



COAL AND SUSTAINABLE DEVELOPMENT - ACHIEVING BALANCE IN PRIORITIES

A position paper by the Coal Industry Advisory Board
prepared for the World Summit on Sustainable Development
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FOREWORD

At the invitation of the International Energy Agency Secretariat, the IEA's Coal Industry Advisory Board has been considering, over the last two years, the concept of sustainable development and its implications for coal production and use.

Underlying the value to governments of the CIAB's advice is the major role coal will continue to play in world energy supply for the foreseeable future. Coal currently accounts for 37% of world electricity production and, in the reference case of the IEA's *World Energy Outlook 2000*, coal consumption rises, in absolute terms, by some 50% by 2020.

The value of coal as a component of energy supply has been underlined by recent events, such as the North American power crisis in winter 2000/1 (with California standing out), and the perception of heightened vulnerability after the terrorist events of 11 September 2001. There is a premium to be attached to a secure form of energy, available from diverse sources in a well-functioning market. However there remains the issue of emissions from coal-fired generation: the CIAB and IEA are in agreement that it is essential to address the question in a way society can afford. Accelerating the deployment of new power generation technologies, such as integrated coal gasification combined-cycle systems, or supercritical and ultra-supercritical steam cycle systems, will help overcome limits in thermal efficiency and emissions control from current coal-based power generation technology. Even more advanced technologies, such as sequestration, are now commanding attention.

This paper, prepared by the CIAB for the World Summit on Sustainable Development, is published under my authority as Executive Director. The views expressed are not necessarily shared by Member governments of the IEA.

Robert Priddle
Executive Director

July 2002

COAL INDUSTRY ADVISORY BOARD

The Coal Industry Advisory Board (CIAB) is a group of high-level executives from coal-related industrial enterprises. Its purpose is to provide advice to the International Energy Agency (IEA) from an industrial perspective on matters relating to coal in the worldwide energy system.

The CIAB was established by the IEA Governing Board in July 1979 to assist the IEA in the practical implementation of the “Principles for IEA Action on Coal” – measures aimed at ensuring a ready supply and trade of coal to underpin energy security. Since then, while the security issue remains important, there is an increasing emphasis on environmental compatibility (including the choice of modern technology in coal use) and issues arising from increasingly liberalized energy markets, including the restructuring and privatisation of coal industries in many countries.

Coal and Sustainable Development

Conclusions and Recommendations from the Coal Industry Advisory Board

Coal makes an important continuing contribution to the economic and social pillars of sustainable development. Coal's environmental performance has improved steadily. Faster and more dramatic improvement in environmental performance is feasible now and should be a high priority of industry and government to enhance coal's contribution to the third pillar of sustainable development.

Co-operation is needed between governments, individual corporations and across industries to accelerate improvement. Governments should accept that coal will continue to play a major role in world energy supply for many decades.

Policies should be put in place to encourage deployment of cleaner coal technologies. These would encourage general improvement in industry sectors, essential to underpin changes in individual companies. Already, many major corporations are changing the way they operate because of perceived benefits in sustainable development. In the coal industry, collaboration between coal producers and electricity generators could improve coal's contribution to sustainable development through product stewardship.

Our more specific observations are that:

- The Coal Industry Advisory Board recognises the paramount importance of sustainable development. The CIAB emphasises that policies must put equal weight on all three pillars of sustainable development in order to be effective.
- Coal will play an important role in energy systems that support sustainable development for the foreseeable future. This is because of coal's unique combination of advantages: it is affordable, is safe to transport and store, and is available from a wide range of sources. Coal therefore remains essential in achieving a diverse balanced and secure energy mix in developed countries; it can also meet the growing energy needs of many developing countries.
- Further improvement in coal's environmental performance will be required. While improved coal technologies have provided very substantial efficiency and emission improvements to date, accelerated technological effort is required to reduce greenhouse gas emissions. Deployment of cleaner and higher efficiency technologies will be important in both developed and developing countries.
- Climate change considerations are complex, with great underlying uncertainties. Any response must be affordable and provide the basis for sustainable development, by addressing ongoing economic and social requirements as well as the environmental challenge.

