

**The World Energy Council's (WEC) Cleaner Fossil Fuels Systems
Committee (CFFS) and the World Federation of Scientists**

**Carbon Sequestration Workshop on Carbon Capture and Storage –
A Way Forward for Cleaner Fossil Fuels**

Erice, Italy, August 24, 2005

Ms Barbara Mckee, distinguished audience.

First, I would like to thank the Chairman of the Clean Fossil Fuel Committee of the World Energy Council, Ms Barbara Mckee, for giving me the opportunity to address you during this important Workshop.

During my presentation I'll discuss three key points that are linked with each other and that I believe are the most important for the deployment of Clean Coal and Zero Emission Technologies: first, the public conception of fossil fuels in face of environmental issues; second, some strategic issues, including demonstration projects and financial questions; and, last, international partnerships, especially in R&D and technology transfer.

All major global projections suggest that fossil fuels will remain a key for power generation at least until the middle of this century. With almost 2 billion people without access to commercial energy while the share of fossil fuels amounts to approximately 90% of the energy matrix, the message is clear: fossil fuels will be an integral part of the world's energy scene, at least at medium term.

This slide shows the electrification rate of some countries, and we want to draw your attention to India and the African countries where less than 50% of the population has access to electric power. In the next slide we can also see that even with an electrification rate of almost 100 %, the consumption of electric power per inhabitant in China and Brazil is low. Another important aspect is that the scenario of high prices induces policies to increase the use of domestic fuels. As a result, developing countries, especially, China and India, will increase the use of energy, and fossil fuels, and coal in particular will tend to be used more extensively. A recent study (performed in 2004) published by the Brazilian Committee of the World Energy Council shows that the energy demand forecast up to 2030, will reach about three times the 2002

figures. Despite the significant expansion of the use of its hydroelectric potential, there will be a considerable increase of fossil fuels in the mix of primary sources in Brazil,

It is important to stress this because one of the focuses when deploying Clean Coal Technologies and Carbon Sequestration, should be on developing countries. As Robert Priddle, former Ex. Executive Director of the IEA, said: "Economic development and poverty eradication depend on secure, affordable energy supplies....Fossil fuels, though environmentally challenged, can meet the criteria of security and affordability. Technology, driven by the right incentives, offers possible answers to the environmental problems - clean coal technology and technologies - to safely capture and store carbon".

As a strategy for communication, I decided to start my presentation by talking about the importance of fossil fuels for the world and, due to environmental and efficiency reasons, the importance of Clean and Zero Emissions technologies. This leads me to mention one of the non-technical barriers to the deployment of Clean Coal and Zero Emissions technologies: obtaining political and public acceptance.

What can be said about the public perception of fossil fuels and Carbon Sequestration?

At the Social Forum held in Porto Alegre – Brazil - in February 2005, the NGOs had developed a strategy to fight against the development of coal in Brazil. The NGOs play with the emotions of ordinary people and linking climate change to fossil fuels can cause public opinion to oppose the best technology of coal firing power generation and carbon sequestration available, making it difficult to deploy them. When we asked the greens how we could reduce energy poverty and provide a better life for 32 million people who live in poverty in Brazil, they said that fossil fuels, especially coal, are not the answer and that carbon sequestration is unreliable and science fiction.

Environmental issues are technical and difficult to understand for the general public, including the members of the legislative and the press. They are a very sensitive point for all of us.

