

Black and Dirty

the real challenges facing India's coal sector



January 2013


Prayas Energy Group

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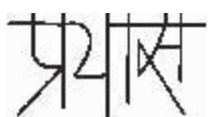
January 2013

Prayas Report

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About Prayas

Prayas (Initiatives in Health, Energy, Learning and Parenthood) is a non governmental, non-profit organization based in Pune, India. Members of Prayas are professionals working to protect and promote the public interest in general, and interests of the disadvantaged sections of the society, in particular. The Prayas Energy Group works on theoretical, conceptual regulatory and policy issues in the energy and electricity sectors. Our activities cover research and intervention in policy and regulatory areas, as well as training, awareness, and support to civil society groups. Prayas Energy Group has contributed in the energy sector policy development as part of several official committees constituted by Ministries and Planning Commission. Prayas is registered as SIRO (Scientific and Industrial Research Organization) with Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India.

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Executive Summary

Coal contributes over half of India's primary commercial energy. Though the share of renewable energy is gradually expected to increase in the coming years, coal is likely to remain India's most important source of energy for the coming decade or two. However, the sector has been beset with controversies of late such as the 'coal-gate' scam related to allocation of captive coal blocks and insufficient coal production leading to questions about who should bear the increased costs of coal imports. While these controversies have helped to bring media limelight on to the coal sector, they have not helped to identify the fundamental challenges that need to be addressed if the sector has to function healthily and promote the causes of energy access and energy security in India.

This report presents a broad overview of the coal sector with the objective of highlighting the key challenges to be overcome, and provides some suggestions on overcoming them. Some of the salient points revealed by the study are as follows:

Coal reserves: There is considerable uncertainty about the coal reserves of the country because of the estimation and classification methodology adopted by the Central Mine Planning and Design Institute (CMPDI). Adopting the modern United Nations Framework Classification (UNFC) methodology has resulted in significant downward corrections of extractable mineral reserves in other countries, and for other minerals even in India. Therefore, this is a serious concern as reserve estimates are the basis for planning the country's energy future.

Coal production: The demand supply gap for domestic coal has increased rapidly. In 2011-12, installed coal-based capacity increased by about 19% while domestic coal production went up by just over 1%, leading to a rapid increase of imports. Actual production in 2011-12 (540 million tons) was well short of even the target defined during the mid-term appraisal of the 11th five year plan (630 million tons) just three years ago indicating weaknesses in production planning.

Coal linkages: Coal linkages given to power plants are well in excess of possible increases in coal production. For example, by April 2011, linkages equivalent to about 270 million tons per annum (mtpa) had been

granted to new power plants, while the most optimistic production increase in the 11th five year plan was only about 250 mtpa. This is perhaps one reason for the spurt in coal based thermal power capacity without corresponding increase in coal production – leading to the current supply shortage. This indicates serious shortcomings in coordination across ministries. Moreover, lack of transparency in the process of granting linkages is another serious concern.

Human, labour and technology issues: India has a fairly low productivity per person-shift among coal producing countries, with productivity in South Africa, China, United States of America and Australia being at least twice the Indian productivity. Though these numbers are not directly comparable across countries, they suggest that there is room for improvement in human and technical resource capacity of Coal India Ltd. (CIL) and other coal mining companies. The very low productivity from underground mining, in spite of repeated official statements indicating its desirability, is particularly puzzling.

Labour health and safety issues do not seem to receive sufficient attention, as indicated by an increase in fatalities per 1000 person between 2007 and 2010. The situation is understood to be even worse for contract labour.

Environmental and social issues: Environmental compliance of Indian coal mines is very poor, indicating severe weaknesses in the environmental monitoring mechanisms. Air pollution levels in areas close to coal mines almost invariably exceed the permitted levels significantly and are often more than twice the permitted levels. Water quality levels are equally poor. Additionally, mining often involves displacement of people and loss of livelihoods; and evidence suggests that there are many problems in the resettlement and rehabilitation (R&R) process of the displaced people. Such environmentally and socially weak mining practices naturally lead to increasing resistance to mining among local population.

Inter-agency coordination: In addition to the issue of excess linkages granted, there are other issues that require coordination across ministries and agencies such as granting clearances, developing evacuation

infrastructure and estimating demand across various sectors. Persistent problems with all these processes indicate weaknesses in inter-agency coordination mechanisms, causing a ripple effect on the entire sector.

Market structure: CIL is practically a monopoly supplier of domestic coal in India. Many factors such as one-sided fuel supply agreements, lack of effective grievance redressal mechanisms for consumers, increasing complaints from power producers about quality and quantity of coal received, and increasing profitability of CIL despite no significant productivity increases suggest that CIL is taking undue advantage of its dominant position.

Further analysis of the issues listed above leads to the conclusion that the fundamental challenges faced by the Indian coal sector are weaknesses in

- a) accountability mechanisms
- b) planning and execution
- c) transparency mechanisms
- d) monitoring and oversight
- e) mitigating environmental, health, safety and livelihood impacts
- f) dealing effectively with law and order issues and
- g) coordination between multiple agencies

These findings reveal that there is no single silver bullet to address all the challenges faced by the sector.

Moreover, addressing only few of the challenges listed above will not be sufficient to improve the sector's health. Instead, a comprehensive, multi-pronged approach involving all stakeholders is required to address the sector's problems effectively.

The report concludes with a few suggestions – some of which have been made before in other reports – of such a multi-pronged approach. It begins with some suggestions to deal with the current crisis, with the starting point being an acceptance that there are no easy solutions to the current supply shortage brought on primarily by a planning coordination failure between the power and coal sectors. Other suggestions to deal with the current crisis include rationalizing coal linkages, suspending or minimizing e-auctions until the shortage is addressed, exploring the possibility of augmenting coal production in the short term and ensuring that the country does not get locked into expensive long term import contracts to address the short term shortage.

To address the larger challenges identified, a wider set of suggestions are provided ranging from very specific to fairly broad suggestions. Specific suggestions include urgently clarifying India's true coal reserve position, separating CMPDI from CIL, and identifying and closing old and unviable mines. The broader suggestions include mechanisms for better R&R, time-bound capacity improvement of agencies such as CIL, Coal Controller's Organization and Ministry of Environment and Forests, improved transparency and public participation, addressing the monopolistic market structure and appointing an independent regulator for the sector.

It is hoped that this report will contribute to a more informed debate about the fundamental challenges before the Indian coal sector and initiatives needed to address them.



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1 Introduction

Coal is India's most important source of energy, and it is likely to remain so for the foreseeable future. It supplied about 53% of the primary commercial energy in India in 2011 and is expected to supply about 47% of primary commercial energy in 2031-32 even in the least coal usage scenario of the Integrated Energy Policy (IEP)(BP, 2012; Planning Commission, 2006a).

The coal sector is also critical to India from an energy security point of view as official numbers suggest that India has significant coal resources while being generally poor in other hydrocarbons (National Statistical Organization, 2012). In particular, the coal sector is important for the power sector in the country, given that about 76% of coal consumed in the country is used by the power sector and that 67% of the electricity generated comes from coal (CCO, 2011; CEA, 2012b). This is reinforced by the increasing resistance to large hydro-electric and nuclear projects, and falling domestic production of natural gas.

It is obvious that effective management and efficient utilization of the country's coal resources are clearly important to the future of the country. Efficient harnessing and use of the coal reserves in the country is also critical if India has to meet its development objectives while minimizing local and global environmental impacts.

In the recent past, India's coal sector has received a lot of media attention highlighting various problems faced by the sector such as:

1. Captive block allocation: Recent discourse has been dominated by the so-called 'coal-gate' scam which has allegedly resulted in undue financial gains of about Rs. 1.86 lakh crores to private sector allocatees because of non-transparent and discretionary allocation of captive coal blocks (CAG, 2012, p. 30).
2. Coal supply: There was a bigger-than-usual shortage of coal supply to power plants in early 2012 leading to power producers seeking the intervention of the Prime Minister's Office (PMO) to address the issue. This resulted in a presidential directive being issued to Coal India Ltd. (CIL) asking it to enter into legally binding Fuel Supply Agreements (FSAs) with power

producers (PMO, 2012). However, the FSA as initially proposed by CIL was very one-sided with a miniscule penalty of 0.01% for any supply shortfall below 80% of the annual contracted quantity (ACQ) (CIL, 2012, p.14)¹.

3. Pass through of imported coal costs: A shortage in domestic coal supply has also led to increased usage of imported coal in power generation, which in turn, has led to debates about whether the increased costs of such power generation should be passed on to consumers (PTI, 2011; Chitnis & Dixit, 2011).
4. Pricing: CIL, which produces 81% of Indian coal, revised coal prices upward in January 2012 while moving to Gross Calorific Value (GCV) pricing (CIL, 2012a). This resulted in a price shock to consumers and the price had to be partially rolled back following protests from them (CIL, 2012b). Meanwhile, The Children's Investment Fund (TCIF), a minority shareholder of CIL has threatened to sue the Board of Directors of CIL for ignoring minority shareholder interests by keeping its prices too low (The Children Investment Fund, 2012).

These controversies have served to shine the limelight on the coal sector and confirm that the sector suffers from some serious deficiencies. However the current discourse has not helped to identify the fundamental challenges faced by the sector. We believe that there is an urgent need to identify and address the challenges faced by the sector, since coal is a key input to addressing the energy poverty in the country, coal imports are rapidly increasing and coal mines and coal-based power plants have long lock-in periods. Though the role of coal in the energy basket is expected to decline in the medium to long term due to resource and environmental challenges, its effective harnessing will help in minimizing its impact on the environment in the near to medium term.

The objective of this report is to present a broad overview of the Indian coal sector by considering its various facets such as the governance institutions, producing companies, consuming industries, evacuation infrastructure and socio-environmental impacts. Based on our analysis, we highlight a set of key

1 Following intense pressure and negotiations, CIL is likely to agree to sign FSAs with greater penalties for not meeting contractual obligations, though the issue of importing coal to meet the shortfall is yet to be resolved (CIL, 2012f).

challenges that need to be overcome for the coal sector to contribute effectively to India's development. We also suggest some steps to overcome some of these challenges. It is hoped that the findings in this report and the suggestions given in it will lead to a healthy debate on reforming the sector in the interest of the health of the country's energy sector and larger economy.

2 The coal sector in India

Coal mining in India dates back to 1744, when coal was first mined in the Raniganj coalfield in West Bengal. As the demand for coal increased after independence, the coal industry could not put in the necessary investments to ramp up production, and production stalled at around 70 million tons per annum (mtpa) in the late 1960s. It was also felt that the coal industry did not pay sufficient heed to safety and health of employees, and adopted mining practices that were not sustainable or safe. This led to the nationalization of the coal industry through the Coal Mines (Nationalization) Act, 1973 and the formation of CIL. CIL is a holding company for nine subsidiaries, eight of which are coal mining companies and one, Central Mine Planning and Design Institute (CMPDI), is a consultancy company for coal exploration. Since then, CIL has been the predominant producer of coal in the country, while some coal is also produced by Singareni Collieries and Coalfields Ltd. (SCCL), a few privately owned mines and captive mines allocated in the recent past. India produces various grades of coal, which are used for different applications. However, Indian coal is generally low in sulphur content, low on calorific value and high in ash content. It is generally accepted that for the first two decades or so after nationalization, CIL and SCCL, backed by Government investments, helped to increase coal production significantly as well as provide improved working conditions for employees. Table 1 gives an overview of the gradually increasing production of coal (and lignite) in the country. In turn, this helped increase electricity generation and thus industrialization, and increase access of electricity to households.

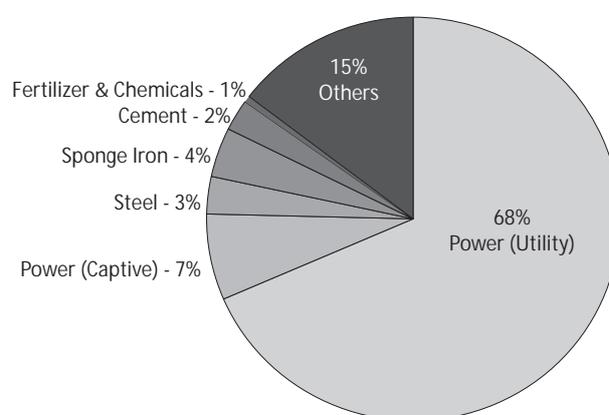
Coal is predominantly consumed by the power sector, while it is also consumed by other sectors such as steel, cement, brick kilns etc. Figure 1 depicts the usage of coal across various sectors in 2011-12. Most of the coal mined in India is extracted through the open-cast process which is appropriate for coal seams relatively closer to the surface, while some coal is also produced from under-ground mines.

Figure 2 roughly depicts the lifecycle of mining and selling coal. In the subsequent sections, we analyze each step of the coal lifecycle and highlight the current shortcomings and opportunities for improvement.

