

Warm-Up

16FEB2016

- What are the 5 Key Environmental Indicators?
 - Yes! Today is after school APES time.

5 Key Environmental Indicators

- *Biological Diversity*
- *Food Production*
- ***Average surface temperatures***
- ***Human Population***
- ***Resource depletion***

Logistics...

- Land Management Project and Presentations are Due tomorrow!
- Read Chapter 12/13!
- Read Chapter 10 in Klein (10/22)
- Ozone Data Check for February is due Thursday
- Warm-ups Due Friday
- Energy Presentations will be 2/23-3/1
 - You will have 2 full class days to research for your presentation (Thursday (220) and Friday)

Warm-Up

17FEB2016

1. How does your project demonstrate the concepts from the chapter and class about land management and “smart” growth?
 - You will have 5 minutes to convince us that your plan is the best
 - Be sure you leave your city for Ms. Leigh to grade

Logistics...

- Land Management Project and Presentations are Due today!
- Read Chapter 12/13!
- Read Chapter 10 in Klein (10/22)
- Ozone Data Check for February is due Thursday
- Warm-ups Due Friday (2/19)
- Energy Presentations will be 2/23-3/1
 - You will have 2 full class days to research for your presentation (Thursday (220) and Friday)

3 kinds of energy technology

- Non-Renewable (fossil-fuels and nuclear)
- Potentially renewable
- Nondepletable (will not decrease)

Nonrenewable



Natural gas



Oil



Coal



Nuclear

Potentially renewable



Wood



Biofuel

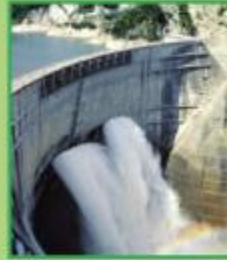
Nondepletable



Wind



Solar



Hydroelectric



Geothermal

Figure 13.1

Environmental Science

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Chapter 12

Nonrenewable Energy Resources

PTT

22FEB2016

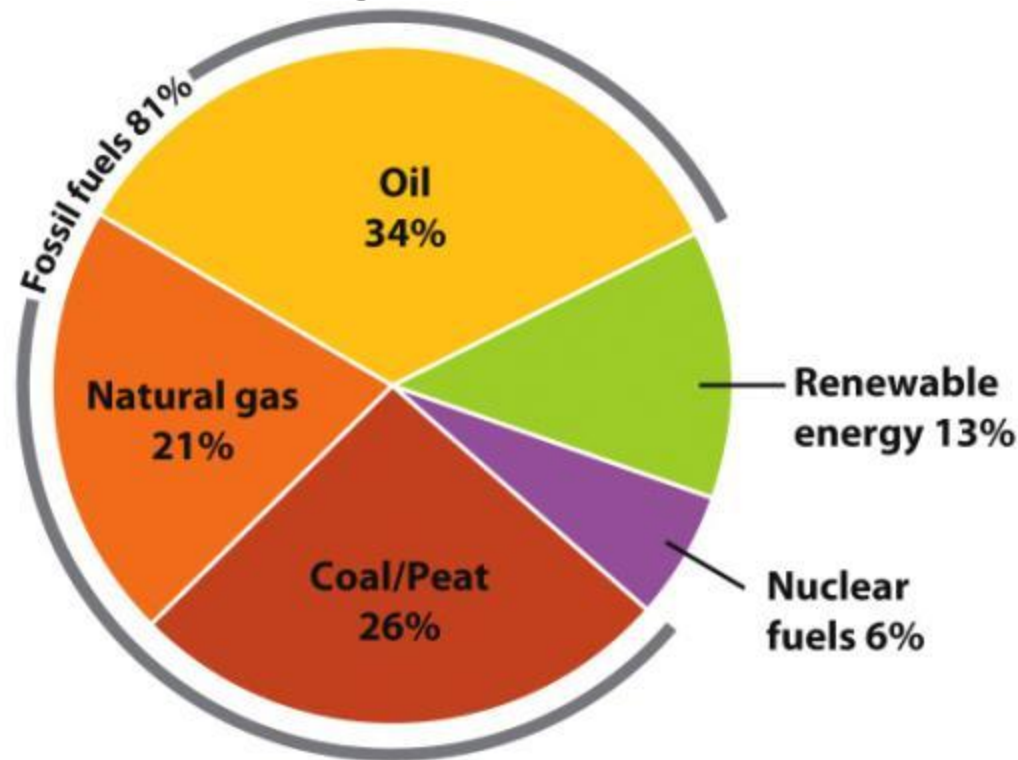
1. What is a keystone species?
2. Provide an example!

Logistics

- 10 Vocabulary due Friday
- Energy Presentations (2/23-3/2)
- You should have already read chapters 12/23 in the APES textbook
- Read Klein Chapter 11 by Monday (2/29)
- Celebration 12/13 (3/4)

Nonrenewable Energy

- Nonrenewable energy resources- fossil fuels (coal, oil, natural gas) and nuclear fuels.



**Total = 495 exajoules
(469 quadrillion Btu, or "quads") per year**

Energy Use

- Commercial energy sources- those that are bought and sold, such as coal, oil and natural gas.
- Subsistence energy sources- those gathered by individuals for their own use such as wood, charcoal and animal waste.

