



**Coal India Limited**

A Government of India Undertaking

*A Maharatna Company*

# Underground Mining Challenges & Way Forward



Presented by

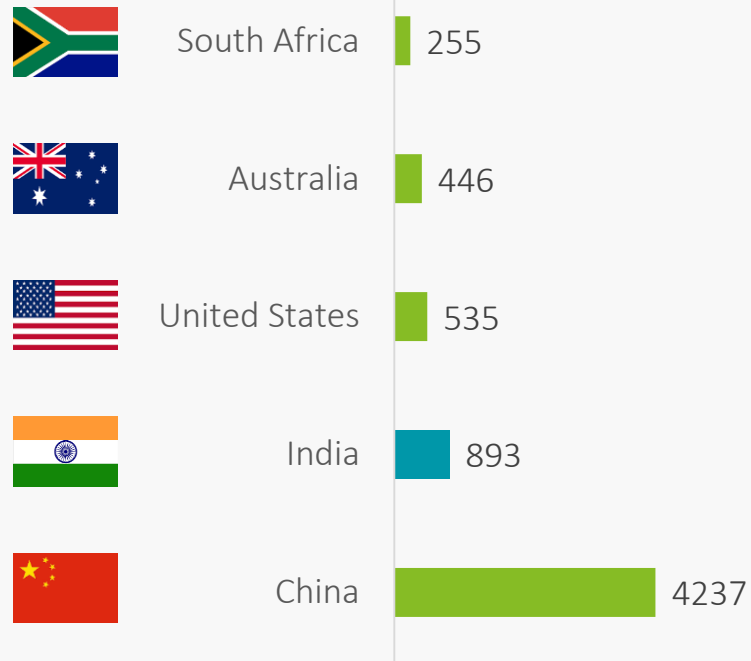
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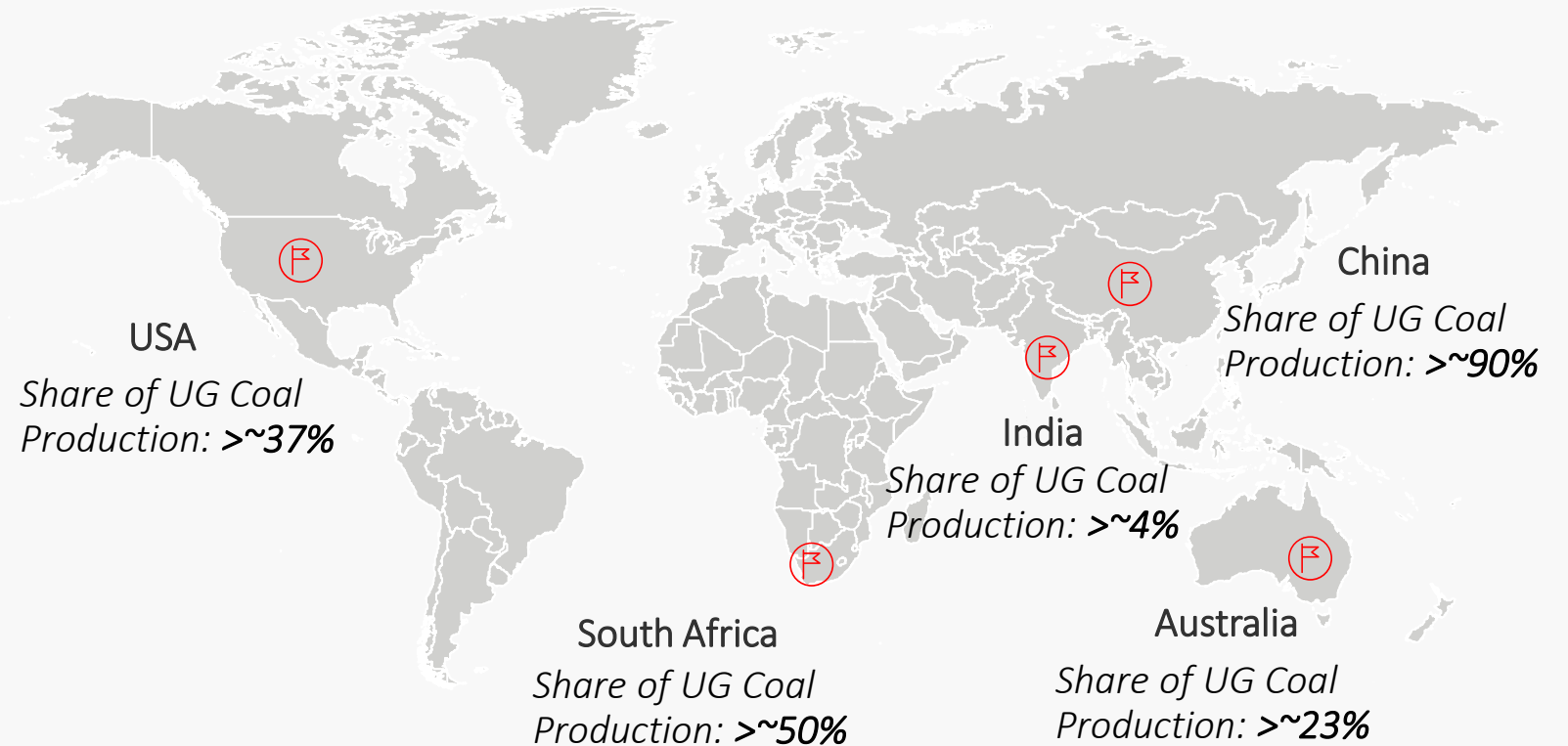
**CMD, Central Coalfields Limited**