Table 1: Historical coal and lignite production in India²

Year	Production (million tons)
1971-72	76.14
1981-82	131.24
1991-92	248.81
2001-02	352.60
2002-03	367.29
2003-04	389.20
2004-05	413.03
2005-06	437.27
2006-07	462.12
2007-08	491.06
2008-09	525.18
2009-10	566.11
2010-11	570.43
2011-12	583.05

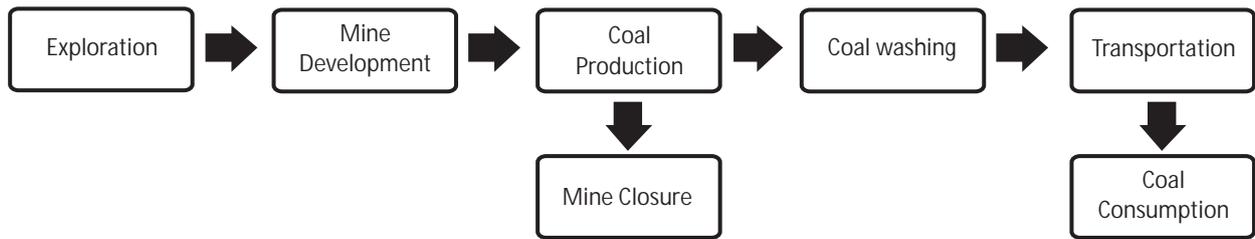
Figure 1: Sectoral usage of coal in India (2011-12)³



² Source: (CCO, 2011, p. 1.14; CCO, 2012, p. 1)

³ Source: (CCO, 2012, p. 9)

Figure 2: Life cycle of mining and selling of coal



3 Exploration

CMPDI and Geological Survey of India (GSI) are the agencies primarily responsible for exploration of potential coal bearing areas in India, and estimating the available and extractable coal reserves in the country. CMPDI is the agency responsible for analyzing and collating the information obtained from exploration. It is obvious that effective exploration leading to a good understanding of its coal reserves is a necessary pre-requisite for any country to plan its energy future.

3.1 Coal reserve estimation

Serious doubts have been expressed about the validity of India's coal reserves and there is a suspicion that it has been over-estimated (The Energy Resources Institute, 2011; CAG, 2012, p. 9; Chikkatur & Sagar, 2009; Chand, 2008). The unreliability arises primarily because of the weaknesses in the methodology adopted by agencies such as CMPDI in classifying reserves (Chikkatur, Sagar, & Sankar, 2009). CMPDI has traditionally classified reserves using the Indian Standard Procedure (ISP) code of 1956 and not an internationally accepted standard such as United Nations Framework Classification (UNFC). Moreover, it is believed that coal that has already been mined is not deducted from the reserve estimates. Re-assessing and re-classifying a country's reserves has often resulted in significant downward corrections of extractable reserves, as has happened in Germany, Poland, South Africa and other nations (Energy Watch Group, 2007; Hartnady, 2010). Indeed, even in India the reserve estimates of minerals such as copper, lead-zinc, rock phosphate and chromite fell by over half on moving to UNFC (Chatterjee, 2003). Therefore, this is a matter of serious concern since reliable estimates of coal reserves should form the basis of any planning for the coal, and

indeed energy, sector of the country, particularly with the official position continuing to rely on the abundance of India's coal reserves (Ministry of Coal, 2012e).

According to the Comptroller and Auditor General (CAG) report on augmentation of coal production, though the Government of India decided to move to a UNFC standard in May 2001, CMPDI undertook a study to move to UNFC only in November 2011 and submitted a draft report of UNFC reserves in a matter of just five months by March 2012 (CAG, 2012). Officials of CMPDI say that it is incorrect to say that the work began only in November 2011. However, it is clear that CMPDI has been very slow in moving towards UNFC, though the Government appointed expert committee had opined that "the data on India's inventory of coal reserves as also the estimates of extractable reserves could benefit immensely by an independent assessment" and mentioned the need to move to UNFC in the 11th five year plan working group report⁴ (Ministry of Coal, 2006, p. 94; Ministry of Coal, 2005, p. 26).

In early 2012, CMPDI published UNFC classification of reserves held by CIL, while UNFC classification of other reserves in the country are still not publicly available (Figure3)⁵. Moreover, even if CMPDI does publish UNFC reserves of the entire country, it is not clear whether the Ministry of Coal (MoC) intends to undertake an independent assessment of this classification as suggested by the expert committee.

There are serious doubts about India's coal reserves and CMPDI has been slow in moving to the UNFC standard. There should also be an independent assessment of the reserve estimates.

⁴ It is also reiterated in the working group report of the 12th five year plan.

⁵ While it is not entirely clear how to interpret CIL's UNFC reserve data put out by CMPDI, it does suggest that it has resulted in a reduction of CIL's reserves compared to the data given in CIL's draft red herring prospectus.

Figure 3: Timeline of CMPDI adopting UNFC⁶

May 2001	April 2007	November 2011	March 2012	May 2012
GOI decision to adopt UNFC	No action till April' 07 according to CAG report but denied by CMPDI officials	CMPDI initiated study to convert existing ISP system into UNFC (according to CAG report)	CMPDI submitted draft UNFC report to GOI	ICRIS (CMPDI) published UNFC classification of CIL coal reserves

3.2 Exploration planning

The IEP expects that domestic coal demand will grow at an average of 5.2% p.a. and reach 1580 mtpa in 2031 even in the scenario requiring the least coal (Planning Commission, 2006a, p. 47). Such an increase in demand necessitates a corresponding increase in production, as recognized by the working group report on coal for the 12th five year plan which states that coal production in the country should go up from 552 mtpa in 2011-12 to 715 mtpa in 2016-17 in the business-as-usual scenario or 795 mtpa in the optimistic scenario – an increase of around 5.3% p.a. or 7.6% p.a. (Ministry of Coal, 2011, pp. 47,51).

Such increases in production require sufficient coal exploration around 10 years in advance to establish mineable reserves. However, as shown in Table 2, regional and promotional exploration – required to identify new potential reserves – during the 11th five year plan was actually less than what was done in the 10th five year plan and only about 70% of the target for the 11th five year plan was achieved. Only 41% of the target for detailed

exploration⁷ in the 11th plan was achieved, but the target for the 12th plan continues to be very optimistic. In fact, even the target for

promotional exploration

in the 11th five year plan was lower than the 10th plan.

The reasons for this are not clear. On the one hand, 4226 sq km⁸, or 23% of the country's prognosticated coal bearing area remains to be regionally explored

Promotional and regional exploration achieved in the 11th five year plan was lower than the 10th plan. Detailed exploration also fell well short of target.

Table 2: Drilling targets and achievements (lakh m)⁹

Type of Exploration	10 th plan		11 th plan		12 th plan
	Target	Actual	Target	Actual	Target
Regional	1.83	1.49	1.94	1.14	1.05
Promotional	5.13	5.24	4.00	2.95	4.80
Detailed	11.01	11.41	56.26	23.21	54.46
Total	17.97	18.14	62.20	27.30	60.31

(Ministry of Coal, 2011, p. 97). On the other hand, targets for regional exploration have gradually tapered off over successive five year plans, suggesting that most coal bearing area in the country has already been explored.

One school of thought is that the under-achievement in exploration is because of the difficulty in obtaining forest clearances, since much of the unexplored area lies under forests. Though detailed exploration requires only 10 boreholes to be drilled per sq. km, it is hard to obtain forest clearances possibly because of the corresponding access infrastructure required, leading to delays in detailed exploration.

3.3 Human resources and technical capacity

Agencies such as CMPDI and GSI can fulfill their responsibilities of exploration only if they have sufficient human resource (HR) and technical capacity. However, it seems that these agencies do not have the required capacity to be able to undertake their tasks. The Expert Committee set up by MoC to suggest reforms for the coal sector had suggested enhancing drilling capacity of CMPDI from 3 lakh m per annum to at least 15 lakh m per annum (Ministry of Coal, 2005). However, as shown in Table 2, the drilling targets and achievement for the country as a whole have been much lower.

6 Source: (CAG, 2012) and CMPDI website www.cmpdi.co.in

7 Detailed exploration is done to prove geological reserves with the highest confidence.

8 This includes about 2800 sq km under Coal Bed Methane (CBM) blocks

9 Source: (Ministry of Coal, 2006, p. 249; Ministry of Coal, 2011, pp. 6,289)

Lack of capacity in CMPDI has also been acknowledged in the 11th five year plan working report, which stated that “The enhancement of drilling activities during XI Plan will require substantial capacity build up for coal core analysis and enhancement of capacities of exploration agencies in Government/PSUs to provide technical support for exploration to be taken up by agencies in private sector.” (Ministry of Coal, 2006, p. 17). However, it appears that this objective has not been achieved as the report of the working group on coal for the 12th five year plan repeats the sentence verbatim except for changing XI plan to XII plan (Ministry of Coal, 2011, p. 6)! Please see Box 1 for more examples of statements recurring across plan working group reports. Interestingly, though the technical and human capacity does not seem to have been sufficiently augmented, drilling targets for the 11th five year plan were considerably higher than the 10th plan.

3.4 Preparation for coal block auctioning

After extensive internal discussions (CAG, 2012, pp. 23-27) and public outcry following the leakage of the draft CAG report, the Government decided to auction captive blocks (Ministry of Coal, 2012b). However, it turns out that 46 of the 54 blocks proposed to be offered have not undergone detailed exploration, of which nine blocks have not been explored at all even though the bids are expected to be based on estimated reserves in the blocks offered (Ministry of Coal, 2011d). Hence, there is at best sketchy understanding of the extent of reserves these blocks contain, raising serious questions about the propriety of such an auctioning process and the potential for subsequent legal complexities depending on the difference between actual and estimated reserves. Very recent media articles suggest that the Government and its consultant are also coming around to the view that auctioning coal blocks without exploring them is not desirable (PTI, 2012; PTI, 2012a). Given that the Government has been deliberating

There is inadequate understanding of reserves in captive blocks being offered for bidding, though the bidding would depend on the reserves.

about conducting auctions for about eight years, it is indeed surprising that more blocks could not be explored better to be ready for the auction.

4 Mine development

Once an area is known to contain coal that can be accessed¹⁰, a mine needs to be developed there. The Coal Bearing Areas Acquisition & Development Act gives the Government the right to acquire the land where the mine needs to be developed (Government of India, 1976). This involves obtaining various clearances and permissions, rehabilitating people, acquiring land and taking up preparatory work for production to begin from the mine. It is generally considered that Ministry of Environment and Forests (MoEF) is the biggest hurdle in mine development. However, the reality is a little more nuanced.

4.1 Clearance process

Obtaining all the requisite clearances often takes years due to multiple causes such as involvement of multiple agencies, delay in finalizing ToR (Terms of Reference), delay in conducting public hearings etc. (Ministry of Coal, 2011, pp. 132, 134, 139). One report states that more than 15 agencies need to be involved at various stages of the clearance process such as MoEF, Coal Controller’s Organization (CCO) and MoC from Government of India and various state government agencies such as mining department, revenue department, forest department, State Pollution Control Board (SPCB) and district authorities (IDFC Ltd., 2009, pp. 8,9). Not surprisingly, dealing with so many agencies at different stages leads to many delays, and the CAG audit report suggests that 32 projects of CIL were delayed for 1-12 years resulting in a loss of production of about 116 million tons (MT)(CAG, 2012, p. 20).

Thus, it is not so much environment clearance alone but the multiplicity of agencies and lack of coordination between them that is a reason for delays in mine development¹¹. This is exemplified by the relatively small increase of production from the mines for which environmental clearances have been granted. Mines are expected to be productive about 3 years after being

10 Accessed at a reasonable cost – that is to say the coal is not under a river or in dense forests or under large in habitations such as cities etc.

11 Forest clearances, also issued by the MoEF, can also be time-consuming to obtain, as it again involves multiple agencies beyond the MoEF such as state forest departments.

granted environmental clearance for production (IDFC Ltd., 2009). However, as Table 3 shows, though clearances were granted for about 96 mtpa of production in 2007, actual increase in production between 2009 and 2012, when these mines should have started producing, was only about 8 mtpa or just

over 8% of the capacity granted clearance.

The problem of multiple agencies involved in the clearance process and the delays arising from them have been highlighted in multiple reports which have also suggested means to streamline the process and improve inter-agency coordination (Ministry of Coal,

Box 1: Plus ça change, plus c'est la même chose[†]

The working group reports on coal for the 11th and 12th five year plans contain many snippets that are either identical or very similar – indicating that the plans laid out in the reports are not being carried through and also putting a question mark on the planning process itself. Some examples are given below:

XI five year plan working group report		XII five year plan working group report	
Page	Statement	Page	Statement
17	The enhancement of drilling activities during XI Plan will require substantial capacity build up for coal core analysis and enhancement of capacities of exploration agencies in Govt./PSUs to provide technical support for exploration to be taken up by agencies in private sector.	6	The enhancement of drilling activities during XII Plan will require substantial capacity build up for coal core analysis and enhancement of capacities of exploration agencies in Govt./PSU to provide technical support for exploration to taken up by agencies in private sector.
71	Major incremental loading of CIL would be coming from Karanpura, Korba and Ib fields. Proactive actions are to be taken to develop infrastructure to cope up with the evacuation needs.	67	Since major incremental indigenous availability of coal would be from Karanpura, Korba & Ib Valley fields special efforts need to be given for development of railway siding/ tracks in Ib Valley, Korba and Karanpura fields both in CIL mines and coal blocks given for captive use.
188	A Special Task Force, constituted under the Secretary (Coal) must closely monitor the approval process.	204	A Special Task Force, be constituted under Secretary (Coal) to closely monitor the approval process.
183	Introduction of competitive bidding system for allocation of captive blocks may be expedited.	206	Future blocks should be allocated on the basis of a transparent bidding process, with bidders placed on a similar platform.
189	Establishment of a regulatory body for coal sector would bring in transparency in coal price fixation, provide reasonable returns to the Producers and would eliminate undue profiteering.	207	The coal sector regulator should be set up on a priority basis*.

[†]'The more things change, the more they remain the same', epigram attributed to Jean-Baptiste Alphonse Karr, January 1849.

*Setting up an independent regulatory authority was a 'thrust area' even in the 10th five year plan (Planning Commission, 2002, p. 557)!

