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**Fossil Fuels PPT Notes – 3 Main Types!!!**

**Petroleum, Oil, and Natural Gas**

1-Cover!!!!

2-Fossil Fuels – Energy Source created from the remains of once living P\_\_\_\_\_\_\_\_\_\_\_\_ and A\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Often called HYDROCARBONS – because from Hydrogen and Carbon
* Examples: Petroleum, Coal, Natural Gas, Oil Shales and Tar Sands

**\*\*3-P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – “Black Gold”**

* An oily, flammable L\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to almost S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Varies from almost colorless to green to black in color
* Composed of various hydrocarbons

4-What is Oil?

C\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Oil – the term for “unprocessed” oil, the stuff that comes out of the ground

* Also known as Petroleum
* Source of raw material that form many products because they contain hydrocarbons
* Found in the upper strata of the Earth in certain locations
* Takes M\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of years to form from decaying P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ material

5-Petroleum Products

A barrel (42 gallons) of Crude Oil Provides…

* Gasoline- 19.5 gallons
* Fuel Oil- 9.2 gallons
* Jet Fuel- 4.1 gallons
* Asphalt- 2.3 gallons
* Kerosene- 0.2 gallons
* Lubricants- 0.5 gallons
* Petrochemicals (other products)- 6.2 gallons

6-How Petroleum is formed

* Organisms (mostly plant materials) are B\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a marine environment
* Large number of organisms, mixed with sediment (dirt)
* Eventually buried in an anaerobic environment (little oxygen)
* Must have D\_\_\_\_\_\_\_\_\_\_\_\_\_ B\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, HEAT, and T\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to change from organic material to petroleum
* Impurities are “squeezed out” and the hydrocarbons are transformed into OIL

7-Oil and Gas Entrapment

8-Oil Refinery

9-Transporting Petroleum

10-Trans Alaska Pipeline System

11-Petrochemical Products – more than 3000 other products…

Detergents, Cosmetics, Fertilizers/Weed Killers, Medicine (antiseptics and anesthetics), Plastics / Synthetic Fibers, Synthetic Rubber, Rust Preventatives, Liquid Petroleum Gas

12-Global Gas and Oil Fields

13-Regional Crude Oil Production, 1980-1999

14-Oil Product Consumption by Region

15-Proved Oil Reserves at end of 2004

16-Oil and Natural Gas Production in the United States

**\*\*\*17-Natural Gas**

A Gas mixture that is trapped in the earth

* Usually M\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and Ethane
* Often found in the S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ W\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as Petroleum
* Transported as Liquified Natural Gas (LNG)
* Used to be discarded as waste and burned off
  + Used increasing as a fuel
  + Cheaper
  + Burns cleaner, less pollution
  + **CH4 + 2O2 ----🡪 CO2  + 2H2O + Heat**

**\*\*\*18-Coal**

* A black or brownish organic S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A meta-sedimentary rock
* Derived from ancient P\_\_\_\_\_\_\_\_\_\_\_\_\_
* Primarily Carbon, with other element mixed in
* B\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and releases great amounts of heat
* Used to be the primary source of energy in the world, until replaced by oil
* Still used heavily for industrial operations and E\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ generation

19-Coal

Several types, depends upon the degree of metamorphosis of the original peat

* Peat (softest, driest)
* Lignite
* Bituminous
* Anthracite (hardest, cleanest)

Anthracite (hard coal) burns relatively clean and hot

Bituminous coal is dirtier, but C\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* + S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in coal produces significant air pollution

**Coal (C) + O2 -🡪 CO2  + H\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + Wastes**

20-Formation of Coal

* Plants grow and die
* Dead plants form PEAT in water logged environments (Swamps)
  + Accumulates fast than it can decay
    - Due to lack of Oxygen
  + PEAT contains recognizable plant parts
* Peat becomes Coal when
  + Peat is buried
  + Peat is compacted
  + H\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and T\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cause an alteration of the organic Carbon molecules
    - Pure Carbon is left behind
* About \_\_\_\_\_\_\_‘ of PEAT becomes \_\_\_\_\_\_\_\_\_\_’ of COAL

21-How Coal Forms

22-Coal Miners Leaving a Coal Mine

23-Working Condition in US Coal mine

24-Strip mining in Kentucky

25-Problems with Future Oil Production

* Not all known Reserves turn out to be feasible
* We have taken the “E\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” oil, only the harder fields remain
  + Much H\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ production costs
* Consumption is increasing at a faster rate than the increase in production.

26-Growth in Fossil Fuel Consumption

27-Population-Driven Energy Demand

28-Future Global Sources of Energy

29-Total US Energy Usage (late 2001)