Due to highly efficient power generation processes, cleaner fossil fuel systems have significantly reduced pollution throughout the world over the last two decades; however, apart from the improved energy efficiency that cut

down CO₂ emissions and is the least costly method, a large amount of money and effort have been spent on technologies to reduce CO₂ and achieve near zero emissions. Despite all efforts, the technologies applied, and the investments made, the coal image does not reflect the realities of the industry. It is necessary for the entire economic chain of fossil fuels to take global action now to market them to the public and policymakers alike, so as to ensure that fossil energy provides a sustainable bridge to the future. The public should know that fossil fuels, particular coal, is a high-tech and environment-concerned industry, increasingly cleaner, and tending to reach zero emissions within the coming years. A good example of communication is the “green country” – Germany – where 52.2% of power is generated from coal. The coal industry recently undertook a marketing campaign, where RAG - German Hard Coal Mining Association - call for a stable and reliable supply of raw materials and energy for Germany. A public pool showed that more than 80% of the German population supports the coal industry. Another example is the ecomagination program developed by General Electric, which includes billions of dollars invested in R&D and is strong on advertising. Here are two examples of print advertising. We, in Brazil, have drawn up an educational program for 9 to 10-year old children (30 thousand in 25 counties) to tell them about the coal chain and sustainable development.

Assessing public perception of Carbon Capture and Storage is challenging because of the relatively technical and “remote” nature of this issue at the present time. Only a few studies have been carried out regarding public attitudes towards Carbon Capture and Storage. Such research presents challenges because the public is not familiar with the technology, and may only have a limited understanding of climate change and the possibilities for mitigating it. In countries where systematic polling data are available, only a low percentage of the general public is familiar with carbon sequestration, making it difficult to assess public perception of the new technology. The results of the few available studies indicate that Carbon Capture and Storage are generally regarded as less desirable than other options for mitigating climate change. Geological storage is seen as a problem (IEA), but would perhaps be viewed more favourably if it were adopted in conjunction with more desirable measures, such as increasing

efficiency, reducing demand, and using fossil fuels together with other than carbon fuels.

But there are a lot of important questions regarding public acceptance to be solved and they are currently under discussion and investigation. They include issues such as: what kind of public consultation is needed; concerns referring to different forms of sequestration; attitudes towards comparing CO₂ with other underground uses, such as underground storage of natural gas, or with nuclear waste disposal.

As said Dr. Hawkins “When a project is proposed, it’s important to show the public that storage of carbon dioxide is sufficiently secure so that, aside from reducing emissions, they pose no significant threat to human health or to ecosystems” (Hawkins, 2003). A monitoring system will be fundamental to give credibility to this technology.

Society and Policymakers need to know that politically motivated decisions to shape the future energy sector should be based on sound and comprehensive research and facts, not wishful thinking and activism. It is important to emphasize to politicians, lobby groups and the public in general, that fossil fuels, and particularly coal, are part of the global solution for a sustainable world, and that Carbon Capture and Storage is a very relevant issue. To give you an example, in my opinion, the “Summary for Policymakers” from the Draft IPCC Special Report on Carbon Dioxide Capture and Storage, did not sufficiently emphasize the importance this issue has for the world.

As marketing is not a magic tool, the second point for deployment of CO₂ Capture and Storage is the need to define a carbon management strategy. This means that there will have to be some clear benefits to the industrial sector early on and during the implementation of the strategy. The strategy needs to be broad in nature. It implies an international context, a short-term efficiency increase, reaching (near) zero emissions technology, including CO₂ capture and storage, and, at long-term, a hydrogen economy. This strategy is recognized by several countries, in particular the United States, Canada, and Australia. The Carbon Sequestration Leadership Forum (CSLF) is an example of this, and the world-wide promotion of “lighthouse projects” for CO₂ and storage is very important for the success of deployment

of the zero emissions technologies. These demonstration projects will provide strong visibility and public confidence that such technologies are possible and beneficial. To be fully successful, the Lighthouse projects must integrate the developing state-of-art fossil fuel power plant with the CO₂ capture and storage systems. There are also other issues that should be addressed. For instance: societal concerns regarding laws and conventions, health and safety issues, the CO₂ emissions trading schemes, and the ability to monitor and verify the amount of CO₂ stored.

Compared with a similar plant that releases CO₂ to the atmosphere, a facility with capture and storage will cost more to build and to operate and will be less efficient in its use of primary energy.