Table 3: Environmental clearances and corresponding increase in production¹²

Company	EC granted in 2007 (MTPA)	MTPA increase in production (2009- 2012)
CIL	63.31	4.58
SCCL	10.13	1.78
Other	22.56	1.59
Total	96.00	7.95

2007, pp. 5, 20, 22; Government of India, 2011, p. 27). However, the process has still not been streamlined and delays are still the norm rather than the exception.

It should also be highlighted that though the system leads to bureaucratic delays in the clearance process, it does not help to either prevent environmental damage or win the support of local population. This is discussed in greater detail later.

The clearance process remains cumbersome despite recommendations to improve it.

4.2 Mining company actions

Organizations owning coal blocks have also been responsible for delays in mine development. The show cause notices issued by the Government to captive block owners indicate that 16 allottees that were allocated captive coal blocks between 2005 and 2007 had not even applied for a mining lease by May 2012, though 5 of these blocks were already explored and they should have applied for a mining lease within 3 months from block allocation, and the other 11 blocks were expected to finish their exploration in 2 years and 3 months of allocation (Ministry of Coal, 2006a)¹³.

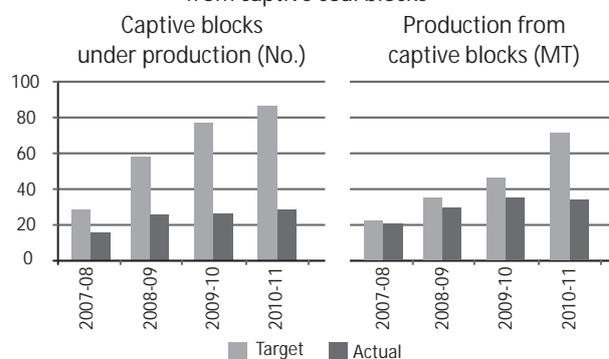
4.3 Captive block development

Normative guidelines fixed by MoC state that a captive block is expected to be productive in 3 to 4.5 years from allocation (Ministry of Coal, 2006b). However, though 109 coal blocks had been allocated before 2007, only 28 captive coal blocks had started production by 2010-11 (CCO, 2011, p. 9.8; Ministry of Coal, 2011c).

Of those not yet producing coal, only 24 block

allocations have been cancelled thus far – most of them relatively recently – while 56 blocks were issued show-cause notices only in May 2012¹⁴ after captive blocks came into the media spotlight given the leaked CAG report and stalled coal production (Ministry of Coal, 2011a). Part of the reason for this could be some design issues with the captive mining policy which resulted in agencies without prior experience in mining having to get into the mining business and some ‘forced marriages’ in cases where one block was given to multiple end-use companies that did not know each other well, because the block’s reserves were more than the need of any one company.

Figure 4: Targets and realizations for production from captive coal blocks¹⁵



The net result is that, over time, the number of captive blocks producing coal and the quantity of coal produced from such blocks has fallen well short of expectations. Figure 4 shows the difference between target and actual progress of captive blocks – both in terms of number of blocks producing coal as well as quantity of coal produced. As can be seen, in 2010-11, the number of captive blocks in production as well as the quantity of coal produced from such blocks was less than half the target. This indicates weak monitoring of captive block development by MoC.

Following the uproar caused by the ‘coal-gate’ scandal, the Government reviewed the performance of captive blocks and de-allocated some of them. However, prima-facie,

The captive mining policy had some design flaws. These were compounded by MoC’s laxity in monitoring development of these blocks.

12 Source: Data from MoEF, (Ministry of Coal, 2011)

13 Expected time for a block owner to apply for a mining lease is from <http://coal.nic.in/captimeC.htm> while data about show cause notices issued is taken from <http://www.coal.nic.in/letters.htm>, both accessed September 14, 2012.

14 Some blocks had been issued show-cause notices earlier, while some have been issued after this date.

15 Source: (CAG, 2012, p. 34)

the choice of blocks to de-allocate suggests some arbitrariness, as 3 blocks allocated more than 10 years ago and not yet producing¹⁶ remain allocated as of October 2012, whereas 19 blocks allocated after 2004 have been de-allocated¹⁷.

4.4 Land acquisition and rehabilitation

Coal mining, particularly open-cast mining which produces about 90% of Indian coal, requires acquisition of land, which almost invariably leads to displacement of local population. Therefore, the compensation offered for land, rehabilitation of people and benefit-sharing of the gains from coal mining with local population are all important from the perspective of social justice as well as gaining local support for coal mining¹⁸.

Though seemingly reasonable rehabilitation policies exist on paper and CIL recently introduced an improved rehabilitation and resettlement (R & R) policy (CIL, 2012d) that may be better than the compensation offered by many states, in practice, the problems of those displaced due to mining activities are acute. There are weaknesses in the public participatory processes, often not all those affected (e.g. landless villagers) are deemed eligible for compensation and even those eligible for compensation are often offered inadequate and/or delayed compensation (Chikkatur, Sagar, & Sankar, 2009; Prayas Energy Group, 2012). These problems are compounded by problems arising from coal mining such as air and water pollution, which are discussed later. Such practices lead to considerable social distress, alienation of local population and eventually popular resistance to coal mining. The problems are also sometimes complicated by other encroachers with bogus claims, and the fact in some villages, villagers themselves are involved in mining the coal illegally as it is the best fuel source available to them. This calls for innovative policies and approaches to land acquisition that takes into cognizance such nuances.

Current land acquisition and R&R mechanisms are very weak leading to social distress. Innovative solutions are required to address this.

5 Production

This is the key step in the (domestic) coal value chain – the preceding steps are intended to facilitate production while subsequent steps improve, transport and consume the produced coal. CIL produces about 80% of India's domestic coal production and hence any study of Indian coal production will necessarily be largely, though not completely, about CIL's coal production.

5.1 Supply and demand

Even as installed coal-based power capacity increased at 9.5% p.a. during the 11th five year plan period from 68 giga-watts (GW) to 112 GW (CEA, 2012a), coal production only increased at 5% p.a. from 431 mtpa to 540 mtpa (Ministry of Coal, 2011, p. 39; Planning Commission, 2012). The difference was much starker in 2011-12 – installed coal-based capacity increased by 19.3% while domestic production of coal went up by only 1.4% as shown in Figure 5 (CEA, 2012; CEA, 2011; CCO, 2012).

As can be seen from Table 4, India's coal production target for 2011-12 was lowered twice in the space of the 11th five year plan, from 680 MT originally to 554 MT finally. But even the sharply reduced target could not be met and actual production fell short of the original target by about 21%. It is interesting to note that, in spite of its being known that large additional power capacity was expected to come online, the final annual target for coal production in 2011-12 was lower than the target of 572 MT for 2010-11. This is very likely due to the coal sector being unprepared for so much power capacity to come online in so short a time. It also raises questions about how linkages for these power plants were given and coordination between the concerned ministries. This is discussed in detail in a later section.

This inability of coal production to keep pace with increase in power capacity addition has

Coal production has lagged demand leading to a sharp increase in imports. Production planning also seems to be off the mark.

16 However, they were issued show-cause notices.

17 List of de-allocated blocks is taken from <http://www.coal.nic.in/de-allocated.pdf> (Accessed August 31 2012). Some more blocks have been de-allocated since then as a fall-out of the CAG report being tabled in Parliament.

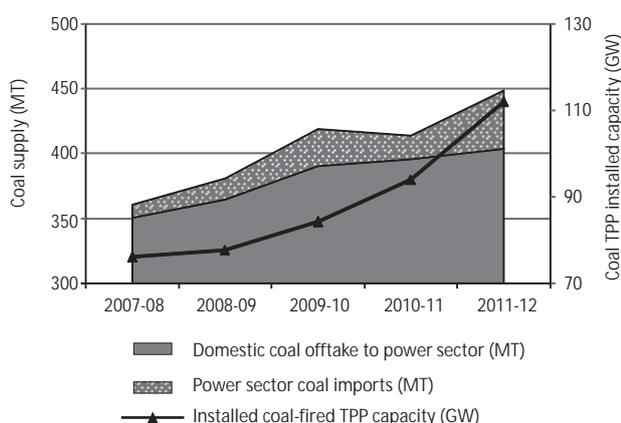
18 Rehabilitation and addressing problems of the displaced are a wider problem in the country, and not restricted only to the coal sector.

partially contributed¹⁹ to a sharp increase in steam coal imports by the power sector (Figure 5). Power sector coal imports went up by nearly 350% from 10 MT in 2007-08 to 45 MT in 2011-12, though installed thermal power capacity went up by only 50%²⁰.

Table 4: Coal production targets and achievement for 2011-12²¹

Original 11 th plan target	680 MT
11 th plan mid-term target	630 MT
Annual target	554 MT
Actual production	540 MT

Figure 5: Power sector demand-supply gap for coal (2007-08 = 100)²²



These facts put together lead to some pertinent questions such as:

1. Why were the coal production estimates for 2011-12 in the 11th five year plan and the mid-term appraisal so far off the mark though it is known that mine development takes around 5 years?
2. Why was the final coal production target for 2011-12 lower than the target of 2010-11, though it should have been known that demand for coal from power plants would increase?

5.2 Coal production data

For a key natural resource belonging to the country, it is not easy to access data related to production (and other aspects) of coal. CCO is the agency responsible

for collecting and publishing key information and statistics about the coal sector. However, as of 3rd November 2012, its website provided a link to only the coal directory of 2011-12 and many sections of the website, including the Right to Information (RTI) section, contain only 'test content'²³. Though CCO officials were very helpful when we visited their office and provided us with copies of coal directories, it would be much better to publish the information suo-motu on their websites in an easily accessible manner, as this will provide citizens with key information and in turn, help improve accountability of the sector. For example, the websites of Central Electricity Authority (CEA), Directorate General of Hydrocarbons (DGH) and Petroleum Planning and Analysis Cell (PPAC) – organizations with roughly similar mandates as CCO – publish a lot of information, which can be useful to citizens²⁴.

Coal sector data is not easily available in the public domain. Mine-wise data which apparently used to be accessible earlier is no longer accessible.

Even though the coal directories accessed by us contain a lot of statistics about coal production and consumption, there is no mine-wise information available. We understand that such information used to be available in previous years. It is unfortunate that a good practice has been discontinued²⁵.

5.3 Human productivity

It is generally understood that manpower productivity of Indian coal mines is low (Ministry of Coal, 2011, p. 118). Human productivity in coal mines is not easily comparable across countries due to issues such as differences in geology and access to technology. However, the large difference in productivity of Indian coal mines compared to many other countries suggests that there is significant room for improvement (Figure 6). In particular, manpower productivity of CIL's underground mines is extremely low at only 0.8 tons

19 Inadequacies of domestic transport infrastructure are also a factor behind the sharp increase in imports – see later section.

20 Less than 5000 MW of the additional capacity would have been designed for imported coal, i.e. requiring about 15 MTPA.

21 Source: (Ministry of Coal, 2011, p. 20; Planning Commission, 2009; CCO, 2012)

22 Source: Coal directories and (CEA, 2012b, p. 18).

23 As on December 12, 2012, the coal directory page on the CCO website (www.coalcontroller.gov.in/statistics/index/ANN) had only a link to the provisional statistics for 2011-12. The only other link (for 2007-08) led to an empty page.

24 The corresponding websites (www.coalcontroller.gov.in for CCO, www.cea.nic.in for CEA, www.dghindia.org for DGH and www.ppac.org.in for PPAC) were accessed on 11th September, 2012.

25 Some officials told us that the information may be available in 'Volume II' of the coal directory. If such is the case, the existence of such a volume should be publicized and it should be made available.

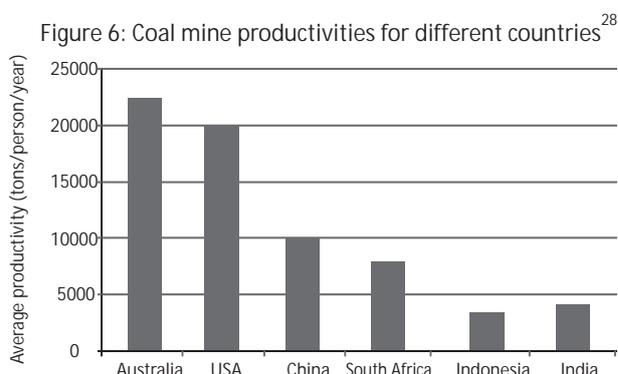
per man-shift. Almost 60% of CIL's work-force is used to produce coal from underground mines but only 10% of its production is from underground mines (CCO, 2011, p. 3.27). CIL's productivity for open-cast mines is better but is still considerably behind other countries. For example, while CIL's open-cast mine productivity is about 10 tons / man-shift, the equivalent for the US is about 69 tons / man-shift (CCO, 2011, p. 3.27; EIA, 2011).

Inadequacy of qualified manpower and technological equipment such as Heavy Earth Moving Machinery (HEMM) is likely to be a major cause behind the low productivity of CIL. We understand that CIL has not recruited personnel at the executive and management levels for many years. This is very likely to have limited its ability to effectively manage its operations and also limited its ability to take advantage of improvements in mining techniques such as much larger excavators and techniques such as long-wall mining. This has led to an observation that CIL is 'emerging as a geriatric organization with average age more than 50, with vanishing skill sets based on experience' (Ministry of Coal, 2011, p. 10).

As the loss of such human capacity would have occurred gradually over time, it is surprising that serious action has not been taken thus far to address this problem. CIL is a 'Maharatna' company and has considerable freedom with regards to HR policies, and is empowered to restructure the organization, and structure and implement schemes relating to HR management and training. It is unfortunate that the HR capacity and productivity of CIL has languished in spite of such empowerment.