# Global Perspective – Underground Coal Mining

Total Coal Production in 2022  
(Figures in MT)



Share of Coal Production from Underground Mines Globally



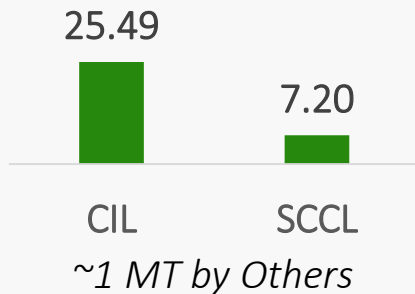
**Note:** While India's coal production in FY23 is 893 MT, CY22 production for other countries have been taken for comparison, as different countries have different cycles of financial year

Globally, major coal producers have considerable share of coal production from underground mining methods. However, India's overall share of underground coal production stood at ~4% in the past 2 years

# Key Challenges for Underground Coal Mining in India has led to the limited share of UG in the overall coal production

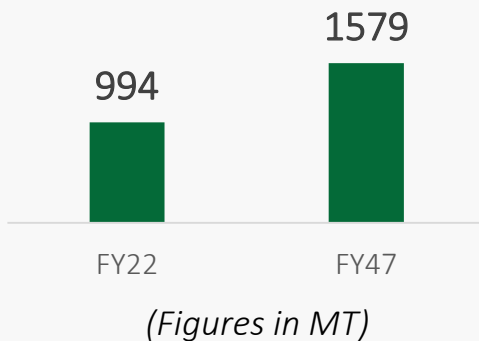
## Underground Coal Production by Major Miners in India

(Figures in MT)



~ 2% YoY growth in UG coal production in FY23 as compared to ~12% growth in overall coal production from FY22

## Projected Demand of Coal in India



As per various studies and assessment the demand of coal in the shall continue to **increase to the levels of 1.5 BT by the year 2030**, plateau and continue at the same level of ~1.5 BT for coming two decades

## Key Challenges for Underground Coal Mining in India

- Safety concerns in terms of geotechnical parameters, ventilation and roof support systems
- Lower productivity for manpower as well as machinery
- Difficult to plan high-capacity mines using PSLW equipment
- Non-deployment of mass production technologies (MPT)
- Lower economies of scale as limited mine capacity (PRC)
- lack of skilled manpower
- Lack of advanced and digitalization technologies etc.

# Recent Advancements facilitating the rapid adoption of underground coal mining in India

In the evolving scenario steep increase in share of coal from underground is envisaged due to gradual fall in production from opencast mines. Other than this factor, a number of other enablers are also conducive to the growth of UG mining in India:

## Sustainability

- Underground coal mining has **lower impact on environment as compared to opencast mining** due to lower land requirement and degradation, lower dust emissions among other considerations

## Ecosystem Maturity

- Improving operational efficiency through **MDO deployment for UG mines**
- 2 nos. UG mines across CCL & SECL** are being operated through MDO
- LoA issued for MDO with revenue sharing model for 10 abandoned mines

## Project Identification

- Identification and approval of Large number of CM/ Shortwall/ Longwall mines
- Identifying reserves for punch longwall mining** to extract reserves locked in batter and associated dip side property having issues of land
- Identification of mines for **extraction through Paste-Fill technology**

## Technology Deployment

- Deployment of Mass Production Technologies (MPT)** such as CM & PSLW, which are readily available in current scenario
- Currently, **24 Continuous Miners are operational** in 16 mines and 2 Longwalls in 2 mines of CIL
- Improvement in digital technologies** which has the potential to enable improved safety & productivity

