

### Vocab

Fossil Fuel	Fuel that comes from the remnants of prehistoric organisms.
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### Vocab (cont)

Commercial Energy Sources	Sources that are bought and sold.
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### Vocab (cont)

Subsistence Energy Sources	Sources gathered by individuals for their own use.
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### Vocab (cont)

Conservation of Energy	Energy cannot be created or destroyed; it can only be changed from one form to another.
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### Vocab (cont)

EROEI	Energy return on energy invested. (Energy obtained from the fuel/Energy invested to get it)
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### Vocab (cont)

Cogene    Using a fuel to generate electri-  
ration    city and produce heat.

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### Vocab (cont)

Coal    A solid fuel formed from the remains  
of 280-360 million yr old plant  
materials

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### Vocab (cont)

Lignite, Sub-    The four types of coal  
bituminous,    ranked from lesser to  
bituminous,    greater age, exposure to  
and anthra-    pressure, and energy  
cite.    content.

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### Vocab (cont)

**Petroleum** A mixture of hydrocarbons, water, and sulfur that occur in underground deposits.

### Vocab (cont)

**Oil Refinery** Uses heat to separate crude oil into gasoline, kerosene, fuel oil, and diesel fuel.

### Vocab (cont)

**Natural Gas** Exists as a part of petroleum in the ground, and in gaseous deposits separate from petroleum.



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### Vocab (cont)

Oil      A slow-moving, viscous deposit of  
Sands    bitumen mixed with sand, water,  
          and clay.

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### Vocab (cont)

Bitumen    A degraded kind of petroleum  
(tar/p-    that forms when petroleum  
itch)      migrates close to the surface  
            where bacteria metabolize some  
            of the light hydrocarbons and  
            others evaporate.

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### Vocab (cont)

Hubbert    A graph that shows the point at  
Curve      which world oil production would  
            reach a maximum and the point  
            at which we would run out of oil.

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### Vocab (cont)

**Fission** A nuclear reaction in which a neutron hits a larger atomic nucleus, which then splits into 2+ parts.

### Vocab (cont)

**Uranium 235 (U-235)** The isotope of uranium that undergoes nuclear fission.

### Vocab (cont)

**Fuel Rods** The cylindrical tubes that house the nuclear fuel used in nuclear power plants.



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### Vocab (cont)

**Control Rods** Cylindrical devices that can be inserted between fuel rods to absorb excess neutrons, thus slowing/stopping the fission reaction.

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### Vocab (cont)

**Radioactive Waste** Nuclear fuel that can no longer produce enough heat to be used in a power plant, but still emits radioactivity.

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### Vocab (cont)

**High-Level Radioactive Waste** The form of nuclear waste used in fuel rods.

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### Vocab (cont)

Low-Level Radioactive Waste The protective clothing, tools, rags, and other things used in routine plant maintenance.

### Vocab (cont)

Nuclear Fusion The reaction that occurs when lighter nuclei are forced together to produce heavier nuclei and release heat. This powers the Sun and other stars.

### The History of Energy Use in the United States

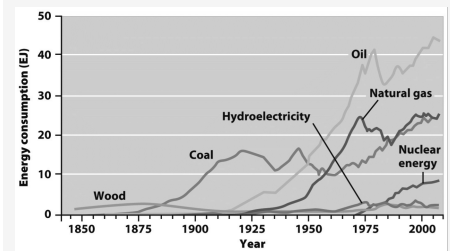


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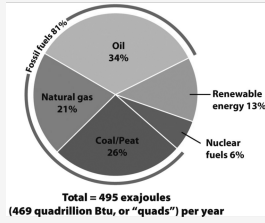
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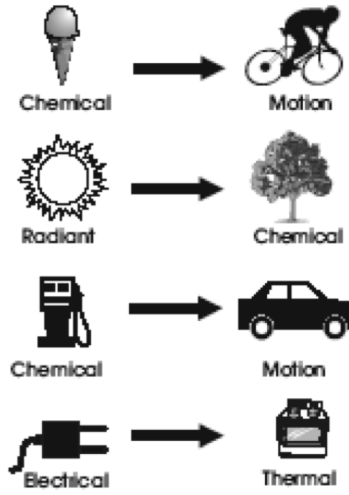


### Global Energy Use



### Energy Transformations

#### Energy Transformations



### Energy Use

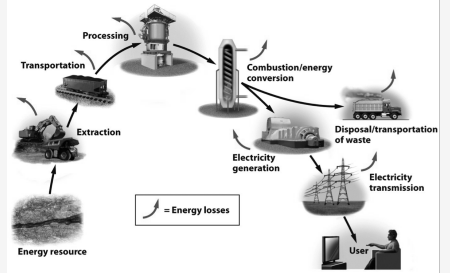


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### Pro/Con Coal

Advantages	Disadvantages
Energy-dense	Contains impurities
Plentiful	Release impurities into air when burned
Easy to exploit by surface mining	Trace metals like mercury, lead, and arsenic are found in coal
Technological demands are small	Combustion leads to increased levels of sulfur dioxide and other air pollutants into the atmosphere.
Economic costs are low	Ash is left behind
Easy to handle and transport	Carbon is released into the atmosphere which contributes to climate change
Needs little refining	

