CSLF

TECHNICAL GROUP MEETING

(19 – 21st Jan. 2004)

PRESENTATION BY

INDIA

PRESENTATION SYNOPSIS

1. Indian Power Scenario

2. R&D works being undertaken in India

3. Areas of knowledge sharing

4. Areas/Projects for association

1. INDIAN POWER SCENARIO

	AS ON 31.12.03	ADDITION TILL 2012	TOTAL TILL 2012
COAL	64955.88		
GAS	11802.82		
DIESEL	1172.83		
TOT. THERMAL	77931.53	62418	140349.53
WIND	1869.66		
HYDRO	27885.23	33680	61565.23
NUCLEAR	2720.00	7215	14935.00
TOTAL	110406.42	103323	213729.42

All figs. In MW

2. R&D works presently being undertaken in various Indian Institutes/Organisations.

A. Indian Institute of Petroleum (IIP) working on Pressure Swing Adsorption (PSA) technology for removal of CO_2 from gas mixture

- PSA is a cyclic separation process with adsorption at high pressure followed by desorption at low pressure. Gas mixture of 8-10% of CO_2 and remaining nitrogen gas simulated as flue gas from power plant.

- Experiment done at 2.5 to 5.2 bar pressure at ambient temperature. 82% of CO_2 removal was achieved.
- Research work on high temperature mixture gas being undertaken.

B. BHEL developing IGCC technology for Indian Coal:

- **Pilot scale plant of 6.4 MW capacity has been put up by BHEL using Indian coal having high ash content.**

- **Concentrated efforts being made to develop 100MW plant using indigenous coal.**

C. Development of molecular sieves from power plant fly ash, to capture CO_2 by National Environment Engg. Research Institute (NEERI):

- **NEERI has successfully developed molecular sieve from fly ash being generated at the thermal power plant on experimental basis.**

- **Zeolite-5A is a resin type material which can adsorb CO_2 from any gas mixture.**

- **The CO_2 adsorbed on zeolite can be transported to the location where CO_2 can be removed by using PSA technology.**

D. NEERI developing artificial photosynthesis by using artificial sunlight (UV energy) and Zeolite material to convert captured CO_2 to useful products

E. Capture of CO_2 by augmentation of carbonic anhydrase enzyme activity:

- Experiment indicate that micro organism found in water reservoirs can be developed for capturing atmospheric CO_2.
- Due to enzyme reactions, carbonate ions formed in water, increased the formation of algal biomass which can be exploited for further various applications.

F. Carbon sequestration through forestry:

- **Thick forest developed at a place in (Maharashtra) where manganese mines were abandoned.**

G. National Institute of Oceanography (NIO) – Goa has been actively engaged in research on natural processes concerning the oceanic biological pump (which involves the "fixation" of CO_2 in the surface waters). NIO has been carrying out studies on mapping the distribution of partial pressure of CO_2 (pCO_2) in surface water for understanding the controlling processes.

H. Indo Gulf Fertilizer (IGF) developed the process to capture CO_2 from the flue gas of their processing unit using chemical monoethanolamine (MEA) solvent which absorbs CO_2 and after heating it releases pure dry CO_2.

3. Areas where knowledge sharing is proposed with CSLF member countries.

A. Present status of pre-combustion and post-combustion CO_2 capture technologies and work being done to bring down the cost of CO_2 capture.

B. CO_2 sequestration process which could be economical and can be integrated/Retrofitted with existing power plants without much modification.

C. New farm management and new varieties of plants for carbon sequestration.

D. CO_2 separation using nuclear technology.

E. Research work on effective PSA cycle for capturing CO_2 from flue gases of power plants .

F. Research work on Plasma technology to capture carbon from flue gases.

G. Research work undertaken to manufacture catalytic material from fly ash of power station and used for CO_2 capture from flue gas.

H. Studies on direct injection of CO_2 into deep oceans, cost optimisations & biogeochemical cycles of ocean.

4. Areas/Projects where India can associate with other CSLF countries.

A. Pilot project in India for separating CO_2 from power plant flue gas with cost economic technology.

B. Feasibility study for CO_2 injection in coal beds having CBM with techno-economics.

C. Association with the design and development of 275 MW prototype zero emission plant being undertaken by USDOE.

D. Feasibility study on direct injection of CO_2 in sea at one of coastal power station with techno-economics.

E. Collaborative Research on Agro-forests for CO_2 sequestration.

F. Collaboration with Institutes/ Organisations working on CO_2 compression, transportation, storage and monitoring/verification technology.

G. Opening of Regional Centre of CSLF in India.


THANK YOU