



# PROMOTIONAL AND DETAILED EXPLORATION



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## 1. Promotional Exploration

Mineral Exploration Corporation Limited (MECL), State Governments and CMPDI are conducting Promotional Exploration under the Ministry of Coal's Plan scheme of "Promotional Exploration for Coal & Lignite". The summary of Promotional Drilling carried out in coal & lignite during the period 2017-18, 2018-19 and 2019-20, 2020-21, Jan'21-Nov'21 (provisional), Apr'21-Nov'21 (provisional) and Dec'21-Mar'22 (Projected) is given below:

(Drilling in Metre)

Command Area	2017-18 Actual	2018-19 Actual	2019-20 Actual	2020-21 Actual	Jan'21- Nov'21 (Provisional)	2021-22 (Apr'21- Nov'21) Provisional	2021-22 Dec'21-Mar'22 (Projected)
Drilling in CIL Command Area	92787	91238	70973	111735	166401	105224	33000
Drilling in SCCL Command Area	0	4747	11210	291	0	0	0
Drilling in Lignite Areas	41894	43023	33497	22852	65406	10341	1700
<b>Total</b>	<b>134681</b>	<b>139008</b>	<b>115680</b>	<b>134878</b>	<b>231807</b>	<b>115565</b>	<b>34700</b>
<b>Growth %</b>	<b>28%</b>	<b>3%</b>	<b>-17%</b>	<b>17%</b>			

\*Achievement of target depends upon timely availability of forest clearance to take up drilling in forest areas & favourable law & order condition.

## 2. Detailed Drilling in Non-CIL Blocks

CMPDI carries out Detailed Exploration in CIL and Non-CIL blocks as per strict timelines to bring resources falling in **indicated** and **inferred** category into the **measured** (proven) category. The exploratory drilling in non-CIL/captive Mining blocks is taken up under the Ministry of Coal's Plan scheme of "Detailed Drilling in Non-CIL Blocks".

The details of actual drilling in Non-CIL/Captive Mining Blocks during the period 2017-18, 2018-19 and 2019-20, 2020-21, Jan'21-Nov'21 (provisional), Apr'21-Nov'21 (provisional) and Dec'21-Mar'22 (Projected) is given below:

*(Drilling in Metre)*

Command Area	2017-18 Actual	2018-19 Actual	2019-20 Actual	2020-21 Actual	Jan'21- Nov'21 (Provisional)	2021-22 (Apr'21- Nov'21) Provisional	2021-22 Dec'21- Mar'22 (Projected)
CMPDI (Departmental)	113228	140683	231352	46249	110515	46249	38000
Outsourcing by CMPDI	372661	342926	464806	92782	247166	92447	14000
<b>Total</b>	<b>485889</b>	<b>483609</b>	<b>696158</b>	<b>139031</b>	<b>357681</b>	<b>138726</b>	<b>52000</b>
<b>Growth %</b>	<b>57%</b>	<b>0%</b>	<b>44%</b>	<b>-80%</b>			

CMPDI has substantially improved its capacity of drilling during the XI & XII plan period. As against the achievement of 2.09 lakh metre in 2007-08, CMPDI achieved 4.98 lakh metre in 2011-12, 13.60 lakh metre in 2018-19 and 12.94 lakh metre in 2019-20 and 12.84 lakh metre in 2020-21, 4.29 lakh metre in 2021-22 (Apr'21 to Nov'21) and 3.21 lakh metre projected for Dec'21 to Mar'22 through Departmental resources and outsourcing. For capacity expansion through modernization of departmental drills, 39 new Mechanical drills & 26 Hydrostatic drills have been procured since 2008-09, out of which 15 have been deployed as additional drills and 33 as replacement drills. CMPDI has also replaced 38 mud pumps and 74 trucks in last nine years.

To meet the increased work load, recruitment has been taken up through campus interviews/open examinations. 259 Geologists, 34 Geo-physicists and 20 Mechanical Engineers as drilling Engineers have joined CMPDI since 2008-09. About 1240 non-executive staffs have also been inducted for exploration work. Out of this, 45 Geologists, 7 Geo-physicists, 5 Mechanical Engineers & 14 non-executives have resigned.

During 2021-22 (April'21 to November'21), a total of about 2.13 lakh metre drilling was carried out through Departmental resources. About 2.15 lakh metre drilling was carried out through outsourcing,

out of which 1.56 lakh metre drilling was carried out through tendering & 0.59 lakh metre drilling through MoU with MECL.

### 3. Drilling Performance in 2021-22

CMPDI deployed its departmental resources for detailed exploration of CIL/Non-CIL blocks, whereas, State Govt. of Odisha deployed resources in CIL blocks only. In addition, MECL and 7 contractual agencies have also deployed resources for detailed drilling/exploration in CIL/Non-CIL blocks. A total of 100 to 120 drills were deployed in 2021-22, out of which, 69 were departmental drills.

