**Petroleum**

NonRenewable Resource accounting for 35.1% of US Energy Consumption

**What is Petroleum?**

1. How is petroleum formed?
2. How long does it take to form?

**Producing Oil**

1. How many exploratory wells produce end up producing oil?
2. How deep is the typical oil well drilled?
3. How much oil comes from off shore wells?

**From Well to Market**

1. Why do we need to process the crude oil at a petroleum refinery?
2. List 4 major petroleum products.

**Shipping Petroleum**

1. How is most petroleum shipped?
2. How long does it take to ship gasoline from Houston, Texas to New York City by pipeline?

**Oil and the Environment**

1. What are 2 ways that petroleum production and use contributes to air pollution?
2. What are 3 ways that petroleum production and use contributes to water pollution of some form?
3. How has the petroleum industry worked to protect the industry?

**Figures throughout the Article**

1. What are the top 3 petroleum producing states?
2. What are the top 2 sectors that consume petroleum, and what percent do they use?
3. What are the top 2 products that come from 1 barrel of oil, and what percent is each?
4. List 5 interesting products made with petroleum.

**Natural Gas**

NonRenewable Resource accounting for 25.2% of US Energy Consumption

**What is Natural Gas?**

1. What is natural gas made of?
2. What is the main ingredient in natural gas?
3. What is mercaptan added to methane?
4. What is natural gas mostly used for?
5. Natural gas is considered a nonrenewable resource, but there is one form of natural gas that can be produced. What source is that and where can we produce it?

**Producing Natural Gas**

1. What is the average depth of a natural gas well?
2. How much natural gas is found offshore?
3. Scientists estimate that we can last for how many years at the current prices and rate of consumption for natural gas.

**Shipping Natural Gas**

1. Natural gas is usually shipped how?
2. How long does it take to ship natural gas from Texas to New York?

**Who Uses Natural Gas**

1. Industry sector uses natural gas for what purpose?
2. Residences sector use natural gas for what purpose?
3. Commercial sector uses natural gas for what purpose?

**Natural Gas and the Environment**

1. What does natural gas release into the air when it is burned?
2. Is natural gas considered clean or dirty, in comparison to other fossil fuels?

**Figures throughout the Article**

1. What are the top 3 natural gas producing states?
2. What are the top 2 sectors that consume natural gas, and what percent do they use?

**Coal**

NonRenewable Resource accounting for 21.3% of US Energy Consumption

**What is Coal?**

1. How is coal related to plants?
2. How did coal form from swamps?
3. How long does the process of coal forming in swamps take?

**Coal Mining**

1. How much of the US coal is mined via surface mining?
2. What is the range of depth of surface mining?
3. Some underground mines can be how deep?

**Processing and Transporting Coal**

1. What does the coal preparation plant remove from the coal that is mined?
2. What are the top 3 ways to transport coal?

**Coal Reserves and Production**

1. Who has the world’s largest coal reserves?
2. The United States has enough coal to last how many year based on current consumption rates?

**How Coal is Used**

1. What is most coal used for?

**Coal and the Environment**

1. What 2 chemicals are produced/released when coal is burned?
2. How is acid rain related to coal being burned?
3. What are 2 ways that we have started making coal more environmentally friendly?

**Figures throughout the Article**

1. What are the top 3 coal producing states?
2. What are the top 2 sectors that consume coal, and what percent do they use?

**Propane**

NonRenewable Resource accounting for 1.6% of US Energy Consumption

**What is Propane?**

1. What phase/state of matter is propane under during normal conditions?
2. How can you turn propane gas into liquid propane?
3. Why is propane stored in liquid form?
4. Propane gas takes up how much more space than liquid propane?
5. Why is an odor added to propane gas?

**Producing Propane**

1. How much of raw natural gas is propane?
2. What is the rest of raw natural gas?

**Transporting Propane**

1. How is propane moved through the country?

**How is Propane Used?**

1. How much of US energy comes from propane?

**Industry**

1. How much of propane used in the US is used by industry?
2. Why do fork lift trucks use propane?

**Homes**

1. What do homes use propane for?

**Transportation**

1. Who uses transportation fuel?
2. List 2 reasons they use propane instead of gas.

1)

2)

1. List 2 reasons that you, as the average American, do not use propane instead of gas.

1)

2)

**Biomass**

Renewable Resource accounting for 4.4% of US Energy Consumption

**What is Biomass?**

1. What is biomass?
2. Give 4 examples of biomass.
3. Where does biomass get energy from?
4. Why is biomass considered renewable?

**Use of Biomass**

1. How much of biomass that is used today is wood?
2. Why/how does the transportation sector use biomass?
3. How many homes in America use wood as a primary heat source?

**Biomass and the Environment**

1. How is growing plants for biomass a good thing for the environment?

**Using Biomass Energy**

**Burning**

1. What are 5 things that are burned for energy?
2. How many pounds of garbage burned will output the same amount of energy as 500 pounds of coal burned?

**Bacterial Decay**

1. As plants and animals decay, what do they produce?
2. How, and why, do we get methane out of landfills?

**Fermentation**

1. Adding yeast to biomass produces what?
2. What crops are the two major crops that are used/fermented to make ethanol?
3. What is the benefit of adding 1 part ethanol to 9 parts gasoline (or, E-10 fuel)?

**Figures throughout the Article**

1. What are the top 2 sources of biomass, and what percent do they contribute?
2. What are the top 2 sectors that consume biomass, and what percent do they use?
3. How much has ethanol consumption increased between ’01 and ’10?

**Hydropower**

Renewable Resource accounting for 2.6% of US Energy Consumption

**What is Hydropower?**

1. Hydropower comes from what?
2. Briefly (in 3-4 short phrases) explain the continuous water cycle?
3. How is hydropower replenished?

**Hydropower Dams**

1. Which is easier to build a hydropower plant on; a river or waterfalls?
2. Where was the 1st hydropower plant?
3. How many dams are in the United States?
4. How many dams generate electricity in the United States?

**Hydropower Plants**

1. What are the 3 parts of a hydropower plant, and the purpose of each one?
   1. Part\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Purpose \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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**Storing Energy**

1. What is one of the biggest advantages of hydropower dams?
2. What type of energy does the water in a reservoir have?

**Amount and Cost of Hydropower**

1. How much of the United States’ electricity does hydropower provide?
2. How much of the World’s electricity does hydropower provide?
3. What is special, financially, about hydropower?

**Hydropower and the Environment**

1. Does hydropower produce air pollution?
2. What are the downsides of building dams?

**Figures throughout the Article**

1. What are the top 3 hydropower producing states?
2. Why do you think that is the case? *(Think about the east side of these 3 states.)*

**Wind Energy**

Renewable Resource accounting for 0.9% of US Energy Consumption

**What is Wind?**

1. What causes wind?
2. Does water heat&cool faster or slower than land?
3. During the day, does warm air rise from land or water?
4. During the day, is the breeze coming from or going towards the sea?

**Today’s Wind Turbine**

1. Wind turbines use blades to capture what energy from the wind?
2. Based on step 3, what does a generator actually do?
3. The amount of electricity a turbine produces depends on what 2 things?
4. A small turbine can power how many homes?
5. A large turbine can power how many homes?

**Wind Power Plants**

1. What is a wind farm?
2. Wind speed increases with what 2 things?
3. List 3-4 of the best locations for a wind farm.
4. Where is the 1st off shore US wind farm located?

**Wind Production**

1. What is a major downside to wind power?

**Environmental Impacts**

1. What are some “downsides” to wind power? List 3 of them.
2. Does wind power produce and pollution?

**Geothermal**

Renewable Resource accounting for 0.2% of US Energy Consumption

**What is Geothermal Energy?**

1. What is geothermal energy?
2. Where does magma come closest to the surface?
3. What are the wells used for?
4. Why is geothermal energy considered a renewable resource?

**Finding Geothermal Energy**

1. Where are most active geothermal resources found?
2. Where is the ring of fire located?

**Hydrothermal Resources**

1. What are the two common ingredients of hydrothermal resources?

**Low Temperature**

1. What is the temperature range?
2. Located at what depth in the United States?
3. What is it used for?
4. How much of Iceland uses Low Temperature Resources?

**High Temperature Resources**

1. What is the temperature range of high temperature resources?
2. What are high temperature resources used for?
3. At what depth are high temperature resources found?

**Geothermal Energy and the Environment**

1. List two advantages of using Geothermal Energy.