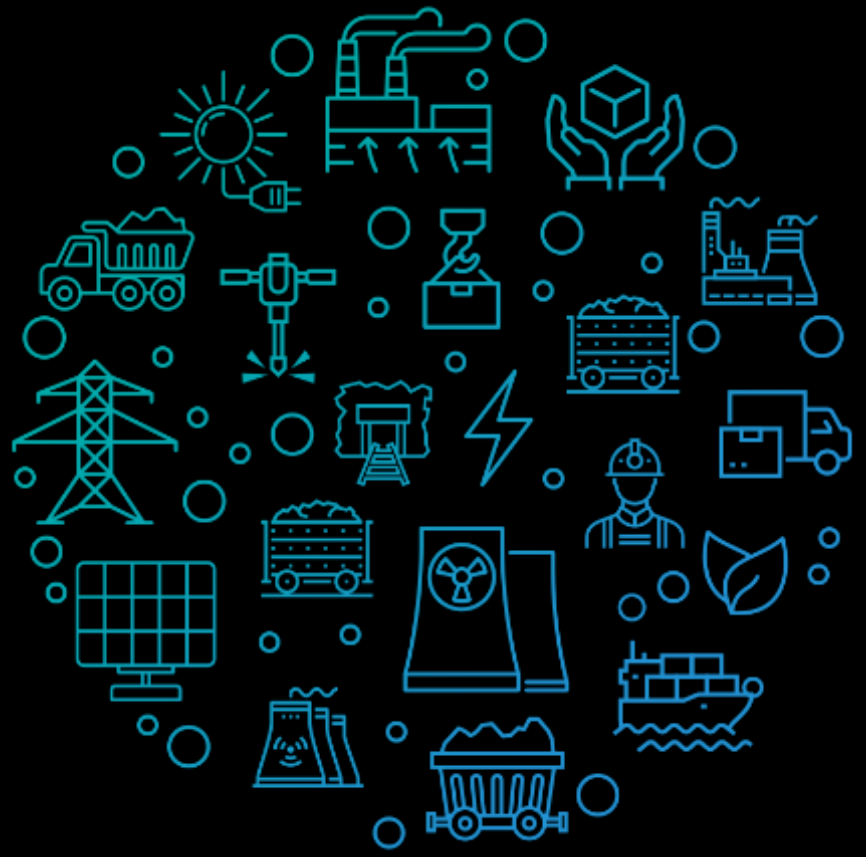
Deloitte.

