

INTERNATIONAL COOPERATION

11.1 EUROPEAN UNION (EU)

The India-EU Energy Panel was constituted as a follow up of a decision taken at the 5th India-EU Summit held in Hague in November, 2004. The first meeting of the Indo-EU Energy Panel was held in Brussels on 29th June, 2005 in which emerging energy scenario and future prospects for development of the fuel chains and key priorities for cooperation were discussed. The Panel decided to set up working groups in the following areas:

- Coal and clean coal conversion technologies
- Energy efficiency and renewable energies
- Fusion energy including India's participation in International Thermo nuclear Experimental Reactor (ITER) project.

As a follow up of the decision made by the Panel, the Working Group on Coal and Clean Coal Technologies was constituted in March, 2006. 1st meeting of the working group on Coal and Clean Coal Conversion Technologies was held on 22-3-2006 at New Delhi. 2nd meeting of the India - EU Working Group on Coal and Clean Coal Technology was held on 28.11.2006 at Brussels, Belgium.

Various areas discussed for cooperation were:

- i) Capacity creation in resource assessment of CBM/CMM/AMM
- ii) In-situ coal gasification.
- iii) Coal beneficiation for coking and thermal coals
- iv) Development of mining methods for steep and thick seam working.

The meeting of Indo-EU CWG to discuss Coal Conversion Technologies was held on 21.1.2008 in New Delhi, where power sector proposed areas of cooperation for improved efficiency in coal utilization for power generation. The 4th meeting of the Indo-EU CWG on clean coal technologies was held in Brussels during 17.6.2008. The areas identified for cooperation were Steep Seam mining, underground coal gasification and underground mine rescue. The 5th meeting of the Indo-EU Energy Panel meeting was held on 6.10.2009 in Brussels. Subsequently the 5th meeting of the Indo-EU Working Group was held during 12-14 April, 2010 in Spain. The progress made by the working group on coal and clean coal technologies was reviewed and steps to improve the Indo-EU cooperation further were discussed. 6th meeting of the Indo-EU Coal

Working Group was held on 11.5.2011 followed by a workshop on steep seam extraction and a visit to North-East region during 12-13, May, 2011 involving experts from Spain to explore the possibilities of exploiting steep seam in this region. The 6th meeting of the Indo-EU Energy Panel was held on 18.11.2011 in New Delhi which reviewed the working group's activities. The next Indo-EU Working Group meeting was held on 9-11, July, 2012 in Leeds, UK where Indian side has impressed upon EU side for taking up a study for extraction of steep seams particularly with reference to NE coal fields.

11.2 REPUBLIC OF SOUTH AFRICA

1. The Working Group on Coal with South Africa was constituted in 2003 and the first meeting of the Working was held in New Delhi on 29-30th July, 2008. At present Secretary, Ministry of Coal is Co-Chair and there are four members including Chairman, CIL and Director General Mines Safety.
2. The specific areas for cooperation identified by the Indian side includes mechanization of Board and Pillar System of underground mining, beneficiation of coal and technology of Conservation of Coal to Liquid (CTL). Some other new areas for cooperation

were also identified during the last meeting held in July, 2008.

3. Some of the areas identified in the course of the meeting were mechanization of underground coal mining. Hard Roof Management techniques, development of Coal Bed Methane, underground coal gasification, identification of coal blocks, facilitation for forging Joint Ventures between CIL and BEE. Both sides agreed to continue exchange of information and dialogue for developing a road map for the South African coal sector.
4. As per the agreed decisions, the next meeting of the Coal Working Group was required to take place in South Africa on a mutually convenient date. MEA is pursuing the issue with South Africa side to firm up possible date(s) for hosting the next meeting of CWG in South Africa.

11.3 MOZAMBIQUE

Mozambique has been chosen by Coal India Limited (CIL), a public sector undertaking, as a preferred destination for securing coal properties abroad, both directly and through the newly formed Joint Venture Company - "International Coal Ventures Ltd" (ICVL) for its

untapped metallurgical and high grade coal resources.

Government of India and Government of Mozambique are having a Joint Working Group on Coal. An MOU between Government of the Republic of India and the Government of the Republic of Mozambique on cooperation in the field of coal resources was concluded on 26.05.2006. First meeting of Indo-Mozambique Joint Working Group on Coal was held on 07.04.2007 in Maputo in Mozambique and the second Joint Working Group meeting on Coal was held on 30.03.2009 in New Delhi. In February 2009, Govt. of Mozambique have allocated two coal blocks at Tete Province to CIL.