The CIAB is undertaking further work in this area by surveying the initiatives towards sustainable development undertaken by its Members' companies.

Sustainable Development – the Background

Sustainable development has been an important part of public policy debate for the last decade. It has evolved into a widely subscribed ideal for how business and society should interact and function. A widely accepted definition of sustainable development is: *development that meets the needs of the present generation without undermining the capacity of future generations to meet their needs*. Or put more simply: *development that lasts*.

The multiple objectives (“three pillars”) of sustainable development – economic prosperity, social well-being and environmental sustainability, make it a concept easy to embrace but challenging to implement in a practical manner. While practical implementation is difficult, it is important to accomplish, given the broad societal and governmental pressure for industry to be responsive.

Coal in Sustainable Development

Some argue that finite resources such as coal have no part in sustainable development. This view overlooks the ability to substitute one form of capital for another. To the extent that substitution at the margin is possible, depletion of one type of capital is consistent with sustainability if offset by an increase in other types of capital.

Therefore, the use of coal is consistent with sustainable development if, while meeting our present needs, it produces new capital and options for future generations – such as infrastructure, new technologies and new knowledge. An associated risk is that coal’s use may degrade natural capital, such as the environment to an unacceptable or irreversible extent, leading to unsustainable development.

From a sustainable development perspective it is instructive to reflect on coal’s role at the start of industrial society and subsequently. Apart from their inherent practical limitations at that time, supplies of biomass, wind and water were limited. Coal was abundant and available and new technology allowed it to be used for steam raising and iron making. The environmental consequences of rapidly growing and uncontrolled coal use were, of course, unacceptable. However, continual technology development over time allowed coal to be used with much greater efficiency and with greatly reduced environmental impact.

During the 20th century technological advances allowed a range of new energy sources to be developed – oil, gas and nuclear energy. These partially displaced coal in existing markets and powered new markets, such as transportation. Yet coal consumption continued to grow rapidly in the two applications where it was most suited: centralised electricity generation and iron making.

This illustrates that the principles of sustainable development were practised early last century - even if by today’s standards the process was imperfect and there were some grave excesses. Finite resources fuelled economic and social development and continual innovation provided new technologies and energy sources in a continual and fluid interplay between social, economic and environmental priorities. Over time, governments set minimum social and environmental standards and established a framework for markets to function and innovation to flourish.

The importance of coal’s advantages – it is abundant, safe to store, available and affordable – has not diminished with time. These attributes along with its wide resource distribution are essential for ensuring reliable electricity supply. Coal has a crucial role in meeting current

needs and is a resource bridge to meet future goals through the enhancement of knowledge and technology.

Technological advances have tamed coal's traditional disadvantages: local and regional environmental impacts. Where state of the art technology is used, for example in Japan and in some North American and European locations, coal meets the most stringent environmental standards, and in most developed countries modern technology enables coal-based plants to perform acceptably. However, modern technologies, still less state of the art technologies, are not universally deployed, notably in some developing economies, and this must remain a high priority for governments, coal users and suppliers.

Future Electricity Generation Options: a USA Case Study

A recent study by American Electric Power (AEP) of future electricity generation options for the United States of America is instructive¹. In 2000 the USA's electricity generation was sourced from coal (55%), nuclear (20%), natural gas (12%), hydro (9%), oil (2.7%), and non-hydro renewables (1.6%). This diversified generation mix, combined with the technological capacity of the USA provides a good starting point to include new technologies in future generation plant.