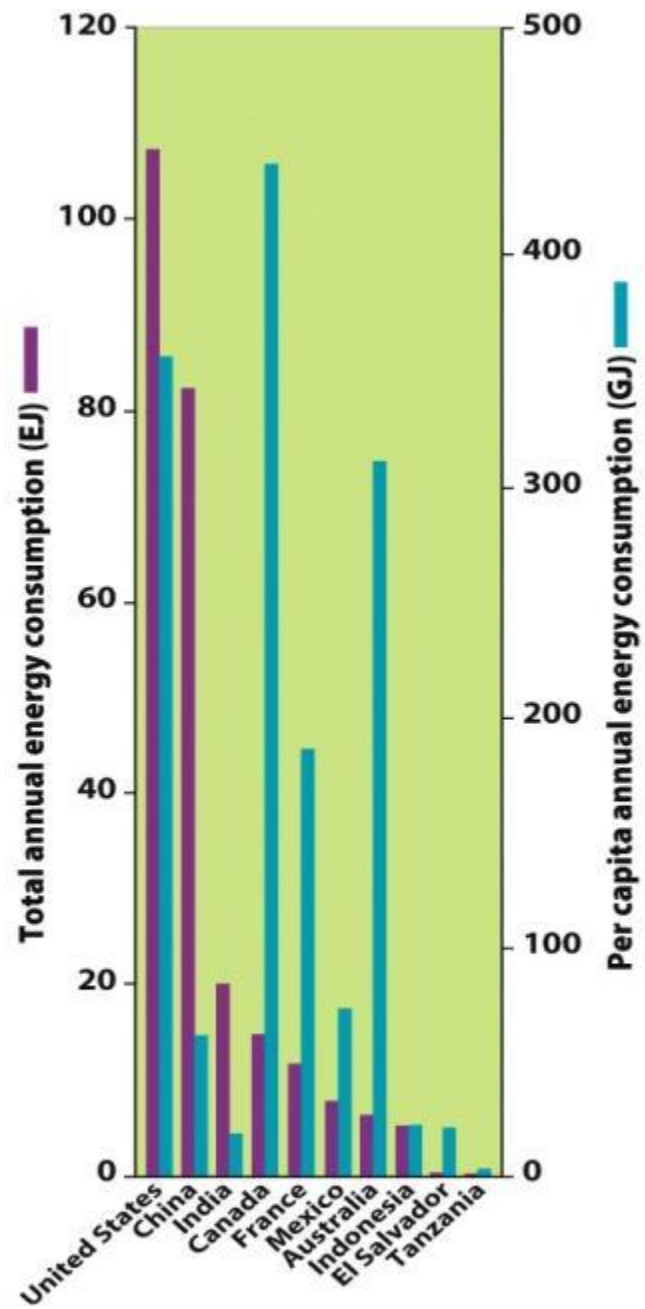


Figure 12.2
Environmental Science

Presentation Hints

- Explain how energy is made!
- Include relevant local energy issue (this can be one of your 5 sources)
 - for example: in Colorado, wind energy conflicts with sage grouse habitat or fracking is degrading water quality, etc.

