

Exercise walk-through

Geothermal Energy ■ 6.10

eXercise

You must be able to

- describe **geothermal** 地热 energy from Earth's heat
- state advantages and disadvantages
- explain where it is most viable

Method — How it works

Geothermal energy taps **Earth's internal heat**: hot water/steam from underground spins turbines to make electricity, or heats buildings directly.

Method — Where it is viable

It is most practical near **plate boundaries and volcanic regions**, where heat is close to the surface (e.g. Iceland). Ground-source heat pumps work more widely for heating/cooling.

Method — Advantages

- **Renewable**, reliable (works day and night), low CO₂.
- Small land footprint.

Method — Disadvantages

- **Location-limited** — best only in geologically active areas.
- Can release some underground gases; high drilling cost.

Method — A worked judgement

Iceland uses abundant geothermal energy because it sits on a plate boundary, but a geologically stable country has far less easily-accessible geothermal potential.

Practice 2.1 ■ 1 mark

What is the source of geothermal energy?

Solution 2.1

Worked steps

Earth's internal heat **B1**.

Practice 2.2 ■ 1 mark

Where is geothermal energy most viable?

Solution 2.2

Method: Where it is viable

Worked steps

Near plate boundaries / volcanic regions **B1**.

Practice 2.3 ■ 1 mark

State one advantage of geothermal power.

Solution 2.3

Worked steps

Any one: renewable, reliable, low CO₂, small footprint **B1**.

Exam-style 3.1 ■ 1 mark

Geothermal energy is limited mainly by

- A** the weather
- B** its dependence on geologically active locations
- C** the time of day
- D** the season

Solution 3.1

- A** the weather
- B** its dependence on geologically active locations 
- C** the time of day
- D** the season

Worked steps

B — its dependence on geologically active locations.

Exam-style 3.2 ■ 2 marks

A country on a plate boundary develops geothermal power.

- (a) State two advantages.
- (b) Explain why a geologically stable country cannot easily use it.

Solution 3.2

Method: A worked judgement

Worked steps

(a) Any two: renewable, reliable (24/7), low-carbon, small land use **B1 B1**. (b) In a stable area the heat is deep underground and hard/expensive to reach, so it is not practical **M1 A1**.

Exam-style 3.3 ■ 2 marks

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

Solution 3.3

Worked steps

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 **M1** **A1**.