AEP explored the USA's future electricity generating industry's options for meeting Kyoto targets. Some major findings were:

- The contribution of coal would be reduced to 27% by 2020 and to 15% by 2030, assuming a continuing role for nuclear energy, CO₂ emission trading, and a reduction in carbon dioxide emissions of 7% below 1990 levels by 2010. The business as usual case projected a 51% contribution from coal in 2020 and a 50% contribution in 2030.
- Under this constrained emissions scenario, reliance on natural gas for electricity generation would rapidly increase to 54% by 2020 and to 76% by 2030. Exhaustion of natural gas supplies would require a very rapid increase in the use of coal after 2030, at a time when the coal industry and coal-fired generation capacity would have been largely closed down.
- The contribution of non-hydro renewables would grow marginally from 1.6% of kWh generated in 2000 to 1.8% in 2030. The maximum possible potential contribution from non-hydro renewable generation in 2030 was estimated at 6.0%.

The conclusion of this study was that allowing environmental policy alone to dictate energy policy would be unsustainable would lead to adverse impacts on the economy and would require rapid changes in the energy system. In an alternative approach that recognised economic and social considerations, coal would have a continuing important role and there would be a heavy reliance on clean coal technology development, including the longer-term sequestration of carbon dioxide from fossil-fuelled electricity generation.

AEP advocates accelerated development of high efficiency coal generation technologies and identified a significant legacy from previous technology development in the USA, including:

- A 30% reduction in flue gas desulphurisation costs since the early nineties and a wide deployment of that technology.

¹ *Why carbon Sequestration? ... A Utility Perspective*. IBC's International Conference on Carbon Sequestration for the Oil, Gas and Electric Power Industry, June 27-29, 2001. Manoj K. Guha, American Electric Power

- Reduction in the cost of nitrogen dioxide control technologies and the installation of the most advanced technology in 30% of coal-fired capacity by 2002.
- Predicted continued commercialisation of advanced conversion technologies - an estimated 16,500 MWe of integrated gasification combined cycle is expected to be in operation in the USA by 2020.
- Estimated near term savings by industry and the public of \$125 billion from clean coal technologies².

A Developing Country Perspective

The largest part of the world population of 6 billion lives in developing countries. Most of these people lack access to adequate energy for economic and social development and much of their present energy system is unsustainable. In its forthcoming World Energy Outlook 2002, the International Energy Agency estimates that at present about 1.6 billion people are without access to electricity.

In the developing world, human dignity demands that poverty alleviation take precedence – providing food, shelter, infrastructure and basic human services to the citizens of the world that live below the subsistence level. In this context, economic growth provides financial resources to expand social services and developing country governments make this their first priority. Environmental considerations receive less attention than the economic and social components of sustainable development owing to lack of educational awareness, technical expertise, technological capacity and financial resources. Put simply, most developing countries cannot yet afford to give priority to environmental protection.

An essential component of economic growth is energy use. We can expect that as the developing world works to alleviate poverty, energy demand will grow commensurately. The IEA projects that developing countries will increase their share of world energy consumption to about 40% by 2010 and to 45% by 2020.

Electricity is one of the most effective and environmentally responsible means of delivering energy to end consumers. While there are a number of options open to developing countries electrifying their economies, their choice will be heavily influenced by cost and complexity. The reliance on agriculture in most developing countries presents barriers to the large scale energy crop plantations that would be necessary to fuel biomass energy systems. Nuclear power is constrained by technological capacity and considerations of international security. Natural gas is often a scarce resource in developing countries and even where it is abundant it demands large infrastructure investments to make it accessible. Renewable resources like wind and solar power rely on the unpredictable availability of wind and solar energy and the present state of energy storage technologies remains inadequate for efficient, long-term and large-scale storage of electric power.

Coal, in contrast, stands out as an affordable resource that is relatively straightforward to convert to electrical power. It is also abundant and reliable and will inevitably form a significant part of the future energy mix in many developing countries. It offers attractive costs, manageable complexity, accessible distribution and reliable availability to the developing world population.

² An even higher range of savings (\$360-\$1380 billion) is estimated by EPRI (*Market based Valuation of Coal Generation and Coal R&D in the US Electricity Sector* May 2002)

Clearly, measures to increase energy supplies in developing countries without adequate management of the local, regional and global environmental impacts of the new energy sources would be unsustainable. Therefore transfer of clean coal technologies to developing countries is of particular importance. This presents a clear challenge to the coal and related industries in giving practical effect to the notion of sustainable development, by helping to facilitate the transfer of environmentally friendly coal technologies to developing economies.