In the 2nd Joint Working Group meeting on Coal, the leader of Mozambique delegation has expressed willingness to further expand cooperation on production sharing basis with Indian Public Sector Undertakings. The leader of Mozambique delegation was keen on the use of Mozambique share of coal in a pit head power plant, to be set up in that country.

Coal India Africana Limitada, a wholly owned subsidiary of Coal India Limited has been granted Prospecting Licenses 3450L and 3451L for coal by the Ministry of Mineral Resources, Govt. of Mozambique w.e.f. 06.08.2009 for a

period of five years based on the winning Bid by CIL against tender no. 06/DNB/08 dated 18.12.2008. CIL/CMPDIL has initiated action for exploration and exploitation of these two blocks.

Setting up of APO and ATO in Mozambique

The consolidated proposal for human resources and capacity building for Africa under the USD 500 million grant-in-aid announced by Hon'ble Prime Minister at the India Africa Forum Summit-I in April, 2008 at New Delhi, includes setting up of an Apex Planning Organization (APO) and an Apex Training Organization (ATO) for coal sector in SADC region in Mozambique. Initially, Funding for the APO and ATO was to be out of Ministry of External Affairs (MEA) funds. MEA was to make direct funding to the implementing agencies and the administrative Ministries concerned would be kept informed in this regard. The implementing agencies would be required to sign two agreements – one with the host country and another with MEA for this purpose. However, as the Govt. of Mozambique is not willing to provide the cost of land and building, CIL has offered to bear this cost, as part of their commitment while obtaining Coal Blocks from the Govt. of Mozambique.

Revised estimates have been made for establishment of APO and ATO. The matter has been taken up with MEA to resolve the various issues involved.

11.4 JAPAN

During the Prime Minister's visit to Japan in December, 2006, it was agreed to set up an India-Japan Energy Dialogue co-chaired by Deputy Chairman, Planning Commission of India and the Minister of Economy Trade and Industry (METI) of Japan to promote cooperation in the energy sector in a comprehensive manner. On 23 April, 2007, Deputy Chairman, Planning Commission of India and the METI Minister of Japan issued a joint statement to launch the Japan-India Energy Dialogue. A Joint Working Group on Coal was set up under India-Japan Energy Dialogue in 2007 and the last meeting of the Coal Working Group was held in October 2012 where the following areas have been discussed under Technical Cooperation.

- a) Continuation of Capacity Building in Clean Coal Technology for the Officers of coal companies;
- b) Development of integrated underground communication system;
- c) Instrumentation for monitoring of mine gases and fires;

- d) Detection of partings between adjoining waterlogged unapproachable workings;
- e) Rescue equipment and operations.
- f) De-moisturising of lignite.

Ministry of Coal had recently renewed the MoU between Department of Economic Affairs, Ministry of Finance, NEDO, Japan and M/s Monnet Ispat Ltd. for the ongoing Clean Coal Technology Washery Project ("Vari-Wave" jig system and Auto Reject Control System) (at Angul, Talcher, Odisha. As per the schedule indicated by the proponents, the Project is likely to be commissioned in April, 2013. This Project is implemented under the Green Aid Plan which is jointly promoted by the Ministry of Economic, Trade & Industry of Japan and the Ministry of Finance, Govt. of India to support the self-help efforts of India in resolving its energy and environment related issues. The project is being partially funded by NEDO.

11.5 RUSSIA

The erstwhile USSR had assisted Coal India Limited (CIL) in implementation of Nigahi and Khadia Opencast Projects of Northern Coalfields Limited (NCL) and Jhanjra underground longwall project of Eastern Coalfields Limited (ECL).

The Association of Russia in coal sector was earlier discussed under bilateral arrangement and Indo-Russia Working Group on Coal used to meet regularly. On formation of Indo-Russia Inter Governmental Commission (IRIGC) on Trade, Economic, Scientific, Technological and Cultural Cooperation, a Working Group on Mines and Metallurgy was formed and the earlier Coal Working Group was dovetailed into this. Subsequently, on the advise of Ministry of External Affairs, the coal related issues have dovetailed into the Joint Working Group on Energy under the Inter-Governmental Russian-Indian Commission on Trade & Economic S&T and Cultural Cooperation from October, 2012 onwards. Both the sides signed a Protocol and noted the significant potential and prospects of cooperation in coal mining industry and expressed interest in expanding mutually beneficial cooperation.

