

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 7th Indo-EU Working Group meeting was held on 9-11, July, 2012 in Leeds, UK where Indian side impressed upon EU side for taking up a study for extraction of steep seams particularly with reference to NE Coal fields. Thereafter the 8th Coal Working Group meeting was held in Chennai, India on 27-28, Nov, 2013 which reviewed the progress of the activities of the working group and 7th Indo-Energy Panel meeting was held in

Brussels, Belgium on 27/3/2014 to review the activities of various working groups under the panel.

11.2 REPUBLIC OF SOUTH AFRICA

1. The Working Group on Coal with South Africa was constituted in 2003. At present Secretary, Ministry of Coal is Co-Chair and there are four members including Chairman, CIL and Director General Mines Safety. The specific areas for cooperation identified by the Indian side include mechanization of Board and Pillar System of underground mining, beneficiation of Coal and technology of Conservation of Coal to Liquid (CTL), Hard Roof Management techniques, development of Coal Bed Methane, underground Coal gasification, identification of Coal blocks and 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.
2. 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), 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. A Memorandum of Understanding (MoU) is to be signed between the two countries to set up APO and ATO.

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 Indian and the METI Minister of Japan issued a joint statement to launch the Japan-India Energy Dialogue. A Joint Working Group on Coal is 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 Limited for the on-going 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 July, 2014. 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. The last Working Group meeting was held in August, 2013 in New Delhi.

Both sides expressed that it is important and beneficial to closely collaborate in the Coal sector such as the implementation of Coal washery technology, the promotion of high-efficiency use of low rank Coal and the implementation of communication system for the

purpose of securing safety in a Coal mine in order to meet the rapid increase in Coal demand, and promote sustainable economic growth taking environmental issues into consideration.

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 overburden slope stability
- Mining of deep seated multiple thin lignite seams
- Hydraulic equipment for roof bolting purposes
- Rapid exploration methods including 3-D HRSS geo physical 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 2nd meeting of the Working Group on modernisation and industrial co-operation under the India-Russia Inter-Governmental Commission on Trade, Economic, Scientific and Technological and Cultural co-operation was held on 2nd October, 2013 in Moscow (Russia). The discussion were held in a friendly atmosphere and the sides acknowledge their mutual interest in further expanding bilateral co-operation between Russian and Indian companies and organisations in the field of civil aviation, chemical and fertilizer industries, mining industries and other areas. The sides also discussed the prospects for co-operation concerning investments in various projects. The sides noted mutual interest in developing of the long term and mutually beneficial co-operation in the field of mining, ferrous and non-ferrous metallurgy and Coal industry. The Indian side

agreed to send information about the Indian companies that may participate in collaborating in spheres of mining with joint stock companies.

11.6 BELARUS

The bilateral cooperation in Coal has been taken up under India-Belarus Inter- Governmental Cooperation for Economic, Trade, Industrial, Scientific, and Technical & Cultural Cooperation. The last meeting of the IGC was held in July, 2013 in New Delhi under the co-chairmanship of Minister of State for Commerce & Industry, Govt. of India and Minister of Industry, Republic of Belarus. Both the co-chairs exchanged the interest of both the countries in the identified areas of cooperation. A protocol was signed by both the Ministers. The Belarus side expressed its keen interest in expanding of the cooperation between the company "Coal India Limited" and JSC "BELAZ" managing company of "BELAZ-Holding" in the supplies of mining equipment to India with the participation of partner of "BELAZ" – Managing Company of "BELAZ-HOLDING" in India.

The Indian side proposed cooperation with Heavy Engineering

Corporation Limited (HEC), a Government company manufacturing heavy machinery in the field of mining equipment. Additional details on the areas and directions of cooperation will be provided by the Indian side.

The Belarusian side is interested in creation of Joint ventures to produce Belarusian automobile and agricultural machinery in India. The Belarusian side solicits to render assistance in the search of concerned Indian companies to set up joint ventures with the Minsk Automobile Plant and Minsk Tractor Plant.

11.7 AUSTRALIA

1. The 8th meeting of Indo-Australia joint working group on energy and minerals was held with the following agenda item -
 - (i) Exploration and estimation of gas in place (GIP)
 - (ii) Methods to extract methane from Coal/lignite
 - (iii) Expertise in Underg-round 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 be 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 was presented in February, 2012 for signing between the countries. In the Joint working group meeting held on 11-12 June, 2013 in New Delhi, a Memorandum of Understanding (MoU) between CMPDIL and CSIRO was also signed for further scientific cooperation between both the countries on 12th June, 2013.

4. A delegation led by Deputy Chairman, Planning Commission alongwith officers of Ministry of Petroleum & Natural Gas and Coal participated at India-Australia Energy Security Dialogue from 31st March to 1st April, 2014 at Brisbane, Australia to enhance bilateral cooperation and the energy security.

11.8 GERMANY

The following areas of cooperation in the Coal sector has been suggested from the Ministry during 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 Under-ground 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 Bohrhole 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 II

& III) 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 Coa 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. Ukraine has rich Coal deposits at Donetsk and India may explore areas of mutual interest in developing in these deposits.