

HOW IS ENERGY USED IN U.S.?

EQ #7

MONDAY 2/3

- **FYIs-**
- Carbon Cycle drawing due today!
- Unit 2 Tests are recorded...we'll have a look today in class
- This is a regular week ... BSU is hosting a Spirit Week for Black History Month. Check the board!

WHAT ARE WE LEARNING TODAY?

- What are fossil fuels? Name the main three.
- Why are they said to be **non-renewable**?
- How are fossil fuels used? What does each power?
- What are the risks of using them today?

WARM-UP CARBON QUIZ

- Get a quiz. Use your notes to problem solve and answer
- We will make corrections and discuss after

HOW DO YOU USE ENERGY?

- 1. How do you use energy each day? List several ways. What activity on your list uses the most?
- 2. What sources are used for each type of energy you listed? Guess if you must.
- 3. What is **ONE** way your family could conserve energy more effectively?

ENERGY POLICY IN THE US

- In the US, federal laws (policies), state laws and local laws all affect energy policy and rules.
- Laws regulate pollution, extraction and use of all fuels by Americans.
- The THREE main fossil fuels are OIL, COAL & NATURAL GAS.

HOW IS ENERGY USED IN THE US TODAY?

- The main uses of energy today are for transportation, heat/cooling and electricity
- Energy is used for industrial processes, too.
- Most of it is non-renewable—can't make more of it on a human time scale.

FIND OUT 5 KEY ENERGY FACTS

- Activity:
- Research Energy Use in the U.S. Use the website. Research on a computer.
- https://www.eia.gov/energyexplained/print.php?page=us_energy_home
- Record your facts in your INB on the Left Side.

ENERGY USE ACTIVITY

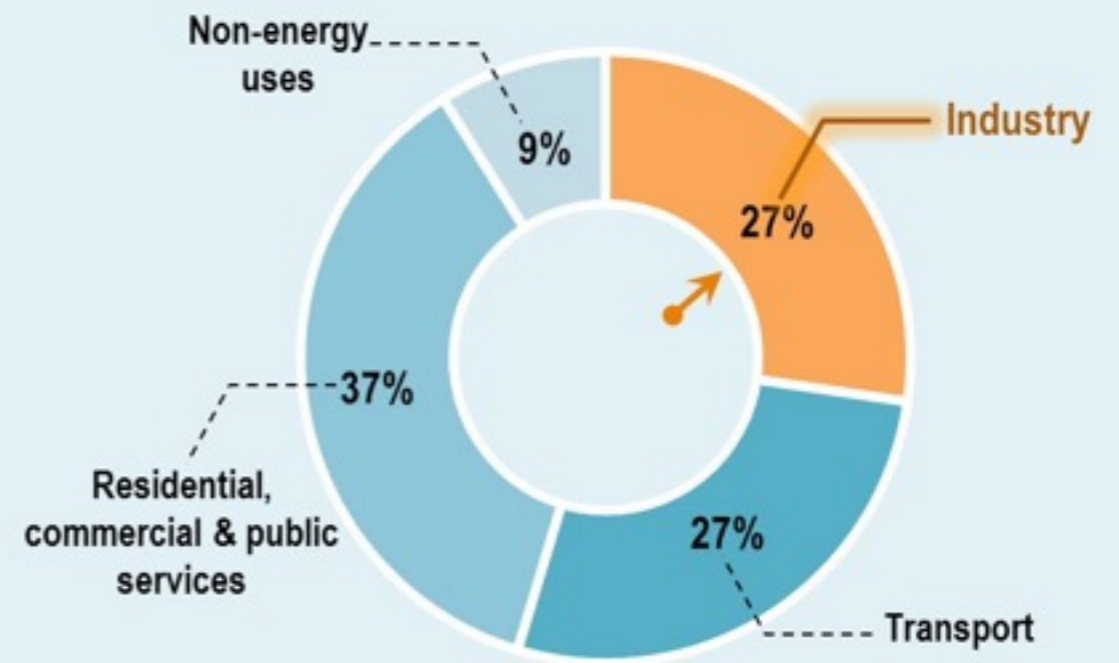
- Interview at least **THREE** other students to see what other facts are out there.
- Choose **ONE** from each student you interviewed that you think are most important. Write those **THREE** down.

ENERGY FACTS

- Americans use 6 times the energy of the average of people in the rest of the world.

