



Module 3, Unit B

ENERGY!

Overview of Generation Fuel Sources

Objectives

- What is energy?
- Fossil fuels
 - Oil
 - Coal
 - Natural gas
- Combustion
- Hydroelectric
- Nuclear

What is Energy?

- In the energy industry, energy is the capacity to do work.
- Work and heat represent energy being transferred to or from a substance.
- The quantity of energy decreases when work is done by something, and increases when work is done on something.



Fossil Fuels

- Contain **chemical** energy.
- Composed of hydrocarbons
- Nonrenewable
- Types of fossil fuels
 - Coal
 - Natural Gas
 - Petroleum



Combustion



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- Is a chemical reaction in which a fuel combines rapidly with oxygen
- Necessary factors in combustion
 - Fuel
 - Oxygen
 - Heat

Oil

- Used for firing steam power plants
- **Distillate** fuel oils are:
 - Clean and free of sediment
 - Comparatively low viscosity
 - Free of inorganic ash
- **Residual** fuel oils contain inorganic ash
- Neither gasoline or diesel are used for steam generation



Coal

- North American coal can be ranked as:
 - Content
 - Heating Value
 - grade
- Factors that affect how well coal burns:
 - Amount of water
 - Volatile matter
 - Carbon content

Natural Gas

- Main ingredient is methane
- Burns cleaner than oil
- Undesirable contents:
 - Sand
 - Hydrogen sulfide
- Natural gas is transported by pipeline.
(225,000 miles in the US).



Hydroelectric

- Construction of plants depends on:
 - Elevation
 - Water flow
 - Water volume
 - Precipitation levels
- Renewable



Nuclear

- Enrichment facilities enrich uranium to the appropriate composition for nuclear reactor rods
- Uranium reactor rods are radioactive, and transportation is controlled
- Radioactive waste must be stored for thousands of years before they are safe



Review

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