

Online interactive brochure



« What does CO₂ geological storage really mean? »

- Climate change and the need for CO₂ geological storage
- Where and how much CO₂ can we store underground?
- How can we transport and inject large quantities of CO₂?
- What happens to the CO₂ once in the storage reservoir?
- Could CO₂ leak from the reservoir and, if so, what might be the consequences?

Explore answers to 6 questions

- How can we monitor the storage at depth and at the surface?
- What safety criteria need to be imposed and respected?

- Expand and explore each question
- Glossary to explain technical terms
- Go into greater detail in the subsections
- No need to read from start to finish: pick up where you want



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Where and how much CO₂ can we store underground?

Figure 5. © BRGM im@gé
 CO₂ is injected into deep geological layers of porous and permeable rocks (cf. sandstone in bottom inset), overlain by impermeable rocks (cf. claystone in top inset) that prevent the CO₂ from escaping to the surface.

Which geological formations can constitute a suitable reservoir rock?

Where to find storage sites in Europe

How to define storage capacity of a suitable reservoir rock

Conclusion

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Once injected underground into a suitable **Reservoir** rock the CO₂ accumulates in the pores (between grains) and in natural cracks, thus displacing and replacing any existing fluid such as gas, water or oil. Suitable host rocks for CO₂ geological storage should therefore have a high **Porosity** and **Permeability**. Such formations, which are the result of the deposition of sediments in the geological past, are commonly located in "sedimentary basins". These permeable formations alternate with impermeable rocks, which can act as an overlying seal (or **Caprock**). Sedimentary basins often host hydrocarbon reservoirs and natural CO₂ deposits, which proves their ability to retain fluids for long periods of time, having naturally trapped oil, gas and even pure CO₂ for millions of years.

The subsurface is often illustrated as an over-simplified, homogeneous, layer-cake structure. In reality, it is composed of unevenly distributed and locally faulted rock formations, reservoirs and caprocks forming complex, heterogeneous structures. In-depth knowledge of the site and geoscientific experience are required to assess the suitability of underground structures that are proposed for long-term CO₂ storage.

Potential CO₂ storage reservoirs must fulfil several key criteria:

- sufficient **Porosity**, **Permeability** and storage capacity;
- an overlying impermeable rock – **Caprock** or seal (e.g. clay, clay stone, marl, salt rock), which prevents the CO₂ from migrating upwards;
- the presence of trapping structures, geological features, such as a dome-shaped cap rock, that can control the extent of CO₂ migration within the storage formation;
- location deeper than 800 m, where pressures and temperatures are high enough to enable the storage of CO₂ in a compressed fluid phase and thus maximize the quantity stored;
- the absence of drinking water – CO₂ will not be injected into waters fit for human consumption and activities.