

EXECUTIVE SUMMARY AND POLICY RECOMMENDATIONS

The momentum driving coal consumption growth in the developed and developing world needs to be reconciled with a growing commitment by many countries, including IEA member countries, to significantly reduce greenhouse gas (GHG) emissions in order to mitigate global climate change. Continued prosperity in the developed world is currently linked to the maintenance and, in some cases, the expansion of coal-based electricity generation. Elsewhere, economic growth in the past two decades has, according to the World Bank, enabled the greatest reduction in poverty in history, primarily in developing Asian countries. However, recently issued reports, including *The Stern Review: The Economics of Climate Change* and the latest reports of the Intergovernmental Panel on Climate Change (IPCC), have emphasised that atmospheric CO₂ concentrations should not exceed the range of 450-550 ppm by 2050, in order to avoid catastrophic economic consequences associated with an average global temperature rise greater than 2°C. They also stressed the need to begin reducing total global emissions within ten to fifteen years, and to achieve absolute cuts in emissions from developed countries of 60-80% by 2050. While not universally accepted, the reports have informed a growing scientific and political consensus to seek real reductions in total global GHG emissions in the next three to four decades.

Forecasts by reputable international and national entities project moderate coal demand growth in the developed world, accompanied by strong coal demand growth in the developing world. Recently released statistics confirm that coal is the fastest growing component of global energy supply; the widespread distribution and competitive cost of coal ensures that its role in meeting energy demand will remain large in the future. Indeed, many major developing countries intend to rely on coal to fuel continued economic growth. While there are alternative sources of energy, geographic concentration, expense or long lead times make it unlikely that they will displace coal in electricity generation to any significant extent in the foreseeable future. Therefore, it is highly unlikely that the dramatic GHG emission reductions by 2050, as called for in *The Stern Review* and IPCC assessments, will be met without coal playing a major role through new, low-emission technologies.

Clean coal technologies (CCTs) have been developed and deployed to reduce the environmental impact of coal utilisation over the past 30 to 40 years. Initially, the focus was upon reducing emissions of particulates, SO₂, NO_x and mercury. The coal sector – producers, consumers and equipment suppliers – as well as governments and agencies in countries where coal is essential, have a long experience of stimulating clean coal technology deployment. Experience continues to grow as the technologies are introduced and spread in developing countries. The clean coal technology focus in IEA countries has moved to the development and operation of low and near-zero GHG emission technologies like carbon dioxide capture and storage (CCS). Deployment of CCS, as part of an effort to reduce GHG emissions, has been endorsed by G8 leaders, the IEA, *The Stern Review* and the IPCC. The IEA has identified four groups of CCTs (coal upgrading, efficiency improvements at existing power plants, advanced technologies and near-zero emission technologies) which can dramatically reduce GHG emissions. The CIAB believes that CO₂ transport and storage must also be developed as a fifth group of CCTs needed to reduce GHG emissions.

To achieve the ambitious GHG emission reduction targets proposed by the IPCC and others, and to maintain economic progress, it is necessary to decarbonise large parts of the electricity generation sector in developed and developing countries; this will demand the widespread deployment of CCS. Review of past efforts to stimulate innovation, development and deployment suggests that intra-national relationships (academia-business-government), national support and international co-ordination and support will be essential elements of CCS deployment.

The CIAB believes that the drivers to develop and deploy emission-reducing technologies and mechanisms to support deployment of low-GHG emission technologies can evolve to create the conditions necessary to stimulate more rapid research, development and deployment of CCS. It has identified several essential policy and commercial drivers that have been used to create and promote deployment of cleaner technologies while maintaining the efficiency and commercial viability of fossil-fuelled energy systems. The CIAB believes that these drivers, tailored to stimulate development and deployment of low-carbon technologies, can reduce the time frame for achieving significant GHG emission reductions and recommends that they should be strongly supported, endorsed and accelerated by national and international policy makers. These drivers include:

- Establishing a clear, balanced legal framework for CO₂ transport and storage;
- Promoting public understanding and acceptance of CO₂ capture and storage (CCS);
- Funding CCS research, development, and deployment;
- Establishing tax incentives and loan guarantees for CCS R,D&D and commercial projects;
- Supporting commercial opportunities for use of CO₂ for enhanced oil recovery (EOR) and enhanced coalbed methane production as a means of developing CCS technology and infrastructure;
- Promoting commercial opportunities in transport fuel and chemical production from coal as a means of developing CCS technology and infrastructure;
- Supporting market-based responses, such as GHG cap-and-trade systems, to speed the ultimate commercialisation of CCS;
- Encouraging mandatory price supports and feed-in tariffs based on the avoided emissions from systems with CCS; and,
- Promoting participation of emerging economies in CCS development and deployment.

As a recognised authority on energy supply, demand and security, the IEA has a unique potential to stimulate the process of deploying CCS by endorsing the use of these drivers and providing advice on their implementation to policy makers in member countries. A specific action would be to advise that CCS be included in the Kyoto Protocol's Clean Development Mechanism to create demand for this technology in developing economies where coal use is growing most rapidly. Furthermore, through its energy technology implementing agreements and co-operative agreements with non-member countries, the IEA can raise the profile of all the above recommendations on policy and commercial drivers and significantly improve the rate at which CCS is developed and deployed in the world.