A high percentage of the population in the developing world is not on the electricity grid. While it is the long-term objective of governments to ensure access of commercial energy to all, an incremental approach is often necessary for practical considerations. For example, in countries where coal is used for household heating and cooking purposes, transfer of clean-coal stove technology would help alleviate the significant health and environmental impacts of current practices. This incremental approach recognises that household coal use will not be eradicated immediately and improves the sustainability of the practice until electrification is possible.

At a practical level, the modalities and possibilities for technology transfer from developed to developing countries require urgent consideration. The Clean Development Mechanism provided for in the Kyoto Protocol is intended to assist developed countries to reduce their emissions in partnership with developing countries. This is one of the mechanisms that can assist the rapid transfer and deployment of clean coal technologies in developing economies.

Simple transfer of clean coal technologies without developing the technological capacity and skills within developing countries is insufficient. A critical consideration in terms of approach therefore is how developing countries can grow their internal skills base and capabilities through technological cooperation. Technology transfer and the development of human and institutional capacity to adapt, absorb and disseminate technologies, as well as to generate technical knowledge and innovations, are part of the same process.

Most of the technologies that could be of immediate assistance to developing countries are already in existence in developed countries. Partnerships should be considered to facilitate and accelerate the kind of technology cooperation between developed and developing nations, to ensure that coal continues to play a role in sustainable development in developing countries where a rapid increase in coal consumption is foreseen.

The World Summit on Sustainable Development provides an opportunity to realise the objective of a partnership on technology cooperation for the improved use of coal globally.

Responding to Climate Change

Concerns about climate change add a most complex challenge to the long-term use of coal in a sustainable development context. In disregarding the great underlying uncertainties of future climate, emissions, and the efficacy of response options, climate change is commonly presented simply as an environmental issue requiring urgent intervention. This approach overlooks two equally important aspects: its long-term nature and the economic and social challenges of any response.

Meeting any greenhouse gas stabilisation target will require unprecedented change in the very foundation of the world's economy and there is a great responsibility of establishing a response that will itself provide the basis for sustainable development. A successful response will involve the following essential components:

- A continuing robust and vital world economy.
- Accelerated evolutionary improvement in current energy systems.
- Revolutionary technological innovation in energy sources, energy efficiency and carbon sequestration.
- Uninhibited diffusion of greenhouse-friendly technologies to ensure they are rapidly deployed where most advantage will accrue.
- Improvement in the circumstances of the world's poor.

The first component is essential and enabling. The innovation and massive capital investment required to eventually stabilise greenhouse gas concentrations and improve the living standards of the world's poor will simply not occur unless a vital world economy and free markets are maintained.

DuPont³, in recognising that climate change policies need to be crafted to protect economic vitality and conserve capital, concludes that:

- The focus must be on the full range of factors that influence atmospheric concentrations (all greenhouse gases and both emissions and sequestration)
- Full flexibility mechanisms will be essential
- The strategy and effort must be global
- Temporal considerations matter – a balance needs to be maintained between the long-term nature of climate change and risking economic and social hardship by over-zealous responses.

Encouraging Improved Sustainability Performance in Coal-related Industries

Change in the sustainability of the complex array of industries that are dependent on coal will require cooperation and action at three levels – government, industry sectors and corporations.

Individual governments have the responsibility to encourage change through establishing enabling policies, after taking into account economic and social development needs and environmental objectives. More so than for less complex issues, policies relating to energy and sustainable development need to be based not only on what is desirable but also on a realistic assessment of what is possible – from the likely contribution of renewable energy sources and the rate of change possible in fossil-fuelled systems. Because of the large and long-life investments in the power generation sector, changes in standards and energy policies are least disruptive when foreshadowed well in advance and implemented in stages. This requires exceptional leadership from governments, which tend to be driven by short-term election-driven issues.