Exhibit 4

Total Final Consumption of Energy 2009—Global

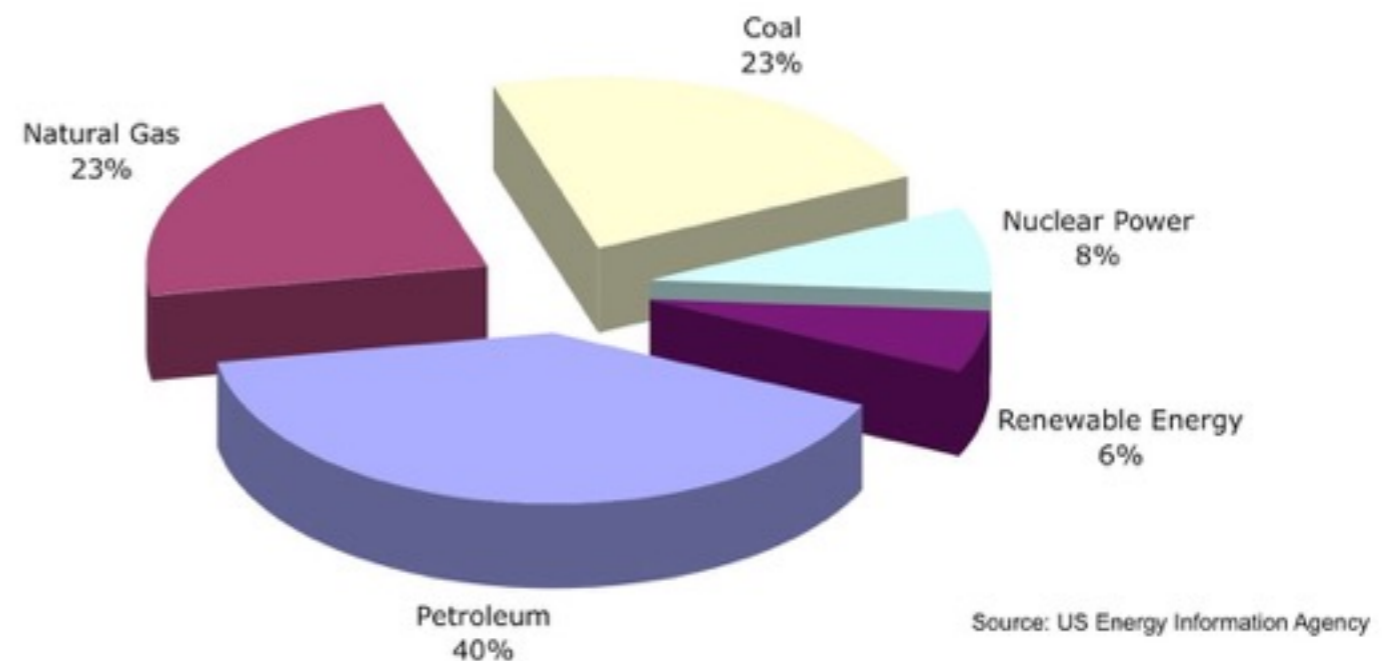


Source: World Energy Statistics-2011, International Energy Agency (IEA)

ENERGY FACTS

- **Fossil Fuels** are depleted at a rate that is 100,000 times faster than they are formed.
- **Coal, oil, natural gas**
- Fossil fuels are finite.

Figure 1: 86% of US Energy Consumption Is Fossil Fuels



ENERGY FACTS

- Approximately 30,000 lives are cut short in the US each year due to pollution from electricity production.