# As we head towards growth of coal sector, **Underground coal mining is essential** for sustainable and green growth of Indian coal sector

## Key Areas

## Key Considerations to Adopt UG Coal Mining



### Reserves & Resources

- *Currently 96% of CIL's production is through opencast methodology*
- *Gradual depletion of coal amenable to OC methods at shallower depths leaving UG mining as only alternative*
- *UG methods find wide applicability in deep seated seams where good quality coal is lying idle*



### Impact on Land

- *UG mining requires less area on surface (~ 4 to 5 Ha.) for mine entry, coal stock, transportation and office infrastructure. Hence, less land acquisition and possession required.*
- *Almost no land degradation during UG mining. Further, zero impact during development phase of mine. During depillaring stage, subsidence is controlled with stowing. Workings below 300 m of surface have no impact on surface.*



### Sustainability

- *No dust emission due to mining & lower impact on surrounding ecology as compared to opencast projects*
- *No large-scale blasting required resulting in no issues of ground vibration and air over pressure*
- *Usage of paste fill technology for stowing of UG mines also shall address issues of fly ash disposal*
- *Offers option to recover methane which becomes fugitive in Open Cast Mining*



### Financials

- *Cost of production from OC eventually would be prohibitive due to strict social & environmental norms*
- *Imports for NRS can be reduced due to availability higher quality of coal*
- *Scaling up production UG coal mines will help in reducing coal imports, thereby helping save Foreign Exchange.*

# CIL UG Vision – How CIL is preparing to scale up its UG coal production to 100+ MT

Targets

100 MT

Underground Coal Production by 2027-28

125 MT

Underground Coal Production by 2029-30

4% to 10%

Proportion of CIL's UG production of coal

Priority Initiatives

- *Scaling up Highwall Mines/ Units*
- *Planning high-capacity mines with Mass Production Technologies (MPT) (CM/ PSLW)*
- *Modernization of existing mines by deploying MPT*

- *Usage of Paste fill Technology*
- *Identification of reserves for Punch entry mining with PSLW/ CM*
- *Engaging MDOs for existing and abandoned mines to infuse efficiency and expertise*

- *Push for indigenization of UG Machines with thrust on Make in India*
- *Sensitization of CIL UG Vision to MDOs, contractors and equipment manufacturers*
- *Capacity building within the organization*

Technology Infusion

**Planned Technology Deployment in Next 5 years**

Continuous Miners (CMs)

**Total 140 nos. (~60 MTPA)**

*(24 existing, 41 in pipeline, rest planned)*

Powered Support Longwall (PSLW)

**Total 4 nos. (~7.2 MTPA)**

*(2 existing, 2 planned)*

Highwall Mining

**30 units (~15 MTPA)**

*(3 in operation, 12 in various stages)*

Paste Fill Technology

**17 nos. mines proposed**

- *Recovery of quality coal without disturbing surface*
- *Disposal of flyash*

**Action Plan** – 100 Mt from UG mines in 2027-28

SUBSIDIARY	TECHNOLOGY			PRODUCTION IN FY 2027-28 (MTY)
	CM	PSLW	HIGH WALL	
ECL	42	-	5	27.75
BCCL	13	2	5	12.91
CCL	7	-	5	7.00
NCL	15	-	3	5.00
WCL	20	-	7	12.33
SECL	39	-	5	30.97
MCL	4	-	-	4.88
<b>TOTAL CIL</b>	<b>140</b>	<b>2</b>	<b>30</b>	<b>100.84</b>

## Way Forward – Assistance Sought

- 1 Re-categorization as Category B2 project for EC as there are minimal environmental issues associated with UG mining operations
- 2 Grant of permission for UG development after Stage-I (in-principal) approval as in case of linear projects
- 3 Reimbursement of back-filling cost for UG mines with back-filling/stowing (Earlier back-filling cost was reimbursed under CCDA through stowing cess, now withdrawn)
- 4 PLIs & Tax reliefs for Indigenous manufacture of UG machinery (Make in India initiative) as imported machineries for underground mines are costly and spares availability is a problem
- 5 Support for Coal Price of UG mines through suitable policy framework to obviate viability issue of UG mines through total e-auction or segment pricing for coal produced from UG mines
- 6 Rebate of 50% in revenue share (bid price) for UG mining to promote large scale underground mining



An aerial photograph of a city, likely New York City, showing a grid of streets and buildings. A bright, glowing light source is visible in the upper left quadrant of the sky, casting a soft glow over the scene. The image is semi-transparent, allowing the text to be clearly visible.

**Thank you**