Indeed, a first step for governments is to accept that coal will necessarily play a major role in world energy supply for many decades, and to put in place policies that will accelerate innovation, investment in and rapid deployment of cleaner coal technologies. This policy position contrasts with the more commonly adopted stance of encouraging a shift away from coal as rapidly as feasible, often into natural gas which, with its more limited reserves, is a less sustainable energy source. Sustainable development requires a diversified energy system that meets economic, social and environmental objectives. The clean use of coal will have an important role in that system.

There is a limit to the changes that individual corporations can achieve without general improvement in the performance of their industry sectors. Recognition of the need for change

³ *Kyoto – In the Longer term Context... A thought Starter*; Tom Jacob, Manager International and Industry Affairs, DuPont.

at the industry level and resulting collaborative initiatives (within and between industry sectors) provides the groundwork for many changes by corporations.

Already, many major corporations have realised that, apart from ethical considerations, there are business benefits associated with aligning corporate strategy with sustainable development. As a result these corporations are changing their operations, products and sometimes their strategic direction. It is increasingly being recognised that the strength of sustainable development is its effective integration of the economic, environmental and social factors, such that each reinforces the others to provide a more comprehensive and effective response. It follows that the most effective sustainable development programs are those where sustainable development is seen as integral to and integrated with every aspect of the business. This takes time and requires a long-term view.

The industries in the coal chain, together with the consumers that depend on the numerous products coal use provides, comprise a complex web of interdependence. This complexity is greatly increased by the international nature of coal trade, electricity generation and metals production and the variation in performance between developed and developing countries at all stages in the coal chain.

Product stewardship is one key element of sustainable development and coal producers are dependent on all others in the coal chain for the performance of their product. Collaboration is increasing between coal producers and electricity generators in programs to improve the performance of coal in electricity generation through research and development and technology transfer. Coal producers recognise that the future of their industry depends on the responsible use of their product and that they need to take an active part in product stewardship. It also results from the recognition by power producers that coal has an ongoing and essential role in fuel supplies and that collaboration makes good sense in innovation.

In the recent environment of declining coal R&D expenditures, the major new programme of US clean coal technology expenditure is very welcome. This recognises that coal will continue to play an important part in US energy supplies, and presents the opportunity to speed the commercialisation of clean coal technologies.

The World Business Council for Sustainable Development (WBCSD) emphasises the importance of the marketplace in fostering sustainable development⁴. It sees markets as the primary link to improving and revolutionising the activities necessary for the integration of production and consumption. The WBCSD also recognises other key factors, including:

- The development of sustainable livelihoods in developing countries,
- The role of financial markets in rewarding sustainable behaviour through price and capital
- The need to look at sustainability performance and challenges for the whole value-chain of industry sectors.

Recent Initiatives

Several recent initiatives and collaborative ventures indicate the seriousness with which the international coal industry views the challenge of sustainable development.

⁴ Sustainability Through the Market; Seven Keys to Success; World Business Council for Sustainable Development, April 2001.

The Global Mining Initiative (GMI)⁵

The Global Mining Initiative was launched in 1999 by ten of the world's largest mining, minerals and metals companies. Its purpose was to re-define the role and contribution of the global mining industry in relation to society's evolving transition to sustainable patterns of development.

The GMI involved three related tracks of work:

- An independent participative analysis of the key sustainability issues facing the industry and how they could be addressed, titled the Mining Minerals and Sustainable Development Project (MMSD)⁶;
- The creation of a new global representative body, the International Council on Mining and Metals (ICMM)⁷, to guide the industry in meeting the challenges of sustainable development.
- A high-level global conference for leaders and stakeholders to actively engage in shaping the future direction of the mining, minerals and metals industries relative to sustainable development. This was held in Toronto in May 2002.

As such the GMI was a catalyst for change, rather than an organisation, and is now concluded. Its outcomes will contribute to the industry's participation at the forthcoming World Summit on Sustainable Development in Johannesburg. The ICMM has now assumed industry leadership on sustainable development.