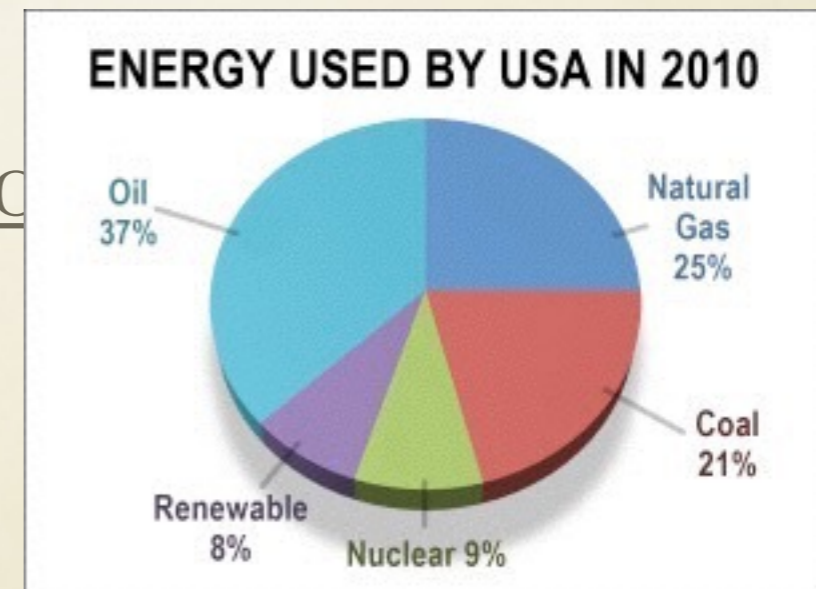
ENERGY FACTS

- A car that gets **20 mpg** emits approximately 50 tons of global-warming greenhouse gases (CO₂) over its lifetime



ENERGY USE

- The U.S. is 5% of the world's population but uses about 17% of the world's energy resources.
- The EU has must import so of the energy resources we use
- About 81% of our energy comes from non-renewable fossil fuels
- What are examples of **fossil fuels**?



ENERGY USE

- | | <u>% of World Pop</u> | <u>/</u> | <u>Energy Consumed</u> |
|--------------|-----------------------|----------|------------------------|
| US | 5% | | 17% |
| Europe (all) | 7% | | 12% |
| China | 18.5% | | 24% |

HOW ARE WE USING ENERGY?

- In 2017, the shares of total primary energy consumption of the five energy-consuming sectors were:

Electric power—39%

Transportation—28%

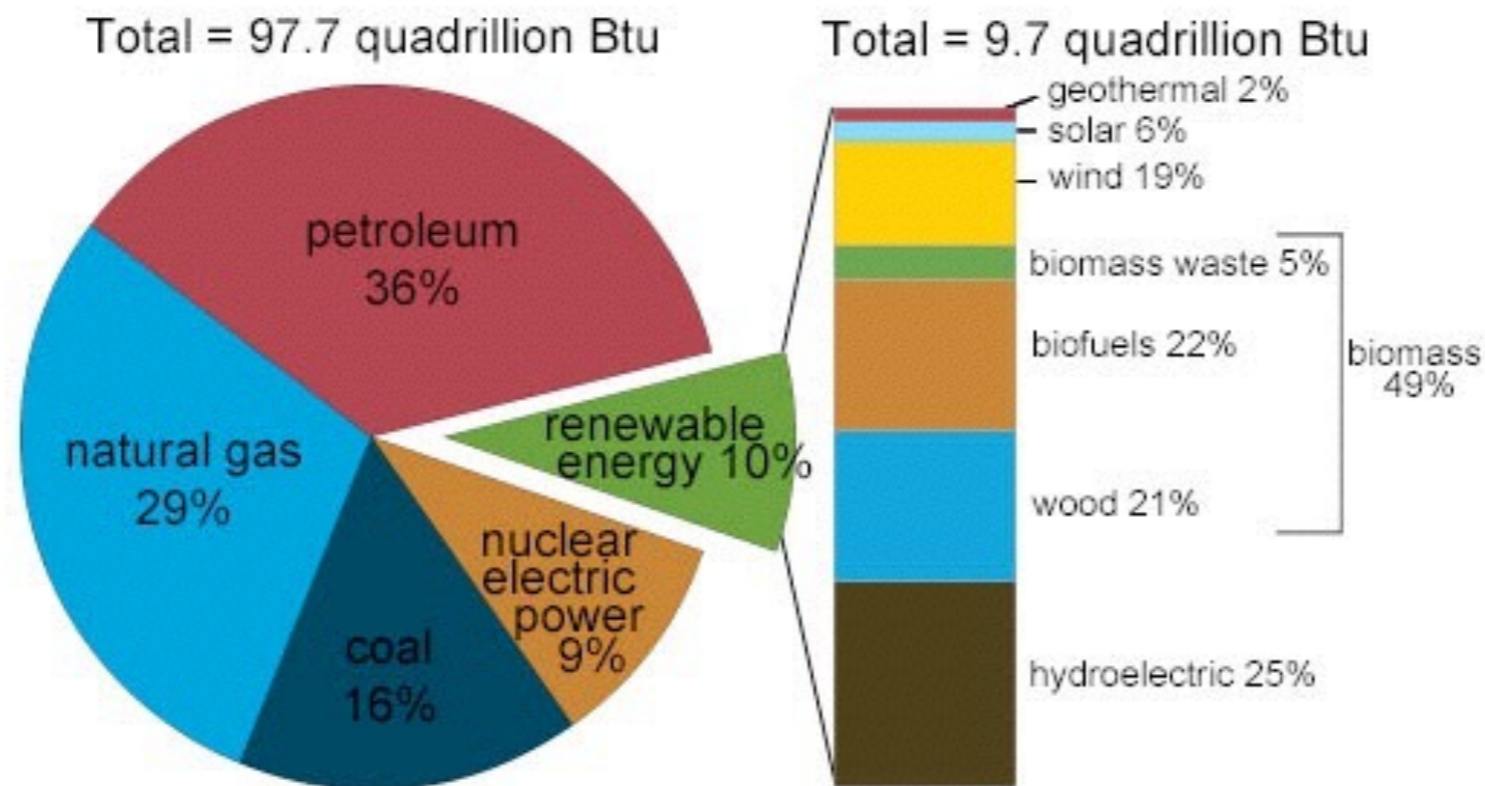
Industrial—22%

Residential—7%

Commercial—4%

OVERALL US ENERGY CONSUMPTION

U.S. energy consumption by energy source, 2015



Note: Sum of components may not equal 100% because of independent rounding.

Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1 (April 2016), preliminary data



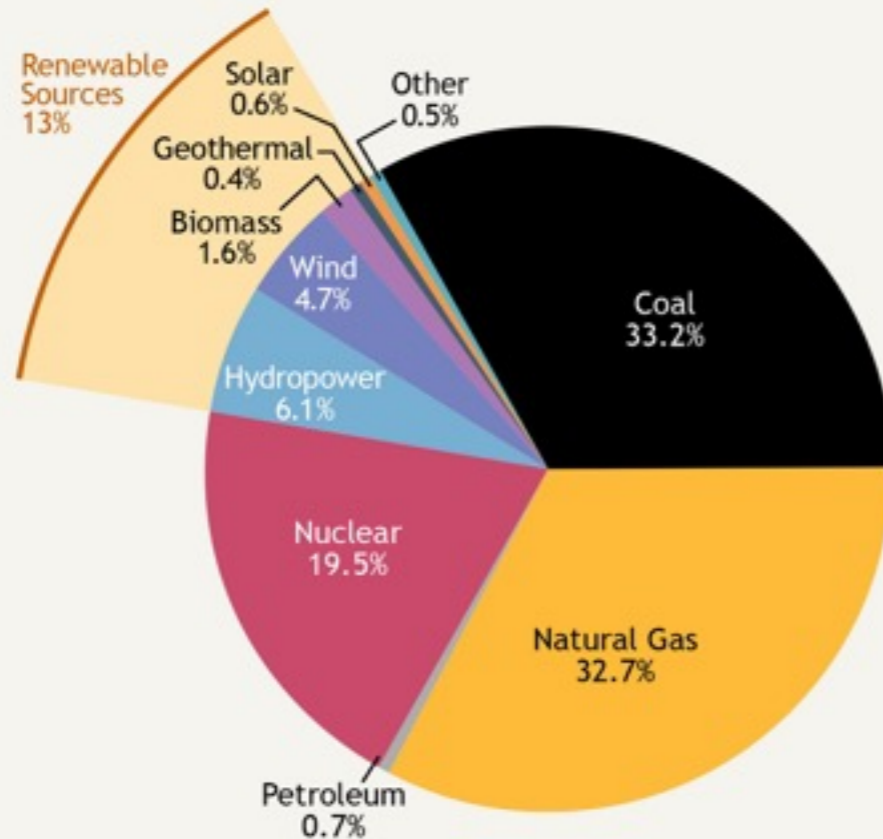
SOURCES OF OUR ELECTRICITY (2018)

- **Non-Renewables** produce MOST of our electricity (81%)
Natural gas = 35%
Coal = 27%
Nuclear = 19%

- **Renewables (total) = 19%**
Hydropower = 7%
Wind = 7%
Biomass = 2%
Solar = 2%
Geothermal = 1%

