



Pilot plant for capturing CO₂.

Underground CO₂ storage: necessary and safe

If we want to limit climate change as a result of the greenhouse gas effect, then underground storage of CO₂ is, for the time being, inevitable. TNO has the knowledge in house to do this safely and efficiently, and is organising a conference in April to address this method of suppressing the greenhouse gas effect.

An inescapable measure. That's how people at TNO regard subsurface CO₂ storage. Of course, they admit, you first have to start by using less fossil fuel and providing incentives for sustainable alternatives. But since CO₂ emissions all around the world have to be drastically reduced, underground storage is unavoidable for the time being.

The Netherlands wants to reduce CO₂ emissions by thirty per cent over the forty year period 1990-2030. In 1990 200 million tonnes of CO₂ filled the atmosphere – by 2030 that figure may not exceed 140 million tonnes. These imposing figures make it clear how necessary underground storage of CO₂ is.

SEPARATION

If you want to store CO₂, you first have to capture it, preferably where the yield is highest – and that's a power plant where the flue gases contain twenty per cent CO₂ and 80 per cent nitrogen. To prevent the storage filling too quickly, you have to separate the nitrogen from the CO₂. This operation can be seen in action at a TNO laboratory in Delft. A liquid solvent trickles downwards through a plastic tube while the CO₂ rises from the bottom. The CO₂ dissolves in the solvent and the nitrogen disappears in the atmosphere. Then the CO₂ and the solvent are separated. The research focuses mainly on the issue of which additives to the solvent best boost the solubility of the CO₂.

By testing this method of capture on a relevant scale, TNO has constructed a pilot plant for capturing CO₂ from the flue gas of a coal-fired power plant of E.ON. The pilot plant has a capacity of 250 kg CO₂ per hour, equivalent to a small but common installation with annual emissions of 2000 tonnes. Energy producer E.ON will be demonstrating the principle further in a 250 MW plant, due to operate in 2015.

Following separation, the CO₂ must be transported under pressure through a pipeline to a underground storage site – TNO also has knowledge in this

aspect. With safety a top priority, the risks must be clear. TNO is investigating the best balance between the distance between the pipeline and built environment, the strength of the pipeline and the costs.

STORAGE

Once the CO₂ arrives at its destination, knowledge of the subsurface is essential to safe storage. Once again, TNO can make use of its experience in oil and gas production and global experience with the safe use of gas injection to enhance the production of oil fields. The obstacle is public opinion, which is highly suspicious of underground storage. The researchers are very aware of and understand public suspicions and argue the need for a good information campaign.

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UNDERGROUND STORAGE CONFERENCE

From 19 until 22 April 2010 in Rotterdam TNO is organising a European conference on underground CO₂ storage. The conference is environmentally-neutral.

Info: www.ccsconference.eu