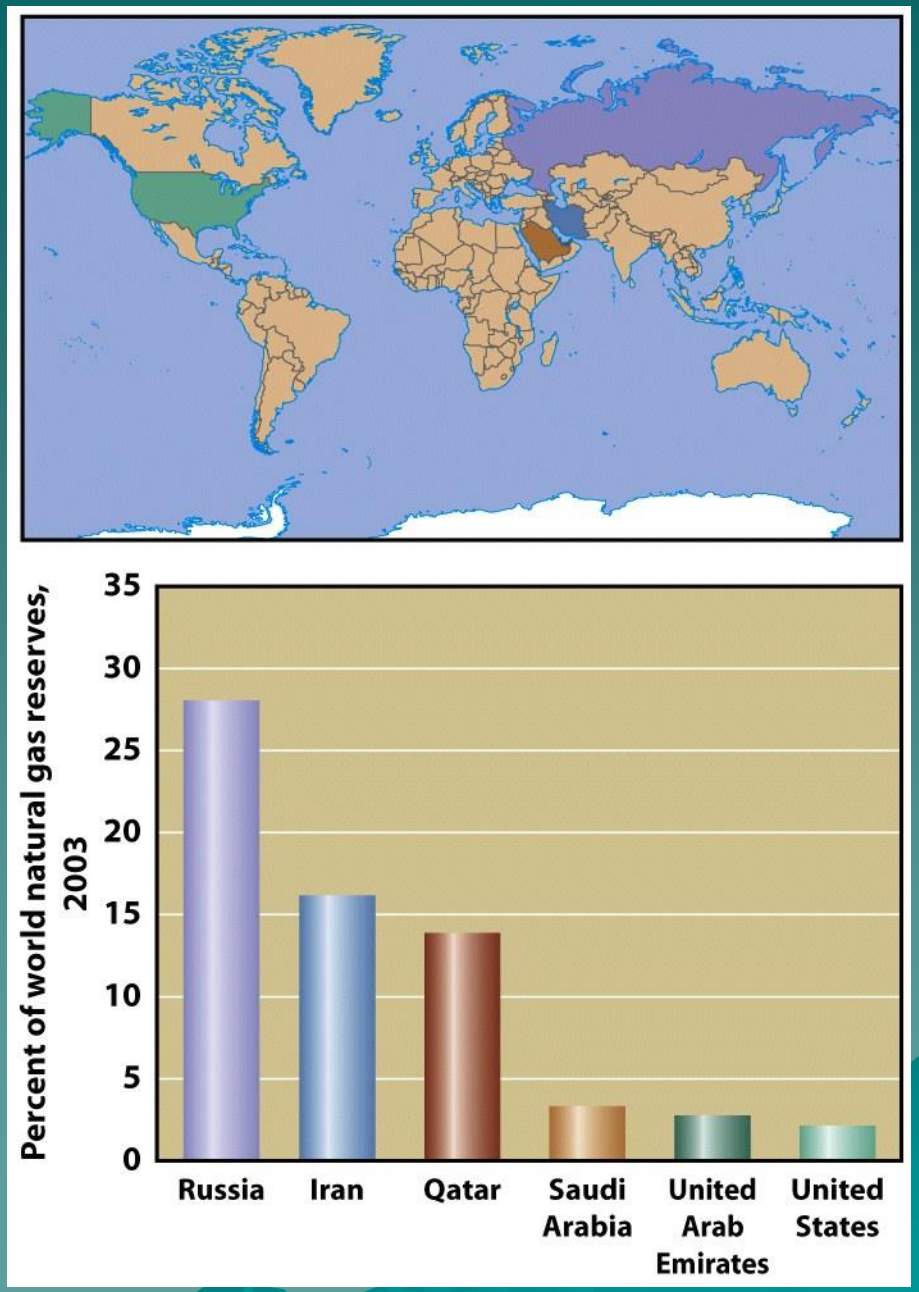
Oil Reserves

- Uneven distribution globally
- More than half is located in the Middle East



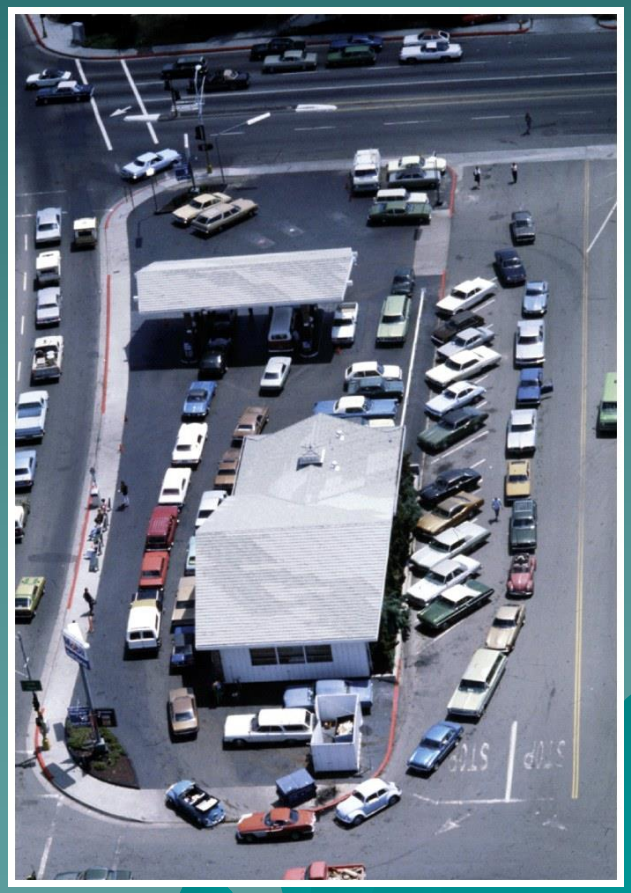
Natural Gas Reserves

- Uneven distribution globally
- More than half is located in Russia and Iran



How long will Supplies Last?

- Difficult to determine and estimates vary
- Depends on:
  - How many more deposits will be located
  - What technology might be available extract deeper resources
  - Changes in global consumption rates
- Experts indicate there may be shortages in 21st century



Some Advantages of Fossil Fuels

- Transport and Use
  - Fossil fuels are easily stored, transported, and used
  - Fossil fuels burn well and produce energy from turning turbines easily
- Discovery and Production
  - We have years of experience finding fossil fuels underground
  - We have years of experience producing these and already have factories to do so

Environmental Impacts of Oil and Natural Gas

- Combustion
  - Increase carbon dioxide and pollutant emissions
  - Natural gas is far cleaner burning than oil
- Production
  - Disturbance to land and habitat
- Transport
  - Spills- especially in aquatic systems
  - Ex: Alaskan Oil Spill (1989)

1989 Alaskan Oil Spill