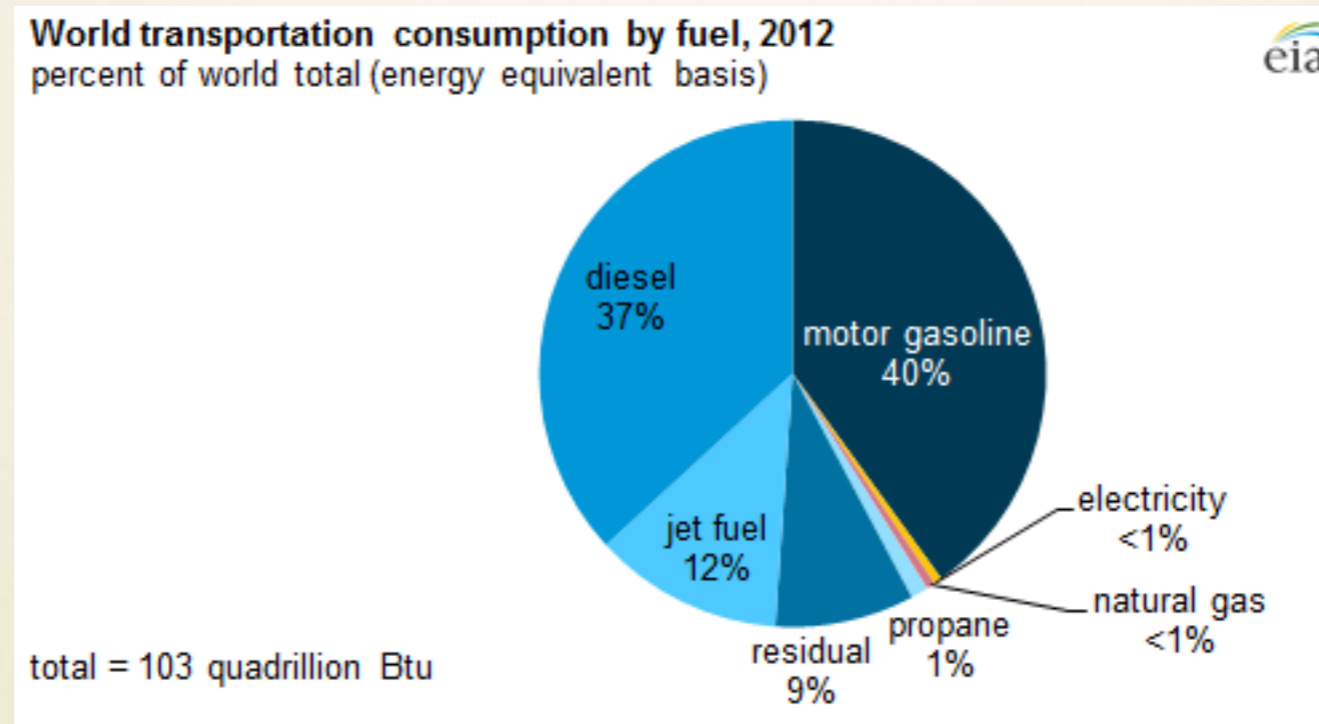
ENERGY USE

**Energy Sources Used to Generate Electricity
in the United States in 2015**



- 1. **Electricity**- Includes heating & cooling, cooking, lighting and appliances. Homes and businesses.
*Most electricity comes from burning coal & natural gas (about 65%)
*Hydropower, wind, nuclear also are used to make electricity in the U.S.

ENERGY USE- TRANSPORTATION



- **2. Transportation-**is the fastest growing energy consumption type; comes mostly from petroleum / oil. U.S. imports 60% of our petroleum.

INDUSTRIAL ENERGY USE

- 3. **Industrial Use**- for heating and production of goods and products. Coal and oil are used most for factory production of goods.

TUESDAY 2/4

- What environmental problems are associated with the use of non-renewable energy?
- What are fossil fuels?
- How do each of the **THREE** major fossil fuels compare? What are the risks and benefits associated with each?