Nonrenewable



Natural gas



Oil



Coal



Nuclear

Potentially renewable



Wood



Biofuel

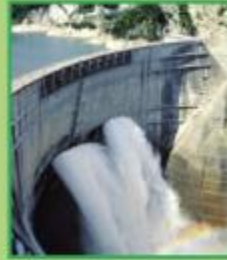
Nondepletable



Wind



Solar



Hydroelectric



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Figure 13.1

Environmental Science

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Chapter 12

Nonrenewable Energy Resources

Energy use in the US

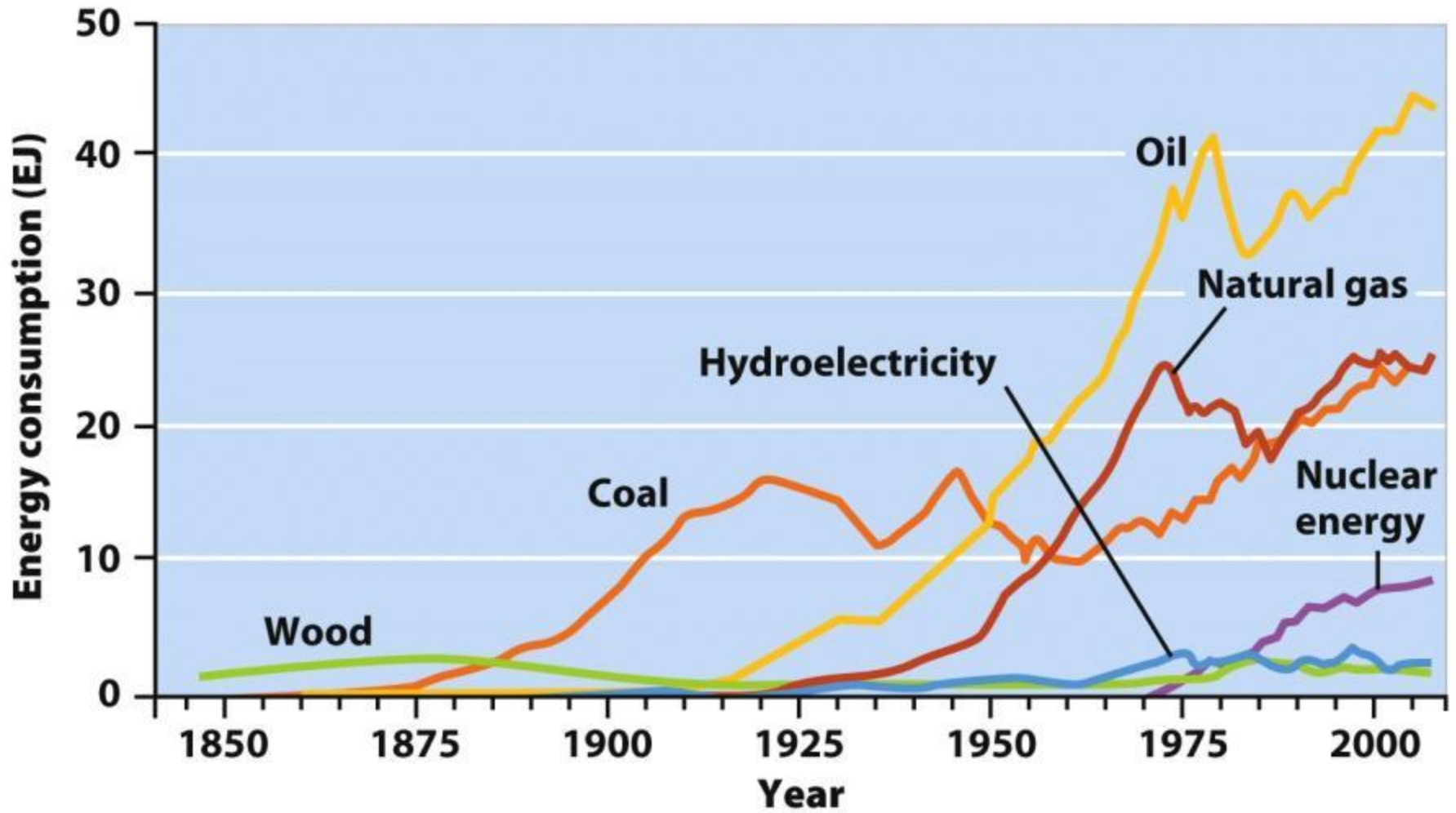
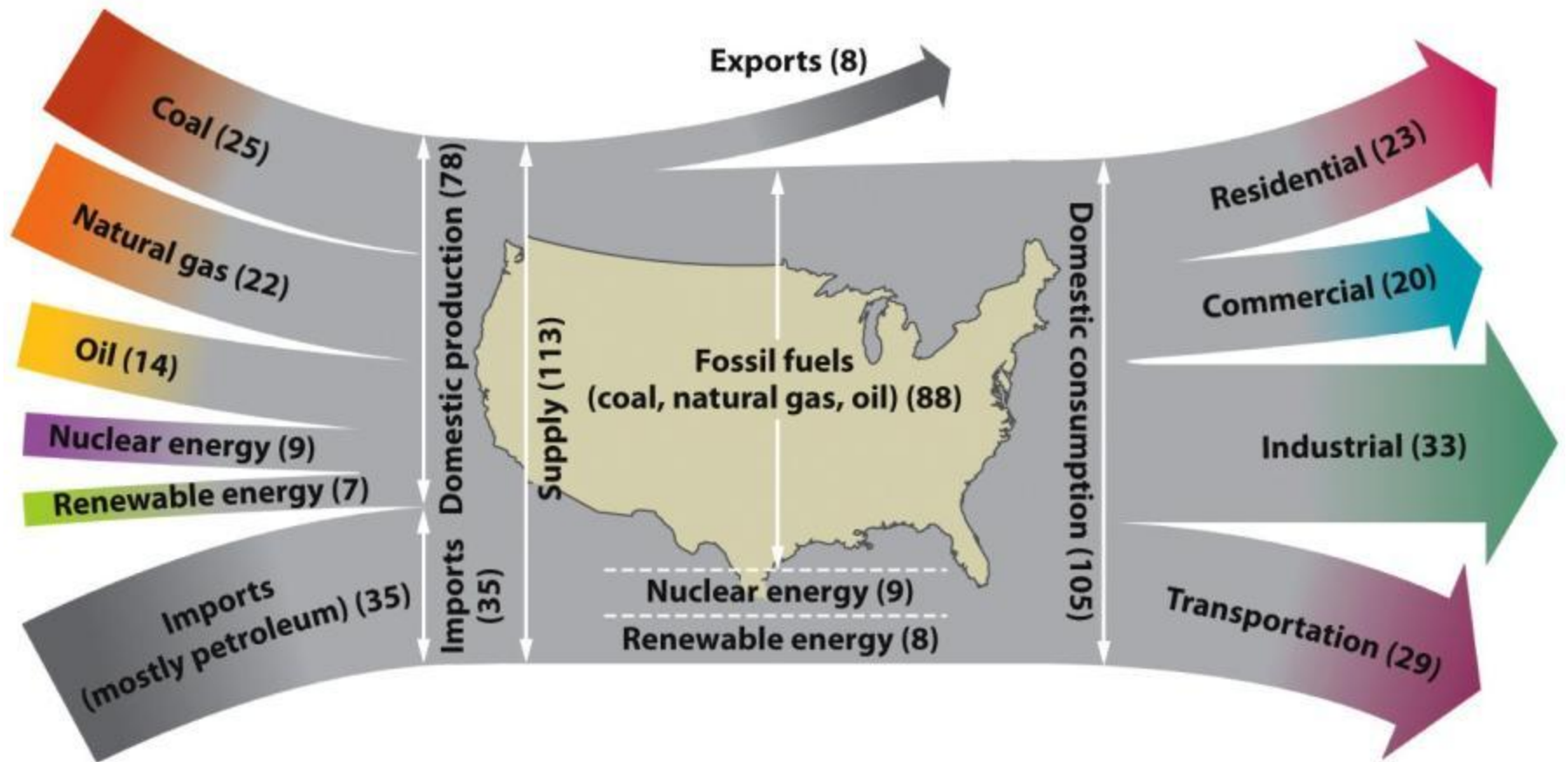