Rapid deployment of Carbon Capture and Storage may also conflict with traditional capital return policies of generators (IEA). An economic mechanism is being implemented: emissions trading. But as it is new, there are uncertainties, such as whether Carbon Capture and Storage projects would be covered by the CDM, the current low value of Certified Emission Reductions, and others. A number of countries have the potential to host Carbon Capture and Storage projects involving geological storage under CDM, but the true potential can only be assessed when the underground storage resources have been mapped. The above shows that there are many financial questions still to be answered.

As we said previously, we all know that Cleaner Fossil Fuels which aggregate new technologies are expensive and that it is not an easy task to utilize this technology in developing countries. One of the major unknown issues refers to environmental policies that the fossil fuels could face. They could push the investments up, increasing the energy cost.

Meeting the needs of those who are excluded from the benefits of electric power is essential since lack of it increases their penury and has a tremendous negative environmental social impact. Energy for poor or emerging countries must be economically sustainable, environmentally sound, and available to all. How can the high environmental costs that increase the price of energy be made compatible with the cost that low-income populations can afford?

Failure to achieve this goal would mean that no Carbon Capture and Storage projects would see the light of the day in the developing countries before 2030 (IEA).

The world must figure out a way to permit growth in the developing nations while lowering emissions. We should try to be more efficient, we should work on the demand side, but we will need more energy. What is required is incentives to stimulate companies to invest in applied technology in developing countries.

As pollution has no frontiers, we recognize that the use of clean coal and zero emission technologies is important for the environment and, that to deploy them, it is necessary to create a global alliance and establish new trade models, as well as development and technological as well as financial assistance for the developing countries that apply them. Examples of specific financial instruments are: green funds; loan guarantees or direct loans, extended payment periods, tax exemptions and/or credits; direct subsidies for construction and/or production; emission credits - an international carbon-trading system; export credit insurance; improvement of political and credit risks, and above all predictable and non-discriminatory energy policies.

One example of international cooperation is the support that the WorldBank/GEF will give to develop the 450 MWe Yantai IGCC demonstration project in order to both accelerate the application of this technology in China and help reaching the long-term goal of hydrogen production and CO₂ capture as the first step toward zero carbon emissions.

The last point I want to mention for the future of fossil fuels is technology. We all know the large amount of money spent by developed countries in research and development toward fossil fuel zero emissions and it is not enough. As IEA, five-fold increase in RD&D is needed.

In poor countries where money is scarce and the needs are huge, resources for R&D are few and should be prioritised. We cannot simply apply the technologies developed in other countries to our fuels. We made this mistake in the past. We need to develop technologies suitable for our conditions. We need to create networks of scientists, research centres, universities to study Carbon Capture and Storage, and this needs financing.

In conclusion:

First, The commitment “of the world with the world” to the effect of better equating world growth with the needs of the environment can be accomplished with fossil fuels.

Second, environmental issues, including poverty, are a global problem.

Third, technology is an important path that harmonizes reliable energy supply, development, and environmental protection.

We need to:

- improve the public perception of Fossil Fuels, and of coal in particular, and to realize that disseminating information of Carbon Capture Storage is fundamental to this. Workshops such as this one are instruments to show the state of art of the technology;
- create a global alliance, now, supported by intergovernmental bodies with the cooperation of non-governmental organizations, such as the WEC, with the help of the Global Environmental Facility, World Bank Funds, and other multilateral institutions, to assist developing countries in acquiring and developing cleaner fossil fuels and zero emissions technologies;
- establish partnerships with research centres, universities and industry, and create financial assistance to promote R&D in developing countries regarding their local conditions in order to produce cleaner fossil fuel energy as soon as possible and affordable to all.

There is a big difference in saying for the public: “We need a low emission world” instead of “We need a low carbon world”. This message should be stressed by organizations, such the World Energy Council, and other Institutions acknowledged for their credibility.

Fernando Luiz Zancan