

Exercise walk-through

6.5

Fossil Fuels

AP Environmental Science

Fossil fuels

Buried life, pressed for *millions* of years into coal, oil, gas.

- **extraction** : mine coal, pump oil & gas
- burn → steam → turbine → electricity

Burning releases **carbon dioxide** plus **pollutants**.



Fossil fuels: energy-dense but nonrenewable

Reaching the oil and gas that are hard to reach

hydraulic fracturing

“fracking”: high-pressure fluid is pumped into shale to crack it and release oil and gas. Risks: groundwater contamination, **methane** leaks, induced earthquakes, heavy water use

tar sands

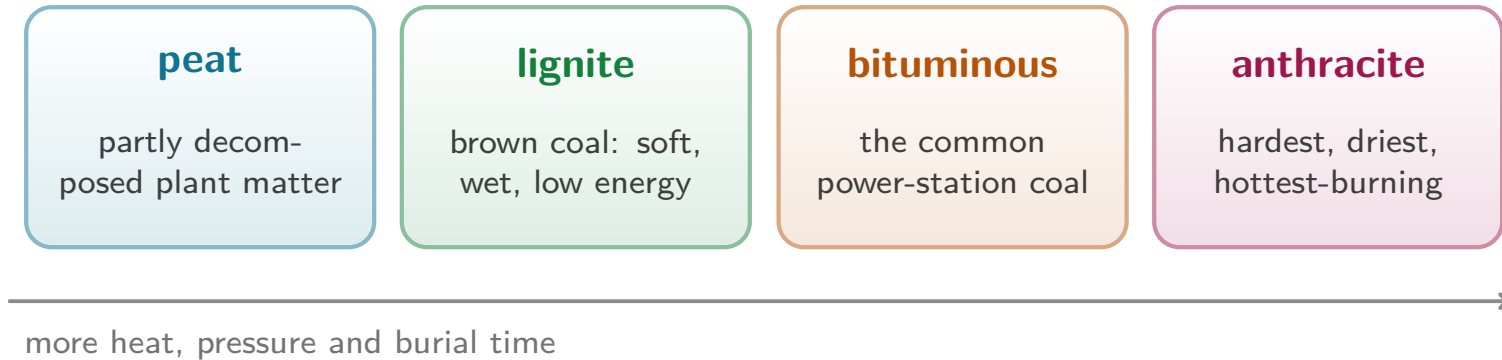
clay, sand, water and thick **bitumen**. Separating the oil is energy- and water-intensive, so the **net energy gain is low**

lignite

brown coal, dug from open pits and burned at the power station beside them

EROEI, energy return on energy investment, is the measure: an unconventional source can still be a net *loss* once you count the energy spent extracting it.

Coal comes in ranks



Rank climbs with what the coal has been through: each step is drier, denser and burns hotter – and takes longer to have formed.

Exercises 2.1-2.3

2.1 How do fossil fuels form?

[1]

2.2 State one advantage of fossil fuels.

[1]

2.3 State one environmental disadvantage.

[1]

Exercises 2.1-2.3

2.1 How do fossil fuels form?

[1]

2.1

- From ancient organisms buried and compressed over millions of years
-

2.2 State one advantage of fossil fuels.

[1]

2.2

- Any one: high energy density, cheap, reliable, existing infrastructure
-

2.3 State one environmental disadvantage.

[1]

2.3

- Any one: CO₂/climate change, air pollution, extraction damage

Exercise 3.1

3.1 Burning fossil fuels contributes to climate change mainly by releasing

[1]

☐

A oxygen

B carbon dioxide

C water only

D nitrogen gas

Exercise 3.1

3.1 Burning fossil fuels contributes to climate change mainly by releasing [1]

☐

A oxygen

B carbon dioxide

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3.1 B

- carbon dioxide

Exercise 3.2 (a)

3.2 A country generates most of its electricity from coal.

(a) State two environmental impacts.

[2]

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3.2 A country generates most of its electricity from coal.

(a) State two environmental impacts.

[2]

(a)

- Any two: CO₂ emissions, air pollution/acid rain, land/water damage from mining

Exercise 3.2 (b)

3.2 A country generates most of its electricity from coal.

(b) Explain one reason it still relies on coal despite these impacts.

[2]

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(b) Explain one reason it still relies on coal despite these impacts.

[2]

(b)

- It is cheap, energy-dense, reliable, and the infrastructure already exists

Exercise 3.3

3.3 Explain why fossil fuels are described as a finite resource.

[2]

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[2]

3.3

- They form over millions of years – far slower than we use them – so the supply is limited and cannot be replaced on a human timescale