Figure 12.3

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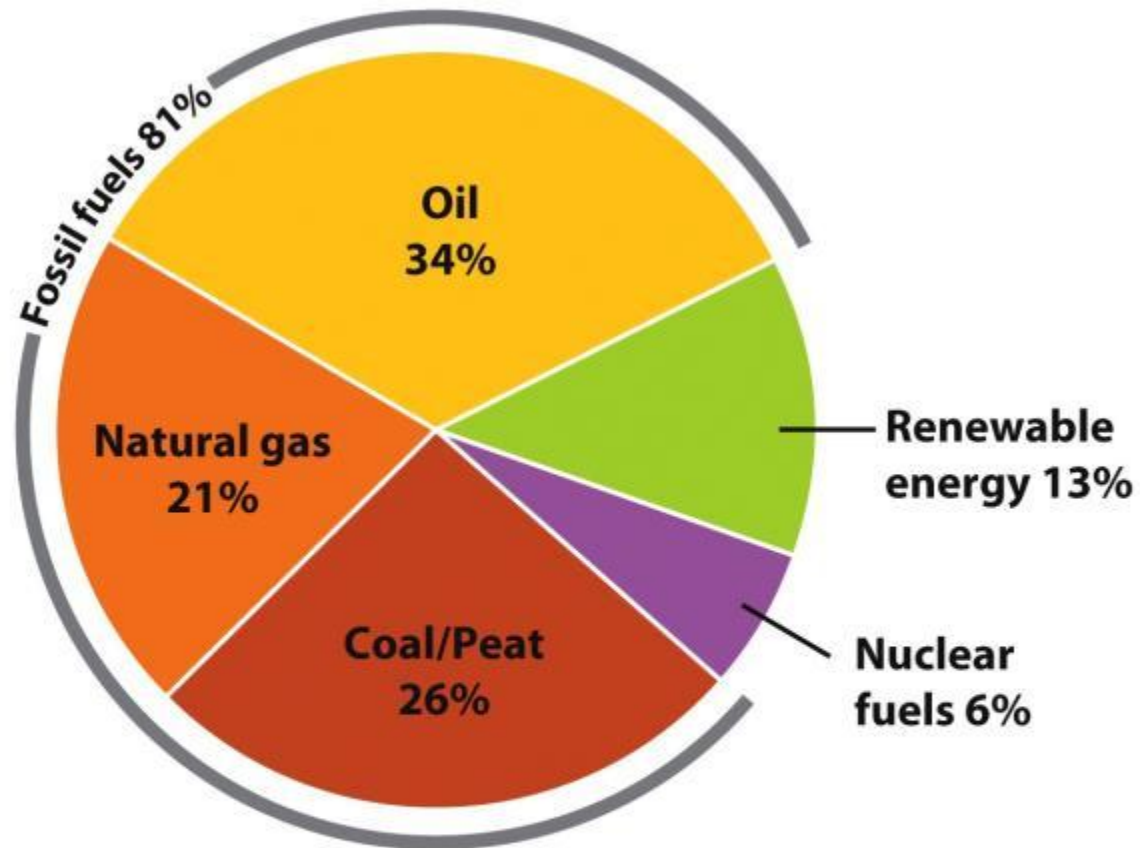


Energy flowchart for the United States (exajoules)

Figure 12.4a

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**Total = 495 exajoules
(469 quadrillion Btu, or "quads") per year**

Figure 12.1
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Energy quality and efficiency

- Just like there is the perfect tool for every job, there is an energy suitable for every use
- Energy-to-mass ratio in one measurement (quality)
- Transportation costs (efficiency)