The following areas related to coal sector were proposed for technical cooperation with Russia:

- Mining of steep, thick and deep seated seams and multi seams, shaft sinking
- Design and maintenance of over burden slope stability
- Mining of deep seated multiple thin lignite seams
- Hydraulic equipment for roof bolting purposes
- Rapid exploration methods including 3-D HRSS geophysical surveys for coal exploration
- Advance drilling Technologies for coal exploration
- Advance dragline application techniques for large opencast mines
- Cast blasting
- Underground communication systems and safety systems
- Underground coal gasification, coal beneficiation, CBM/CMM development etc.

Indian side indicated that Russian side could participate in global tenders being floated by Coal companies for mining and equipment supplies.

The CMPDIL has renewed their MoU with their counterparts in Russia namely Giproskhakht till 2014.

11.6 BELARUS

The bilateral cooperation in Coal has been taken up under India-Belarus Inter-Governmental Cooperation for Economic, Trade, Industrial, Scientific, Technical & Cultural Cooperation. The last meeting of the IGC was held in November, 2008 in New Delhi.

A Ministerial delegation led by Hon'ble Minister for Coal visited Belarus during 16-19 June, 2011 and met First Deputy Prime Minister of the Republic of Belarus, Minister of Industry, Ministry of Natural Resources, Minister of Energy and Deputy Foreign Minister during the visit.

The following areas of technical cooperation between India and Belarus were discussed.

- Supply of HEMM by Belarusian Companies like Belaz by participating in the global tenders being floated by Coal Companies.
- Supply of OTR tyres by Belarusian Companies like Belshina by participating in the global tenders being floated by Coal companies.
- Development of clean coal technologies including underground coal gasification, CBM/CMM, etc.
- Technology for 3D Seismic Surveys.
- Possible cooperation of Indian side in the proposed lignite deposit development in Belarus.

11.7 AUSTRALIA

The 8th meeting of Indo-Australia joint working group on energy and

minerals scheduled to be held with the proposed following agenda item -

- (i) Exploration and estimation of gas in place (GIP)
- (ii) Methods to extract methane from coal/lignite
- (iii) Expertise in Underground Gasification technology.
- (iv) Mining of deep seated coal reserve of degree-III gassiness after taking up the operation of degasification.
- (v) Presently coal exploration in India, is primarily carried out by coring drilling supported by geophysical method. 3-D High Resolution Seismic Survey (HRSS) technique is a powerful tool for rapid subsurface mapping. Introduction of DTH non-coring drilling with Borehole Imaging System (BIS) as integral part of geophysical logging shall speed up exploration.
- (vi) Indian coal seams with high degree of gassiness (Degree III & II) occurring particularly on the central portion are the potential source of BCM. CIL is looking for suitable technology/service provider in the new technology areas under

CBM/CMM for commercial development. The identified blocks are proposed to e-awarded through competitive bidding German companies may like to participate in the above tendering process.

2. SCCL Board during its meeting held on 4.9.2006 approved the proposal for under taking Technical Studies in association with CSIRO, Australia and SCCL have signed collaborative Research Agreement during January, 2007. Accordingly CSIRO, Australia took up the following Collaborative Research Projects and the Status of the same is as follows:
 - i) Thick Coal Seam Extraction –CSIRO completed the Project and submitted final Report during June, 2012.
 - ii) Mine Fires Prevention and Control – CSIRO completed the Project and submitted final report during May 2012.
 - iii) Stability analysis and Design Optimization of OB Dumps and Deep Opencast Mines at SCCL – Under Progress.
3. A draft Memorandum of Understanding between CMPDIL and CSIRO has been

finalized and is awaiting signing by both the sides.

11.8 GERMANY

The following areas of cooperation in the coal sector has been suggested from the Ministry for the proposed visit by Minister of External Affairs to Germany.

