

# Transition to sustainable use of fossil fuels

## Coordinator:

Dr. A.P.C. Faaij

## Involved organisations:

Universiteit Utrecht

Technische Universiteit Delft

Universiteit Leiden

## Program term:

2001-2007

## Summary of problem definition:

A transition of the current global energy system, which depends heavily on fossil fuels towards a system that meets a wide spectrum of sustainability criteria (social, economic, ecological), is an unsurpassed challenge. Deep energy efficiency improvement, dematerialisation and the use of renewable energy sources are in principle capable of meeting such criteria, including far going reductions of greenhouse gas emissions. However, the required technology development, cost and many other implications of such a shift are immense. It is expected that fossil fuels will play a dominant role in the world's energy supply till far into the next century, since the world fossil fuel resources (both conventional and unconventional) are abundant and exploitable at relatively low costs for many decades to come. Fossil fuels can be used with greatly reduced GHG emissions by removing carbon during conversion into electricity or hydrogen and subsequently storing the captured CO<sub>2</sub>

in geological formations. Deep saline aquifers, empty gas fields and deep coal beds are options with a large storage capacity. Furthermore, improved and new technology should ensure that fossil fuel utilisation takes place efficiently, at competitive cost levels and meets strict ecological standards. The aim of this project is to provide an overview of promising technologies and systems, determine its performance and costs and compare them amongst each other. Promising concepts are investigated in detail to obtain thorough insight in potential, performance, sensitivities and R&D needs essential for commercialisation. These analyses are carried out for both short term (2005–2010) and a longer time frame (2020–2030).

## Subprojects:

- System analyses of transition routes to advanced fossil fuel utilisation with CO<sub>2</sub> removal and sequestration, K. Damen
- Carbon dioxide injection in coal seams for sequestration and enhanced methane production, S. Mazumder
- Informed opinions of the general public as a tool for policy measures regarding advanced fossil fuel options, M. de Best-Waldhober en D.D.L. Daamen

## Results:

- De Best-Waldhober, M. & Daamen, D. (2006), Public perceptions and preferences regarding large scale implementation of six CO<sub>2</sub> capture and storage technologies. Centre for Energy and Environmental Studies, Faculty of Social Sciences, Leiden University.
- Damen, K.J. (2003), Reforming fossil fuel use : the merits, costs and risks of carbon dioxide capture and storage. PhD thesis. Copernicus Institute, Utrecht University.
- Mazumder, S. (2007), Dynamics of CO<sub>2</sub> in Coal as a Reservoir. PhD thesis. Faculty of Geotechnology, Delft University of Technology.
- See the NWO-website for a full list of publications, [www.nwo.nl/energieonderzoek](http://www.nwo.nl/energieonderzoek)