Process of Energy Use

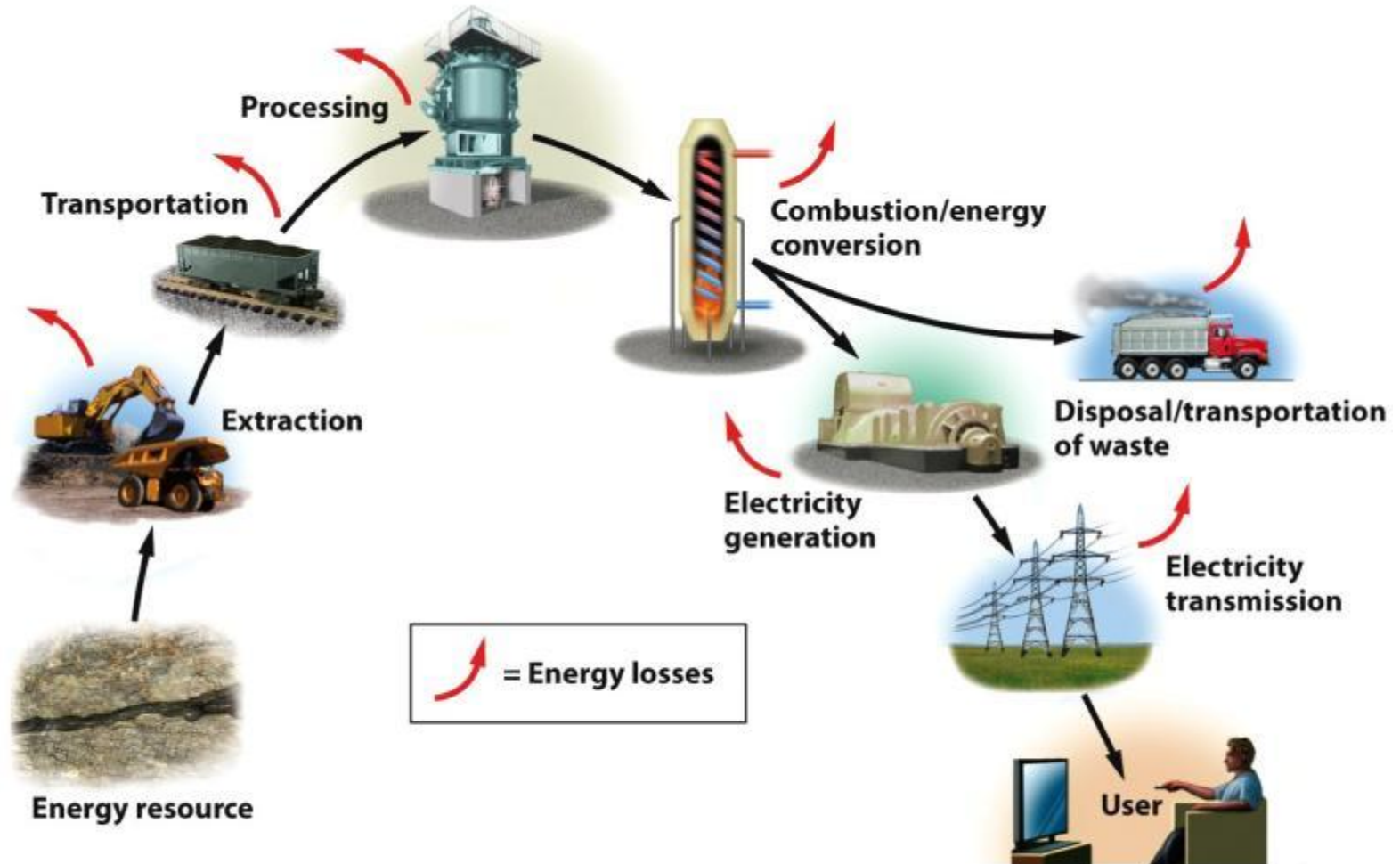


Figure 12.5
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- 30% of energy use in the US is from transportation
 - Air
 - Car
 - Train
 - Bus

