

## 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 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 XI plan envisages to undertake 7.50 lakh metre of drilling (4.0 lakh metre in coal and 3.5 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. It is envisaged to undertake 13.50 lakh metre of drilling in Non-CIL blocks during the XI Plan through CMPDI as well as through outsourcing.

#### 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. The detailed guidelines are available in the website of Ministry of Coal.



Heavy blasting before coal extraction, in an opencast coal mine

### 3.2 EXPLORATION ACTIVITIES IN 2011-12

#### 3.2.1 Promotional Exploration:

A total of 1,33,800 metre of Promotional drilling has been targeted in 2011-12. As against these targets, a total of 67,361 metre of promotional drilling has been carried out during the period April to December 2011 covering 16 coal and 10 lignite blocks. It is projected that about 24,000 metre of additional drilling would be achieved during the period Jan. - March, 2012.

3.2.2 About 37% boreholes drilled for promotional exploration have been logged geophysically and a total of 50,341 metre of multi-probe Geophysical Logging has been carried out during the period April to December 2011. It is projected that about 15,000 metre of additional logging would be achieved during the period Jan. - March, 2012. A total of 11 Geological Reports on coal (6) and lignite (5) exploration have been submitted during April to December 11. One Remote Sensing study report has also been submitted during the referred period.

3.2.3 CMPDI and GSI have completed samples collection from nine 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 one more borehole would be collected during the period January - March, 2012.

3.2.4 Under the project on creation of 'Integrated Coal Resource Information System (ICRIS)' by CMPDI, designing and integration of database has been completed during April to December 2011. Out of 249 zones, 10 zones model data has been completed and migrated into database. Geological modelling of 1 block by SCCL under ICRIS project has been completed during April to December 2011. Out of 59 zones, 1 zones model data has been completed and migrated into database. For similar project on creation of 'Integrated Lignite Resource Information System (ILRIS)' by NLC, Geological modelling of 9 blocks has been completed during April to December 2011. Uploading of 11 model data

has been completed and migrated into database.

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

In 2011-12, a total of 1,96,000 metre of detailed drilling has been targeted in Non-CIL/Captive Mining blocks. Out of it, 56,000 metre is targeted for CMPDI (departmentally) and 1,40,000 metre through outsourcing. During the period April to Dec. '11, a total of 1,60,565 metre of detailed drilling has been carried out in Non-CIL/Captive Mining blocks. Out of it, 42,834 metre has been drilled through departmental resources in seven blocks and 1,17,731 metre of drilling has been carried out through outsourcing in ten blocks. It is projected that about 50,000 metre of additional drilling would be achieved in Non-CIL blocks during Jan.-March, 2012.

**3.2.6** CMPDI has decided to outsource seven more blocks, involving 4.37 lakh metre of detailed drilling, through open tendering. This includes four Non-CIL blocks involving 3.07 lakh metre of drilling. Bids have been received after re-tendering and tender is under finalization.

### 3.2.7 Coal Core Analysis Capacity Augmentation:

The scheme for expansion of coal core

analysis capacity of Central Institute of Mining & Fuel Research (CIMFR) labs through CIL funding with revenue sharing was approved by the Govt. Various meetings have been held and draft expansion proposals discussed. The proposal was sent to Coal India Board for approval. CIL Board has approved the proposal of CIMFR on 12.11.2011 in the 274th CIL Board meeting. MoU between CMPDI (on behalf of Coal India Ltd.) and CSIR for "Quality Evaluation of coal explored from different regions of India" has been signed at CMPDI, Ranchi on 03.12.2011.

## 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 285.86 Billion tonnes of Geological Resources of Coal have so far been estimated in the country as on 1.4.2011. The details of state-wise geological resources of coal are given as under:

(in Million Tonnes)

State	Geological Resources of Coal			
	Proved	Indicated	Inferred	Total
Andhra Pradesh	9297	9728	3029	22055
Arunachal Pradesh	31	40	19	90
Assam	465	46	3	513
Bihar	0	0	160	160
Chhattisgarh	12879	32390	4011	49280
Jharkhand	39761	32592	6584	78936
Madhya Pradesh	8871	12192	2063	23126
Maharashtra	5490	3094	1950	10533
Meghalaya	89	17	471	576
Nagaland	9	0	307	315
Orissa	24492	33987	10680	69159
Sikkim	0	58	43	101
Uttar Pradesh	866	196	0	1062
West Bengal	11753	13132	5071	29955
Total	114002	137471	34390	285862

(Source: Geological Survey of India)

The next inventory of coal resources would be prepared in April 2012 and would be available on 1st May 2012.

### 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 1.4.2011 are given in table below:

(in Million Tonnes)

Formation	Proved	Indicated	Inferred	Total
Gondwana Coals	113408	137372	33590	284370
Tertiary Coals	594	99	800	1493
Total	114002	137471	34390	285862

3.3.3 The Type and Category-wise coal resources of India as on 1.4.2011 are given in table below:

(in Million Tonnes)

Type of Coal	Proved	Indicated	Inferred	Total
(A) Coking :-				
-Prime Coking	4614	699	0	5313
-Medium Coking	12573	12001	1880	26454
-Semi-Coking	482	1003	222	1707
Sub-Total Coking	17669	13703	2102	33474
(B) Non-Coking:-	95739	123638	31488	250895
(C) Tertiary Coal	594	99	800	1493
Grand Total	114002	137471	34390	285862

### 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 285.86 billion tonnes. 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
1.1.2007	97920	118992	38260	255172
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

**3.4 LIGNITE RESERVES IN INDIA**

The state wise and depth wise geological

lignite resource as on 01-04-2011 of the country is given below:

( In Million Tonnes)

States	Depth	Proved	Indicated	Inferred	Total
Pondicherry	0-150	0.00	405.61	11.00	416.61
Tamil Nadu	0-150	3735.23	1115.65	1084.64	5935.52
	150-300	0.00	7513.43	690.10	8203.53
	>300	0.00	14270.97	4482.90	18753.87
	<b>Total</b>	<b>3735.23</b>	<b>22900.05</b>	<b>6257.64</b>	<b>32892.92</b>
Rajasthan	0-150	982.52	399.51	443.59	1825.62
	150-300	184.44	1748.51	1007.93	2940.88
	>300	0.00	0.70	68.09	68.79
	<b>Total</b>	<b>1166.96</b>	<b>2148.72</b>	<b>1519.61</b>	<b>4835.29</b>
Gujarat	0-150	540.68	121.68	45.36	707.72
	150-300	702.97	197.02	1114.34	2014.33
	>300	0.00	0.00	0.00	0.00
	<b>Total</b>	<b>1243.65</b>	<b>318.70</b>	<b>1159.70</b>	<b>2722.05</b>
J&K	0-150	0.00	20.25	7.30	27.55
Kerala	0-150	0.00	0.00	9.65	9.65
West Bengal	0-150	0.00	0.29	0.86	1.15
	150-300	0.00	0.64	0.00	0.64
	<b>Total</b>	<b>0.00</b>	<b>0.93</b>	<b>0.86</b>	<b>1.79</b>
Grand Total	0-150	5258.42	2062.99	1602.40	8923.81
	150-300	887.41	9459.60	2812.37	13159.38
	>300	0.00	14271.67	4550.99	18822.66
	<b>Total</b>	<b>6145.83</b>	<b>25794.26</b>	<b>8965.76</b>	<b>40905.85</b>