Power After Sunset

Compare energy sources for a town recreation center

ENV.2.1 "Differentiate between renewable and nonrenewable resources and compare and contrast the pros and cons of using these resources."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the evidence that shows how quickly each energy source is renewed. Circle one benefit of each source, then write 1 beside a drawback of solar electricity and 2 beside a drawback of natural gas electricity.

Keeping the Center Running

1. At a town recreation center, the lights, pumps, and air conditioners use electricity every day. The town can put solar panels on the roof or buy electricity from a nearby natural gas plant. Sunlight reaches Earth continually, so solar energy is renewable on a human time scale. Natural gas forms underground over millions of years, far more slowly than people use it, so it is nonrenewable. Both sources can supply electricity for the same building, but their supplies are renewed at very different rates. Choosing between them requires more than checking which one is available today.

2. On a clear afternoon, rooftop panels generate electricity without burning fuel at the center. This can lower emissions from electricity use, and sunlight itself has no fuel bill. However, panels cost money to install and produce less electricity on cloudy days and none at night. A natural gas plant can generate electricity when the sun is down, as long as it has fuel, which helps meet evening demand. Gas plants also require construction and fuel purchases. Burning natural gas releases carbon dioxide, a heat-trapping gas, and leaks during gas production and transport can release methane, another heat-trapping gas.

3. The center's busiest hours are often after school, when the sun is lower and the pool pumps still run. A battery could store some daytime solar electricity for evening use, but buying and maintaining it adds expense. The town could also use solar electricity when available and natural gas electricity when solar output is low. That plan may reduce gas use without assuming the sun always shines. Still, even a backup gas plant needs fuel and produces emissions when it runs. The best choice depends on how much electricity is needed at different times, the budget, and the town's pollution goals.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why is solar energy renewable while natural gas is nonrenewable, even though both can supply the center with electricity?

2. Compare one benefit and one drawback of each source when the center needs electricity in the evening.

3. How do the costs described for solar electricity differ from those described for natural gas electricity?

4. How could using both sources help the center, and what drawback would remain?

3 YOUR TURN

Your own words

A small island clinic needs electricity day and night and wants to limit pollution. In four sentences, recommend solar electricity, natural gas electricity, or both; compare a benefit and a drawback of each source, explain how each is renewed, and describe how the clinic will get electricity at night.

ANSWER KEY

Power After Sunset

HIGH SCHOOL · ENV.2.1

PART 1 · READ AND MARK

Underline the evidence that shows how quickly each energy source is renewed. Circle one benefit of each source, then write 1 beside a drawback of solar electricity and 2 beside a drawback of natural gas electricity. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why is solar energy renewable while natural gas is nonrenewable, even though both can supply the center with electricity?	**Sunlight reaches Earth continually, while natural gas forms over millions of years, far more slowly than people use it.**
2	Compare one benefit and one drawback of each source when the center needs electricity in the evening.	**Solar panels generate electricity without burning fuel, but they produce less as sunlight fades and none at night. A gas plant can generate electricity after sunset, but burning gas releases carbon dioxide.**
3	How do the costs described for solar electricity differ from those described for natural gas electricity?	**Solar panels cost money to install, but sunlight has no fuel bill. Gas plants require construction and ongoing fuel purchases.**
4	How could using both sources help the center, and what drawback would remain?	**Using solar when available and gas when solar output is low could meet demand while reducing gas use. The gas plant would still need fuel and produce emissions when it runs.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would use solar electricity during daylight and natural gas electricity when solar output is low. Sunlight reaches Earth continually, and panels do not burn fuel, but they cannot generate electricity at night. Natural gas takes millions of years to form, so it is nonrenewable, and burning it releases carbon dioxide. Despite its fuel costs and emissions, gas electricity could meet the clinic's nighttime needs.

Accept other four-sentence recommendations if they accurately compare both sources, address renewal rates, and provide a workable nighttime plan. Students may recommend a battery if they account for its added expense.