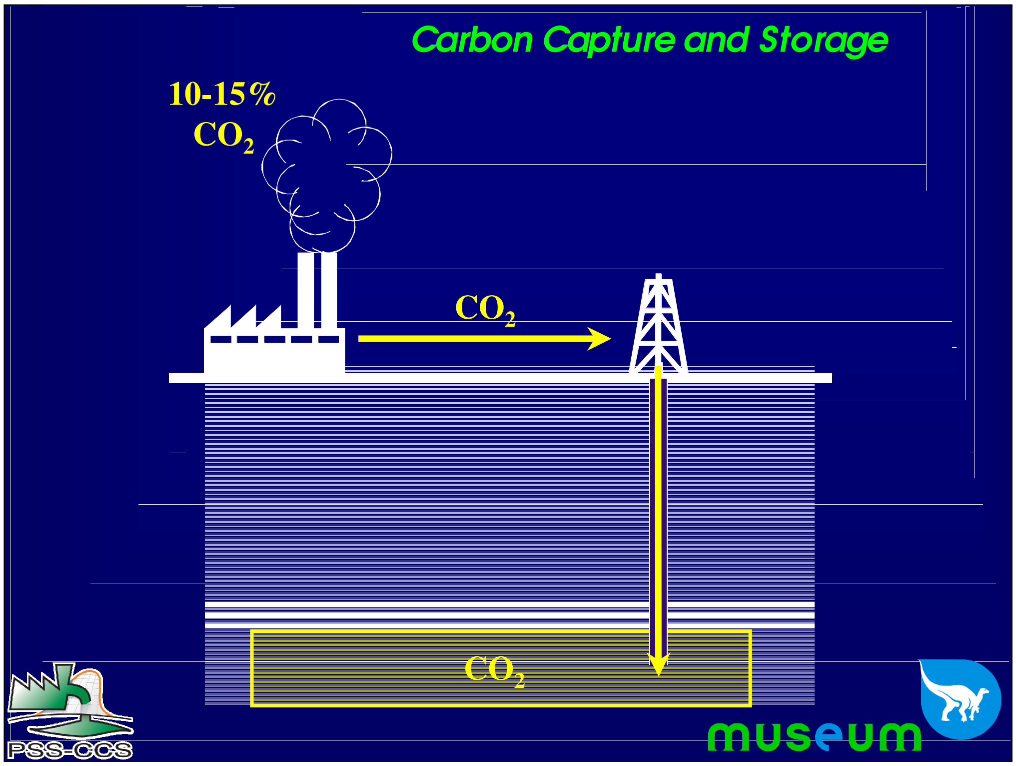
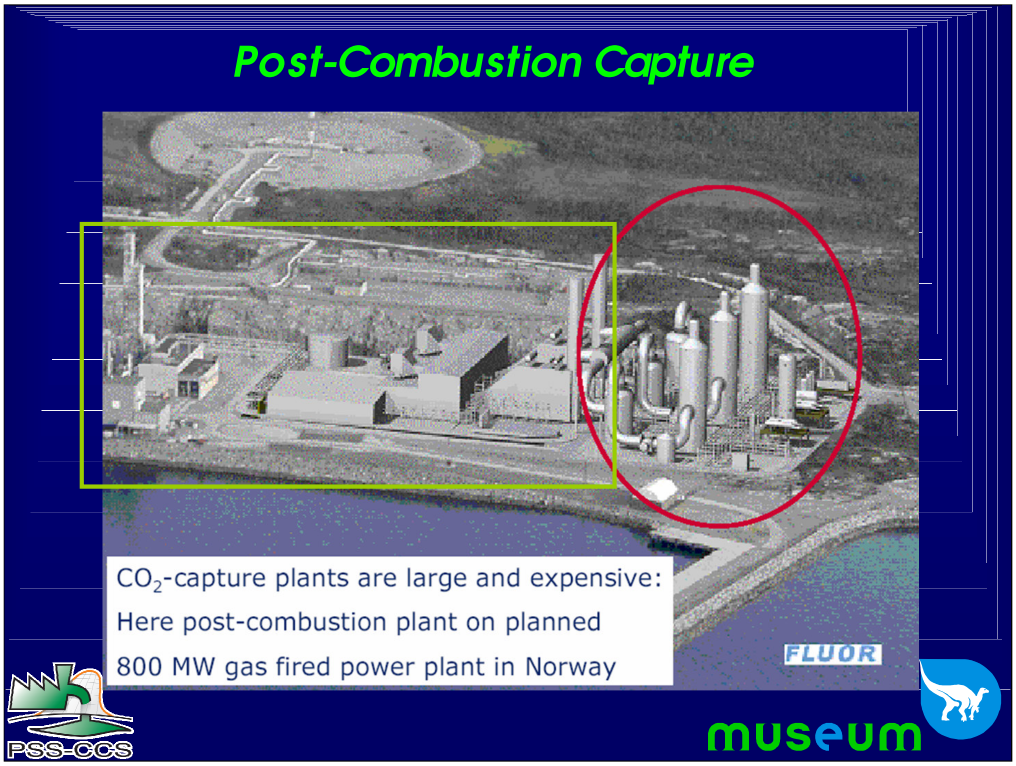