There is an opinion that productivity of mines overseas is higher because shifts in those mines are 12 hours long²⁶ rather than 8 hours as in India, which enables more effective utilization of HEMM equipment. While 12-hour shifts are likely to be unhealthy to mine workers and mining communities²⁷, it is true that equipment utilization during shift hours in India is lower

than international norms (Ghose & Dhar, 2000). Therefore adequate steps are required to ensure greater utilization of capital intensive equipment during shift hours to improve productivity.



CCO is an organization that is expected to monitor coal blocks and production from them. However, it is unable to fulfill its responsibility, once again because of inadequate technically qualified staff to do the monitoring. In fact, we understand that CCO has almost no technically qualified staff at all. The CAG report affirms this claim and states that though the CCO requested for 17 technical posts in 2007, MoC had not sanctioned them as of 2011 (CAG, 2012, p. 38). This has meant that CCO has been unable to monitor coal production from mines, and hence there is no official verification of production from coal mines – an important issue since coal is a national resource and the country needs to monitor its production.

The HR strength and productivity of organizations like CIL, CCO etc. is weak. CIL has not addressed this problem in spite of being empowered to do so.

5.4 Labour health and safety

Safety in Indian mines continues to be a major concern. It is highly unfortunate that the total number of fatalities has increased from 78 in 2007 to 120 in 2010, and the fatalities per 1000 persons has increased from 0.21 to 0.25²⁹ (Ministry of Coal, 2011, pp. 163,164).

26 See, for example, <http://www.peabodyenergy.com/content/304/Publications/Fact-Sheets/Francisco-Mine> accessed 4th November 2012

27 See, for example, <http://www.theglobalmail.org/feature/homeless-on-100k-the-boom-digs-into-mining-towns/20/> and <http://www.greenleft.org.au/node/46615>, both accessed 4th November 2012

28 Source: Indian coal productivity for 2007 from (CCO, 2008, p. I.4) and other countries productivity from (Energy Edge limited, 2007, p. 18).

29 However, the number of serious accidents and the rate of serious accidents are reported to have reduced over the last few years.

This concern about inadequate attention to labour safety is reinforced by the findings of the CAG inquiring into CIL's Corporate Social Responsibility (CSR) activities (CAG, 2010). According to this report, less than 8% of contracted employees are subject to regular health check-ups though all are expected to be monitored regularly. We also understand that cases of silicosis/respiratory diseases are rampant among coal mine workers. Increasing use of contract workers, and lesser protection available to them, results in their issues being further neglected.

This unfortunate status of labour safety prevails in spite of India being a signatory to the International Labour Organization (ILO) 176 convention concerning health and safety in mines, which has been in force since 5th June 1998³⁰. Clearly, the institutional safety mechanisms intended to ensure labour health and safety are not functioning as expected.

Labour health and safety issues do not receive the attention they deserve, reflecting a systemic weakness.

5.5 Technological capacity

Similar to its shortage of HR capacity, CIL is also faced with inadequate technological capacity – in terms of the equipment used by it, their availability and utilization.

5.5.1 Open cast mining technology

It appears that CIL uses norms for availability and utilization of HEMM – critical for open-cast mining – defined as far back as 1986 (CAG, 2012, p. 20). A review of these norms had been initiated about a decade ago (Planning Commission, 2003, p. 550), though it is not clear what has come out of it.

As shown in Table 5, the population of dumpers, dozers and drills with CIL has actually decreased from 2009-10 to 2010-11 even though production was expected to grow from 435 MT to 461 MT in this period. It is also interesting to see the complete mismatch between the number of draglines and shovels envisaged by MoC for 31st March 2012 and the actual numbers with CIL. The availability and utilization of the HEMM that CIL has also falls short of even the 1986-defined norms for shovels, dumpers, dozers and drills (Table 6).

This could either indicate improper procurement planning by CIL or insufficient communication between MoC and CIL, or the result of increasing outsourcing of operations by CIL so that it does not need to own many capital assets. However, the working group report on coal for the 12th five year plan suggests that the delay in procurement of HEMM is one of the causes for delays in cost and time overrun of projects (Ministry of Coal, 2011, p. 126). Similarly, there also seem to have been delays in overburden removal, which also resulted in reduced production from open-cast mines (CAG, 2012, p. 16). Very recent media reports suggest that CIL may acquire fresh HEMM equipment (Bose, 2012).

CIL's open-cast mining technological capacity has reduced in the recent past, and their availability and utilization also appears to be poor.

Table 5: CIL HEMM population on 31st March of various years³¹

Name of Equipment	2007	2008	2009	2010	2011	2012	
						Envisaged by MoC	Actual
Dragline	41	41	40	40	40	119	40
Shovel	686	687	703	747	754	843	727
Dumper	3364	3240	3293	3366	3217	3555	3280
Dozer	989	998	1025	991	981	805	987
Drill	696	744	754	713	709	655	664

Table 6: Norms and actual HEMM availability and utilization during 11th plan³²

Equipment	Availability %		Utilization %	
	CMPDI norms	Actual	CMPDI Norms	Actual
Dragline	85	78-85	73	61-78
Shovel	80	71-74	58	43-49
Dumper	67	66-67	50	34-37
Dozer	70	64-65	45	26-27
Drill	78	75-77	40	28-31

5.5.2 Under-ground mining technology

Similar to HEMM, productivity of underground equipment such as Side Discharge Loader (SDL) is worse than expected. Moreover, productivity of SDL has deteriorated from 85 tons per day per machine in 2009-10 to 77 tons per day per machine in 2010-11 (Ministry of Coal, 2011, p. 119). Similarly, productivity of other equipment such as Load Haul Dump (LHD) and Continuous Miner (CM) has also decreased over this period.

30 See http://www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_INSTRUMENT_ID:312321 accessed 4th November 2012

31 Source: (CAG, 2012, p. 19; CIL, 2012c, p. 57)

32 Source: (CIL, 2012c, p. 57; CAG, 2012, p. 20)

Compared to a world average of around 60% of coal coming from underground production, only 10% of India's coal comes from underground (World Coal Institute, 2009, p. 7; CCO, 2011, p. 3.23). While the proportion of coal that can be mined from underground would, of course, depend on local geological conditions, India's underground coal production has been steadily decreasing in spite of various reports recommending increasing the share of underground mining and adopting latest underground mining technologies such as long-wall mining (Ministry of Coal, 2007, p. 60; Ministry of Coal, 2006, p. 149). Moreover, given that about 22% of India's proved coal reserves that lie at a depth greater than 300 m (CMPDI, 2012), the country needs to decide whether it wants to adopt appropriate technology to exploit these reserves or leave these resources unexploited.

One of the reasons cited by CIL for not expanding under-ground production is that its cost of production is higher than open-cast mining while the realization for both kinds of coal is the same. While such an argument may seem justified from the narrow perspective of CIL's finances, it is obviously not in the interest of the country, because in the absence of underground coal production, the country would either have to use even more expensive alternatives such as imported coal or other fuels. It may also be debatable whether underground coal production would really be unaffordable for CIL, given its current levels of profitability, inefficiency and anecdotal evidence that it is operating some underground mines currently though its cost of production is over Rs. 20,000/ton.

Moreover, since displacement, clearance, land acquisition and pollution related problems are likely to be lower with properly implemented underground mining, it may be strategically beneficial to pursue underground mining, even though Indian geology may not be able to support very efficient mining techniques such as long-wall mining.

Though underground mining may be strategically desirable in the national interest, it continues to be neglected.

5.6 Environmental impacts

CIL and other mining companies often complain about the lengthy procedural delays in obtaining various clearances, particularly environment and forest clearances. However, once the clearance is obtained,

the mining practices followed often result in severe air and water pollution in the areas near the mines causing distress to local villages and affecting agricultural productivity. We provide some examples below.

5.6.1 Air pollution

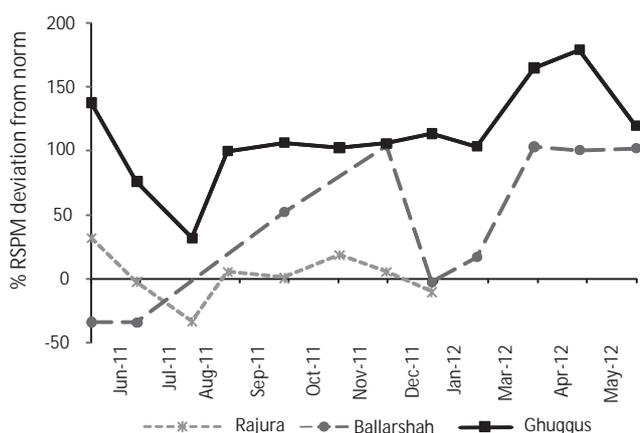
Coal mining, particularly open cast mining, results in air pollution because of coal dust and coal transportation leading to suspended particulate matter, which can cause respiratory diseases and lower agricultural productivity. Though there exist well defined standards for ambient air quality and air quality around coal mines (MoEF, 2000; CPCB, 2009), actual mining practices, along with coal consuming industries that come up close to coal mines, frequently result in air quality that is much worse than the standards. This is borne out by air quality data from towns close to coal mining areas (Figure 7). As can be seen, ambient air quality was always worse than the norm for Ghuggus—which not only has coal mines but also associated industries such as a power plant, cement plant and an iron and steel plant – and many months recorded respiratory suspended particulate matter (RSPM) levels that were more than twice the norm. In other locations such as Rajura and Ballarshah, RSPM levels were worse than the norm in most months for which data was available. The generally poor air quality near coal mines is corroborated by another report on the air quality near Korba coal mines and our experience when we visited some villages near mining areas (The Energy Resource Institute, 2000; Prayas Energy Group, 2012, pp. 17,18).

5.6.2 Water pollution

Coal mining practices also result in water pollution due to causes such as dispersal of chemicals used for mine explosion into ground water, dispersal of sediments into drainage system by erosion of over-burden dumps, release of dissolved substances including heavy metals and other toxic substances to rivers, lowering of ground water table in the mining area due to exhaustive pumping of mine water etc. (Patil S. & Katpatal A., 2008, p. 276) The amount of total dissolved solids, which is an overall indicator of water quality, can also be affected badly due to coal mining practices and in some cases it has been

The coal mining practices followed often result in severe air and water pollution of nearby areas.

Figure 7: RSPM deviation from norms near coal mining locations (2011-2012)³³



found to be more than double the accepted limit for drinking water (Thakre, Dixit, & Chaudhary, 2011, p. 542). This is in contravention of the desirable drinking water quality standard as defined by the Ministry of Water Resources (Ministry of Water Resources, 1991).

5.6.3 Compliance monitoring

Studies have shown that there are serious problems with monitoring and lack of enforcement of environmentally good practices in projects that have received environmental clearance, whether for coal or other sectors (Kohli & Menon, 2009). This report shows that

- 1 only few of the cleared projects have project monitoring reports as required under due process
- 2 many projects with monitoring reports indicate high degrees of non-compliance
- 3 the monitoring reports often under-report non-compliance to environmental conditions
- 4 MoEF's ability to monitor projects is severely hampered by lack of adequate number of qualified personnel, though its efficiency in granting clearances is significantly higher

The findings of a CAG audit of CIL's CSR activities, summarized in Table 7, generally affirm the lax environmental practices adopted in coal mining (CAG, 2010).

Thus, while the current clearance regime may lead to delays in

Current environmental monitoring mechanisms are dysfunctional and do not prevent severe environmental damage.

exploration and extraction of coal, in reality, it does not protect the local environment from degradation nor does it enable proper rehabilitation of the affected people. As a result, not only does the country's energy sector suffer, but the local population and environment bears a huge and largely under-estimated cost of the mining process. This naturally leads to increasing grass-root resistance to coal mining, making the mining process even more difficult.

Table 7: Observations in CAG's audit report of CIL's CSR³⁴

Issue	Audit findings
Environmental clearance for pre-1994 mines that have expanded activities	239 mines currently (i.e. 2010) in operation without such clearance
Land backfilling and technical reclamation.	Backlog of over 12,000 ha across 7 of CIL's 8 subsidiaries
Safe stacking of OB (height and gradient)	Violated in 10 out of 18 mines inspected
Topsoil restoration	Violated in 13 out of 18 mines inspected
Plantation density (>2500/ha)	Violated in 10 out of 18 mines inspected
Presence of effluent / sewage treatment plants	Violated in 6 out of 18 mines inspected
Mandatory regular medical checkup of contracted employees	Less than 8% of contracted employees subject to such checkups
Environmental Management System certification	558 out of 629 mines did not have the certification

5.7 Illegal mining and coal theft

It is generally accepted that illegal coal mining and coal diversion is a serious problem and has also been highlighted by the Parliamentary Standing Committee on Coal and Steel (Standing Committee on Coal and Steel, Fifteenth Lok Sabha, 2012; Infraline, 2009). One estimate claimed that actual production of coal was about 20% more than reported production (Lahiri-Dutt, 2007). Such large scale diversion and illegal mining result in inefficient and unaccounted use of a precious resource, hazardous and inefficient mining practices, increased pollution, increased crime and loss of revenue to the state.

While law and order is a state subject, and it is the

³³ Source: Maharashtra Pollution Control Board data accessed from <http://mpcb.gov.in/envtdata/demoPage1.php#station3>

³⁴ Source:(CAG, 2010)

prerogative of state governments to take the lead on this issue, it is unfortunate that little concrete action has been taken in this regard. The Parliamentary Standing Committee on Coal and Steel expresses its frustration at this lack of action by stating that the Ministry of Coal was “absolving itself from the responsibility of curbing illegal mining” and “the Committee feel that Ministry/Coal PSUs have utterly failed to discharge their responsibilities as far as stopping of illegal mining is concerned.” (Standing Committee on Coal and Steel, Fifteenth Lok Sabha, 2012, pp. 11, 16). Reports indicate that an attempt by CIL to understand and address illegal mining in some of its areas has also met with failure, possibly due to the entrenched nature of the illegal mining (CIL, 2012e; Ministry of Coal, 2012c).

