

Main findings of the IPCC report on Carbon Dioxide Capture and Storage

Dr. Leo Meyer, Head Technical Support Unit Working Group III, IPCC

This IPCC report (2005) assesses recent literature published on CO₂ sources, capture systems, transport and various storage mechanisms. It identifies those gaps in knowledge that would need to be addressed in order to facilitate large-scale deployment. The report characterizes the major sources of CO₂ that are technically and economically suitable for capture, in order to assess the feasibility of Carbon Dioxide Capture and Storage (CCS) on a global scale. Technological options for CO₂ capture are discussed extensively, including methods of CO₂ transport. It describes geological storage, ocean storage, mineral carbonation, and industrial uses. The overall costs and economic potential of CCS are discussed and followed by an examination of the implications of CCS for greenhouse gas inventories and emissions accounting.

Some highlights:

CCS can be applied to large “point sources” such as power plants and factories. While many of these technologies, such as CO₂ pipelines and gas injection into geological formations, are already mature, many other elements will require further development over the coming decades.

Under current conditions, producing electricity costs about US\$ 0.04 – 0.06 / kWh (kilo-watt hour). Adopting today’s CCS technologies would raise this cost by an estimated US \$0.01 – 0.05 / kWh. The future costs of CCS could decline due to technological advances and economies of scale – perhaps by 20-30% over the next decade, assuming sustained R&D and deployment.

A key factor in the economic viability of CO₂ capture and storage is whether a value is attached to reducing CO₂ emissions. For CCS systems to contribute to lowering emissions from the power sector – the sector with by far the greatest potential for this technology – the price of carbon dioxide reductions would have to exceed \$25-30 per ton of CO₂.

The most economically feasible storage options for CO₂ are geological formations, particularly given the experience in the oil and gas industry. A large proportion of existing point sources lie within 300 km of areas that potentially contain storage reservoirs such as oil and gas fields, unminable coal beds and deep saline water-bearing formations. Three CCS pilot projects are already operating in Algeria, Canada and the North Sea off the Norwegian coast.

In addition to technology and cost issues, the report addresses health, safety, environmental and legal concerns. Potential risks include slow leaks from storage sites. A key legal issue would be how international law would treat CO₂ injection activities in international seas.

The report has been written by almost 100 Lead and Coordinating Lead Authors and 25 Contributing Authors. They came from industrialized countries, developing countries, countries with economies in transition and international organizations. The report has been reviewed by more than 200 experts (both individual experts and representatives of governments) from around the world.

The full report, including summaries in the 6 UN languages, is electronically available at <http://www.ipcc.ch>. Hard copies can be purchased from Cambridge University Press.