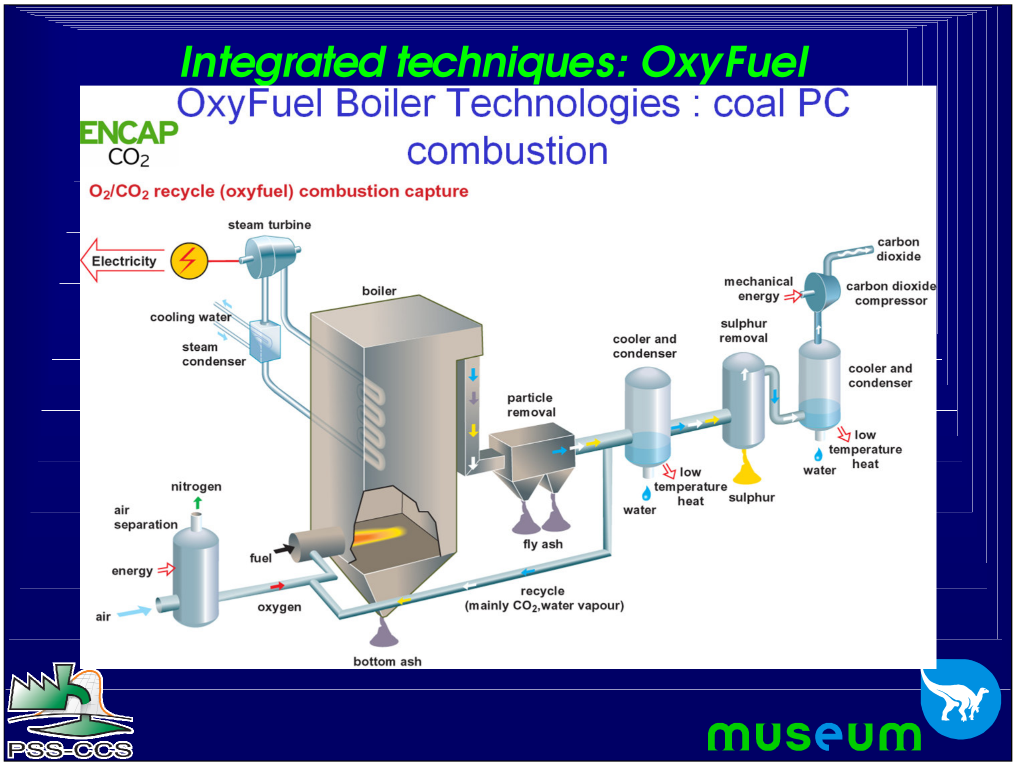
This is the basic Carbon Capture and Storage scheme, in which you have following elements:

1. Source: usually a large industrial facility, such as a power plant, where fossil fuels are burnt. The flue gasses contain typically between 10 and 15% CO_2. The CO_2 needs to be captured (extracted/separated) from the flue gas, and readied for transport (purified, dried, cooled and/or compressed).
2. Transport: usually a pipeline, but for off-shore purposes also tankers may be used. These are needed to transport the CO_2 from the source to the injection site.
3. Sink: A geologically suited location for storing CO_2 in the deep subsurface. One or more wells are drilled that allow for the injection of CO_2 into the reservoir.