Apart from the above, CMPDI continued the technical supervision of Promotional (Regional) Exploration work undertaken by MECL in coal Sector in 5 blocks, DGM (Nagaland) in 2 block & Outsourced Agencies in 7 blocks. CMPDI has also taken up promotional drilling in 6 blocks. Promotional Exploration work was undertaken by MECL in Lignite Sector in 3 blocks. A total of about 1.15 lakh metre of Promotional (Regional) drilling was carried out in Coal (1.05 lakh metre) & Lignite (0.10 lakh metre) during 2021-22 (April'21 to November'21).

In 2021-22, CMPDI and its contractual agencies took up exploratory drilling in 113 blocks/Mines of 24 coalfields situated in 11 States. Out of 113 blocks/mines, Departmental drills of CMPDI took up

exploratory drilling in 68 blocks/mines, whereas, contractual agencies took up exploratory drilling in 45 blocks.

The overall performance of exploratory drilling during 2021-22 (upto Nov.'21) is given below:

Agency	ACHIEVEMENT DURING APR'21-NOV'21 (Provisional)			Achieved Apr'20- Nov'20	Growth (%)
	Target	Achiev.	Achiev. (%)		
<b>Detailed Drilling undertaken by CMPDI:</b>					
<b>I. Departmental (CIL, Consultancy &amp; Non-CIL)</b>	<b>2.701</b>	<b>2.135</b>	<b>79%</b>	<b>2.343</b>	-9%
St. Govts. (CIL)	0.012	0.003	27%	0.001	
MECL-MOU (CIL/Non-CIL)	0.425	0.590	139%	2.906	-80%
Tendering (CIL/Non-CIL)	1.415	1.564	111%	1.460	7%
<b>Sub-Total Outsourcing:</b>	<b>1.852</b>	<b>2.157</b>	<b>116%</b>	<b>4.368</b>	-51%
<b>Grand Total</b>	<b>4.553</b>	<b>4.292</b>	<b>94%</b>	<b>6.710</b>	-36%
<b>Promotional Drilling by MECL, GSI, DGM (Nagaland) &amp; DGM (Assam)</b>					
<b>I. COAL SECTOR</b>					
MECL	0.143	0.188	131%	0.328	-43%
DGM(Nagaland)	0.012	0.011	95%	0.006	87%
DGM (Assam)	0.000	0.000	0%	0.000	
CMPDI	0.775	0.853	110%	0.065	
<b>Total COAL</b>	<b>0.930</b>	<b>1.052</b>	<b>113%</b>	<b>0.399</b>	<b>163%</b>
<b>II. LIGNITE SECTOR</b>					
MECL	0.074	0.103	140%	0.128	-19%
<b>Grand Total</b>	<b>1.004</b>	<b>1.155</b>	<b>115%</b>	<b>0.527</b>	<b>119%</b>

In 2021-22 (up to Nov'21), CMPDI achieved 94% of its overall drilling targets. The negative growth is mainly due to premature closure of drilling in 24 blocks by MoC due to reduction of fund which required shifting & re-organization of drills affecting drilling achievements. The major local issue at Talcher & Khosla Camps of RI-VII, Odisha, where 7 rigs are idle since 30<sup>th</sup> Oct'21 (till date) also affected drilling. In addition to this, achievement was affected due to COVID-19 lockdown, sporadic outbreak of COVID-19, containment zone, non-availability of

spares & repairing work in nearby operation area, unseasonal heavy rains etc.

#### 4. Progress of 2D & 3D seismic survey

CMPDI has taken up 2D/3D seismic survey and data acquisition with depth range up to about 1000 metre. During 2020-21, work order was issued for 10 blocks for carrying out exploration with 2 boreholes per sq km coupled with 2D/3D seismic survey. In 2002-21, 295.37 line km of survey was achieved. In 2021-22, about 558.10 line km of 2D/3D seismic

survey was carried out, departmentally & through outsourcing up to Nov'21 against the target of 310 line km which is 180% of the cumulative target.

### 5. Geological Reports

In 2021-22 (up to Nov'21), 9 Geological Reports have been prepared on the basis of detailed exploration conducted in previous years involving **4.63 Billion Tonnes** of Measured (Proven) coal resources category. About 18 GRs are expected to be submitted during Dec'21-Mar'22 with estimated resource of about 5 billion tonnes.