Recent media reports indicate that the Union Government is now trying to work with state governments to set up special task forces to deal with the problem (Siddhanta, 2012). We hope that such forces are set up with appropriate accountability and empowerment, so that they can contribute to addressing the problem.

We also understand that the illegal mining operations employ large numbers of people, and many people resort to it for lack of access to other forms of energy. Hence, the problem may also have a key social dimension to it, rather than being just a law and order issue. Therefore, any solution to the problem needs to be nuanced and consider the social as well as law-and-order elements, and local citizens should see the benefits from coal mining activities so that they become agents of change.

The problem of illegal coal mining remains unaddressed. Innovative solutions will be required to address this challenge which has social and law-and-order dimensions.

6 Washing or beneficiation

Indian coal is high in its ash content and low in its calorific value. MoEF has issued a directive that only coal with ash content less than 34% should be transported more than 1000 km³⁵ to power plants. Therefore, washing or beneficiation of coal is a

desirable step to improving the quality of coal before it is transported or used, and the Government has also accepted the need for setting up washeries and wash coal in various reports since 2002 (Ministry of Coal, 2007, p. 88; Ministry of Coal, 2006, p. 65; Planning Commission, 2002, p. 790). However, an analysis of the installed capacity of washeries and their utilization tells a different and interesting story.

As can be seen from Figure 8, installed capacity of washeries for non-coking coal remained almost constant from 2002 to 2008, in spite of the declared desire to take up washing earnestly in 2002. In 2008-09 there was a huge spike in the installed capacity, with practically all the additional capacity coming from private washeries. In spite of this huge jump, the current washery capacity in the country remains highly inadequate at only about 144 mtpa as against the country's production of about 540 mtpa.

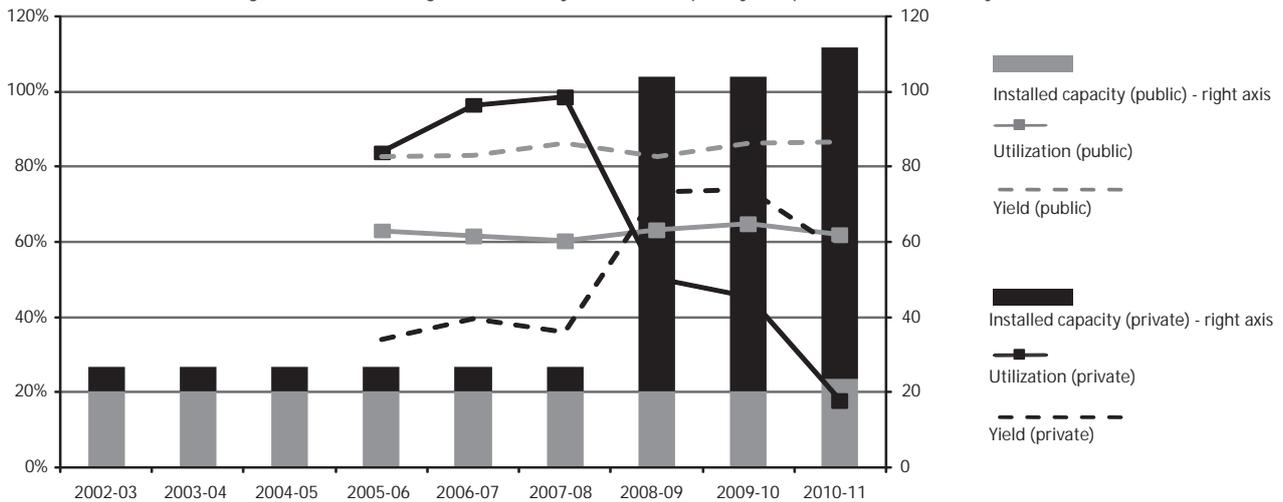
Curiously, this addition of washery capacity by the private sector was followed by a continuous and precipitous decline in utilization of capacity over the past few years, with utilization in 2010-11 being well below 20%. The yield (i.e. ratio of washed coal to raw coal feed) of private washeries went up from a poor 34% in 2005-06 to 74% in 2009-10, before falling again to about 58% in 2010-11. In contrast, the installed capacity, utilization and yield of public sector washeries have been nearly constant over a decade, with yields being consistently above 80%.

Publicly available data does not contain the average quality of the raw coal fed to washeries and resulting from the washing process – so this could not be analyzed. However, there have been complaints by some consumers about the quality of coal delivered by washeries. For example, Maharashtra State Power Generation Company Ltd. (MSPGCL) complained that there were “serious quality related issues” in the washed coal supplied to them (MSPGCL, 2012). There have also been news reports about arrests of washery officials, income tax raids on washeries and shutting down of some washeries (Anparthi, 2011; Times News Network, 2012;

Though accepted to be beneficial, coal washing is still not widely prevalent. News reports also suggest that there could be law and order issues regarding the washing business.

35 We understand this limit is going to be reduced further to 500 kms (Ministry of Coal, 2011, p. 82).

Figure 8: Non-coking coal washery installed capacity (mtpa), utilization and yield³⁶



Times News Network, 2012a). The sudden spike in private washery capacity, their low utilization and yield figures, complaints about quality of washed coal and the news reports cited above, together indicate that all is not above board with the washery sector – though the need and desirability of washing coal has been identified a decade ago.

7 Transportation or evacuation

Many coal consumers are not located at pit-heads. Therefore, increasing demand for coal also translates into increasing need for coal transport. Rail is the primary mode of coal transport in India and accounted for 52% of coal transported. It is also an efficient mode for coal transport. Given the expected increase in coal production and consumption, rail transport links and rolling stock for coal transport should have been augmented.

The importance of improving rail links and rake availability has been repeatedly mentioned in Government reports and their importance is also understood by the CIL management (Ministry of Coal, 2006, pp. 71,72; Ministry of Coal, 2011, p. 64; Rao, 2012). For example, the links at Karanpura, Mand-Raigarh, Korba and Ib Valley coalfields have been identified as key links in the 11th plan working group report. However, development of these and other key

lines have not progressed and evacuation of coal is a serious concern. This is reflected in the increasing amount of pithead coal stocks which have not been evacuated (Figure 9). Pithead stocks had crossed 70 million tons on 31st March 2012 – nearly 13% of the country's annual production³⁷. CIL officials also cite the futility of increasing production further in the absence of the ability to evacuate it. This is reinforced by the Figure 9 which shows how pithead stocks have increased much faster than annual coal off-take or coal production.

The expert committee constituted by the Government had also recommended that the sector should move towards Fuel Supply and Transport Agreements (FSTAs) so that transport arrangements are also part of the legally binding arrangement (Ministry of Coal, 2005, p. 14). This was reiterated in the 11th plan working group report as well as recommended in the New Coal Development Policy (Ministry of Coal, 2006, p. 185; Ministry of Coal, 2007a, p. 6). However, no progress has been made in this regard until now, and the 12th five year plan working group report seems to suggest that Indian Railways has decided not to enter into FSTAs (Ministry of Coal, 2011, p. 200).

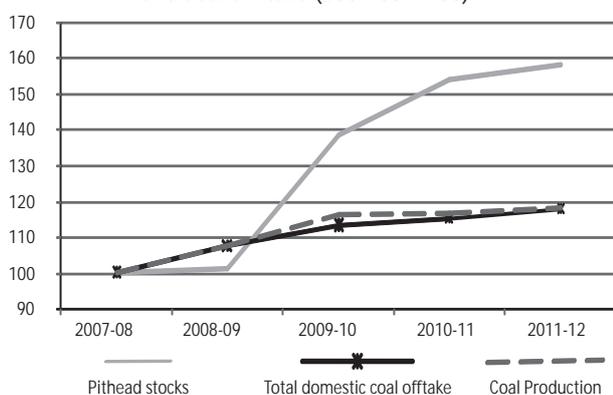
Key rail links for coal evacuation remain incomplete, despite multiple official reports calling for them to be expedited.

36 Source: (Ministry of Coal, 2006, p. 60) and Coal Directories for various years. There are also some significant data discrepancies about installed capacity and washed coal production between the Coal Directories and the working group reports for the 11th and 12th five year plans.

37 We understand that pit-head stocks are high around the end of March, because they are used to supply coal during the monsoon months when production is low.

It is not entirely clear why the evacuation infrastructure has not improved, because we understand CIL has also been willing to fund the construction of the infrastructure, though reasons cited have included the problem of environmental clearances and disinterest from the railways.

Figure 9: Variation in pithead stocks on 31st March and coal off-take (2007-08 = 100)³⁸



In addition to this problem with infrastructure planning, there are also inefficiencies in coal linkages without an attempt to optimize coal transportation. For example,

1. Sub-optimal linkages: The Raichur thermal power plant of Karnataka Power Corporation Ltd. has an FSA of about 2.5 MTPA from Western Coalfields Ltd. (WCL), which has mines in Vidarbha region of Maharashtra, but coal-fired power plants in Vidarbha such as the National Thermal Power Corporation (NTPC) 1320 MW at Mauda, MSPGCL's 500 MW plant at Khaperkheda and Adani's 1320 MW plant at Tiroda have Letters of Assurance from Mahanadi Coalfields Ltd. (Orissa), South Eastern Coalfields Ltd. (Chhattisgarh) etc. (WCL, 2010; Ministry of Coal, 2012).
2. Captive blocks: Similarly, some captive blocks also seem to have been allocated without consideration for the transportation overheads. For example, Morga III and IV blocks in Chhattisgarh have been allocated to Government of Madhya Pradesh for commercial purposes, while the Suliyari block in Madhya Pradesh has been allocated to Government of Andhra Pradesh, also for commercial purposes. Moreover, these allocations were made on the

same date (25th July 2007) and the combined geological reserves of Morga III and IV are roughly the same as the reserves of Suliyari³⁹.

3. Imported and domestic coal: About 11% of the 54 GW of power plants planned on the coast and granted environmental clearance plan to use completely domestic coal, and an additional 21% plan to use a blend of imported and domestic coal⁴⁰. Similarly, there has been a recommendation that even those power plants that have been planned to run on domestic coal should blend imported coal to compensate indigenous coal supply shortage (CEA, 2012d).

Many coal linkages are sub-optimal and result in unnecessary transport of coal.

8 Coal consumption

8.1 Coal linkages

The minutes of the meeting of the long term standing linkage committee (SLC (LT)) on Power held on 13th April 2011 show that coal linkages⁴¹ had been granted for 134 power plants, with a cumulative capacity of nearly 84,000 MW (Ministry of Coal, 2011b). Of these, linkage quantities are mentioned for 96 plants with a cumulative capacity of about 58,600 MW, with these linkages adding up to 209 mtpa⁴². Given that the most optimistic estimate of increase in coal production during the 11th five year plan was about 250 mtpa, these linkages appear to be quite unreasonable. This is borne out by Figure 10 which shows the incremental coal requirement only for power plants commissioned during the 11th plan with coal linkage⁴³ and the actual increase in coal production. It can be seen that over the last two years of the plan, increase in production fell well short of increase in demand – perhaps because the coal sector did not anticipate the rapid increase in commissioning of power plants, mostly led by the private sector. Such a gap between incremental

38 Source: Coal directories for 2007-08, 2008-09, 2009-10, 2010-11 and (CCO, 2012).

39 Source: MOC website (<http://www.coal.nic.in/allocated161211.pdf>), accessed on 30 August, 2012

40 As of May 2011 Compiled from data available on MoEF website regarding environmental clearances granted

41 For simplicity, we use the term "linkages" to refer both to linkages and letters of assurance or LoAs.

42 Assuming that the linkage promises even 50% requirement for the 25,000 MW for which linkage quantities are not mentioned, the total linkage commitment becomes about 270 mtpa from 209 mtpa.

43 Real increase in demand would be greater, as other consuming sectors demands would also have increased.

demand of power plants with coal linkage and actual production points to a serious lack of coordination between the concerned ministries.

This is further illustrated by Figure 11, which shows that linkages were approved for over 210 mtpa in 2009 & 2010 alone, even considering only a partial coal allocation of 3.4 MTPA/GW (as against the norm of 5 MTPA/GW) for the power plants that requested coal linkage. In sharp contrast, the total increase in production expected in the BAU scenario in the entire 12th five year plan is only 175 MTPA. It is not clear how these plants will be supplied coal if they get commissioned. If these linkages were used by power plant developers to make their projects bankable, then the implications of granting these unrealistic linkages become worse.

In addition to the seemingly irrational linkages being granted, there is also a question of the transparency and objectivity of the allocation mechanism. The Committee on Allocation of Natural Resources has stated that the principles used by the SLC (LT) to allocate coal to various organizations requesting coal linkages needs to be more transparent and the minutes of the SLC (LT) meetings need to have better justifications for the linkages granted (Government of

India, 2011, pp. 17, 18). As of 31st July 2011, about 1500 applications for linkages were pending with the Government including applications for about 600 GW of power plants (or 3000 mtpa at a normative average of 5 mtpa per GW) and a further 650 mtpa for cement and sponge iron plants (Ministry of Coal, 2011e). Clearly, such a huge pent-up demand cannot be satisfied and the allocation process will have winners and losers. If this process is not transparent and objective, it could unduly benefit some players at the cost of national interest.

There are serious concerns about the inter-ministerial coordination, transparency and objectivity in the process of granting linkages.