Future of Coal & Role of Commercial Mining

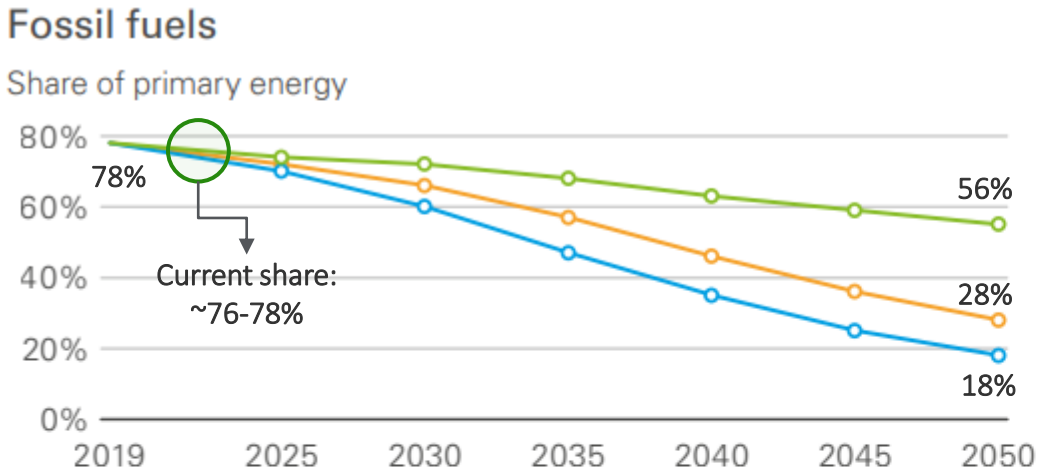


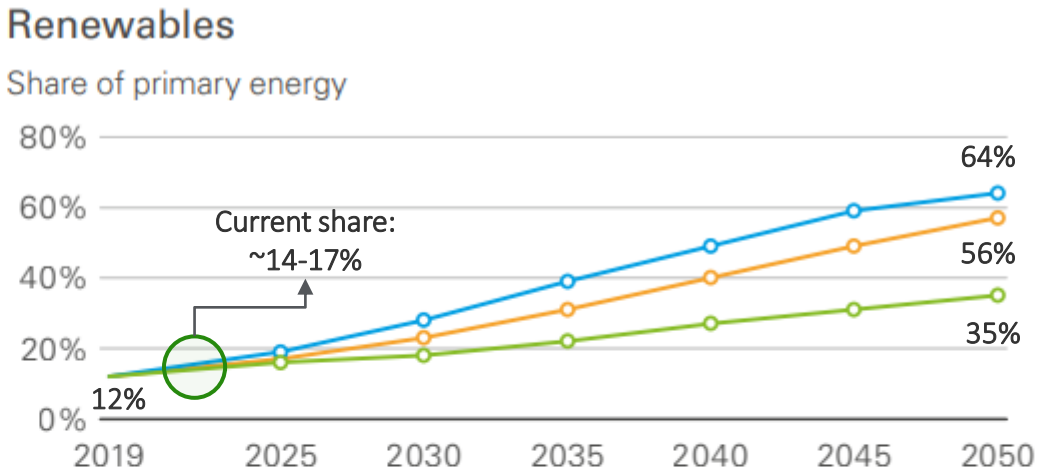
UMANG 2023 organized by IMMA Kolkata Chapter

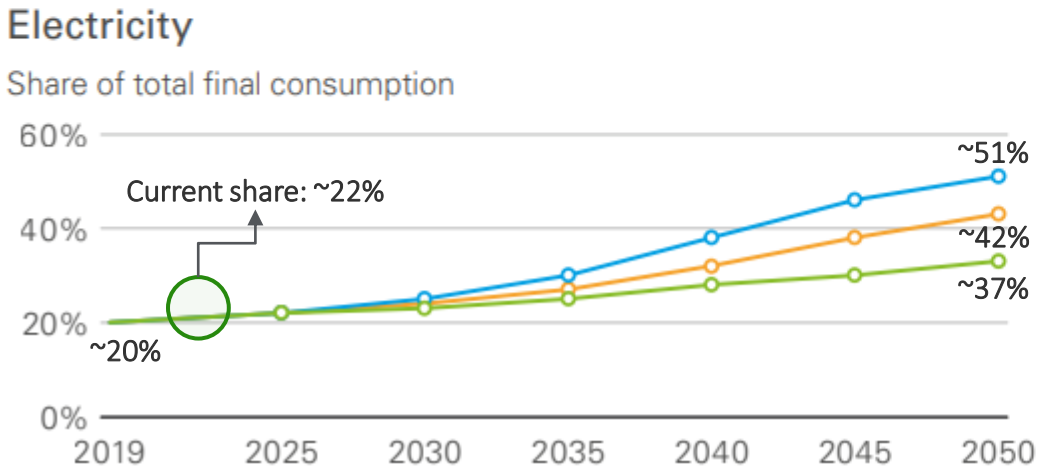
23rd December 2023

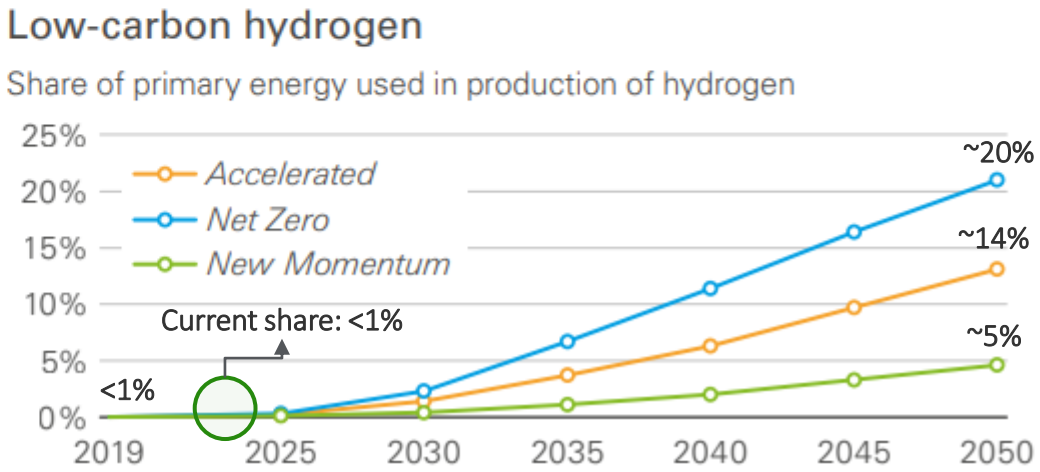
MAKING AN IMPACT THAT MATTERS since 1845

The future of global energy is dominated by four trends: declining role for hydrocarbons, rapid expansion in renewables, increasing electrification, and growing use of low-carbon hydrogen