Step 1: Capture

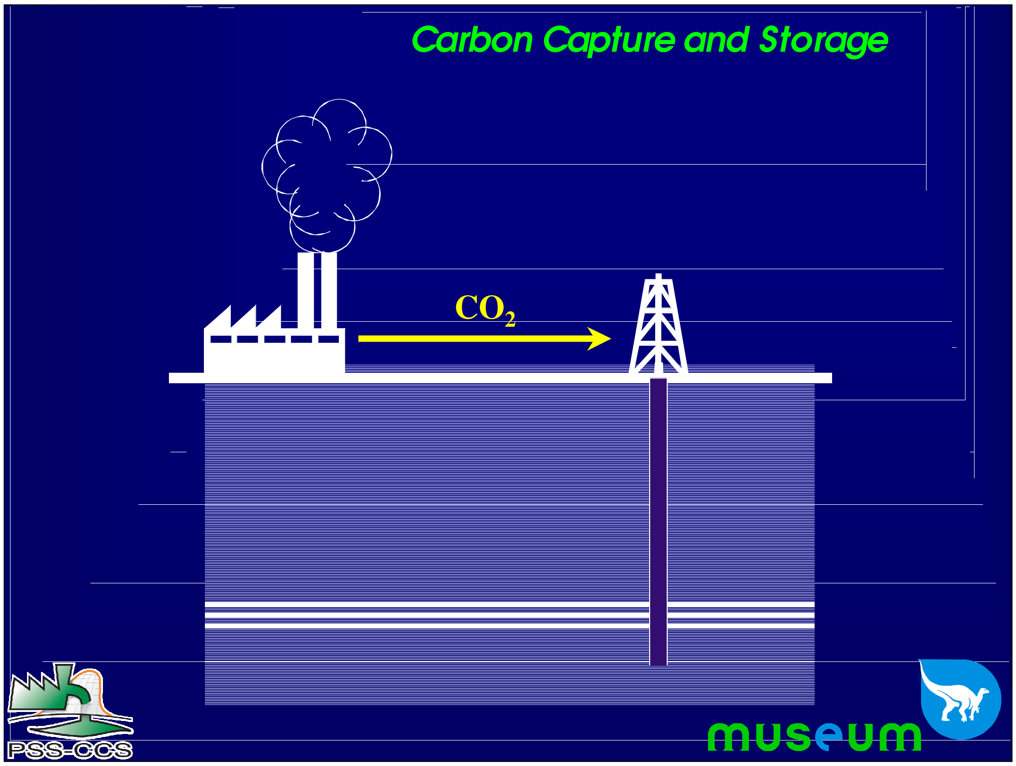
First power plants will probably be equipped with post-combustion capture installations. This means that you have a regular power plant (green square) and a capture facility (red circle). As you can see, the capture installation is big. It is also expensive.



Step 1: Capture

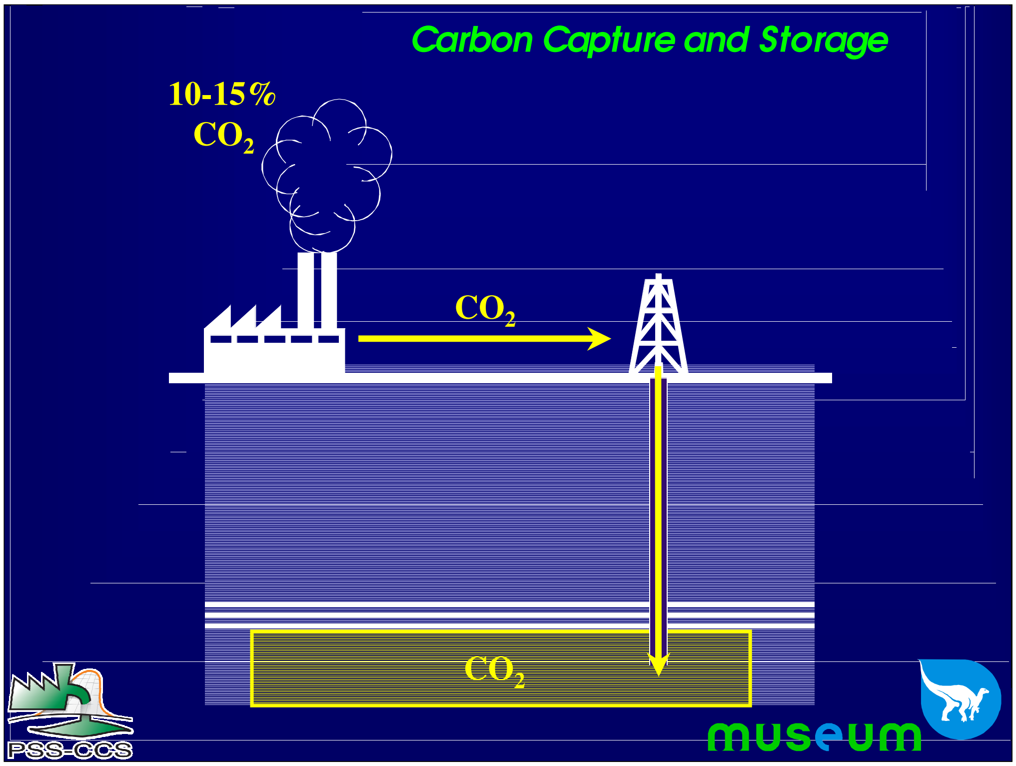
Other techniques will become available, such as oxyfuel combustion, where pure oxygen is used to burn the fossil fuels instead of air. As a result the flue gas will consist of close to 100% CO_2. Also a pre-combustion capture technique is investigated. Here, hydrocarbons are first converted into CO_2 and hydrogen, after which CO_2 is absorbed to Selexol, while hydrogen passes through to the combustion area. After a decrease in pressure, CO_2 is released and guided to the storage room.