WARM-UP ENERGY & CLIMATE

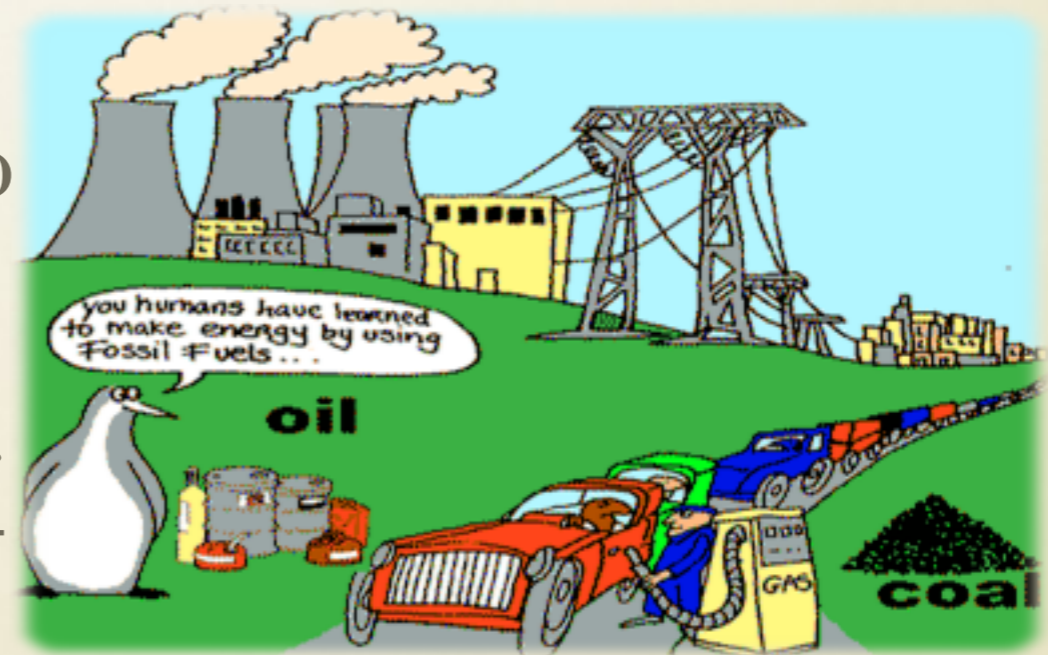
- Read the handout on Energy Use in US
- Mark it up
- Recored FIVE fun facts from the handout in your INB on the LEFT side.
- Glue in the pie chart detailing energy use in US

THE PROBLEMS WITH NON-RENEWABLE FUELS

- Non-Renewable Resources
 - Resources that cannot be replenished on a human time scale.
 - Are most commonly **fossil fuels** that took 300 million years to form.
 - When burned, cause pollution and global warming

