

# Profiles

## Implementing clean coal projects under Kyoto

‘CCTs allow continued use of coal for electricity production while reducing environmental impacts’

This report discusses the use of Joint Implementation and the Clean Development Mechanism to co-finance clean coal technologies (CCT) in economies in transition and developing countries. CCTs allow continued use of coal for electricity production while strongly reducing environmental impacts. The environmental impacts of the use of coal vary from unsustainable mining practices to emissions of health threatening pollutants and climate changing CO<sub>2</sub>. In recent years, much attention has been given to the climate impacts of coal use for electricity. Estimates of damage costs of coal use

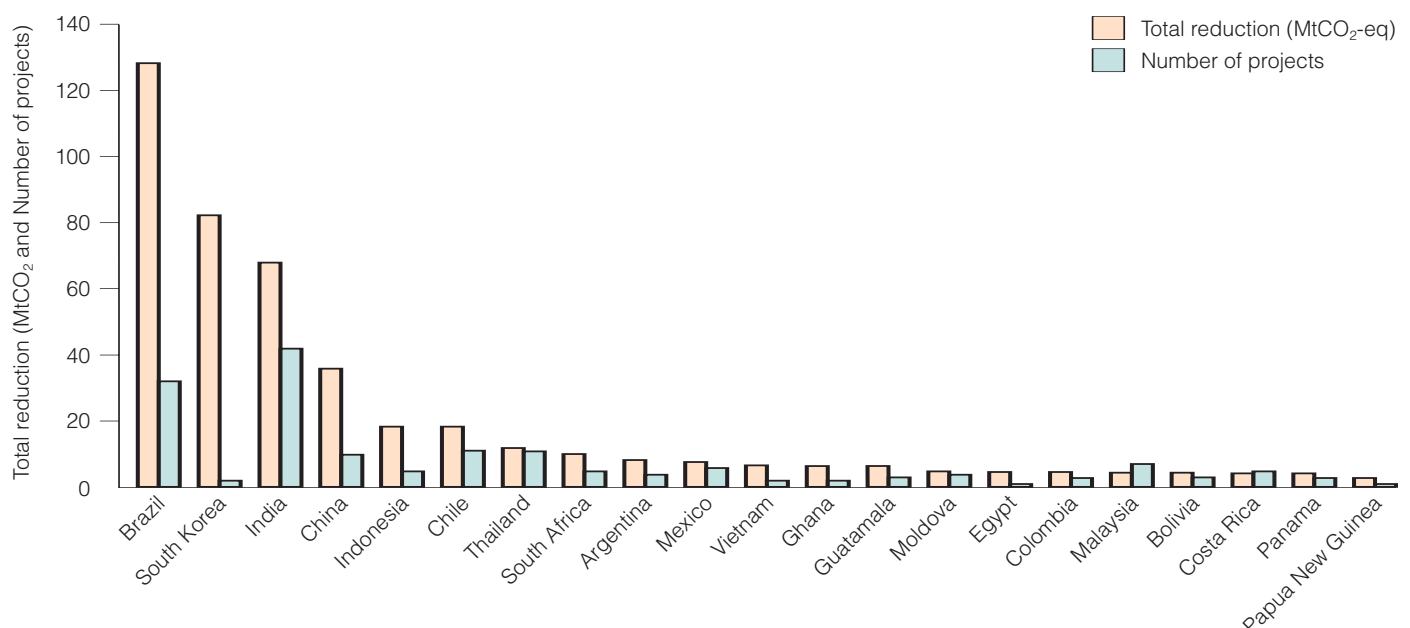
‘The Kyoto Protocol allows trading of emission reductions and allowances using flexible mechanisms’

for electricity production are in the order of 9 €ct/kWh, mainly because of impacts on public health and climate change. Implementation of CCTs for electricity generation would, by means of more efficient use of coal and other characteristics, reduce air pollution as well as CO<sub>2</sub> emissions.

The international community agreed on the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. This Convention states the need to stabilise greenhouse gas concentrations at a level preventing dangerous climate change. More than 180 countries ratified the UNFCCC.

‘JI and CDM are project-based mechanisms’

The Kyoto Protocol under the UNFCCC was agreed in 1997 and obliges the industrialised countries to reduce their greenhouse gas emissions by several percentage points. The Kyoto Protocol also allows for trading of emission reductions and allowances by means of the so-called flexible mechanisms, which are the main topic of this report. These flexible mechanisms are designed to reduce the costs of complying with the Kyoto Protocol for countries with an emission target. The flexible mechanisms are International Emissions Trading (IET), Joint Implementation (JI) and the Clean



Country distributions of total CO<sub>2</sub> reduction and number of CDM projects  
The projects depicted here are those submitted to the CDM Executive Board for registration or those having published a project design document

Development Mechanism (CDM). JET will take place between countries with a commitment under the Kyoto Protocol in need of CO<sub>2</sub> emission allowances, and countries with a commitment under the Kyoto Protocol with CO<sub>2</sub> emission allowances on offer.

JI and CDM are project-based mechanisms. This means that the CO<sub>2</sub> emission credits traded are generated from a single project. In advance of the project, an estimate is made of the emissions the project will reduce. This is done by calculating 'what would have happened otherwise' in a baseline scenario. JI takes place between countries with a commitment under the Kyoto Protocol (Annex B countries). In the case of CDM, an Annex B country purchases CO<sub>2</sub> reduction units from a country without an emission reduction target, usually a developing country. Before a JI or CDM project can proceed or be recognised it must comply with a number of rules that include host country approval, and (in the case of CDM) a demonstrated contribution to sustainable development.

The current project portfolio under JI and CDM mainly covers technologies in the field of gas capture, energy efficiency and renewable energy. To date, no CCT JI/CDM projects have been registered. On the other hand, much of the cheap reduction potential in developing economies, Eastern Europe and the Former Soviet Union is identified to be in the field of CCTs. This potential is currently under-utilised. This report sheds light on the eligibility of CCTs for JI and CDM. It will do so by giving an overview of the issues around JI and CDM, by making a suitability and barrier analysis, and by examining a number of hypothetical case studies of CCTs in JI or CDM host countries.

CCTs are rapidly developing. In Europe, agreements on energy use and air pollution reduction have induced deployment of increasingly efficient coal technologies, improving efficiency by a net 10% and reducing CO<sub>2</sub> emission factors by 15% over the last 25 years. There are several different types of CCTs that have been developed successfully and are being used on a commercial scale. Whether a technology is a clean coal technology depends, apart from the technology itself, on the following: coal handling, coal pre-treatment, coal transformation and handling, coal combustion, flue gas

treatment, and coal ash utilisation.

This report examines the following CCTs and their suitability for JI or CDM projects:

- supercritical pulverised coal combustion (PCC);
- circulating fluidised bed combustion (CFBC);
- pressurised fluidised bed combustion (PFBC);
- pressurised circulating fluidised bed combustion (PCFBC);
- integrated gasification combined cycle (IGCC).

The reason for evaluating these technologies rather than advanced Zero Emissions Technologies (ZETS) for JI/CDM use is their comparative maturity, and the associated low risk the technologies will run as part of JI or CDM. The technologies are rare in developing countries and Eastern Europe where significant emission reductions (~30% for supercritical PCC for instance) could be achieved through their introduction and implementation. The difference in CO<sub>2</sub> emissions between the new plant and the commonly applied coal technology could be claimed as CO<sub>2</sub> reduction, thus generating extra revenues for the project developer.

Each issue of *Profiles* is based on a detailed study undertaken by IEA Clean Coal Centre, the full report of which is available separately. This particular issue of *Profiles* is based on the report:

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