

Geosequestration in a Nutshell

A guide for journalists prepared by the AusSMC

This is part of the *Science in a Nutshell* series produced by the AusSMC. This document provides a simple explanation of the technology and of some of the terms associated with it.

If you would like to know more about geosequestration please contact the AusSMC by email (info@smc.org.au) or call us on 08 7120 8666.

Geosequestration is...

The process of capturing and storing carbon dioxide from major industrial and energy-related sources (such as power stations) underground. Another term for geosequestration is Carbon Capture and Storage (CCS). In a typical geosequestration process, carbon dioxide (CO₂) is captured at an industrial facility, compressed and transported by pipeline to a suitable storage location. There, it is injected into a deep geological formation beneath the Earth's surface where it is intended that the CO₂ will be stored in isolation from the atmosphere for a very long time.

Safety issues

Some people are concerned that CO₂ stored underground could become unstable or that it could leak out slowly or rapidly following earth movements. This could result in the asphyxiation of people and animals. However, there are many places in the earth's crust where oil, gas and CO₂ have been safely stored for millions of years and geosequestration aims to emulate these natural traps.

Experts say it is extremely unlikely that CO₂ will leak to the surface from a geosequestration site because the storage location is deep and is overlain by impermeable geological formations that act as a seal. Storage sites will also be monitored to check the location and behavior of the CO₂.

Geosequestration in Australia

The Otway Project was the first demonstration of CO₂ geosequestration storage in Australia, conducted by Australian research group, the Cooperative Research Centre for Greenhouse Gas Technologies (CO₂CRC). Located in south-western Victoria, the project is currently in its second stage of operation and is considered one of the world's largest and most successful geosequestration research projects. Though other CCS projects are also underway, none have yet been planned for large scale commercial use.

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The problem with CO₂

CO₂ is produced when fossil fuels such as coal, oil or gas are burned. Most scientists say CO₂ is the biggest contributor to the greenhouse gas effect because it traps heat from the Sun in the Earth's atmosphere. This leads to climate change. Other gases, such as methane, nitrous oxide, chlorofluorocarbons (CFCs), hexafluorocarbons (HFC) and sulphur hexafluoride also add to the problem.

Reducing greenhouse gas emissions in Australia

In Australia coal is reliable, plentiful and relatively cheap and its supporters argue that we are likely to remain dependent on it for our energy needs for the foreseeable future. In 2006 the Federal Government committed to decreasing Australia's CO₂ emissions through a strategy of promoting innovation and the development of 'clean' technologies. It nominated Carbon Capture and Storage (CCS) as one of a number of technology options needed to reduce greenhouse gas emissions.

The Intergovernmental Panel on Climate Change (IPCC) estimated that a power plant with a CCS system could reduce CO₂ emissions by 80-90% compared to a plant without CCS. However, CCS is an expensive and unproven technology. If it works, the IPCC estimates that it will add 25 to 50% to the cost of coal-fired electricity.

Sources:

Intergovernmental Panel on Climate Change (IPCC) Special report on Carbon Capture and Storage. https://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf

Cooperative Research Centre for Greenhouse Gas Technologies
http://www.co2crc.com.au/publications/all_factsheets.html#ccs ABC Science Online
www.abc.net.au/science/features/gasgrave/

More information:

Australian Government's Energy White Paper
www.pmc.gov.au/publications/energy_future/index.htm

Australian Greenhouse Office, Department of the Environment and Heritage
www.greenhouse.gov.au

Saddler, H, Riedy, C & Passey, R 2004, Geosequestration: What is it and how much can it contribute to a sustainable energy policy for Australia? Discussion Paper Number 72, The Australia Institute, Canberra, September 2004.

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