### Pro/Con Petroleum

Advantages	Disadvantages
Convenient to transport and use	Releases carbon dioxide into atmosphere
Relatively energy-dense	Possibility of leaks when extracted and transported
Cleaner-burning than coal	Releases sulfur, mercury, lead, and arsenic into the atmosphere when burned



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### Pro/Con Natural Gas

Advantages	Disadvantages
Contains fewer impurities and therefore emits almost no sulfur dioxide or particulates	When unburned, methane escapes into the atmosphere
Emits only 46% as much carbon dioxide as coal	Exploration of natural gas has the potential of contaminating groundwater

### Pro/Con Nuclear

Advantages	Disadvantages
No air pollution is produced	Possibility of accidents
Countries can limit their need for imported oil	Disposal of the radioactive waste

### Hubbert Curve

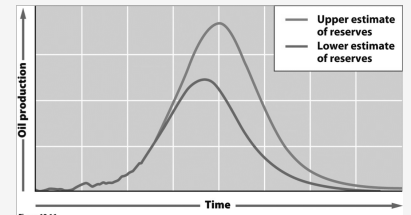


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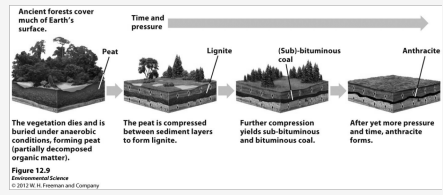


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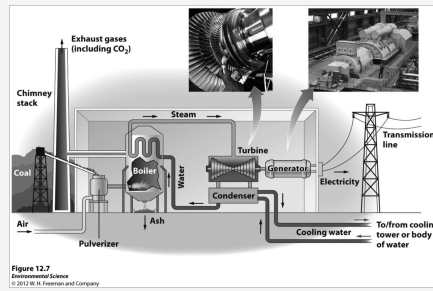
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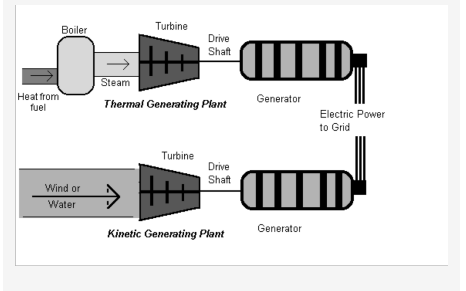
### Coal Formation



### Coal Plant Electricity Generation



### Electricity Generating Plants



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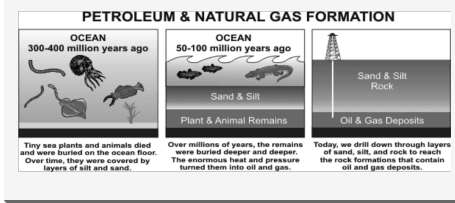
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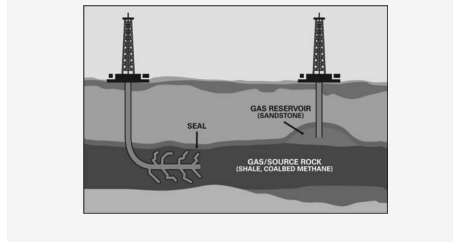
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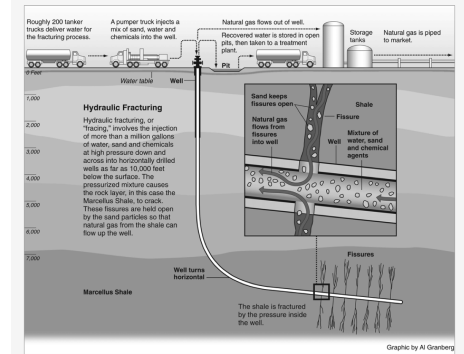
### Petroleum and Natural Gas Formation



### Hydraulic Fracking



### Fracking



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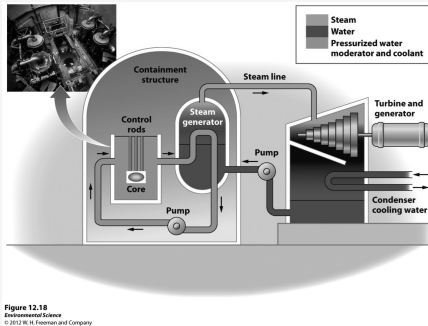
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### Nuclear Reactor



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