Overall Fuel Efficiency of U.S. Automobiles

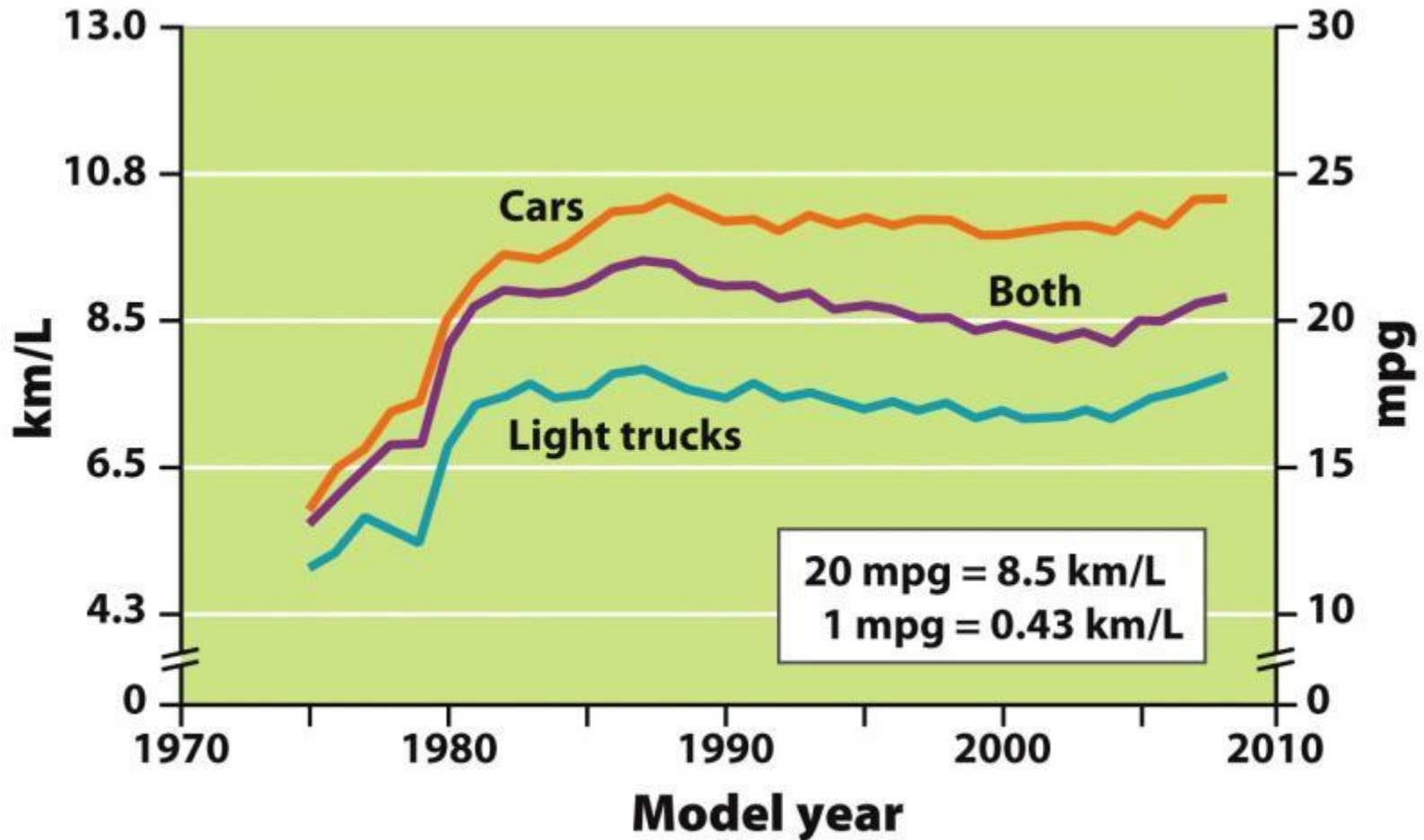


Figure 12.6
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Warm-Up

23FEB2016

1. Which type of energy makes up most of the energy generation (renewable, non-renewable, or potentially renewable)?

Today: Coal and Petroleum

OZONE CHECK

Tomorrow: Natural Gas and Oil Sands

10 Vocab due Friday, Read Klein #11, STUDY 12/13

Warm-Up

24FEB2016

1. What is meant by the “True Cost of Coal”?

Today: Natural Gas and Oil Sands

OZONE CHECK

Tomorrow: Nuclear (Kalyynn/Ethan)

Biomass and Biofuels (Abdi/J. Martinez)

10 Vocab due Thursday (Jnrs), Read Klein #11,
STUDY 12/13

Warm-Up

25FEB2016

1. Why has natural gas become the most consumed fossil fuel in the US?

Today: Nuclear and Biomass/Biofuel

10 Vocabulary (Jnrs)

Energy Calculations (ALL)

Tuesday: Wind (Presquilla and Sena)

Solar (Alondra)

Read Klein #11, STUDY 12/13

TABLE 12.1**Energy expended for different modes of transportation in the United States**

| Mode | MJ per passenger-kilometer |
|-------------------------------------|-----------------------------------|
| Air | 2.1 |
| Passenger car (driver alone) | 3.6 |
| Motorcycle | 1.1 |
| Train (Amtrak) | 1.1 |
| Bus | 1.7 |

Source: All data are from Bureau of Transportation Statistics, U.S. Department of Transportation, except for the passenger car, which was determined by assuming one occupant per vehicle obtaining average fuel efficiency of 22 mpg (9.4 km per liter).

Table 12.1*Environmental Science*

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- What are 3 examples of energy sources used by humans?
- Describe the difference between energy efficiency and energy quality.
- How do we determine the overall efficiency of energy use in a system?

- Electricity is a convenient form of energy
- Aka an energy carrier (movable and can deliver energy)
- Produced from coal, natural gas, wind, and solar

