

Exercise walk-through

6.12

Wind Energy

AP Environmental Science

Solar and wind



Solar PV: clean but intermittent

Photovoltaic cells turn light to
electricity; need storage at night.



Wind: kinetic energy on coasts & ridges

No fuel once built – but both need
backup for calm, dark hours.

What each renewable costs you

photovoltaic

clean and falling in price, but needs a **large area** and produces nothing at night

wind

clean and cheap to run, but **intermittent**, and siting raises noise and wildlife objections

hydroelectric

reliable and low-emission, but the **reservoir** **floods land** and blocks fish migration

geothermal

renewable and steady, but only where the heat is near the surface

biomass

carbon-neutral *if* replanted; **ethanol** from corn or cane adds no new carbon but competes with food

Every one of them trades a fossil-fuel problem for a land, timing or siting problem. Naming that trade is the answer.

Exercises 2.1-2.3

2.1 What spins a wind turbine's blades?

[1]

2.2 State one advantage of wind energy.

[1]

2.3 State one disadvantage.

[1]

Exercises 2.1-2.3

2.1 What spins a wind turbine's blades?

[1]

2.1

- Moving air (wind)
-

2.2 State one advantage of wind energy.

[1]

2.2

- Any one: renewable, no CO₂, no fuel cost, land still usable
-

2.3 State one disadvantage.

[1]

2.3

- Any one: intermittent, harms birds/bats, noise/visual impact, location-limited

Exercise 3.1

3.1 A disadvantage of wind power is that it is

[1]

☐

A a major CO₂ source

B intermittent (depends on wind)

C nonrenewable

D available everywhere equally

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3.1 B

- intermittent (depends on wind)

Exercise 3.2 (a)

3.2 A region installs a large wind farm.

(a) State one benefit and one drawback.

[2]

Exercise 3.2 (a)

3.2 A region installs a large wind farm.

(a) State one benefit and one drawback.

[2]

(a)

- Benefit: clean, renewable power / dual land use; drawback: intermittent or harms birds

Exercise 3.2 (b)

3.2 A region installs a large wind farm.

(b) Explain how the intermittency problem could be managed.

[2]

Exercise 3.2 (b)

3.2 A region installs a large wind farm.

(b) Explain how the intermittency problem could be managed.

[2]

(b)

- Store surplus energy (batteries) or combine with other sources/backup for calm periods

Exercise 3.3

3.3 Explain why wind energy is considered renewable and low-carbon.

[2]

Exercise 3.3

3.3 Explain why wind energy is considered renewable and low-carbon. [2]

3.3

- Wind is continually renewed by the Sun-driven atmosphere and burns no fuel, so it emits no CO₂ during operation