

BIOL 1127

Alternative Energies

Final Report

Student Name Layne Burkhart
Student ID 316024
Lesson Alternative Energies
Institution Columbus State Community College
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Course BIOL 1127
Instructor Mort Javadi

Test Your Knowledge

Classify each source as a fossil fuel, renewable alternative energy source, or non-renewable alternative energy source.

	Fossil Fuel	Renewable Alternative Energy Source	Non-Renewable Alternative Energy Source
1	Coal	2 Biomass	3 Nuclear
	Oil	Solar	
	Natural gas	Wind	

Match each term to the best description.

Harvested from the fission of uranium atoms which produces steam that powers electricity generators	1	Nuclear energy
Plant and animal wastes burned to produce heat and generate electricity	2	Biomass energy
Clean resource harvested from reservoirs of hot water and steam below Earth's surface	3	Geothermal energy
Sustainable resource harvested using photovoltaic panels	4	Solar energy
Low cost resource harvested using turbines that generate electricity and generate zero emissions	5	Wind energy

Exploration

All ____ sources are naturally replenished either at the rate they are used or during a human lifespan.

- alternative energy
- renewable energy
- fossil fuel
- non-renewable energy

In 2020, _____ represented 9% of U.S. total energy consumption and 52% of alternative energy used in 28 states.

- biomass fuel
- hydropower
- nuclear electric power
- solar power

_____ generators are most commonly located within dams or other restriction structures.

- Hydropower
- Solar
- Wind
- Geothermal

Exercise 1

What was the most common fuel consumed in 2019 for each of the states analyzed in the procedures? Is the fuel considered a renewable or non-renewable resource? How does the fuel use impact the environment? Reference Data Table 1 in your explanation.

Most common fuel by far was natural gas. Natural gas is considered non renewable. This fuel is a fossil fuel and when burned negatively impacts our environment and ecosystems within it. Some examples include acid rain and corrosion.

What was the most-produced alternative energy source for Colorado and California in 2019? Reference Data Table 2 in your explanation. Is the fuel a renewable resource? What challenges are associated with the production and use of the energy source?

Most produced by both was biofuels and they are reusable. They are very sustainable. Biggest challenge is availability of the biofuel you are using.

Are Colorado and California net producers or net consumers of alternative energy? Reference Data Table 2 in your explanation. What benefits would each state achieve by increasing the consumption of wind energy? What challenges would increased wind energy harvesting and production present to the states?

Both are net producers of alternative energy as they produce more than they consume. Benefits of increasing consumption of wind energy, a clean and renewable source of energy, would be to reduce green house gasses and emissions. A big challenge of wind energy is that constant wind is needed to make it viable. California may work better as it is a coastal state but a state like Colorado is surrounded by mountains.

Data Table 1: Energy Consumption Estimates, 2019

Source	Colorado consumption (Trillion Btu)
Natural gas	<input type="text" value="559.8"/>
Coal	<input type="text" value="273.3"/>
Motor gasoline excl. ethanol	<input type="text" value="268.0"/>
Distillate fuel oil	<input type="text" value="127.8"/>
Other renewables	<input type="text" value="114.2"/>
Jet fuel	<input type="text" value="82.3"/>
Biomass	<input type="text" value="47.5"/>
HGL	<input type="text" value="19.7"/>
Other petroleum	<input type="text" value="35.8"/>
Hydroelectric power	<input type="text" value="16.1"/>
HGL	<input type="text" value="19.7"/>
Nuclear Electric Power	<input type="text" value="0.0"/>
Residual fuel	<input type="text" value="0.0"/>
Total alternative consumption	<input type="text" value="177.8 BTU"/>

Source	Fuel type
Natural gas	<input type="text" value="Fossil fuel"/>
Coal	<input type="text" value="fossil fuel"/>
Motor gasoline excl. ethanol	<input type="text" value="fossil fuel"/>
Distillate fuel oil	<input type="text" value="fossil fuel"/>
Other renewables	<input type="text" value="alternative fuel"/>
Jet fuel	<input type="text" value="alternative fuel"/>
Biomass	<input type="text" value="alternative fuel"/>

HGL	alternative fuel
Other petroleum	alternative fuel
Hydroelectric power	alternative fuel
HGL	alternative fuel
Nuclear Electric Power	alternative fuel
Residual fuel	alternative fuel
Total alternative consumption	

Source	California consumption (Trillion Btu)
Natural gas	2271.2
Coal	30.9
Motor gasoline excl. ethanol	1688.1
Distillate fuel oil	566.7
Other renewables	627.3
Jet fuel	602.2
Biomass	308.0
HGL	61.5
Other petroleum	323.8
Hydroelectric power	341.5
HGL	61.5
Nuclear Electric Power	168.8
Residual fuel	184.4
Total alternative consumption	1276.8 BTU

Data Table 2: Energy Production Estimates, 2019

Source	Colorado production (Trillion Btu)
Natural gas-marketed	<input type="text" value="2385.5"/>
Crude oil	<input type="text" value="1081.0"/>
Coal	<input type="text" value="270.5"/>
Other renewable energy	<input type="text" value="0.0"/>
Biofuels	<input type="text" value="18.4"/>
Nuclear electric power	<input type="text" value="0.0"/>
Total energy production	<input type="text" value="3755.4 BTU"/>
Total alternative production	<input type="text" value="18.4 BTU"/>
Percent alternative production	<input type="text" value=".489"/>
Net alternative consumption	<input type="text" value="159.4 BTU"/>

Source	Fuel Type
Natural gas-marketed	<input type="text" value="fossil fuel"/>
Crude oil	<input type="text" value="fossil fuel"/>
Coal	<input type="text" value="fossil fuel"/>
Other renewable energy	<input type="text" value="alternative fuel"/>
Biofuels	<input type="text" value="alternative fuel"/>
Nuclear electric power	<input type="text" value="alternative fuel"/>
Total energy production	
Total alternative production	
Percent alternative production	
Net alternative consumption	

Source	California production (Trillion Btu)
Natural gas-marketed	<input type="text" value="220.8"/>

Crude oil	920.1
Coal	0.0
Other renewable energy	0.0
Biofuels	25.9
Nuclear electric power	168.8
Total energy production	1335.6 BTU
Total alternative production	25.9 BTU
Percent alternative production	1.939
Net alternative consumption	1250.9 BTU

Competency Review

_____ is an example of an alternative energy source.

- Hydropower
- Wind energy
- Geothermal energy
- All of the above

Nuclear energy is classified as an alternative, non-renewable energy source.

- True
- False

Challenges to ____ energy include intermittent availability, potential hazards to wildlife, and view obstructions.

- hydropower
 - wind
 - geothermal
 - nuclear
-

____ is a renewable, zero-emission energy source.

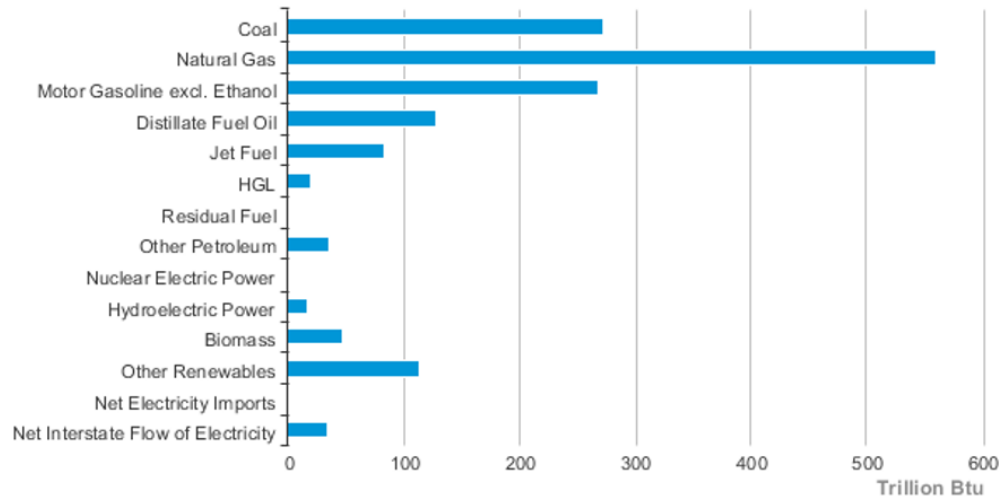
- Solar energy
 - Coal
 - Natural gas
 - Biomass fuel
-

The harvesting of ____ energy is dependent upon steam and heat reservoirs below Earth's surface.

- hydropower
 - nuclear
 - solar
 - geothermal
-

The primary non-renewable energy source consumed in Colorado in 2019 was ____.

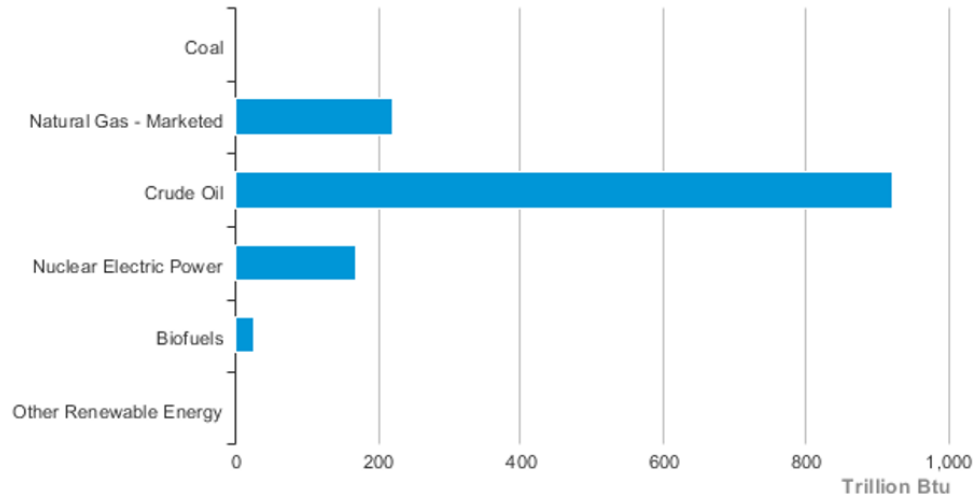
Colorado Energy Consumption Estimates, 2019



- nuclear electric power
- biomass
- natural gas
- coal

_____ was the most produced alternative energy in California in 2019.

California Energy Production Estimates, 2019



- Natural gas
- Crude oil
- Nuclear electric
- Biofuel

The biomass fuels produced and used in Colorado pose no threats to the natural environment.

- True
- False

Extension Questions

The local electric utility provider is planning to add a renewable, zero-emissions, alternative energy source to their network.

Apply your knowledge of the properties of alternative energy resources to recommend the best zero-emissions resource for your area. Explain why the recommended resource is ideal for your area and include your location in your answer.

The best would be wind energy as it keeps carbon, greenhouse gas and emissions down it also promotes clean renewable energy and would be somewhat reliable in Columbus, Ohio as we have constant win as we are not a very mountainous region.