Together with improvements regarding the efficiency of installations, these techniques can considerably reduce the cost of capture, but it will always remain significant.



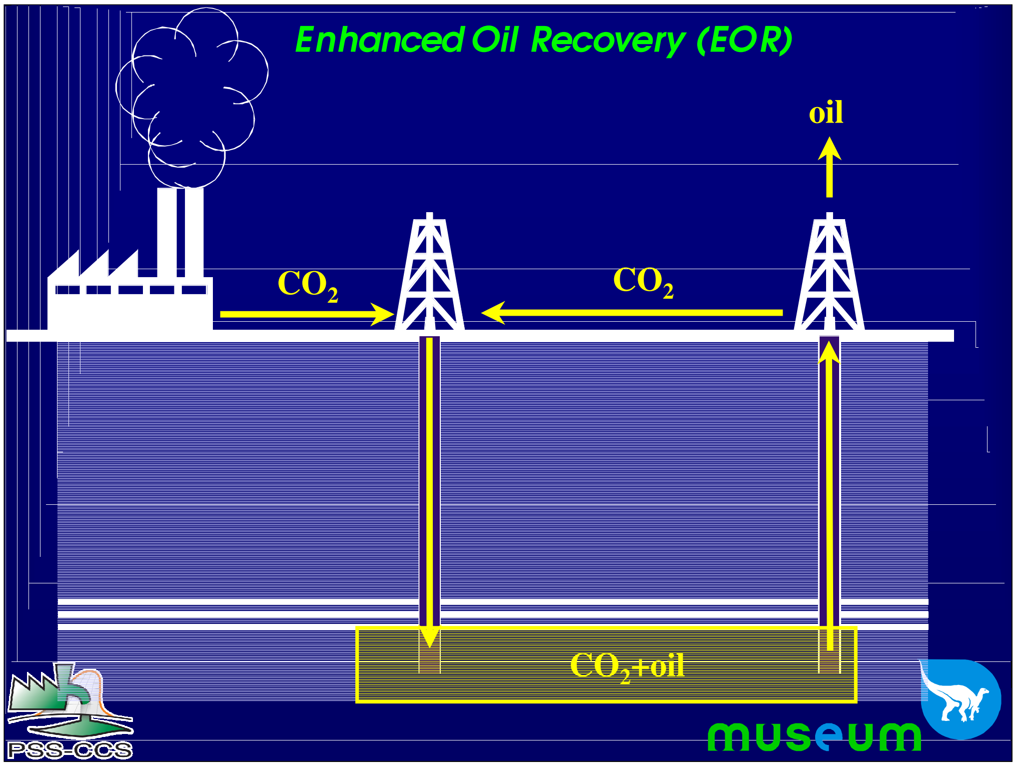
Step 2: Transport

CO_2 is a well known substance in industry and can be handled very safely. There are no problems for transporting it in large volumes by e.g. pipe lines.