Electricity Generation

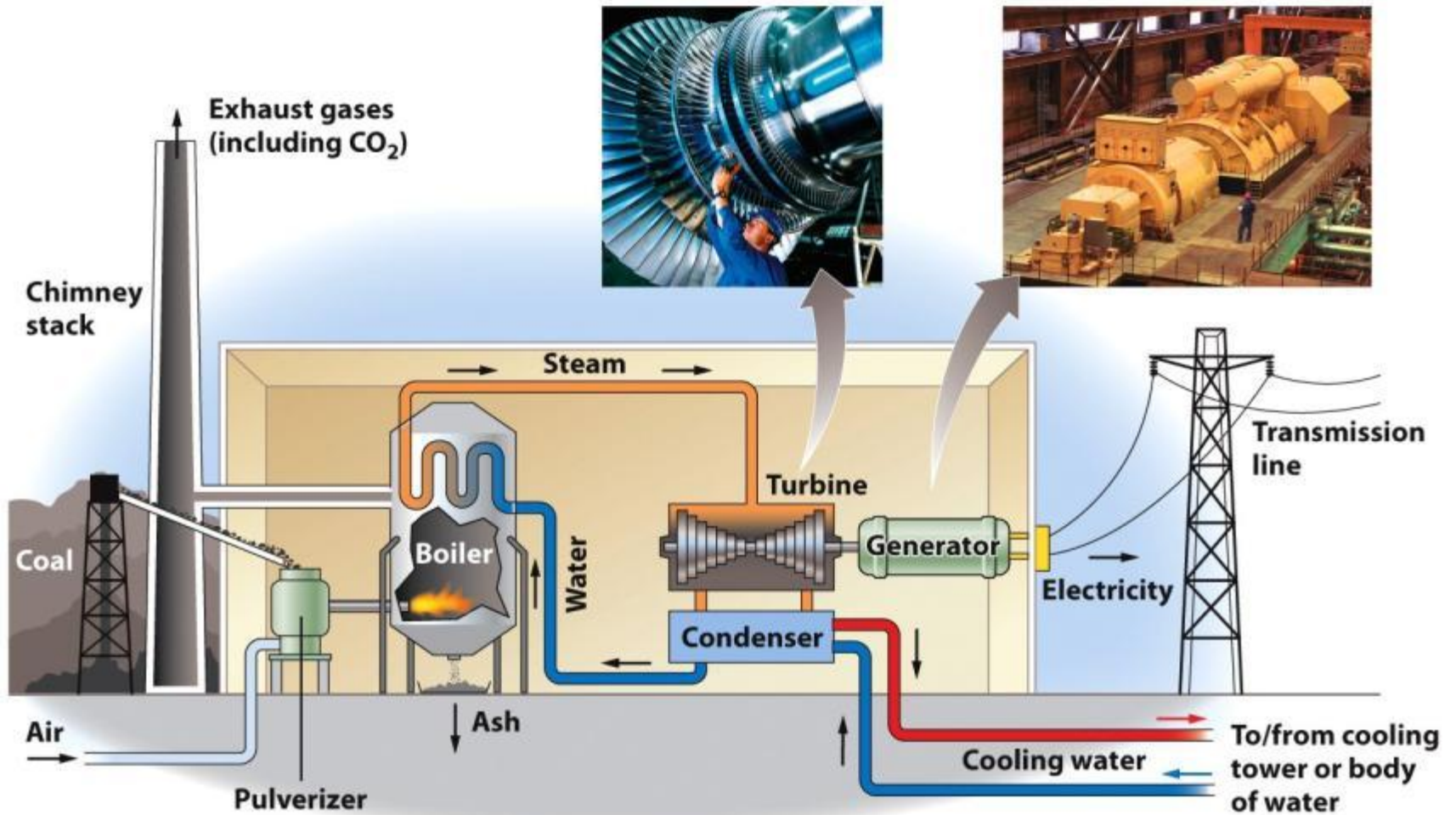


Figure 12.7

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Electricity Generation

- The burning fuel from coal transfers energy to water, which becomes steam.
- The kinetic energy contained within the steam is transferred to the blades of a turbine, a large device that resembles a fan.
- As the energy in the steam turns the turbine, the shaft in the center of the turbine turns the generator.
- This mechanical motion generates energy.

Energy Efficiency

- Most coal burning power plants are about 35% efficient.

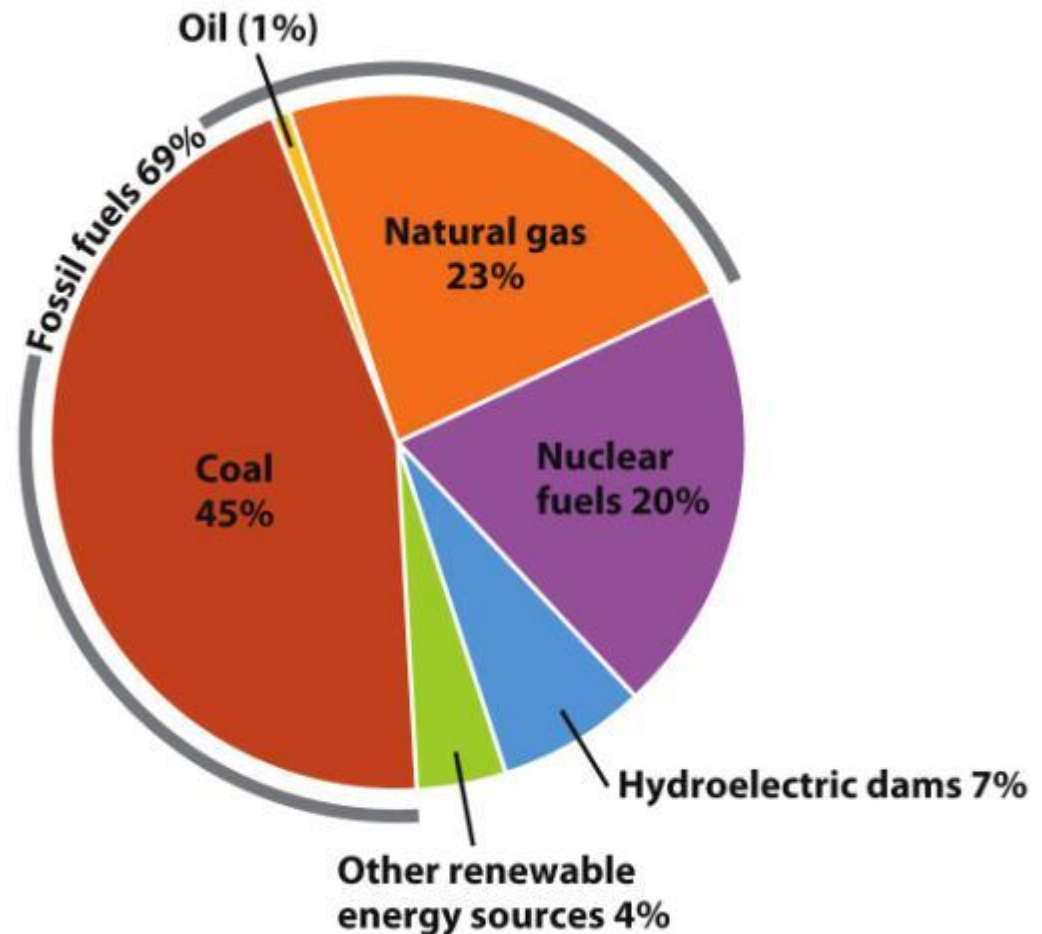


Figure 12.8
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Cogeneration

- Cogeneration- using a fuel to generate electricity and to produce heat.
- Example- If steam is used for industrial purposes or to heat buildings it is diverted to turn a turbine first.
- This improves the efficiency to as high as 90%.

