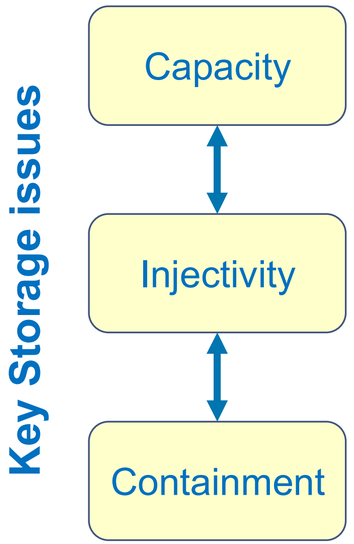
Geological Storage of CO_2

1. The basic concept is to store captured CO_2 underground in reservoirs that would otherwise contain water, oil or gas
2. We need to be deep (greater than 800m) to ensure CO_2 is in a dense form – the super-critical phase
3. These are also the depths where we are confident that natural gas has been trapped for millions of years
4. But the big questions are:
    - Where do we store it?
    - How much CO_2 can we inject?
    - Can we store it safely?
    - Can we store it cost-effectively?

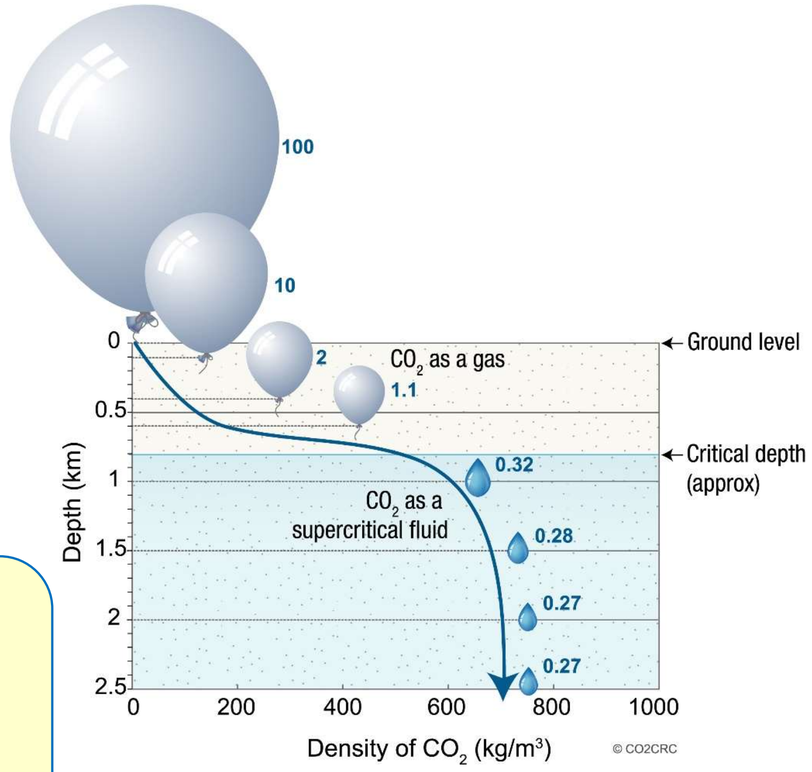


CO_2 at depth

- CO_2 is stored at depths >800m to ensure that CO_2 is in a dense form
- This is also important for storage security, because storage seals become more effective with depth
- CO_2 properties are highly variable, f(P,T)

At standard conditions (ISA) (1.013 Bar & 15°C)

- 1 m^3 of CO_2 has a mass of 1.87 kg
- 1bscf = 28.32 x10^6 m^3
- Mass of 1bscf = 52959.5 tonnes
- Mass of 1MMscf = 52.96 tonnes
- So a single well injecting 20 MMscf per day is injecting about 1000 tonnes of CO_2 per day



Simplified CO_2 density versus depth diagram (from CO2CRC)

NB. Gas engineers tend to work in standard cubic feet (scf) while CO_2 projects prefer to report mass