**Fossil Fuels and Conservation**

**Chapter 19**

**Fossil Fuels**

1. How do the laws of thermodynamics apply to the fuel cycles and efficiency?
2. What is the historic trend in energy use in the US and worldwide?
3. What are projections for energy use in the US and worldwide for the coming decades?
4. Complete the chart below:

|  |  |  |  |
| --- | --- | --- | --- |
| Fuel source | How formed | Relative amount used | What we use them for |
| Coal |  |  |  |
| Oil |  |  |  |
| Natural Gas |  |  |  |

1. a. Which fossil fuel source does the United States have significant reserves of?

b. Could we be energy independent using any of these?

c. What countries are leading producers of oil, coal, and natural gas?

6. What is the difference in *economically* and *technologically* recoverable reserves?

7. Complete the chart below: (consider the full fuel cycle, including obtaining (drilling/mining) the fuel, processing, transporting, burning it, and disposing of any waste.

|  |  |  |  |
| --- | --- | --- | --- |
| Fuel Source | Environmental impacts  (air pollution, water pollution, land degradation, loss of biodiversity, etc) | Economics impacts  (relative cost, net energy, etc) | Physical advantages/disadvantages  (land degradation, safety of difficulty/safety of transport, safety of use, etc)) |
| Coal |  |  |  |
| Oil |  |  |  |
| Natural Gas |  |  |  |

8. Explain the concept of “peak oil” and explain roughly with peak oil is likely to occur. (“Hubbert’s Peak”)

9. What does peak oil mean for:

a. price

b. availability

c. resource wars

d. environmental impact

10. Make a list of the pros and cons for drilling in the Arctic National Wildlife Refuge ( ANWR).

11. List the different types of coal and give the properties for each.

12. What is meant by the concept “net energy”?

13. a. How does a thermal electric power plant function?

b. What is consistent whether the fuel is coal, oil, gas, or nuclear?

14. a. What is hydraulic fracturing?

b. What benefits does hydraulic fracturing offer?

c. What risk does it pose? (not much in the textbook but we will discuss this in class)

15. a. Is the use of *oil shale* and *tar sands* realistic in the next few years? Next few decades?

b. What advantages do they offer over current fuels?

c. What disadvantages do they offer over current fuels?

16. a. What doe “clean coal” mean?

b. What is possible today?

c. What is under development?

d. Is it clean *enough*?

17. a. What is carbon capture (sequestration)?

b. Why are we pouring money into it?

c. How does it (might it) work?

d. What are some difficulties?

e. Should we pursue this?

**Energy Conservation**

18. What is the difference between energy efficiency and conservation?

19. Explain the following federal energy conservation programs:

a. CAFÉ standards

b. EnergyStar

20. What other *regulatory* and *economic* tools *could* the government use to encourage energy conservation?

21. Name several key energy saving practices for:

a. home

b. transportation

c. industry/commercial

22. Explain the concept of cogeneration?

23. What is meant by “energy intensity?”

24. What are hybrid vehicles?