

## COAL EXPLORATION & RESOURCES

### 3.1 INTRODUCTION

Exploration for coal in the country is carried out in two broad stages i.e. the Regional Exploration and Detailed Exploration. The regional exploration for coal is carried out by the Government organizations whereas detailed exploration is largely undertaken by coal companies.

#### 3.1.1 Regional and Promotional Exploration

In the first stage of exploration, Geological Survey of India (GSI, under Ministry of Mines) undertakes Regional Exploration of large areas to find out the broad availability of coal seams, geological structure, resource etc. on a systematic routine basis. In order to supplement and augment the efforts of the GSI, Ministry of Coal (MoC) is also undertaking regional exploration of coal on promotional basis. A central sector scheme of Promotional Exploration of Coal and Lignite has been introduced in 1989 and is continuing on plan-to-plan basis through Mineral Exploration Corporation (MECL), GSI, State Govts. and CMPDI. DGM (Nagaland & Assam) has also been inducted in

the scheme. The reconstituted Committee-V (on Energy Minerals & Resources) of Central Geological Programming Board approves the programmes, coordinates and reviews the work. CMPDI acts as a nodal agency for disbursement of funds for Promotional Exploration besides carrying out technical supervision of MECL's work in coal sector. The Promotional Exploration programme for XII plan has proposed to undertake 8.14 lakh metre of drilling (4.80 lakh metre in coal and 3.34 lakh metre in lignite) along with sub-components of creation of coal & lignite information system and CBM studies.

#### 3.1.2 Detailed Exploration:

In the second stage, Detailed Exploration is carried out in potential areas identified through Regional/Promotional Exploration. Such blocks are taken up for detailed drilling and geological assessment to bring the reserves into Proved category to increase the confidence level. The Geological Reports of such detailed exploration form the basis of Mine Feasibility Studies/Mining Plans and

formulation of Project Reports for mining and updation of National Coal Inventory. Detailed exploration in areas of coal PSUs is funded by respective companies whereas some of the Captive Mining block allocatees are also funding detailed drilling in blocks allotted to them. In addition, the MoC's Plan scheme of Detailed Drilling in Non-CIL/Captive Mining Blocks aims at covering exploration of coal blocks in order to reduce time lag between allotment and development of blocks. The scheme is continuing on plan-to-plan basis. The proposed

outlay for undertaking 20.13 lakh metre of drilling in non-CIL/Captive blocks through CMPDI and outsourcing during XII plan is ₹ 974.69 crore.

### 3.1.3 Guidelines for conducting Detailed Exploration of captive coal blocks by the block allottees:

All regionally explored/unexplored coal blocks already allotted or to be allotted can be taken up for detailed exploration by the allottees on their own as per these guidelines of Ministry of Coal.



Modern opencast mining machine, In-Pit Coal Crusher in operation at Piparwar OCP

### 3.2 EXPLORATION ACTIVITIES IN 2012-13

#### 3.2.1 Promotional Exploration:

A total of 1,11,000 metre of Promotional drilling has been targeted in 2012-13. As against these targets, a total of 77,152 metre of promotional drilling has been carried out during the period April to December 2012 covering 14 coal and 12 lignite blocks. It is projected that about 36,000 metre of additional drilling would be achieved during the period Jan. - March, 2013.

3.2.2 About 62,800 metre of multi-probe Geophysical Logging has been carried out during the period April to December 2012. It is projected that about 18,000 metre of additional logging would be achieved during the period Jan. - March, 2013. A total of 12 Geological Reports on coal (8) and lignite (4) exploration have been submitted during April to Dec. '2012.

3.2.3 CMPDI and GSI have completed samples collection from five boreholes for CBM studies under the promotional exploration programme. The analysis of samples and preparation of report is under progress. It is projected that samples from seven more bore hole would be

collected during the period Jan.- March, 2013.

3.2.4 Under the project on creation of 'Integrated Coal Resource Information System (ICRIS)' design of database has been completed and the final report submitted to MoC and is accepted. During XII Plan, modelling of 249 zones is envisaged to be completed. During 2012-13, 25 nos. of geological models is expected to be completed by CMPDI and updated in the database. It is also proposed to upgrade the current hardware and software because of obsolescence and is to be completed by 2013-14 at all the data centres working at different locations.

Geological modelling of 3 zones by SCCL under ICRIS project has been completed and submitted for uploading in database during April to December '2012. 1 zone model data will be completed and migrated into database by March'2013.

UNFC classification of reserves of 147 blocks has been done by NLC under 'Integrated Lignite Resource Information System (ILRIS)' project. The salient features of 65 blocks have been completed and 10 GRs uploaded in database.

**3.2.5 Detailed Drilling in Non-CIL Blocks:**

In 2012-13, a total of 1,74,900 metre of detailed drilling has been targeted in Non-CIL/Captive Mining blocks. Out of it, 52,900 metre is targeted for CMPDI (departmentally) and 1,22,000 metre through outsourcing. During the period April to Dec.'2012, a total of 1,51,346 metre of detailed drilling has been carried out in Non-CIL/Captive Mining blocks. Out of it, 49,520 metre has been drilled through departmental resources in eighteen blocks and 1,01,826 metre of drilling has been carried out through outsourcing in thirteen blocks. It is projected that about 45,000 metre of additional drilling would be achieved in Non-CIL /Captive Mining blocks during Jan. - March, 2013.

