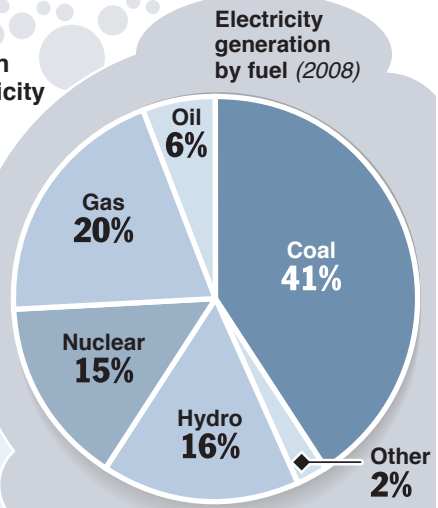
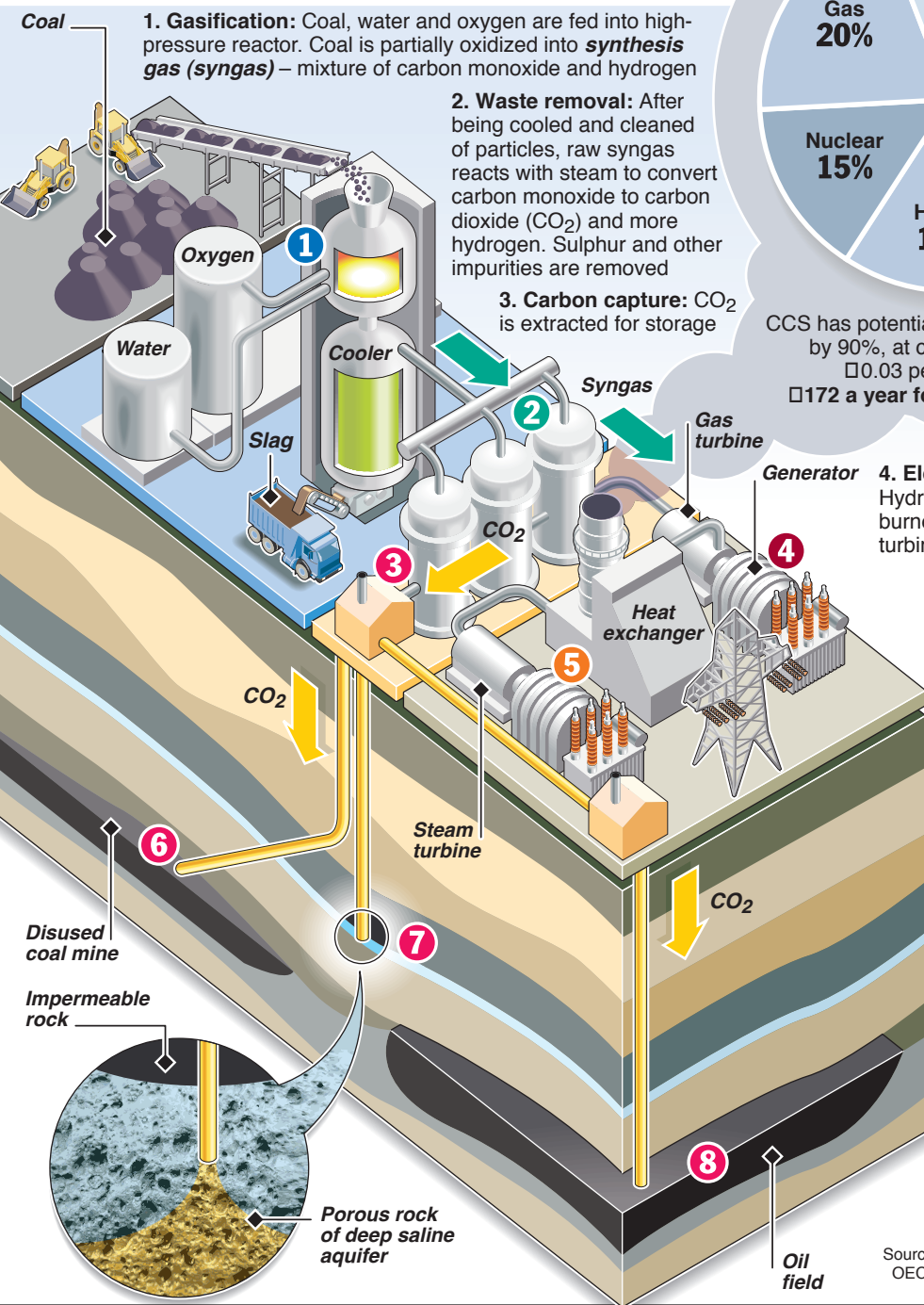


Clean coal energy production

A newer type of coal-fired power plant called Integrated Gasification Combined Cycle (IGCC) transforms coal into gas to generate electricity more cleanly and efficiently than traditional coal plants. The process also offers options to eliminate greenhouse gases such as carbon dioxide with carbon capture and storage (CCS)



CCS has potential to cut CO₂ emissions by 90%, at cost to consumer of
□ 0.03 per kilowatt-hour
□ 172 a year for typical consumer

1. Gasification: Coal, water and oxygen are fed into high-pressure reactor. Coal is partially oxidized into **synthesis gas (syngas)** – mixture of carbon monoxide and hydrogen

2. Waste removal: After being cooled and cleaned of particles, raw syngas reacts with steam to convert carbon monoxide to carbon dioxide (CO₂) and more hydrogen. Sulphur and other impurities are removed

3. Carbon capture: CO₂ is extracted for storage

4. Electricity generation: Hydrogen-rich syngas is burned to drive gas turbine-generator

5. Combined cycle: Heat from gas turbine exhaust passes through heat exchanger to generate steam to drive steam turbine-generator

6. Carbon storage: Captured CO₂ is compressed and sent via pipeline to permanent underground storage sites hundreds of kilometres away

7. CO₂ can be stored in porous, saltwater filled strata, sealed with impermeable rock

8. CO₂ can be stored in mature oil wells. Pressure of gas is used to boost recovery of petroleum