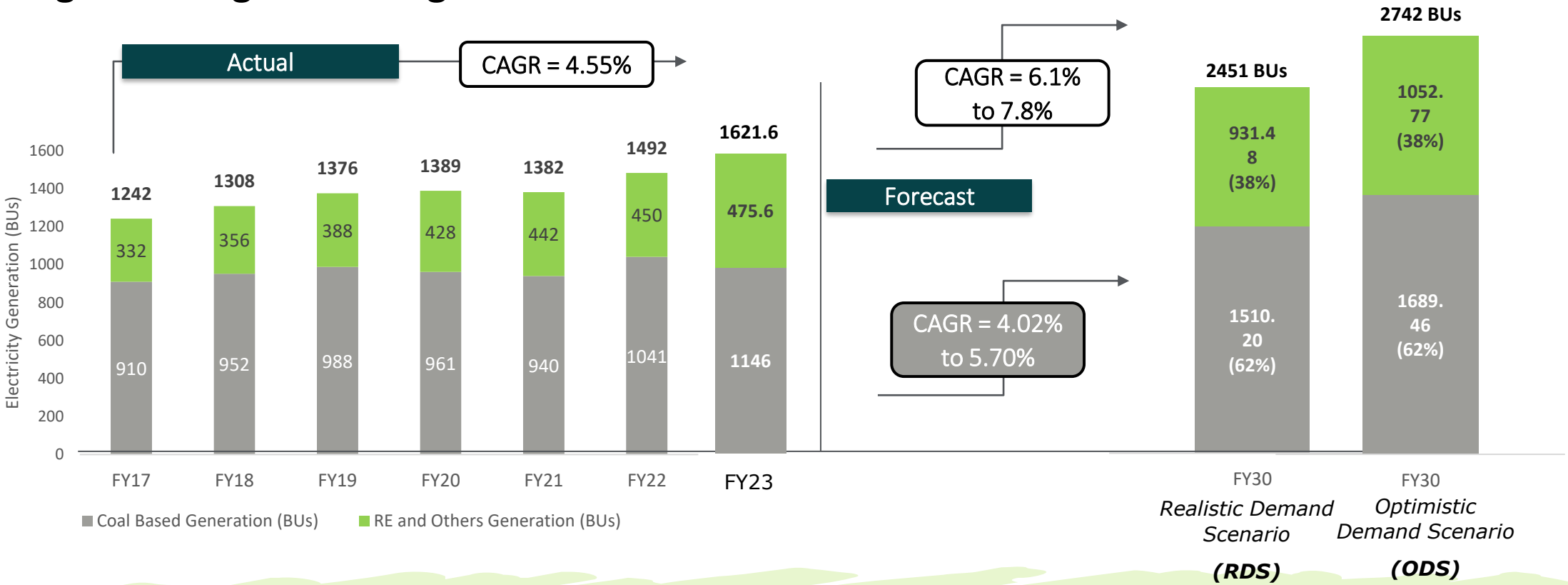




Note: CO_2e fall by 75% by 2050 relative to 2019 levels in Accelerated scenario and by 95% in Net Zero scenario. CO_2e emissions in New Momentum peak in the 2020s and by 2050 are around 30% below 2019 levels.

Source: https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2023.pdf, Our World in Data

Electricity generation in India to grow at a substantial CAGR of ~6.1% to 7.8% till 2030, owing to strong demand growth



- Per capita energy consumption of India (1218 KWh) is way below some of the leading nations
- In FY23, coal-based generation rose 10.1% to reach 1145.86 Bus, total generation grew ~9% Y-o-Y
- Electricity generation, closely linked to demand, is estimated to be ~2451 to 2742 BU for FY30
- The share of coal in the domestic electricity generation has hovered around ~71% in the last decade.
- It is likely to decline to 62% by FY30 which translates to coal demand ranging from 1037 to 1160 MTPA by FY30

Source: Monthly Statistical Reports, Ministry of Coal, Provisional Coal Statistics, National Rail Plan 2020, National Electricity Plan by CEA, 20th EPS Survey by CEA