**3.2.6** CMPDI has decided to outsource eleven more blocks, involving 1.83 lakh metre of detailed drilling, through e-tendering. This includes six Non-CIL blocks involving 1.23 lakh metre of drilling. Work orders for six blocks have been issued and balance blocks are under process of approval. Existing norm of allowing upto 20 boreholes per 10 sq.km. is not sufficient for detailed drilling in forest area and needs to be revised.

**3.2.7 Coal Core Analysis Capacity Augmentation**

CIL Board has approved the proposal of CIMFR for expansion of capacity and a MoU has been signed by CMPDI, on behalf of CIL, with CSIR (Council of Scientific & Industrial Research) for "Quality evaluation of coal explored from different regions of India".

CIL has approved ₹ 19.31 crores for enhancement of capacity by CIMFR for coal core analysis of CIL blocks. ₹ 2.82 crores has already been released to CSIR/CIMFR for revenue expenditure.

**3.3 COAL RESOURCES****3.3.1 Inventory of Geological Resources of Coal in India**

As a result of exploration carried out up to the maximum depth of 1200m by the GSI, CMPDI, SCCL and MECL etc, a cumulative total of 293.50 Billion tonnes of Geological Resources of Coal have so far been estimated in the country as on 1.4.2012. The details of state-wise geological resources of coal are given as under:

State	Geological Resources of Coal (in MT)			
	Proved	Indicated	Inferred	Total
Andhra Pradesh	9566.61	9553.91	3034.34	22154.86
Arunachal Pradesh	31.23	40.11	18.89	90.23
Assam	464.78	45.51	3.02	513.31
Bihar	0.00	0.00	160.00	160.00
Chhattisgarh	13987.85	33448.25	3410.05	50846.15
Jharkhand	40163.22	33609.29	6583.69	80356.20
Madhya Pradesh	9308.70	12290.65	2776.91	24376.26
Maharashtra	5667.48	3104.40	2110.21	10882.09
Meghalaya	89.04	16.51	470.93	576.48
Nagaland	8.76	0.00	306.65	315.41
Odisha	25547.66	36465.97	9433.78	71447.41
Sikkim	0.00	58.25	42.98	101.23
Uttar Pradesh	884.04	177.76	0.00	1061.80
West Bengal	12425.44	13358.24	4832.04	30615.72
<b>Total</b>	<b>118144.82</b>	<b>142168.85</b>	<b>33183.48</b>	<b>293497.15</b>

### 3.3.2 Categorization of Resources

The coal resources of India are available in older Gondwana Formations of peninsular India and younger Tertiary formations of north-eastern region. Based on the results of Regional/ Promotional Exploration, where the boreholes are normally placed 1-2 Km apart, the resources are

classified into 'Indicated' or 'Inferred' category. Subsequent Detailed Exploration in selected blocks, where boreholes are less than 400 meter apart, upgrades the resources into more reliable 'Proved' category. The Formation-wise and Category-wise coal resources of India as on 1.4.2012 are given in table below:

(in Million Tonnes)

Formation	Proved	Indicated	Inferred	Total
Gondwana Coals	117551	142070	32384	292004
Tertiary Coals	594	99	799	1493
<b>Total</b>	<b>118145</b>	<b>142169</b>	<b>33,183</b>	<b>293497</b>

**3.3.3 The Type and Category-wise coal resources of India as on 1.4.2012 are given in table below:**

(in Million Tonnes)

Type of Coal	Proved	Indicated	Inferred	Total
<b>(A) Coking :-</b>				
-Prime Coking	4614	699	0	5313
-Medium Coking	12837	11952	1880	26669
-Semi-Coking	482	1003	222	1707
<b>Sub-Total Coking</b>	<b>17933</b>	<b>13654</b>	<b>2102</b>	<b>33689</b>
<b>(B) Non-Coking:-</b>	<b>99618</b>	<b>128416</b>	<b>30282</b>	<b>258316</b>
<b>(C) Tertiary Coal</b>	<b>594</b>	<b>99</b>	<b>800</b>	<b>1493</b>
<b>Grand Total</b>	<b>118145</b>	<b>142169</b>	<b>33183</b>	<b>293497</b>

**3.3.4 Status of Coal Resources in India during Last 5 years**

As a result of Regional, Promotional and detailed Exploration by GSI, CMPDI, SCCL, MECL, State Govts.

etc., the estimation of coal resources in India reached to 293.50 billion tones. The increase/upgradation of coal resources in the country during last 5 years is furnished in table below:

(in Million Tonnes)

As on	Geological Resources of Coal			
	Proved	Indicated	Inferred	Total
1.1.2008	101829	124216	38490	264535
1.1.2009	105820	123470	37920	267210
1.1.2010	109798	130654	36358	276810
1.1.2011	114002	137471	34390	285862
1.1.2012	118145	142169	33183	293497

**3.4 LIGNITE RESERVES IN INDIA**

Lignite reserves in India have been currently estimated at around

41962.79 million tonnes. The State-wise distribution of lignite reserves as on 1.4.2012 is as follows

State	Area		Geological Reserves (M.T.)
Tamilnadu & Puducherry	A. (i)	Neyveli Region	4150.00
	(ii)	Jayamkondacholapuram	1206.73
	(iii)	Eastern part of Neyveli	562.32
	(iv)	Veeranam	1342.45
	(v)	Others	987.82
	(vi)	Pondy (Bahur)	416.61
	B.	Mannargudi lignite field	24202.34
	C.	Ramanthapuram	1426.47
	Total	34294.74	
Rajasthan			4907.01
Gujarat			2722.05
Jammu & Kashmir			27.55
Kerala			9.65
West Bengal			1.79
Total			41962.79