

Guided Research

Evaluating Solutions to Human Impacts

Scientists and engineers are working to develop solutions to human impacts on the hydrologic and biogeochemical cycles. Burning fossil fuels for energy has one of the largest impacts on these cycles. Finding alternatives to fossil fuel energy is key to decreasing human impact and making lasting changes.

Currently engineers and scientists are investigating solar, wind, water, biological, and geothermal energies as potential alternatives to fossil fuels. You may have already heard of wind and solar farms. Scientists must ask many questions when they consider implementing new energy sources such as these, including:

- **Costs** - Is the solution cost effective? Can a similar solution be reached in a less costly manner without losing quality?
- **Safety** - Is the solution safe for humans and other living things?
- **Reliability** - Is the solution going to hold up over time in the given conditions? Will it need large amounts of upkeep to be maintained over time?
- **Aesthetics** - Does the solution add to or detract from the natural visual beauty of the area?
- **Social and cultural impacts** - How does the solution impact human societies and cultures? Are there any concerns about these impacts?

FIGURE 14: These wind turbines capture energy from the wind and convert it to electricity. Wind energy is an alternative to energy from fossil fuels.



- **Environmental impacts** - How does the solution impact the environment? Are there any concerns about these impacts?
- **Meeting criteria** - Does the solution solve the problem and meet the needs of those who will use the new energy source?
- **Evidence to support the solution** - How well does the evidence provided support the claims that are being made about this solution and how it will work?



Language Arts Connection

Choose an alternative energy source and research how it impacts the biogeochemical and hydrologic cycles or how it reduces human impact on these cycles. Write a blog entry detailing your research. Explain how the alternative energy source will work for human populations in terms of its trade-offs, such as cost, reliability, and impact on society and the environment. Gather evidence from multiple sources and describe specific evidence from each source.

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