8.2 End-use of captive blocks

In the controversy that broke after the tabling of the CAG report, the Government responded to allegations of giving away coal blocks 'free' by stating that the purpose of captive block allocation was not revenue maximization and auctioning coal blocks would have increased the cost of coal, and hence, power (Ministry of Coal, 2012a; PMO, 2012a). However, this argument is not really valid, for the following reasons:

1. Captive blocks were given out not only to power generators but also to sectors such as steel and cement, which are unregulated sectors. Hence, captive block allocations are unlikely to reduce product prices in these sectors and are likely to only distort these markets.
2. There were also no conditions attached to the captive blocks given to the power sector, which would have forced such generators to pass on the benefit of cheaper coal to their consumers (Ministry of Coal, 2006b; Ministry of Coal, 2006a; Sreenivas, 2012). We understand that the Government is now trying to address this at least for the forthcoming captive block allocations (Singh S. P., 2012; Ministry of Power, 2012).
3. Similarly, there has also been a controversy regarding usage of excess coal mined from blocks

MoC had not imposed any conditions to ensure that the benefits of cheap coal were passed on to consumers by captive block owners. There are attempts to address this now.

Figure 10: Incremental coal requirement and coal production⁴⁴

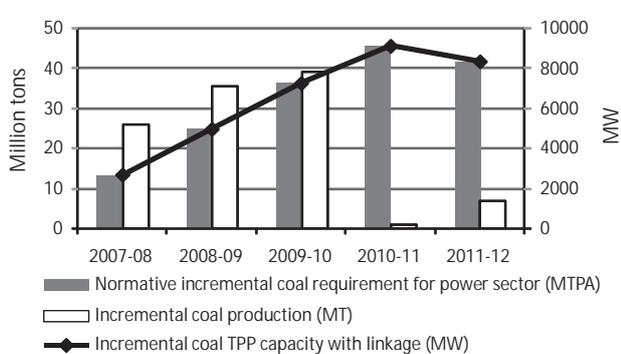
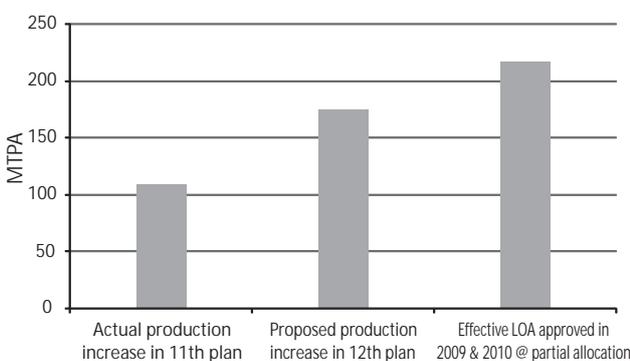


Figure 11: Proposed coal production and linkages granted⁴⁵



44 Source: (CCO, 2011; Ministry of Power, 2007).

45 Source: (Ministry of Coal, 2011; Ministry of Coal, 2011b)

Box 2: Coal allocation to the Sasan UMPP

As can be seen from the timeline of different actions with regard to allocation of coal blocks to the Sasan UMPP, excess coal seems to have been allocated to the UMPP, which Reliance Power Ltd. (RPL), the developer, has been allowed to use in another plant at Chitrangi (CAG, 2012a). Interestingly, the tariff quoted by the Sasan plant was about Rs. 1.12 per unit, while it was around Rs. 2.45 per unit for the Chitrangi plant (Forum of Regulators, 2010). This suggests the possibility that benefits of cheaper coal to Chitrangi plant are not being passed on to consumers, though RPL has said that such tariff comparisons are inappropriate (Reliance Power Ltd., 2012). It also raises the question of fairness of the bidding process.

September 2006

- Moher, Moher-Amlohri extension blocks allocated to Sasan Power (600 MT geological reserves)

October 2006

- Chhatrasal block also allocated to bring geological reserves to 700-800 MT

August 2007

- Sasan UMPP awarded to RPL and contract signed

November 2007

- Chief Minister of Madhya Pradesh refers to excess coal in blocks and requests its usage in RPL's Chitrangi power plant

March 2008

- Mining plan for Moher and Moher-Amlohri extension submitted, 12 MTPA production
- RPL says balance to come from Chhatrasal

May 2008

- Empowered Group of Ministers (EGoM) states that not enough excess coal
- Excess coal, if any, to be used by Sasan itself for longer period

July 2008

- Mining plan for Chhatrasal submitted

August 2008

- RPL claims availability of excess coal due to improved technology and requests usage in Chitrangi plant
- EGoM approves usage of excess coal for Chitrangi
- EGoM says excess coal to be used for tariff based competitive bidding only

September 2008

- RPL submits revised mining plan for Moher and Moher-Amlohri extension for 20 MTPA production.

March 2009

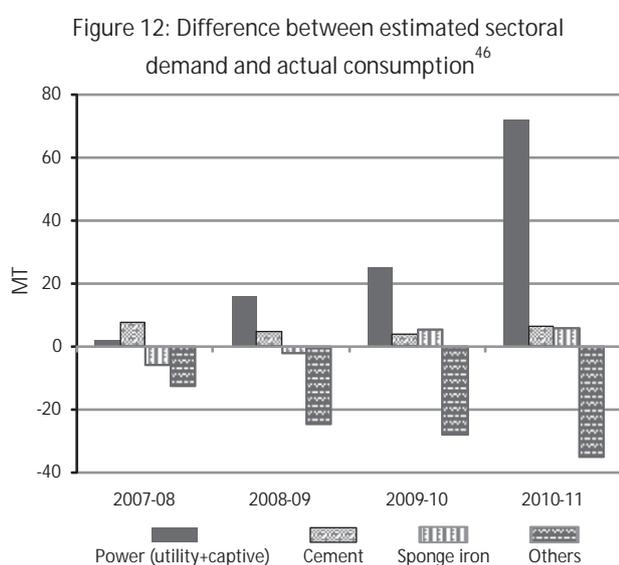
- MoC standing committee approves Chhatrasal mining plan for 5 MTPA
- Minutes of committee meeting reveal that Sasan does not need Chhatrasal, other two blocks sufficient

allocated to the Sasan UMPP (CAG, 2012a). It appears that, in this case, project developers have been allotted coal in excess of their needs, and have been allowed to use the excess coal in another plant – see Box 2 for details.

8.3 Demand estimation

Figure 12 shows the difference between estimated demand and actual off-take of coal by various sectors over the past few years. It can be seen that the estimated demand from the power sector seems to be consistently over-estimated while the estimated demand for ‘others’ sector consisting of small industries such as brick kilns etc. is consistently under-estimated. This indicates a weakness in annual demand assessment for the ‘others’ sector, and perhaps also indicates an over-estimation of demand for the power sector in the past (though the sector currently faces a shortage of coal supply). Such inaccuracies in demand assessment and tying linkages to these assessments may also be a cause for coal diversion as consumers are unable to get coal through linkages as per their requirement.

The demand estimation methodology used by MoC seems weak, and could be an indirect cause of coal diversion.



9 Coal India Ltd.

CIL is the world’s largest coal producer and supplies about 80% of India’s domestic coal. As a result, most

consumers have to depend on CIL for their coal supply. Therefore, issues related to CIL and its dominant position are dealt with in a section of their own.

9.1 Quality and quantity of coal supply

Many consumers have complained about the quantity and quality of coal they get from CIL (NCL, 2010; MSPGCL, 2012; Singh & Bhaskar, 2012). They complain that the coal they received is of bad quality in the form of either having inferior calorific value or being wet etc. Many consumers have also complained of actually receiving significant amount of rocks in some of their coal shipments. These problems indicate serious shortcomings in the quality verification mechanisms that are currently in use. For example:

1. CIL naturally only takes responsibility for coal quality until the point of loading the coal into a train or truck, while Indian Railways and other transport agencies do not seem to take any responsibility. This leads to a system where coal quality can be compromised during transit.
2. The FSA provides for joint collection of samples and quality checking at loading point (CIL, 2012f). However, the feedback we have received from some consumers is that this system does not work in practice, as either the consumer representative at the pithead is compromised or is unable to perform his duties due to coercion.
3. Similarly, though the FSA provides for a backup sample to be collected for dispute resolution in case the consumer finds delivered quality to be inferior, in practice, the current system does not seem to provide the consumer any effective means of grievance redressal.
4. Until 2011, prices of coal were based on broad Useful Heat Value (UHV) bands which classified coal into different grades. Broad pricing bands effectively reduce the incentive for coal suppliers to improve coal quality as it is unlikely to improve their returns. Pricing is expected to have moved to GCV basis, with narrower pricing bands, from 2012. However, we understand this is not proceeding at the expected pace, thus not addressing the coal quality problem.

46 Source: (Ministry of Coal, 2011, p. 246)

Consumers also complain that they do not receive requisite quantity of coal on time. According to the CAG report, between 2008-09 and 2010-11, CIL did not supply about 54 million tons of coal that had been contracted through FSAs (CAG, 2012, p. 11).

Interestingly, even as there was significant shortage of coal during 2011-12, over 35 MT of coal was sold through the e-auction route by between April and December 2011 by CIL and SCCL (Ministry of Coal, 2012f, p. 47). The e-auction mechanism was envisaged to make coal available for small and medium consumers who could not get coal linkages (Ministry of Coal, 2007a). However, the shortage of coal supplied under FSAs pushed even large consumers such as power generators to use the e-auction mechanism (and increase their coal imports). In spite of this, the country's coal-based power generation fell short of expectations by almost 30 billion kWh, which is about 5% of total electricity generated from coal, due to either shortage of coal or poor quality of coal (CEA, 2012c, p. VII). This suggests that customer requirements according to existing linkage agreements were not met even as coal was auctioned at high prices.

Though consumers complain of quality and quantity problems regarding coal supply, there seem to be no effective grievance redressal mechanisms.

9.2 Fuel supply agreements

The FSA signed between CIL and its consumers defines the legal contract by which CIL would supply coal to its consumers. This agreement defines a particular ACQ of coal that must be supplied annually by CIL to its consumers. The New Coal Distribution Policy (NCDP) that became effective in 2007 mandated that all coal supply contracts should move to the FSA regime in a stipulated time-frame. It is not clear from publicly available information how completely this has been implemented. For purposes of this section, we assume that the model FSAs published by CIL such as (CIL, 2008) are currently in use⁴⁷.

The currently operational FSA includes clauses that require the consumer to pay the seller a 'performance incentive' for supply of coal over 90% of the ACQ in any year. For example, the model FSA for power sector

consumers includes clauses for an incentive of 15% for supply of coal between 90% and 95%, and 30% for supply of coal more than 95% of the ACQ (CIL, 2008, p. 18). In contrast, the coal supplier has to pay compensation to the consumer only when the actual supply falls below 50% of the ACQ, and even then the compensation is only 10% (CIL, 2008, p. 15). Such an agreement is clearly one-sided, and reduces accountability of the coal supplier to meet its obligations.

Moreover, such an FSA structure provides a structural incentive to CIL to discriminate among consumers, as it can earn a performance incentive by diverting coal to some consumers by supplying over 90% of the quantity and not suffer a penalty for under-supplying others as long as the shortfall is above 50% of the contracted quantity. For example, if CIL has FSAs with two consumers for an ACQ of 10 MTPA each and is in a position to supply 16 MTPA, it can maximize its revenues by supplying one consumer only 6 MTPA and supplying the other 10 MTPA, since it need not pay any penalty for supplies over 5 MTPA, while it can earn an incentive for supplies over 9 MTPA. Assuming a coal price of Rs. 1000 / ton for simplicity, CIL can earn additional revenue of Rs. 25 crores from an example as given above. In contrast, if the consumer getting less coal imports coal to make up the shortfall, it would cost him an additional Rs. 130 crores, assuming imported coal costs US \$ 50 / ton and has calorific value 1.5 times that of domestic coal.

The prevalent FSA is structurally imbalanced and biased towards the coal producer.

To compound matters, CIL was pressured to enter into binding FSAs through a presidential directive, when it was clear that it could not produce enough coal to satisfy all its FSAs. This led to CIL initially proposing an FSA that practically absolved it for not meeting the contracted quantity and quality (CIL, 2012). Following intense pressure from consumers, it is understood that this issue may be at least partially addressed in the form of a slightly improved penalty and incentive structure (CIL, 2012f). However, even this modified proposal appears one-sided, particularly regarding the import related side agreement (CIL, 2012g), which does not bind CIL to make due efforts to source coal at the

47 Another FSA structure is currently being discussed and may be adopted in future (CIL, 2012f)

cheapest price but binds the consumer to pay for the price quoted by CIL though the penalty for not delivering would still be calculated according to domestic coal price.

9.3 Coal pricing

Government of India de-regulated coal prices in 2000, allowing coal producers to set prices of the coal they produced (Ministry of Coal, 2000). Given the monopolistic nature of the coal sector since its nationalization, it is not clear what could have been the rationale for price deregulation. This is particularly so if one considers the following:

1. The power sector is the primary consumer of coal and most power producers have a pass-through clause regarding fuel cost. Therefore, they would have no incentive to pressurize CIL to bring its prices down, and the ultimate sufferers would be ordinary citizens buying the power.
2. The sector does not have an independent regulator to prevent arbitrary price increases.

Indeed, a similar fear was also expressed by MoP way back in 2000, leading to the matter being referred to the tariff commission (Ministry of Coal, 2000). It is not clear what the recommendations of the tariff commission were since they are not publicly available. However, it is clear that CIL still controls the pricing of coal even 12 years later.