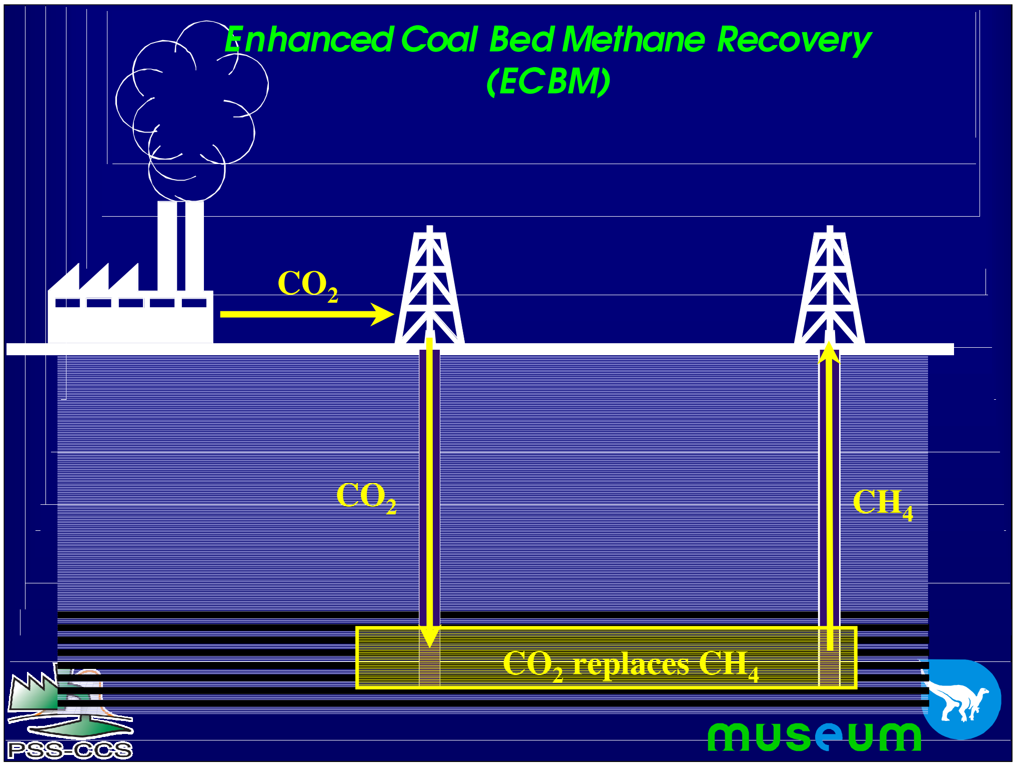
Step 3: Sink

In the common CCS scheme CO_2 is stored in deep saline aquifers or depleted oil or gas fields. These should be deeper than 800m, be sufficiently permeable and be sealed by a cap rock to prevent CO_2 leaking towards the surface.