1. Extraction of deep seated lignite seams

The lignite seams occurring at deeper depths could not be exploited through conventional mining, as it has limitation up to 150 meters. Hence alternate mining technology like Under Ground Gasification or extraction of coal bed methane is proposed to harness the energy resources. Assistance is required in the following field:

- (i) Exploration and estimation of gas in place (GIP)
- (ii) Methods to extract methane from coal/lignite
- (iii) Expertise in Underground Gasification technology.

2. Extraction of thick and steeper dipping coal seams

Mining of deep seated coal reserve of degree-III gassiness after taking up the operation of degasification.

3. Exploration/ Sub-surface mapping

Presently coal exploration in India, is primarily carried out by coring drilling supported by geophysical method. 3-D High Resolution Seismic Survey (HRSS) technique is a powerful tool for rapid subsurface mapping. Introduction of DTH non-coring drilling with Bore hole Imaging System (BIS) as integral part of geophysical logging shall speed up exploration.

4. Coal Mine Methane

Indian coal seams with high degree of gassiness (Degree_III& II) occurring particularly on the central portion are the potential source of BCM. CIL is looking for suitable technology/service provider in the new technology areas under CBM/CMM for commercial development. The identified blocks are proposed to e-awarded through competitive bidding German companies may like to participate in the above tendering process.

11.9 USA

The Indo -US Coal Working Group has been actively functioning since July, 2005 and several activities have been undertaken in different areas of interest. A few meetings of the Indo-US Coal Working Group (CWG) on Coal have also taken place and progress in respect of activities under Indo-US Coal Working Group is

being reviewed from time to time in the Planning Commission as well as in Ministry of External Affairs. The 7th meeting of the Indo-US Coal Working Group was held on 24.3.2011 in India. The 8th Indo-US Coal Working Group meeting was held on 26.9.2012 at Washington DC.

A number of areas have been identified for cooperation and include development of coal beneficiation simulators, fine coal beneficiation, capacity building, in remote sensing UCG, CMM/CBM clearing house, 3D seismic survey, moisture removal form lignite, planning of large OC mines, mine rehabilitation and reclamation etc.

11.10 MALAYSIA

Some of the upcoming projects in ECL in collaboration with Malaysia are:

- a) Kotadih Continuous Miner (capacity 0.51+0.09=MT)
- b) Bansra Continuous Miner (New Project).
- c) Haripur Continuous Miner (New Project) (estimated capacity 0.51+0.09=0.60 MT).
- d) Madhaipur Extension (Low Height CM), (Rangamati B) (New Project).

11.11 INDONESIA

An MoU between the Ministry of Coal and the Ministry of Energy & Mineral

Resources of Govt. of Indonesia has been signed on 10.6.2010 on the establishment of the Working Group to cooperate in areas such as promotion of trade and investment in the coal sector, enhancing understanding of coal related energy issues, promotion of exchange of information on policies, programmes, and technologies etc. The 2nd meeting of the India-Indonesia Joint Working Group meeting was held in New Delhi on 24.11.2011. The broad areas of cooperation as discussed in the first meeting of the JWG were reiterated and the areas of interest from Indian side were emphasised.

11.12 KAZAKHSTAN

The 10th India-Kazakhstan Inter-Governmental Commission (IGC) on Trade, Economic, Scientific, Technological, Industrial and Cultural Cooperation was held at New Delhi during 8-9 January, 2013.

Both sides observed that there were good potential for cooperation under the Mining Sector and agreed to identify the specific areas that require each other's assistance.

Ministry of Coal proposed the following areas for Technical Cooperation for consideration of the Kazakhstan:

1. Exchange of Technology /information in mining equipment.
2. Clean Coal Technology:
 - i. Development of Underground Coal Gasification (UGC)
 - ii. Development of Coal Mine Methane (CMM).
3. Kazakhstan Companies may participate in the Global Bids being floated by Coal Companies of India for project development.
4. Kazakhstan side may indicate the opportunities for Indian Companies to acquire coal assets in Kazakhstan.
5. Capacity building and training of the technical manpower of coal industry.

11.13 UKRAINE

The 4th Session of the Indo-Ukrainian Inter-Governmental Commission on trade, economic, scientific, technological, industrial and cultural cooperation in Kyiv during 31st May-1st June, 2012. Although, there is no cooperation between India and Ukraine in the Coal related matters, however, Ukraine has rich coal deposits at Donetsk and India may explore the same.