

Exercise walk-through

6.10

Geothermal Energy

AP Environmental Science

Hydro and geothermal



Hydro: reliable, but floods valleys
dam drops water through turbines.



Geothermal: Earth's heat near plates

Only works where hot rock is shallow.

Distribution, and the two big renewables

renewable

replenished on a human timescale – sun, wind, water, biomass, geothermal

nonrenewable

finite on that timescale – coal, oil, gas, uranium

uneven distribution

oil is concentrated in some regions, coal in others, and renewables depend on local sun, wind or rivers

the consequence

energy is traded and fought over, and no country's mix is freely chosen

hydroelectric

flowing water spins turbines – renewable and low-emission, but dams flood habitat, block fish migration and trap sediment

wind

renewable, clean and cheap to run – but intermittent, land- or sea-intensive, and a hazard to birds

EROEI

– energy return on energy investment – is what separates a real source from one that costs more energy than it yields.

Exercises 2.1-2.3

2.1 What is the source of geothermal energy?

[1]

2.2 Where is geothermal energy most viable?

[1]

2.3 State one advantage of geothermal power.

[1]

Exercises 2.1-2.3

2.1 What is the source of geothermal energy? [1]

2.1

- Earth's internal heat
-

2.2 Where is geothermal energy most viable? [1]

2.2

- Near plate boundaries / volcanic regions
-

2.3 State one advantage of geothermal power. [1]

2.3

- Any one: renewable, reliable, low CO₂, small footprint

Exercise 3.1

3.1 Geothermal energy is limited mainly by

[1]

☐

A the weather

B its dependence on geologically active locations

C the time of day

D the season

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3.1 B

- its dependence on geologically active locations

Exercise 3.2 (a)

3.2 A country on a plate boundary develops geothermal power.

(a) State two advantages.

[2]

Exercise 3.2 (a)

3.2 A country on a plate boundary develops geothermal power.

(a) State two advantages.

[2]

(a)

- Any two: renewable, reliable (24/7), low-carbon, small land use

Exercise 3.2 (b)

3.2 A country on a plate boundary develops geothermal power.

(b) Explain why a geologically stable country cannot easily use it.

[2]

Exercise 3.2 (b)

3.2 A country on a plate boundary develops geothermal power.

(b) Explain why a geologically stable country cannot easily use it. [2]

(b)

- In a stable area the heat is deep underground and hard/expensive to reach, so it is not practical

Exercise 3.3

3.3 Explain why geothermal energy is more reliable than solar or wind.

[2]

Exercise 3.3

3.3 Explain why geothermal energy is more reliable than solar or wind. [2]

3.3

- Earth's heat is available constantly (day and night, all weather), unlike solar (needs sun) and wind (needs wind), so geothermal provides steady baseload power