At the Toronto conference, 20 chief executives or chairmen from mining companies from around the world, as well as other industry leaders, engaged directly with mining related officials from 25 governments including state ministers, industry association and academic participants and leaders from 74 non-government organisations, in developing responses to challenges identified by the MMSD project.

At the conference industry leaders said that it is imperative to continue the dialogue started in Toronto about ways to improve social and environmental performance, negotiate agreement on protected areas off-limits to mining, and develop protocols with verification mechanisms.

Following the close of the conference, the ICMM Council of industry CEOs adopted the ICMM Toronto Declaration. Further details on the ICMM goals and implementation process have been posted on the ICMM website (www.icmm.com).

The World Coal Institute Principles

The World Coal Institute has developed its own extensive review⁸. In the course of the review the Institute's members adopted ten principles that the CIAB would broadly endorse. These principles are set out at Appendix 1.

⁵ <http://www.globalmining.com/index.asp>

⁶ The MMSD was an independently managed consultation that analysed the challenges facing the industry and indicated ways to resolve the issues. See www.iied.org/mmsd.

⁷ ICMM is the restructured global mining minerals and metals industry trade association based in London with a broad-based membership to provide leadership on sustainable development. See www.icmm.com.

⁸ *Sustainable Entrepreneurship, the way forward for the coal industry*. A report on the progress and achievements of the coal industry in promoting the sustainable development agenda since the Rio Earth Summit. December 2001

Further CIAB Work

The CIAB is in process of surveying the initiatives towards sustainable development undertaken by its Members' companies. Meanwhile Appendix 2 quotes examples from two countries that give an indication of the measures being taken.

Conclusions and recommendations

- The Coal Industry Advisory Board recognises the paramount importance of sustainable development. The CIAB emphasises that policies must put equal weight on all three pillars of sustainable development in order to be effective.
- Coal will play an important role in energy systems that support sustainable development for the foreseeable future. This is because of coal's unique combination of advantages: it is affordable, is easy to store, and is available from a wide range of sources. Coal therefore remains essential in achieving a diverse balanced and secure energy mix in developed countries; it can also meet the growing energy needs of many developing countries.
- Further improvement in coal's environmental performance will be required. While improved coal technologies have provided very substantial efficiency and emission improvements to date, accelerated technological effort is required to reduce greenhouse gas emissions. Deployment of cleaner and higher efficiency technologies will be important in both developed and developing countries.
- Climate change considerations are complex, with great underlying uncertainties. Any response must be affordable and provide the basis for sustainable development, by addressing ongoing economic and social requirements as well as the environmental challenge.

Appendix 1

Sustainable Development and Coal – World Coal Institute’s Ten Principles

Coal plays a fundamental role in global development, but it must meet a number of economic, social and environmental challenges to demonstrate its role in sustainable development, as called for by the Brundtland Report. This Report defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987).

Coal is a crucial and enduring element in a modern, balanced energy portfolio, providing a bridge to the future as an important low cost and secure energy solution to sustainability challenges. The immediate task is to accelerate the deployment and further development of innovative, advanced, efficient, cleaner coal technologies – whilst continuing to meet the energy needs of society and minimising environmental impacts.

The member companies of the World Coal Institute recognise and accept the challenges of sustainability – and support the following key principles and objectives:

1. In addressing the challenges of sustainable development, three basic and inter-related objectives must be met: economic security and prosperity; social development and advancement; and, environmental sustainability.
2. Minerals-based industrial materials and the provision of adequate, reliable and affordable energy are fundamental to achieving these objectives – and for meeting the needs and aspirations of people in both developed and developing countries. Access to energy remains a critical development need, particularly for the one-third of the world’s population without electricity.
3. Meeting the sustainable energy challenge on a global scale in the face of rapidly growing energy demand will require innovation and acceleration of technological change across all energy sectors, including coal and other fossil fuels.
4. Coal is the world’s most abundant and widely distributed fossil fuel resource, emphasised by the role coal has played in underpinning world economic and social progress. Given the projected strong growth in global demand and the importance of supply security, coal will continue to be an essential part of the world’s energy and industrial materials in the foreseeable future.
5. The industry recognises the need to address issues that challenge the role of coal in the transition to a more sustainable society. These include health impacts from the domestic use of coal; environmental impacts from emissions associated with the use of coal; environmental impacts associated with coal production; and, economic and social contributions during, and at the conclusion of, mining activities.
6. In addressing these issues and to give practical effect to sustainable development, the coal industry has identified five key actions:
 - I. minimise coal production impacts on the biosphere (land, water) and on local communities;
 - II. improve the technical and economic efficiency of energy conversion, thereby minimising resource use;
 - III. significantly reduce ‘per unit’ emissions from the production and use of coal;

