# Lab 14 Response: Impact of Energy Choices (For Individuals)

## Part 1: Analyzing Energy Graphs and Tables

1. Take a look at the graph titled **Average oil liquids net-energy production from 1950 to 2050, compared to the gross energy** in Part 1 of the lab instructions. What are your key takeaways from this graph? What evidence do you have to support that reading?
2. Now, consult the table **Calculated Potential of Renewable Energy Resources, 2020** in Part 1 of the lab instructions. What are your key takeaways from this table? What evidence do you have to support that interpretation?
3. Consult **Renewable Energy Production and Consumption by Source** in Part 1 of the lab instructions. What are your key takeaways from this graph? What evidence do you have to support that reading?

## Part 2: Impacts of Energy Choices

Directions: Fill out the tables below. You may summarize your textbook to discuss the different fuel choices or consult the Library Research Guide for other credible sources. If you choose to find your own sources, you can use the [Library Research Guide](https://library.cod.edu/biolo1110/energy) or search on your own, **but be sure that all sources you use are credible and authoritative (refer to**[**Lab 1**](https://cod.pressbooks.pub/envirobiologylab/chapter/lab-1-introduction-to-the-scientific-method-information-literacy-and-data-literacy/)**for more information about evaluating sources).**

### Part 2a: Carbon-based fossil fuels

1. For each energy type, summarize the **convenience, applicability, environmental impact, social impact, economic impact, and health impact from energy capture to use**. Then list what each type of energy is primarily used for, such as transportation, heating, etc. If you use a source other than your textbook, cite it using the website title and URL below the information you’re using.

|  |  |  |  |
| --- | --- | --- | --- |
| **Energy option** | **Pros** | **Cons** | **Uses of energy source** |
| **Coal**Definition: |  |  |  |
| **Petroleum** Definition: |  |  |  |
| **Natural Gas**Definition: |  |  |  |

### Part 2b: Non-carbon energy choices

1. For each energy type, summarize the **convenience, applicability, environmental impact, social impact, economic impact, and health impact from energy capture to use**. Then list what each type of energy is primarily used for, such as transportation, heating, etc. If you use a source other than your textbook, cite it using the website title and URL below the information you’re using.

|  |  |  |  |
| --- | --- | --- | --- |
| **Energy option** | **Pros** | **Cons** | **Uses of energy source** |
| **Nuclear (fission)**Definition: |  |  |  |
| **Geothermal**Definition: |  |  |  |
| **Hydropower**Definition: |  |  |  |
| **Wind**Definition: |  |  |  |
| **Solar**Definition: |  |  |  |

### Part 2c: Carbon-neutral energy sources

1. For each energy type, summarize the **convenience, applicability, environmental impact, social impact, economic impact, and health impact from energy capture to use**. Then list what each type of energy is primarily used for, such as transportation, heating, etc. If you use a source other than your textbook, cite it using the website title and URL below the information you’re using.

|  |  |  |  |
| --- | --- | --- | --- |
| **Energy option** | **Pros** | **Cons** | **Uses of energy source** |
| **Biomass**Definition: |  |  |  |
| **Biofuel**Definition: |  |  |  |
| **Biogas**Definition: |  |  |  |

## Part 3: Future Energy Portfolio of the United States

### Part 3a: Summarize and explain

1. **Summarize your own and your classmates’ research from Part 2 to fill out the following table.**Provide 3 key takeaways for each energy group, explain if we should limit usage of the energy group or reserve it for specific usages, and then explain your reasoning.

|  |  |  |  |
| --- | --- | --- | --- |
| Energy Group | 3 Key Takeaways | Limit Usage or Prioritize | Why? |
| Carbon-based fossil fuels |  |  |  |
| Non-carbon energy choices |  |  |  |
| Carbon-neutral energy usages |  |  |  |

1. Are there any outliers (energy sources that are very different from the rest of the group) among the carbon-based fossil fuel energy sources that you would recommend a different prioritization for? If so, which ones and why?
2. Are there any outliers among the non-carbon energy sources that you would recommend a different prioritization for? If so, which ones and why?
3. Are there any outliers among the carbon-neutral energy sources that you would recommend a different prioritization for? If so, which ones and why?

### Part 3b: Current and historical energy consumption data

1. What are your key takeaways from the chart **U.S. primary energy consumption by energy source, 2023**? What evidence do you have to support that reading?
2. What are your key takeaways from the graph **U.S. primary energy consumption by major sources, 1950-2023**? What evidence do you have to support that reading?
3. Now compare your responses to the questions from part 3a to the chart **U.S. primary energy consumption by energy source, 2023.** How do you think this energy mixture should continue to change in the future? List three concrete changes we should make, using your research and your classmates’ research to support your argument. These proposed changes will serve as your group’s guiding principles for sustainable energy use.
4. **Based on your guiding principles for sustainable energy use, enter percentages in the table below to represent your recommended energy consumption by energy source in the United States. Numbers from the 2023 data column are calculated from the chart “U.S. primary energy consumption by energy source, 2023.”**

|  |  |  |  |
| --- | --- | --- | --- |
| **Energy Source** | **2023 Data** | **2050 (your ideal mixture)** | **Difference between 2023 and 2050 (Express as + or -)** |
| Petroleum | 38% |  |  |
| Natural Gas | 36% |  |  |
| Coal | 9% |  |  |
| Nuclear | 9% |  |  |
| Geothermal | .09% |  |  |
| Solar | .99% |  |  |
| Hydroelectric | .9% |  |  |
| Wind | 1.62% |  |  |
| Biomass | 5.4% |  |  |

1. Discuss how your guiding principles for sustainable energy use were influenced by the 2023 data. What tradeoffs did you accept? (i.e., Did a certain choice prioritize the environment, the economy, our standard of living…)
2. How will your energy mixture serve societal needs for transportation, heating, and electricity?
3. What challenges would you expect to encounter if you attempted to implement your ideal energy portfolio?
4. What actions should we take (as individuals and as a society) to move our energy portfolio closer to the mixture that you propose?