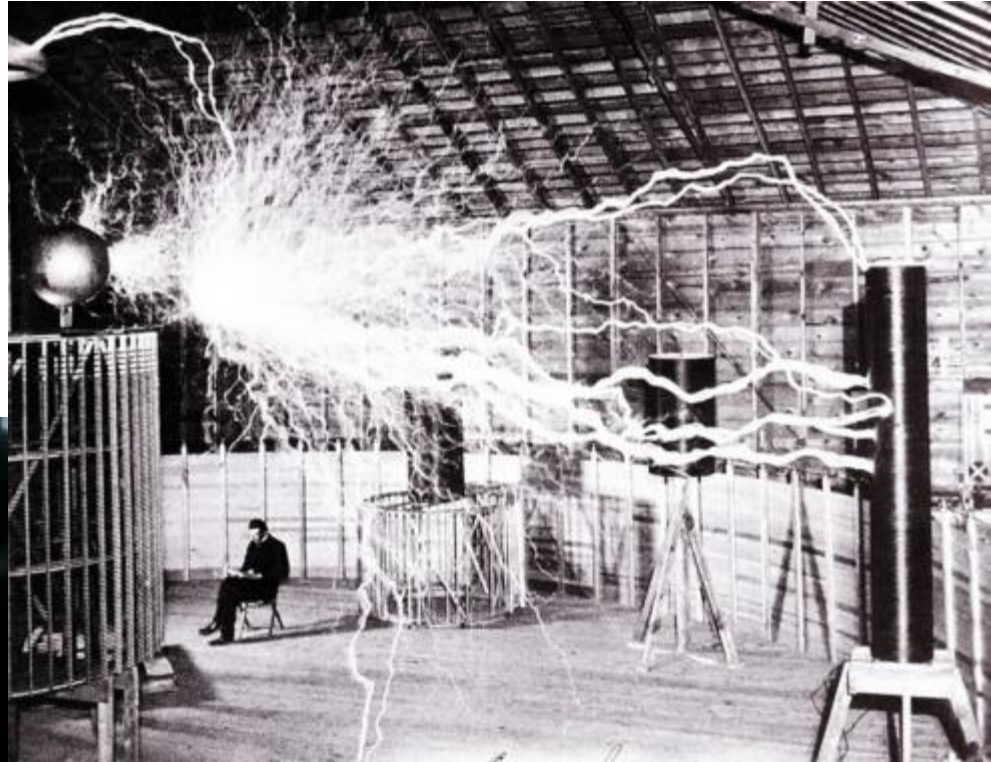
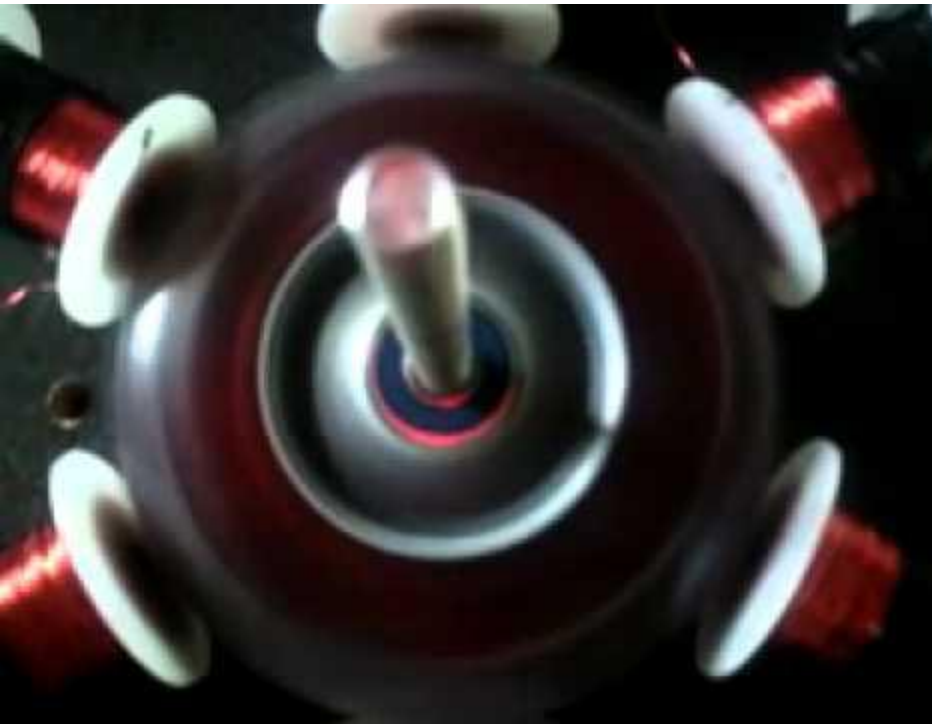
- What is the basic process by which the energy in a fuel is converted into electricity?
- What are the major fuels that are used to generate electricity in the US?
- What is cogeneration?

- Fossil Fuels and energy production is the basis for our economy at current
- It is this way deliberately by people in power that have been in power for a long time

Paper/Hemp Story



Story of Nikola Tesla



Oil



Presentation Hints

- Remember that your peers are relying on you for the information about your energy technology
- All the requirements are listed on the instructions PLEASE ask if you have questions
- Include relevant local energy issue (this can be one of your 5 sources)
 - for example: in Colorado, wind energy conflicts with sage grouse habitat or fracking is degrading water quality, etc.