- IV. contribute to the efficient and beneficial transfer of new and advanced cleaner coal technologies to enhance their global uptake and to assist in meeting the needs of developing countries (recognising their legitimate development aspirations and the low energy efficiency of existing thermal plant); and
 - V. support by individual coal companies for community development initiatives to address local sustainability issues, providing enhanced economic and social opportunities relevant to the location and scale of their operations.
7. Continuing reduction in emissions through accelerated technology improvement and transfer is the key to effective, least cost solutions to sustainability and climate change issues, and is the industry's major priority for the future. Past improvements – including significant increases in thermal efficiency and reductions in sulphur and nitrogen oxides (SO_x, NO_x) and particulate emissions – need to be more broadly adopted and enhanced. Coal also has a valuable role in improving the efficiency of other energy sources (including renewables) through synergies from combined activities, which need to be understood and applied.
 8. Life cycle analysis (LCA) provides greater transparency and understanding of the full environmental performance of energy and materials alternatives, and illustrates that differences in GHG emissions between coal and its alternatives are significantly less than conventional burner tip analysis has indicated. A number of new research initiatives hold great promise to significantly reduce GHG emissions from coal use, while options such as production of hydrogen from coal to provide a cleaner energy source, and emissions capture, are longer term prospects.
 9. The particular needs of developing countries must be addressed through practical programmes for the transfer of the most up-to-date commercial technologies, electrification, and modern combustion systems for domestic household use of coal as a transition to broader distributed and reticulated grid energy systems. Priority must be given to overcoming existing unsafe domestic use of non-commercial forms of energy, which pose adverse environmental impacts and health risks.
 10. Policy responses must be flexible and recognise that there is no one single solution to the sustainability challenge. Effective, least cost outcomes will need markets to operate with minimum distortion, and to encourage innovation and eco-efficiency in creating enhanced economic value with reduced environmental impacts.

The World Coal Institute and its members are committed to promoting these principles and objectives and seek to work with their customers, technology suppliers, governments and international agencies.

November 2001

Appendix 2

Examples of Current Industry Initiatives to Improve the Sustainability of Coal Use

The CIAB is in process of surveying the initiatives towards sustainable development undertaken by its Members' companies. Meanwhile the examples quoted below from two countries give an indication of the measures being taken.

ACA Sustainable Development Program

Recognising that the community is demanding continuous improvement in performance, the Australian Coal Association recently established a Sustainable Development Program with a Directorate based in Canberra. The program is specifically aimed at encouraging and promoting improved environmental performance and sustainability within the coal industry, and providing factual information about coal, its environmental performance, its place in the future energy mix and its important economic and social contribution to key decision makers and a wide range of other stakeholders.

Coal in a Sustainable Society

Coal in a Sustainable Society (CISS) is a major program of life cycle analysis investigations and communication. CISS is examining the cradle to grave, or full life cycle impacts, of current and developing technologies for electricity generation and iron making. CISS's aims are to:

- Develop a better understanding of coal's role in energy supplies and iron making,
- Provide an input into national and international policy deliberations,
- Identify opportunities to improve the performance of coal.

CISS seeks to shift the debate surrounding coal from the anecdotal and emotional to the analytical and systematic. CISS will achieve this by taking a total system approach, based on life cycle analysis principles and by including economic, environmental and social factors.

