

## Ch 15: Nonrenewable Energy Sources

(Review the **Carbon Cycle\***, ch 2, figure 2-20, pp. 39-40, as well as the **Mining\*\*** section from Ch 11, fig. 11-14, pp. 236-242)

What is **Deepwater Horizon Spill**?

Who possesses largest proven reserves of Oil?

Natural gas?

Coal?

What are **fossil fuels** & how are they *formed*? (In other words, *what is the recipe*?)

**anaerobic**

“Ancient Sunlight”

photosynthesis.

**carbon**

global distribution?

Middle East

Russia

USA

consumption rates/uses?

In the US, fossil fuels supply 89% of energy needs.

net energy & EROI

major advantage & major disadvantage of fossil fuels?

*Electricity*

**Coal**

How is it extracted/mined? (see Ch 11, “*mining*” section)

What are the costs (environmental & human) associated with coal extraction?

How is it used/processed?

What are the costs (environmental & human) associated with coal use?

How is it disposed?

**Natural Gas**

How is it extracted?

What are the costs associated?

Top producer of natural gas?

Top consumer of natural gas?

**Oil**

Extraction: drilling

Refining: make multitudes of products (lubricants, plastics, fabrics, pharmaceuticals).

*Technically recoverable vs. economically recoverable*

proven recoverable reserve

*Oil gets harder to retrieve from a deposit over time...*

M. King Hubbert, petroleum geologist, “peak oil”/ “Hubbert’s Peak”

1956 predicts US oil production will peak in 1970; 1974 predicts global production peak in 1995. (In fact, discoveries of new oil fields peaked 30 years ago!

Global demand continues to rise, particularly as China & India industrialize rapidly.

How much US oil is imported?

Where do we get it today?

**Nuclear**

What is *nuclear energy* & how is it derived?

Advantages/Disadvantages?

small risks of large accidents. examples?

US produces more electricity from nuclear than any other country. How much of our electricity is from nuclear?

Why nonrenewable?

How many plants in US? Worldwide?

Where do we put radioactive waste? In CA?

### ANWR

What is the special designation of the 1002 area?

How many gallons in a barrel of oil?

What are the two main sides of the debate? Who are the stakeholders in the debate & what are their respective positions on the issue (for & against)

Trans-Alaska Pipeline

Inupiat

Gwich'in

Porcupine Caribou

### Energy Efficiency & Conservation

What is energy conservation (ch 15, pp 354-356)? U.S. history w/ respect to it? OPEC embargo, CAFE standards.

What are two (2) routes to conservation? What is cogeneration?

Some basics/background on energy – refer to Ch 2 section, “Energy Fundamentals” (pp. 30-31) For example, potential, kinetic, chemical, first and second laws of thermodynamics, radiation, and e-m spectrum. Also, review electricity and EROI from Ch 15 (pp. 334-336)

### VIDEOS \*\*\*figures 2-20 and 11-14:

