

Renewable vs. Non-Renewable Resources Compare and Contrast Essay

Introduction: Worldwide there is a range of energy resources available to us. These energy resources fall into two main categories, **Renewable** and **Non-Renewable** energy resources. Each of these resources can be used to generate electricity, which is a very useful way of transferring energy. The concept of renewable energy resources versus non-renewable energy resources provides the basis for sustainability. Renewable energy resources are replenished by natural processes over time and we can use them again and again over an extremely long span of time like solar energy, wind energy, tidal energy, geothermal etc. On the other hand, non-renewable energy sources like oil or minerals are formed over multi-millions of years under the earth's crust. Earth can replenish non-renewable resources, but this takes place over multi-millions of years during which organic matter (carbon-containing compounds) is transformed into fossil fuels.

Renewable Resources	How these resources are replenished
Hydro-Electric (Ocean Current or Ocean Tide)	Water Cycle / Ocean Currents
Hydro-Electric (Rivers)	Water Cycle
Oxygen	Plant and Animal respiration
Wind	Atmospheric Cycles / Temperature Variations
Forests	Reproduction and germination.
Solar Radiation	Nuclear fusion in the sun
Water	Water cycle
Animals	Reproduction
Geothermal	Circulation of the earth's crust between the Earth's core and it's surface
Soil	Earth's sediment cycle
Microbes (biomass)	reproduction

Non-Renewable Resources	How these resources are depleted
Coal	Mining and burning to produce energy
Oil	Extraction and burning to produce energy
Natural Gas	Extraction and burning to produce energy
Metals	Mining
Minerals	Mining/Extraction
Uranium	Mining and nuclear fission producing energy
Petroleum	Extraction and burning to produce energy

The world's total consumption of renewable and non-renewable natural energy resources can be expressed by a term called the ecological footprint. The ecological footprint is equal to the amount of land and water needed to sustain life on earth and absorb wastes. Since the mid-1980's, the world's population has exceeded its ecological footprint. In other words, people are consuming resources faster than the Earth can replenish them.

Research Questions: (answer the following questions on a separate sheet of paper)

1. What does it mean when an energy resource is said to be "renewable"?
2. Give five examples of renewable energy resources.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
3. Give five examples of non-renewable energy resources.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
4. What are "fossil fuels"? Which non-renewable energy resources qualify as "fossil fuels"?
5. According to the chart attached, what percentage of US energy is produced by all of the non-renewable sources combined? (show your calculations)
6. What energy resource is most commonly used to make electricity?
 - a. Is this energy resource renewable or non-renewable? (circle one)
7. What are the three main types of air pollutants produced by electrical power plants in the United States? (in descending order from greatest quantity to least)
 - a. _____
 - b. _____
 - c. _____
 - i. Do nuclear power plants produce pollutants? If so, what type?
8. Air pollutants are produced in power plant emissions, what can one do to reduce one's needs for electrical energy?
 - a. Give one example of a technology for reducing the amount of air pollution from power plant emissions.
9. Choose one type of renewable energy and answer the following questions:
 - a. Name two benefits or advantages for your chosen renewable resource.
 - i. _____
 - ii. _____
 - b. What are two limitations or disadvantages of your chosen renewable resource?
 - i. _____
 - ii. _____
10. Choose one type of non-renewable energy and answer the following questions:
 - a. Name two benefits or advantages for your chosen non-renewable resource
 - i. _____
 - ii. _____
 - b. What are two limitations or disadvantages of your chosen non-renewable resource?
 - i. _____
 - ii. _____

Part 1 – Background Research

- Use the information provided and the information found on-line to complete the 10 research questions found on page 2

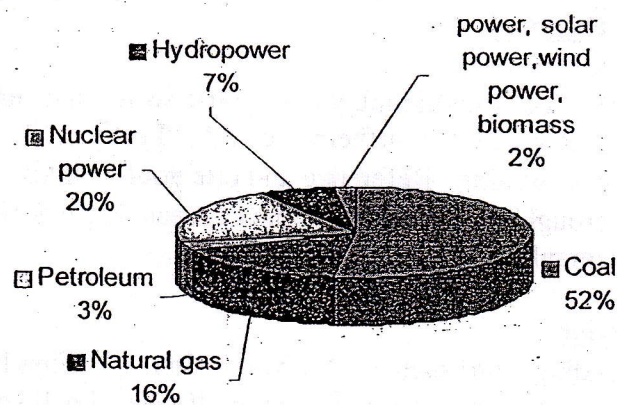
Part 2 - The Essay - use the information gathered during the background research to write a 5-paragraph essay.

Compare and Contrast one of the following options.

- Compare two renewable sources of energy against each other.
- Compare two non-renewable sources of energy against each other.
- Compare one type of renewable energy to one type of non-renewable energy
- Compare all renewable energy sources vs. all non-renewable energy sources.

Essay Requirements

- Your essay must be at least 5-paragraphs in length (intro, 3-body-paragraphs, conclusion)
- Each paragraph must be a minimum of 3-sentences.
- Be sure to cite any research information used in your essay.
- Follow the attached guidelines for writing a 5-paragraph essay.
- Your essay and research questions may be typed or hand written.
- You have one week to submit part 1 and 2 together.



Capacity to Generate Electricity by Energy Source, in the U.S.
Source: United States Energy Information Admin

How to Write a Five Paragraph Essay

Note: It is important to structure your thoughts and arguments in an organized manner.

Paragraph #1 – Introduction

- Start by indenting your paragraph. (you will need to indent each paragraph)
- The introduction is typically 5-7 sentences in length.
- Capture your audience! Make it interesting!
- Make sure you introduce your topic, what you will cover in the paper, and the reason you are writing.
- Provide background information on your subject.
- Conclude the introduction with a thesis statement. Use a strong thesis, and avoid saying “In this paper I will.....”

Paragraph #2 – Body Paragraph

- Start with a topic sentence.
- You may use introductory words such as: “To begin with...” or “First”.
- Use examples in your writing. Reference and cite your sources.
- Make sure you thoroughly express your topic or reasoning before moving on to the next body paragraph. Stay organized!

Paragraph #3 – Body Paragraph

- Start with a topic sentence.
- You may use words such as: “Furthermore”, “Another reason why...”, “Secondly...”, “Next...”
- Use examples in your writing. Reference and cite your sources.
- Make sure you thoroughly express your topic or reasoning before moving on to the next body paragraph. Stay organized!

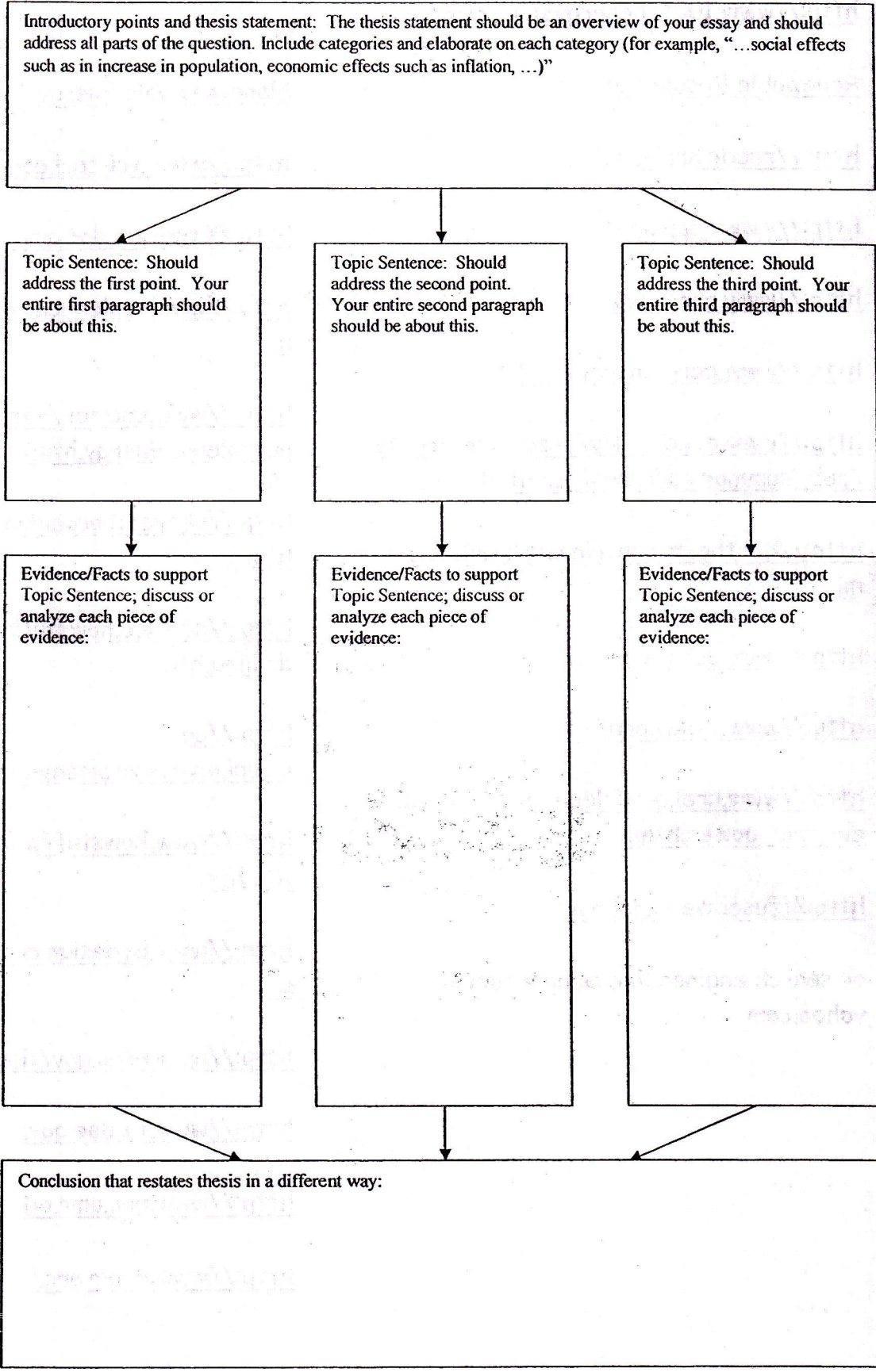
Paragraph #4 – Body Paragraph

- Start with a topic sentence.
- Since this is your last body paragraph you may use words such as: “Thirdly...”, “Next...”, “A final cause.....”, “Furthermore.....”, “Lastly.....”
- Use examples in your writing. Reference and cite your sources.
- Make sure you thoroughly express your topic or reasoning before moving on to the next body paragraph.

Paragraph #5 – Conclusion

- Start with a concluding word such as: “In conclusion...”, “Finally...”
- Conclude your thoughts and recommendations. If needed call your audience to act.
- Review the topics you covered.
- Avoid introducing new topics or information in the conclusion.

5 PARAGRAPH ESSAY OUTLINE



WEB SITES FOR RESEARCH

<http://www.100topenergysites.com/>

Renewable Resources

<http://rredc.nrel.gov/>

<http://www.repp.org/>

<http://www.rnrf.org/>

<http://www.eere.energy.gov/>

http://www.eia.doe.gov/cneaf/electricity/pub_summaries/renew_es.html

<http://geothermal.marin.org/pwrheat.html>

<http://www.ases.org/>

<http://www.txses.org/>

http://www.nrel.gov/clean_energy/hydroelectric_power.html

<http://fusedweb.pppl.gov/>

or search engines like Google.com or yahoo.com.

Nonrenewable Energy

<http://www.wci-coal.com/>

<http://www.eia.doe.gov/fuelcoal.html>

<http://www.coaleducation.org/default.htm>

http://www.unc.edu/~zmg/geosoc/links_petroleum-energy.html

<http://proyectoargentino.com.ar/index1.htm>

<http://science.howstuffworks.com/oil-drilling.htm>

<http://api-ec.api.org/newsplashpage/index.cfm>

<http://www.howstuffworks.com/question105.htm>

<http://www.bydesign.com/fossilfuels/links/>

<http://www.usgs.gov/themes/energy.html>

<http://www.fe.doe.gov/>

<http://www.nuc.umn.edu/~ans/QA.html>

<http://www.ecolo.org/>