CISS is not a mere public relations program. The driving ethic is transparent integrity – the bad news is being reported with the good, improvement opportunities are being identified, assumptions are clearly stated and the work is internationally peer-reviewed.

Funding is provided mainly through the Australian Coal Association's Research Program (ACARP), coal industry funds and from other international and Australian stakeholders in the coal industry.

CRC for Coal in Sustainable Development

Sixteen Australian organisations, including major coal producers, electricity generators, the Australian Coal Association Research Program, four universities, the Queensland Government, and the CSIRO with Federal assistance have established a \$60 million cooperative research centre (CRC). The CRC for Coal in Sustainable Development will enable the best coal researchers in Australia to work closely with industry, external sustainability advisers and international coal research organisations. It would be a world first, by combining think-tank and experimental capabilities.

The CRC's objective is to become a centre of excellence and influence in the Asia-Pacific region, assist with clean coal technology development and deployment and advise on the use of coal in a sustainable development context.

Mining, Minerals and Sustainable Development (MMSD) Analysis⁹

A major focus of the Global Mining Initiative is an independent analysis of the issues facing the mining industry. Commissioned through the World Business Council on Sustainable Development, it aims to bring a wide spectrum of sponsors into the process in order to generate a broadly based and authoritative analysis of the key issues arising from peoples' expectations of sustainable development.

The International Institute for Environment and Development (IIED) has designed the process for the analysis. This will be conducted at arm's length from the industry and be based on broad participation by stakeholders – governments, international organisations, civil society organisations and other business sectors. The intent is to build the foundation for the new relationships and partnerships that the scale of the challenges demands.

The Role of Coal in Assisting Sustainable Development in South Africa

The current public debate on coal in South Africa has been narrowly focused on the potential negative impact on the environment and associated health risks. A lack of a sound integrated approach to pollution control provided fertile ground for environmental activism against the use of coal. In addition, South Africa's latest ranking as fifteenth highest per capita emitter of greenhouse gases is likely to ensure that the country remains a focus of attention.

It was accepted that the concerns raised by the public must be addressed in a transparent manner and it is a legitimate expectation that coal should be utilised in a responsible manner. However, it was also recognised the debate should be broadened to accommodate the huge potential of clean coal technologies, and the benefits and risks associated with coal utilisation.

The South African Government has identified pollution control as a priority amongst the many sustainable development imperatives. As a result, societal efforts are focused on the need to establish a sound air quality management framework.

South Africa's economy is coal based and there is a significant household coal usage for cooking and heating as a result of an underdeveloped electricity sector. While significant strides have been made in terms of the Government's electrification program, more remains to be achieved. Government is also actively working towards an energy plan for South Africa that will consider an energy mix, which will include coal, gas and renewable sources of energy.

Given this approach, it is imperative for the coal sector in South Africa to consider practical ways to increase the efficiency of coal and reduce the environmental impact of its usage. A major coal company has launched a partnership between producers and consumers of coal to consider the following:

- To explore the possibility of a collaborative initiative between producers and consumers of coal towards sustainable development, which includes a particular focus on improved air quality management. In this regard a common approach will consider the role of technology to reduce emissions from coal usage.

⁹ http://www.iied.org/mmsd/what_is_mmsd.html

- To adopt a pro-active approach that seeks to articulate the critical role that coal has to play in the transition to a sustainable South Africa.
- To pilot the envisaged cooperation, demonstration projects are intended for show casing at the World Summit on Sustainable Development.

The experience to be derived from this interaction will form a critical input into the national process intended to establish an air quality management plan/strategy.

The next step envisaged by the partnership is an association with the Coaltech 2020 program. This collaborative research program was formed by the major coal companies, the national electricity generating company, the universities, the CSIR, organised labour and the state to address the specific research needs of the coal mining industry in South Africa, using local and international knowledge and skills.

The program is highly focused and has a clear vision, which is: “The development of technology and the application of research findings which will enable the South African coal industry to remain competitive, sustainable and safe well into the 21st Century.”