CIL's actions while introducing new prices earlier in 2012 give an indication of how such discretion of pricing may potentially be misused. Subsequent to a decision to move from the UHV method to the internationally used GCV method for pricing coal, CIL published its GCV bands along with notified prices effective January 1 2012 (CIL, 2012a). These prices significantly increased the cost of coal for many consumers as shown in Figure 13. The revised prices were substantially higher for grades C, D and E which together contributed about 44% of CIL's production in 2010-11 (CCO, 2011, pp. 3.19,3.20). After protests from

The rationale to deregulate coal pricing in a monopoly situation without an independent regulator is not clear.

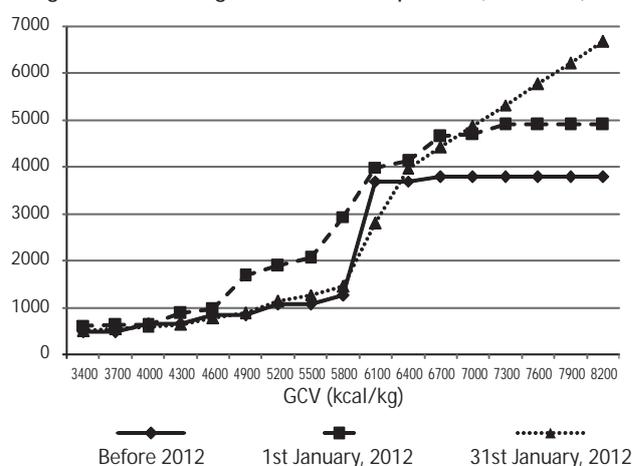
consumers of coal, these prices were later revised downward in February 2012 (CIL, 2012b). In short, the changed prices published by CIL following a change of pricing methodology were not revenue-neutral but attempted to increase revenues without any increase in quantity or quality of coal.

9.4 CIL's profitability

One interesting aspect of the coal sector is that, in spite of low productivity and stalled production levels, CIL's profits have generally increased over the last few years (Figure 14). As can be seen, though coal off-take increased by only about 10% and productivity increased by only about 20% during these three years, profits increased by over 600%⁴⁸. It is possible that such increase in profitability was due to increased realizations from e-auctions (ironically, due to shortage of domestic coal availability) and/or reduction in costs by not recruiting appropriate qualified personnel. Estimates suggest that realization from e-auctions in 2011-12, the year with the most coal shortage through the 'normal' route, went up by 88% though the quantity auctioned increased only by about 7.5%⁴⁹.

The primacy of financial performance over customer satisfaction is also reflected in the Memorandum of Understanding signed between CIL and MoC, where various profit and sales metrics amount to over 20% of CIL's performance evaluation, while both customer satisfaction (measured as 'dispatch covered under agreed sampling to power sector') and dispatch of coal to the power sector by rail are accorded only 2% weight

Figure 13: Change in CIL's coal prices (Rs / ton)⁵⁰



48 A similar view is expressed in the IEP (Planning Commission, 2006a, p. 117).

49 This also suggests that at least some customers are willing to pay more for coal if they can get access to it.

50 Source: (CIL, 2012a; CIL, 2012b)

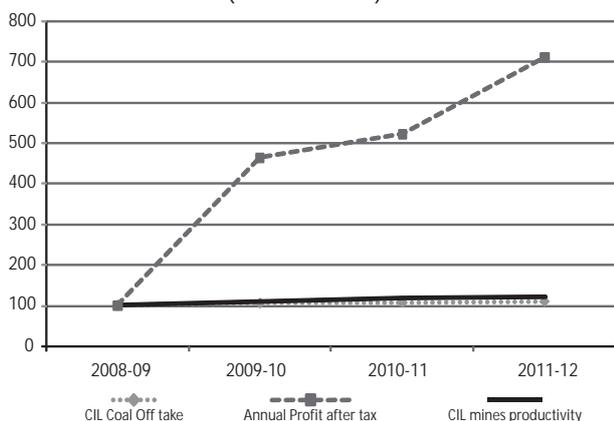
each, and there is no entry at all for consumer grievances addressed (CIL; MoC, 2010).

Faced by the absence of grievance redressal mechanisms and an imbalanced FSA structure, some consumers receiving poor quality or quantity of coal appear to have approached the Competition Commission of India (CCI) as they feel CIL is abusing its monopolistic position (Jog, 2012).

There are suggestions of monopoly abuse by CIL.

There are many lacunae in current practices of mine restoration, which results in long-standing ecological damage and also makes land acquisition harder.

Figure 14: Coal India Ltd.'s performance and profits (2008-09 = 100)⁵¹



10 Mine closure

At the end of a mine's useful life, it is expected to be closed and restored back to a state where the land can be gainfully used either for rehabilitating people or for other activities such as afforestation. For open-cast mines, this would typically involve backfilling the OB, leveling the ground, restoring top-soil, biological reclamation of leftover OB dump etc.⁵², while for underground mines, it would mean filling up the mine with sand etc. to prevent land subsidence and sealing the entrance shafts.

However, very little of this is practiced in reality. Though CMPDI has produced a report on land reclamation based on satellite imaging which provides encouraging figures for reclaimed land (CMPDI, 2012a), as summarized in Table 7, a CAG audit report of CIL's CSR activities concludes that CIL has not been adequately backfilling exhausted mines (CAG, 2010). These problems were also evident during our visit to the Durgapur and Padmapur mine areas in Vidarbha where some mines had not been back-filled for over six

years after all its coal was extracted. The importance and inadequacy of mine closure is also reflected in the reports of the 11th plan and 12th plan working groups on coal (Ministry of Coal, 2006, p. 140; Ministry of Coal, 2011, p. 134). According to the guidelines published by MoC on mine closure, mine owners are to inform CCO about progress in this matter and CCO is expected to certify proper mine closure (Ministry of Coal, 2012d). However, given the capacity constraints of CCO, it is unable to fulfill this function effectively.

This is really unfortunate because proper restoration of the mine after its useful life, or even during its useful life for large open cast mining areas such as near Raniganj, can help in quicker and more economical R & R of local population, as it can facilitate offering land for land, relatively local displacement and resettlement of entire communities without breaking them up. Biological reclamation of OB dumps, including restoration of topsoil, can also help to ensure that agriculturally productive land is not lost forever due to mining. If adopted, such practices can go a long way in reducing people's resistance to coal mining, and help to not only increase coal production but also move towards truly inclusive development.

11 Conclusions

The above analysis shows that there are serious weaknesses with many aspects of the coal sector. Broadly, these can be classified into the following:

1. **Accountability:** This is a fundamental problem with the coal sector and is illustrated by the inadequate understanding of reserves, imbalanced FSA structure, CIL's continuing profitability without sufficient productivity improvements, seemingly arbitrary amount of linkages being granted, weak conditions attached to captive blocks, blatant flouting of environmental and social norms in mining operations and lack of recourse to consumers receiving poor quality and quantity of coal. In the absence of appropriate accountability mechanisms, institutions do not have sufficient

⁵¹ Source: Data from coal directories and CIL annual reports. All values normalized to 100 for 2008-09

⁵² See <http://www.coal.nic.in/120112.pdf> (accessed 26th September 2012)

incentives to perform and deliver on their expectations.

2. **Planning and execution:** This is evident from the widening demand-supply gap, inconsistencies between demand estimations, production plans and linkages given, the inability to meet targets for exploration, production, washing and evacuation, insufficient planning to enhance technological and HR capability and inadequate preparation for auctioning of captive blocks.
3. **Transparency:** As stated by the Supreme Court of India in a landmark judgment in 1975, transparency is the first requisite for accountability in any democratic institution (Supreme Court, 1975). Unfortunately, the coal sector is quite non-transparent as indicated by the non-availability of lot of important information publicly such as rationale for linkages granted, mine-wise production and dispatch information and information regarding coal rake availability and utilization as also highlighted by various other reports (CAG, 2012, p. 22; Government of India, 2011, p. 17).
4. **Monitoring and oversight:** Weaknesses in monitoring have allowed operators to under-perform and flout norms. Examples include weak monitoring of production from captive blocks and CIL, as well as weak monitoring of environmental compliance and mine closure.
5. **Health, safety and livelihood issues:** There is an increasing resistance to coal mining and other industrial activities in rural India as it is perceived that they are not benefiting from such 'developmental efforts'. In addition to suffering the ill-effects of mining activities, it is felt that citizens' livelihoods are adversely affected due to poorly designed and implemented rehabilitation packages. Further, safety and health issues of employees in the coal sector, particularly contract labour, are also compromised.
6. **Law and order:** The coal sector has come to be associated with a 'coal mafia' and the issue continues to plague the sector in spite of being officially acknowledged. Illegal mining is a serious problem that has both law and order and social dimensions to it.
7. **Inter-agency coordination:** Many problems arise

due to insufficient coordination between concerned ministries and other agencies. Examples include the inordinate delays in getting clearances, lack of realization of rail infrastructure for coal evacuation, planning inconsistency across sectors such as coal and power, and the continuing inability to deal with the illegal coal mining and mafia problem.

We believe that the crisis facing the coal sector cannot be resolved unless all the challenges listed above are addressed with equal seriousness. Unfortunately, many currently proposed 'solutions', such as the presidential directive or auctioning of coal blocks, only look at very specific aspects out of the complex set of issues that need to be addressed, and are hence unlikely to succeed unless a more comprehensive approach is taken.

12 Suggestions

Based on the analysis, we compile a set of suggestions to holistically address the challenges faced by the Indian coal sector. These suggestions include many that have been suggested earlier by others (Ministry of Coal, 2005; Ministry of Coal, 2007; Chand, 2008; Government of India, 2011). We would like to re-iterate our belief that addressing the coal sector's challenges requires a comprehensive approach to address all the concerns raised above and there are no 'silver bullets'. It will have to be a rigorous, collective approach involving all stakeholders in the sector. It will also have to be a multi-pronged approach that addresses various issues such as governance, socio-environmental impacts and market structure.

12.1 Addressing the current shortage

There is an understandable need to find urgent solutions given the current 'crisis' in the coal and power sectors. However, care must be taken to avoid quick-fix solutions that are incompatible with long-term goals and public interest at large. Some suggestions on these lines are given below:

1. **Coal linkages and FSAs:** The root cause of the current problem is that much more coal has been promised to consumers than is realistically possible for CIL to supply. Importing coal to meet the shortfall and pooling prices is a suggestion that has been mooted to address this problem. It is beyond

the scope of this report to suggest an optimum pricing solution to the crisis, but a free and frank discussion among stakeholders based on an acknowledgment that it is not possible to honour existing contracts will be a good starting point to finding an amicable solution.

2. E-auctions: Until the supply situation improves, FSAs and other such commitments for supply of coal should take precedence over any guidelines about quantities of coal that should be e-auctioned. Limited quantities of e-auction may be allowed to enable small consumers to access coal, but large consumers with FSAs should not be allowed to participate in such auctions.
3. Rationalizing coal linkages: All existing coal linkages should be reviewed and optimized to reduce coal transportation requirements. Linkages of end-use plants whose progress is unsatisfactory should be reassigned to end-users who have shown greater progress.
4. Coal production and evacuation: It is understood that opening only a few critical mines and/or completing evacuation infrastructure from them (such as the links at Karanpura, Mand-Raigarh, Korba and Ib Valley) can help CIL increase its production by about 100 million tons. Efforts should be focused on these mines and evacuation infrastructure. Needless to say, these efforts should include taking local citizens into confidence, compensating them adequately, sharing the benefits of the increased coal production with them, and minimizing local environmental degradation.
5. Coal imports: It is apparent that, at least in the short-term, India's coal imports will increase significantly and India may soon be one of the largest coal importers in the world. Coal exporters are likely to see this as an opportunity to increase their revenues (Nair & Arun, 2012). To counter this, India could consider using its negotiating power as a large importer to strike a long-term coal import deal with some countries at reasonable prices, or try to obtain access to economical coal reserves in exchange for developmental assistance or trade concessions. In any case, it should ensure that it does not get locked into high priced long-term

commitments to meet the short term shortages. It should also be stated here that CIL would perhaps not be the best agency to strike coal import deals, since it is neither its area of expertise nor should it be burdened with this task in addition to producing more coal.

12.2 Other suggestions

A set of further suggestions on addressing the multitude of challenges faced by the coal sector are given below. These cover a range of suggestions from very specific actions to broad structural issues to be addressed.

1. Apex committee: Government of India should form an apex coordination committee to comprehensively review the coal sector and make recommendations to move towards a healthy coal sector that can contribute to India's energy future and energy security.
 - a. The committee should consist of representatives from all relevant ministries such as coal, power, railways, environment and forests, iron and steel, industry, finance, PMO and the Planning Commission.
 - b. It should be mandated to consult and take on board suggestions and inputs from all stakeholders, including coal producers, consumers, social and environmental activists, academics, consultancy organizations, washeries and logistics organizations.
 - c. Based on frank and objective discussions, the committee should make specific recommendations on mechanisms to be set up and actions to be undertaken by agencies along with their timelines.
 - d. Its functioning should be completely transparent, and it should publish the agenda of its meetings in advance and also the minutes of its meetings.
 - e. The report(s) of the committee should also be made public and finalized only after considering all feedback.
2. Clarity on coal reserves: This fundamental question needs to be answered at the earliest to provide clarity and confidence about the coal reserves India

really possesses and can usefully extract. This will enable rational planning for the coal and energy sectors based on a realistic assessment of reserves. In particular, CMPDI should expedite publication of its UNFC classification of Indian coal reserves, and this should be independently vetted by a competent agency. Both CMPDI's reserve estimation as well as the independent evaluation should be available in the public domain.