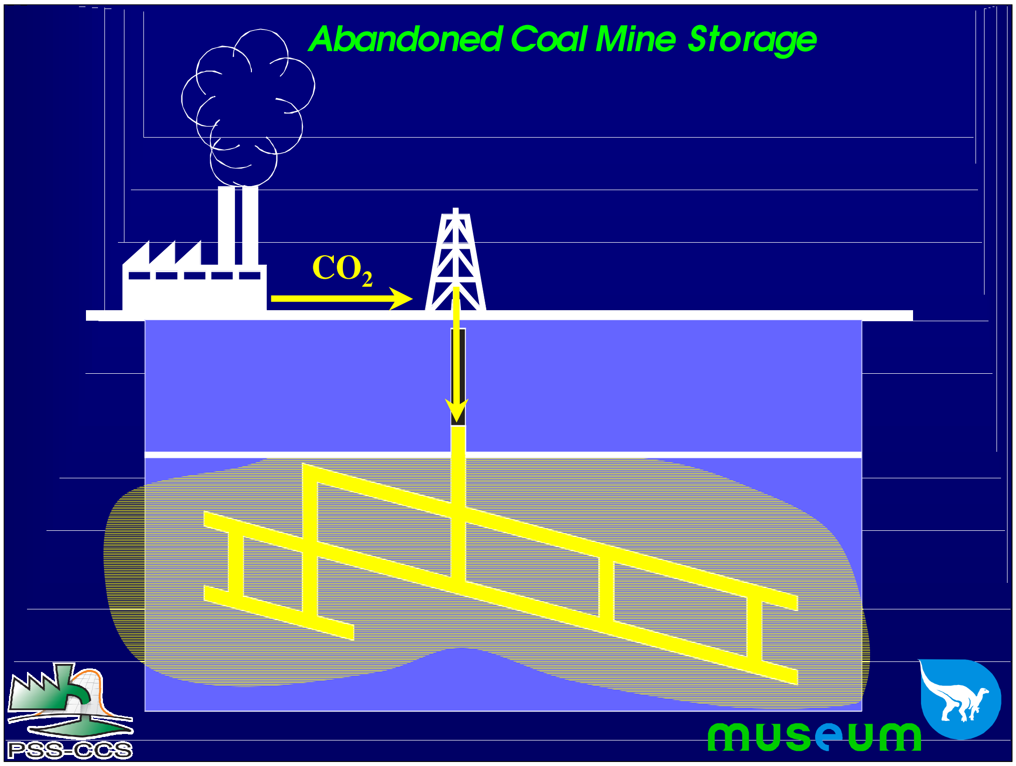
Step 3: Sink

An other interesting possibility is Enhanced Oil Production (EOR) in which CO_2 is injected to mobilise the oil. Part of CO_2 remains in the reservoir and is stored.



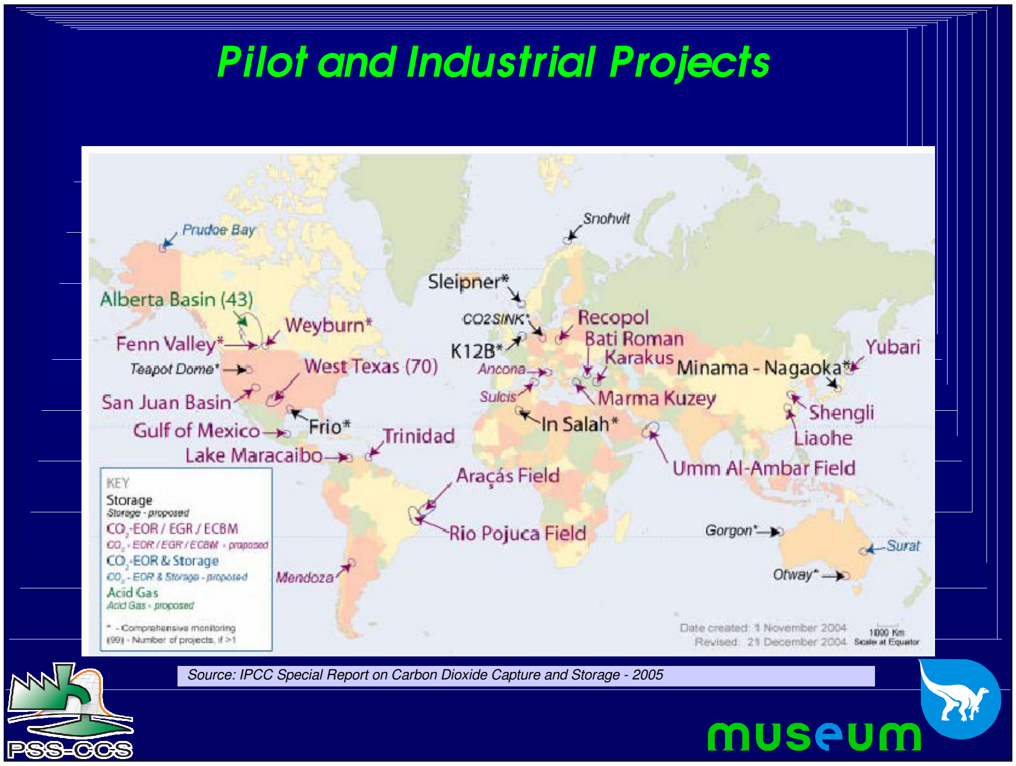
Step 3: Sink

A comparable technique is Enhanced Coal Bed Methane Recovery (ECBM) where the injection of CO_2 into virginal coal seams replaces the methane (CH_4) that is bound to coal. Methane can then be extracted from an adjacent well and used as natural gas.



Step 3: Sink

Storage schemes have also been developed for abandoned coal mines.



CCS is not an option that is just considered from a theoretical point of view. Pilot and industrial projects are emerging world wide.