### 6. Geophysical Studies

#### (a) Other Geophysical work

In 2020-21, 2.01 lakh metre of geophysical logging was achieved against a target of 1.57 lakh metre. In 2021-22, 0.53 lakh meter of Geophysical logging has been carried out till Nov'21 departmentally especially for complimenting non-coring drilling. Integrated geophysical survey, Resistivity Imaging & 2D Seismic survey, is being employed for detection of void (if any) at the proposed site of new Sawang Washery, CCL. About 75.11 line km of Magnetic survey was also carried out.

### Hydrogeological Studies

Hydrogeological studies of 87 number of mining projects/mines were taken up for preparation of 'Groundwater Clearance Application' for CGWA approval. 10 nos. of Hydrogeological report were prepared for EIA / EMP Clearance. CMPDI is carrying out groundwater monitoring of MoEF&CC cleared projects (12 nos. of Clusters of ECL, 15 nos. of Cluster of mines of BCCL and 10 nos. of Projects of NCL). A total of 63 nos. of Hydrogeological studies on GR/PR/Piezometers have been completed and preparation of 14 nos. of Reports is in progress.

In outside consultancy, Hydrogeological studies for "Fly Ash disposal at Gorbi mines voids for NTPC, Vindhyachal, Singrauli" and Comprehensive

Hydrogeological Report for 06 nos. of mines of UCIL, Jaduguda for NoC from CGWA have been submitted.

### 7. Coal Resources

#### Inventory of Geological Resources of coal in India

As a result of exploration carried up to the maximum depth of 1200m by the GSI, CMPDI, SCCL and MECL, a cumulative total of 352.12 Billion tonnes of geological resources of coal have so far been estimated in the country as on 01.04.2021.

The details of State-wise geological resources of coal are given below:

#### Statewise Geological Resources of Coal in India

As on 01.04.2021

State	Resource
Jharkhand	86216.82
Odisha	84878.05
Chhattisgarh	73423.54
West Bengal	33092.14
Madhya Pradesh	30216.82
Telangana	22850.50
Maharashtra	12935.64
Bihar	3464.07
Andhra Pradesh	2247.22
Uttar Pradesh	1061.80
Meghalaya	576.48
Assam	525.01
Nagaland	446.42
Sikkim	101.23
Arunachal Pradesh	90.23
	<b>352125.97</b>

Note: Figure is provisional.

Source: Geological Survey of India's Inventory of Geological Resources of Indian Coal as on 1.4.2021. The inventory did not take into account the mined out reserves.

## 8. 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 metre apart, upgrades the resources into more reliable 'Proved' category.

The formation-wise and Category-wise coal resources (provisional) of India as on 1.4.2021 are given in table below:

(Resource in million tonne)

Depth Range (m)	Measured (331)	Indicated (332)	Inferred (333)		Total
			Exploration	Mapping	
<b>GONDWANA COAL</b>					
<b>Coking</b>					
0-300	8089.72	4282.29	54.73		12426.74
0-600	8398.96	5.58	0.00		8404.54
300-600	1361.12	5113.86	795.59		7269.84
600-1200	2319.52	3480.22	1198.87		6999.05
<b>0-1200</b>	<b>20169.03</b>	<b>12881.95</b>	<b>2049.19</b>		<b>35100.17</b>
<b>Non-coking</b>					
0-300	117062.79	58523.02	7629.89		183215.70
0-600	5657.14	444.86	0.00		6102.00
300-600	30756.59	60431.97	12305.54		103494.10
600-1200	2939.58	14546.07	5104.70		22590.35
<b>0-1200</b>	<b>156416.10</b>	<b>133945.92</b>	<b>25040.13</b>		<b>315402.15</b>
<b>TERTIARY COAL</b>					
<b>High Sulphur</b>					
0-300	407.96	105.02	158.75	749.92	1421.65
300-600	185.85	16.15	0.00	0.00	202.00
<b>0-600</b>	<b>593.81</b>	<b>121.17</b>	<b>158.75</b>	<b>749.92</b>	<b>1623.65</b>

Note: Figure is provisional.

Coking			SUMMARIZED TABLE				(Resource in million tonne)	
			Non coking			High Sulphur	Grand Total	
	Prime	Medium	Semi coking	Superior (G1-G6)	Inferior (G7-G17)			Ungraded
0-300	0.00	11959.97	466.77	21574.73	154011.07	7629.89	1421.65	197064.08
0-600	4058.28	4346.26	0.00	202.42	5899.58	0.00	0.00	14506.54
300-600	0.00	6511.70	758.14	13440.58	77747.99	12305.54	202.00	110965.95
600-1200	1254.78	5261.66	482.61	3129.86	14355.79	5104.70	0.00	29589.40
<b>0-1200</b>	<b>5313.06</b>	<b>28079.59</b>	<b>1707.52</b>	<b>38347.59</b>	<b>252014.43</b>	<b>25040.13</b>	<b>1623.65</b>	<b>352125.97</b>

Note: Figure is provisional.