3. CMPDI: The expert committee had recommended that CMPDI should be made an independent agency and collaborate with international mine planning and development agencies. We believe this is also required to address an inherent conflict of interest: CMPDI is the country's primary exploration agency for coal – a national resource – while CIL is one of the coal producing companies (albeit, producing about 80% of the coal and being mostly publicly owned). Therefore, this needs to be reconsidered on a priority basis.
4. Old and unviable CIL mines: It is understood that some old mines of CIL, particularly underground mines, continue to function in spite of these mines being completely unviable. A thorough review must be conducted of all CIL mines in operation, and mines most of whose resources are exhausted and are currently unviable should be shut down. This should be accompanied by appropriate HR policies such as suitable voluntary retirement schemes and/or retraining personnel to employ them elsewhere in the coal sector. The report containing the review and corrective actions must be made public.
5. Transparency: As discussed earlier, transparency is a key requirement for improving accountability. The need for transparency is strengthened by coal being a depletable national resource. Therefore, not only should all data related to the coal sector be public and easily accessible, but all policy decisions and other rulings should also be made public in an easily accessible manner. This applies not only to MoC, but also to agencies such as CIL, CCO, CMPDI and other coal producers. The information that is published should include⁵³
 - a. details of potential coal bearing areas,

exploration done, reserves classified according to UNFC, and their geographic locations plotted on a map,

- b. clearances and other permissions for exploration, mines and rail infrastructure,
- c. mine-wise information about coal production, off-take, quality etc.,
- d. tenders issued by CIL for outsourcing operations, number of bidders, names of winning bidder and anonymous comparison of winning bid with other bids,
- e. linkages given and rejected, and the rationale for each such decision
- f. details of FSAs signed, and actual quantity and quality of coal supplied against these FSAs
- g. details of complaints from coal consumers about coal quality or quantity and steps taken to address them
- h. details of land acquired, the rehabilitation measures undertaken and pending disputes, if any
- i. reports of CCO's inspection of mines, corrective actions demanded and corrective actions taken
- j. reports of MoEF's monitoring of mine operations, corrective actions demanded and corrective actions taken
- k. mine closure reports by the companies and CCO's mine closure monitoring reports
- l. details of measures undertaken related to employee safety and health

Such levels of transparency will enhance accountability and confidence in the working of the various agencies in the sector and also enable better analysis and understanding of the coal sector, thus leading to better solutions.

6. Public participation: Public participation is a means of enabling citizens to provide inputs once basic transparency norms are established and implemented. It is possible that some of these are legally mandated even currently, but they need to be implemented in earnest. In the coal sector, this would be applicable in at least the following situations:

53 Only a small part of this information is available publicly now.

- a. Pro-actively seeking public inputs on major policy reforms such as creation of a coal regulator, terms and conditions for auctioning new captive blocks and developing new quality control norms
 - b. Meaningful public participation regarding starting new mines in a particular area and rehabilitating citizens in that area
 - c. Involving citizens in the monitoring of on-going projects to ensure that local environmental damage is minimized and where unavoidable, adequately compensated for.
7. Land acquisition and R&R: R & R processes should ensure that local citizens are open to activities such as coal mining because they see some benefits in the process. This requires innovative approaches to land acquisition and R&R. These could include ideas such as:
- a. Long term lease of land: Rather than purchasing land, it could be leased on a long term basis. This would ensure that the asset continues to belong to the land owner and the land owner is also assured of a long term regular source of income. Of course, this needs to be accompanied by suitable processes to ensure that the land is returned to the land owner in the same or better condition than it was, when leased.
 - b. Offering developed land: In cases where land values are likely to go up after purchase (say, due to expected industrialization), all those who stand to lose their livelihoods could be offered part of the developed land whose value would have appreciated. These lands can be commercially exploited by the people to generate livelihoods.
 - c. Offering equity: All affected people (including the landless) can be offered equity in the development projects for which the land has been acquired. This will ensure that they continue to receive the benefits of the development taking place on their land, while their time is free to pursue other livelihood activities that may be less hazardous than mining. If designed and implemented well, we submit that such an approach would be superior

to offering employment in CIL as CIL is already over-staffed at the labour level⁵⁴ and augmenting employees in that category would only lead to under employment.

- d. Offering annuities: Annuities could be offered to all those, whose livelihoods are affected, thus providing a regular stream of income.

Some ideas on the lines above have already been proposed in policies of various states (Government of Karnataka, 2009; Government of Uttar Pradesh, 2011).

8. Independent regulator for the coal sector: An independent regulator has been suggested for the coal sector in many reports to help improve the performance and accountability of coal companies and provide a level playing field (Ministry of Coal, 2007; Chikkatur, Sagar, & Sankar, 2009; Ministry of Coal, 2000). It is also understood that formation of such a regulator is under active consideration. An independent, empowered and accountable regulator would help in addressing a fundamental conflict of interest in the sector where the Government of India is both a majority shareholder in CIL and the de-facto regulator for the sector as a custodian of the national resource. Moreover, such a regulator would also help to protect consumer interest in a monopoly market where pricing has been deregulated.

The independent regulator should be responsible not only for issues such as pricing, quality and contract adherence but also meeting production targets, safety, mine restoration, compliance to environmental norms etc. The regulator's role would become even more important if the sector is considered to be opened for commercial mining.

It goes without saying that the proposed regulator should also adhere to the highest standards of transparency and encourage public participation in its decision making, so that the regulator's accountability is strengthened and it can gain public confidence. The mechanism of appointing members to the regulatory body should also encourage regulatory independence.

- 9. Market structure: The current market structure of the coal sector is monopolistic by design, through

54 This does not take away the fact that CIL suffers from serious HR constraints at the technical and managerial levels.

the Coal Mines (Nationalization) Act of 1973. However, there are increasing concerns about possible abuse of this dominant position by the public sector monopoly, CIL.

The Committee on Allocation of Natural Resources suggests an interesting innovation of a coal trading platform as a way to gradually move towards a competitive scenario with multiple sellers and buyers (Government of India, 2011). It also suggests that independent mining firms should also be allowed to take part in the auction of captive coal blocks along with clearly identified end-use firms, so that firms with the right expertise can get into coal mining. These are interesting suggestions worthy of serious consideration though implementing such ideas without improving the sector's transparency and accountability could lead to undesirable results. However, there is clearly a need to seriously rethink the market structure in the coal sector. Two aspects related to the market structure are discussed in detail below:

- a. Pricing: Pricing of coal is an issue of debate, particularly given the law suit filed by TCIF. This issue should be examined along with market restructuring, but it must be borne in mind that the most important downstream consumer of coal, i.e. the power sector, is a regulated sector. Moreover, a large part of India's population does not have access to electricity or has access only to erratic and poor quality of electricity. Therefore, any pricing reform must identify mechanisms to mitigate the negative impacts of pricing changes on this segment of population. The prevalent dual pricing of coal for 'core' and 'non-core' sectors also needs to be revisited, as it could provide yet another motivation for coal diversion.
- b. Fuel supply agreements: Another issue that needs attention is the contractual structure between coal suppliers, transporters and consumers. The current FSA structure is biased towards the seller and does not seem to provide for effective grievance redressal. FSTAs have been suggested as a way to bring coal transport also into the FSA ambit. Developing a fair and effective contractual structure with functioning grievance redressal mechanisms is crucial to improving the sector.

10. Environmental management: The current regime is unable to ensure good environmental practices or compliance to environmental norms. Combined with insufficient compensation for lost livelihoods and displaced communities, such a regime could potentially lead to a sharp mobilization against mining in particular and industrialization in general. This is already visible in parts of the country and could have severe long term impacts. Therefore, this issue needs urgent attention and a holistic framework developed to ensure effective environmental management. Augmenting the capacity of MoEF and other agencies to effectively monitor operations and actively seeking the participation of local communities in environmental monitoring are some suggestions in this regard.
11. Underground mining: Though various reports on coal repeatedly emphasize the need to increase underground mining (Ministry of Coal, 2006, p. 149; Ministry of Coal, 2011, p. 208), coal industry officials are skeptical about it citing India's geological constraints which do not permit technologies such as long-wall mining to be deployed. There is also the view that underground mining may have significantly lesser social and environmental impacts, and hence its overall costs (including social costs) would be much lower than estimated. The Government must develop (or commission) a paper that considers all these aspects such as Indian reserves and their depths, geology, prevalent technology, social, environmental and financial costs and arrive at a suitable strategy for their exploitation through a combination of open cast and underground technologies. This strategy paper, after a public review, can guide future development of the sector.
12. Capacity building: A time-bound plan must be drawn up to improve the HR strength and technological capacity of many agencies. CMPDI needs the requisite capacity analyze the information obtained from drilling even if actual drilling operations are out-sourced. CIL needs to augment its technical and managerial strength to be able to increase its productivity and use the latest available technology. CCO needs to be strengthened to perform its duties of inspecting mines, monitoring production and collecting

reliable statistics. The analytical ability of MoC also should be enhanced to enable better planning and policy formulation. Similarly, a time-bound plan must be drawn up to augment the capacity and institutional strength of MoEF and state pollution control boards to enable them to effectively perform their task of monitoring coal mine operations and closure.

There is a feeling that capable and young technocrats are not attracted to the coal sector due to the emergence of other 'clean' opportunities in sectors such as information technology and finance. The only solution to this problem is to make the coal sector comparably attractive by modernizing the coal industry, providing a safe and attractive working environment, and good compensation packages. Retired officials from the coal sector could be used to bridge the capacity gap as an interim measure.

13. Labour and safety issues: Safety and working conditions of labour in the Indian coal industry appears to be unhealthy, though India is a signatory to the ILO 176 charter. The Ministry of Labour and Employment should look into the issue and suggest working practices that protect worker interests as well as help improve productivity.

14. Clearance process: The process of obtaining the various clearances should be streamlined. The expert committee had recommended setting up a special task force to address this issue as well as to monitor progress of mines, and the idea has also been repeated in two planning commission working group reports (Ministry of Coal, 2005, p. 38; Ministry of Coal, 2006, p. 187; Ministry of Coal, 2011, p. 204). A suitable solution should be worked out in consultation with the various ministries, state governments and environmental groups.

15. Law and order: The virtual capture of many operations in the coal sector by various mafias must be recognized, and an action plan to address this problem should be drawn up. It should also be recognized that the problem also has a social dimension and should be sensitive to such issues.

We hope that the suggestions in this report can trigger a healthy discussion towards finding solutions that can address the long term health of the coal sector to make it fair, sustainable and equitable.



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List of abbreviations

ACQ	Annual Contracted Quantity
CAG	Comptroller and Auditor General
CCO	Coal Controller's Organization
CEA	Central Electricity Authority
CIL	Coal India Limited
CMPDI	Central Mine Planning & Design Institute
CSR	Corporate Social Responsibility
DGH	Directorate General of Hydrocarbons
EGoM	Empowered Group of ministers
FSA	Fuel Supply Agreement
FSTA	Fuel Supply and Transport Agreement
GCV	Gross Calorific Value
GoI	Government of India
GSI	Geological Survey of India
GW	Gigawatt
HEMM	Heavy Earth Moving Machinery
HR	Human Resource
IEP	Integrated Energy Policy
ILO	International Labour Organization
ISP	Indian Standard Procedure
MoC	Ministry of Coal
MoEF	Ministry of Environment and Forest
MSPGCL	Maharashtra State Power Generation Company Limited
MT	Million Tons
MTPA (mtpa)	Million Tons Per Annum
NCDP	National Coal Distribution Policy
NCL	Northern Coalfields Limited
NTPC	National Thermal Power Corporation
OB	Over burden
PMO	Prime Minister's Office
PPAC	Petroleum Planning and Analysis Cell
PSU	Public Sector Undertaking
PTI	Press Trust of India
R&R	Rehabilitation and Resettlement
RPL	Reliance Power Ltd.
RSPM	Respirable Suspended Particulate Matter
RTI	Right to Information
SCCL	Singareni Collieries Company Limited
SDL	Side Discharge Loader
SLC (LT)	Standing Linkage Committee (Long Term)
SPCB	State Pollution Control Board
TCIF	The Children's Investment Fund
ToR	Terms of Reference
UHV	Useful Heat Value
UMPP	Ultra Mega Power project
UNFC	United Nations Framework Classification
USA	United States of America
WCL	Western Coalfields Limited

Prayas Energy Group's Related Publications

- 1 'Coalgate' is about opaque decision-making (2012)
<http://www.prayaspune.org/peg/publications/item/184.html>
- 2 Prayas comments about the draft shale gas policy (2012)
<http://www.prayaspune.org/peg/publications/item/182.html>
- 3 Utilization and pricing of natural gas (2011)
<http://www.prayaspune.org/peg/publications/item/159.html>
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- 5 Towards a rational, objective natural gas utilization policy (2009)
<http://www.prayaspune.org/peg/publications/item/72.html>
- 6 Emerging Issues in the Indian Gas Sector: A Critical Review (2007)
<http://www.prayaspune.org/peg/publications/item/67.html>

The coal sector, which contributes over half of India's primary commercial energy, has recently been beset with controversies such as the 'coal-gate' scam and insufficient coal production leading to questions about who should bear the increased costs of coal imports. This report presents a broad overview of the coal sector with the objective of highlighting the key challenges to be overcome and provides some suggestions on how this can be done. The study reveals that weaknesses in accountability mechanisms, planning and execution, transparency mechanisms and monitoring and oversight are some of the fundamental challenges faced by the Indian coal sector. Moreover, there is no silver bullet to address these challenges. Instead, a comprehensive, multi-pronged approach involving all stakeholders is required. The report gives some suggestions for such an approach. It is hoped that this report will contribute to a more informed debate about the fundamental challenges before the Indian coal sector and initiatives needed to address them.



Prayas Energy Group