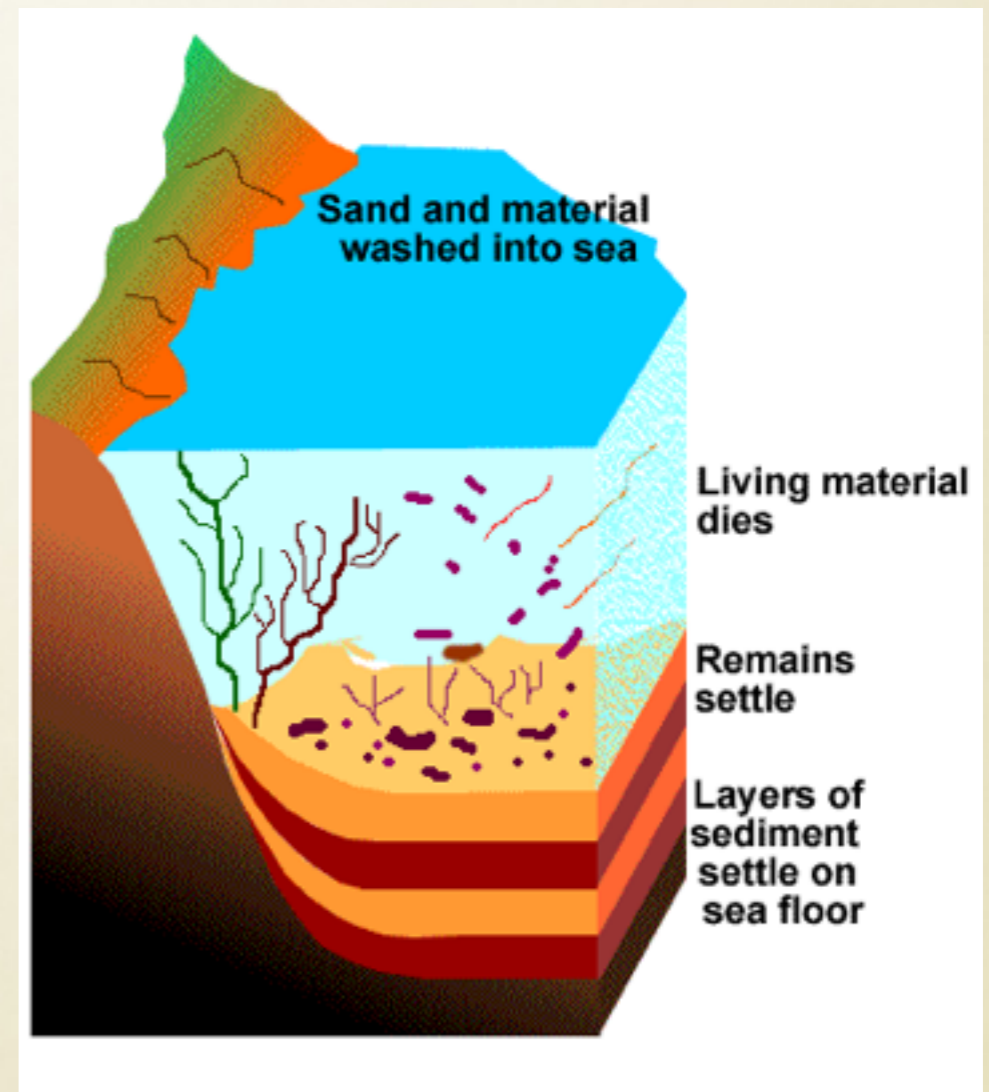
FOSSIL FUELS

- Are natural fuels formed over hundreds of millions of years from the fossil remains of plants and animals.
- Are relatively cheap to extract and plentiful.
- Provide about 81% of the energy in US.



HOW DID FOSSIL FUELS FORM?

- Formed 300 million years ago
- Form from dead plants and animals settled on the floor of swamps and oceans
- Over time, they were compressed by more and more layers of sediments
- They hardened and became **coal, oil** and **natural gas**.



WHAT ARE THE ISSUES WITH FOSSIL FUEL USE?

- Fossil fuels are finite; we don't know exactly when they'll run out.
- Key risks are that they emit CO₂ when burned and are warming the atmosphere and causing air & water pollution

COMPARE NON-RENEWABLE ENERGY SOURCES

- Activity- Compare the THREE most used fossil fuels.
- How is each extracted? What risks are there for each during extraction?
- How is each used? What are the risks and benefits of each in use?

WEDNESDAY FEB 5

- Review Carbon Quiz from Monday
- Film Clips- **EXTRACTION** of fossil fuels
- Work Time- Fossil Fuels Compare Chart
- Fossil Fuels debrief with your team (if time)

FILM CLIPS LINKS

- Film Clips- **EXTRACTION**
Natural Gas Fracking -https://www.youtube.com/watch?v=Tudal_4x4F0
- **Coal- Mountaintop Removal**- <https://all-geo.org/highlyallochthonous/2014/09/mountaintop-removal-mining-what-it-looks-like-and-what-it-does-to-appalachian-streams/>
<https://www.pbs.org/newshour/show/mountaintop-mining-affects-life-landscape-west-virginia>
- **Oil- Drilling & Pipelines- DAPL** <https://www.pbs.org/newshour/nation/dakota-access-pipeline-operation-months-resistance>

THURSDAY 2/6

FOSSIL FUELS DEBRIEF

- Finish Film Clips
- Meet with your team
- Share information. Be sure to say
 - ***How the fuel is used,**
 - ***How it's extracted and**
 - ***Where it's found** in US and the world.
- Play the Team Kahoot with the class.

HOW MUCH ENERGY DO WE USE?

- See pie chart / graph
- <https://www.eia.gov/energyexplained/renewable-sources/>
- <http://css.umich.edu/factsheets/us-energy-system-factsheet>

READ THE HANDOUT ON US ENERGY USE

- EIA Today in Energy Article
- 1. What changes did you notice from 2018 compared to 2014?
- 2. Did US Energy use grow? How much? Why?
- 3. How much of our energy use is from fossil fuels?