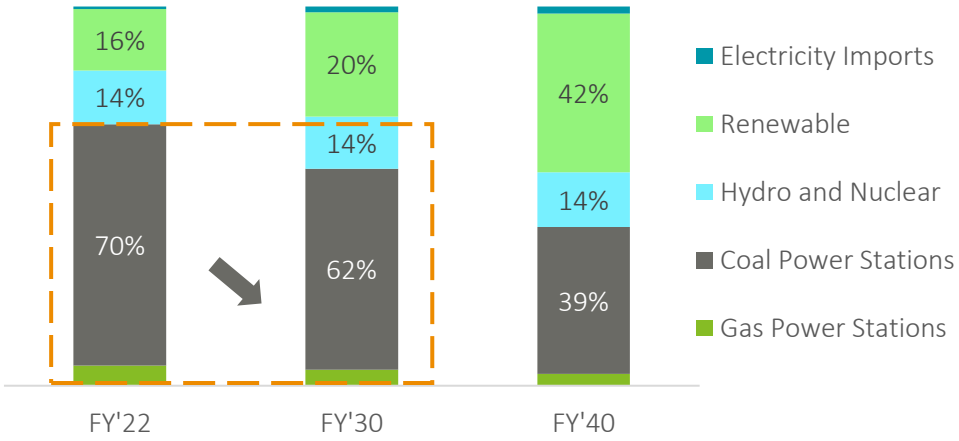
Coal is here to stay

Coal to remain a dominant source of fuel supply for electricity generation in India along with increased demand from NRS due to steel & cement capacity additions

Vision 2030	*1.5+ BT Coal Production*	*140 MT Coking Coal Requirement*	*Energy Security for the Nation*	*Sustaining +1.2% Coal Rents (% of GDP)*	*125MT from Underground*

- Raw Material Security & Import Reduction
- Logistics Infrastructure Development
- Technology & Industry 4.0

Projections of India's Generation Mix



- Alternate & Green Usage of Coal
- Decarbonization & Energy Efficiency
- Environmental & Social expectations

Key Imperatives	*Indigenous production & non-essential import reduction*	*Capacity addition for HEMM manufacturing*	*Novel usages of coal & diversification*	*Boost to Commercial Mining*	*Digital technology adoption*

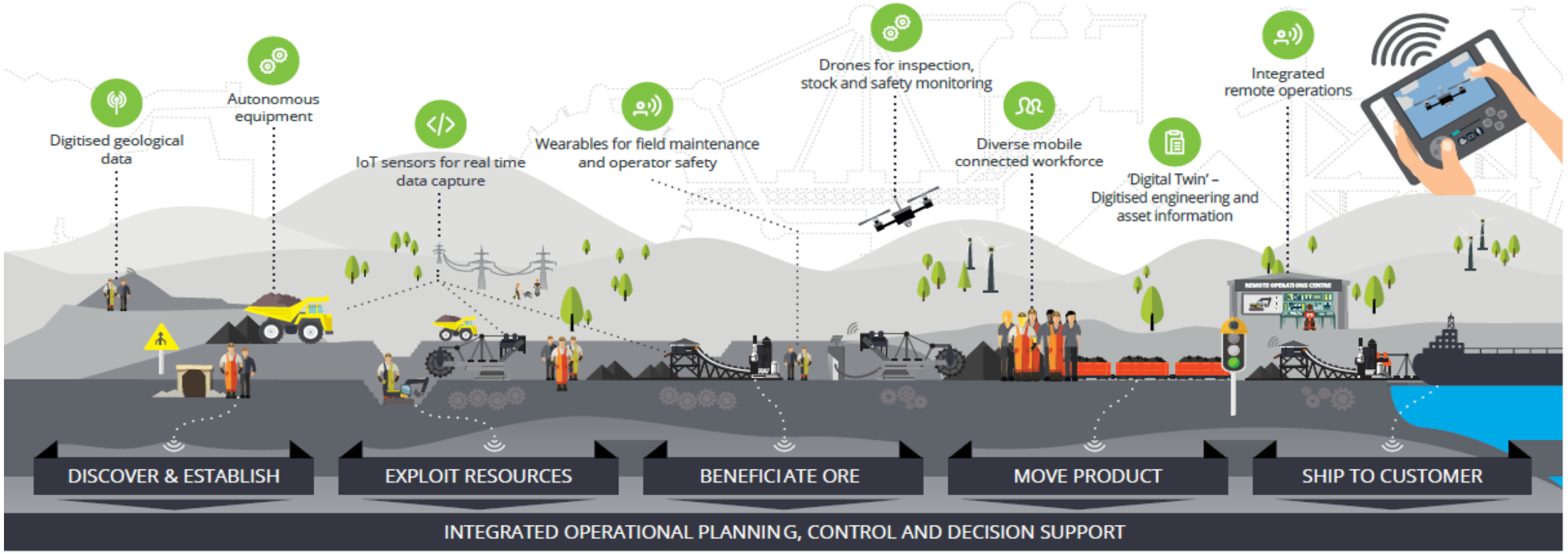
Today's Focus Area

Source: Press Information Bureau, Trading Economics, World Bank, Mission Coking Coal, Secondary Research

Future of the Coal Sector – Mining of tomorrow will be different from how it looks today

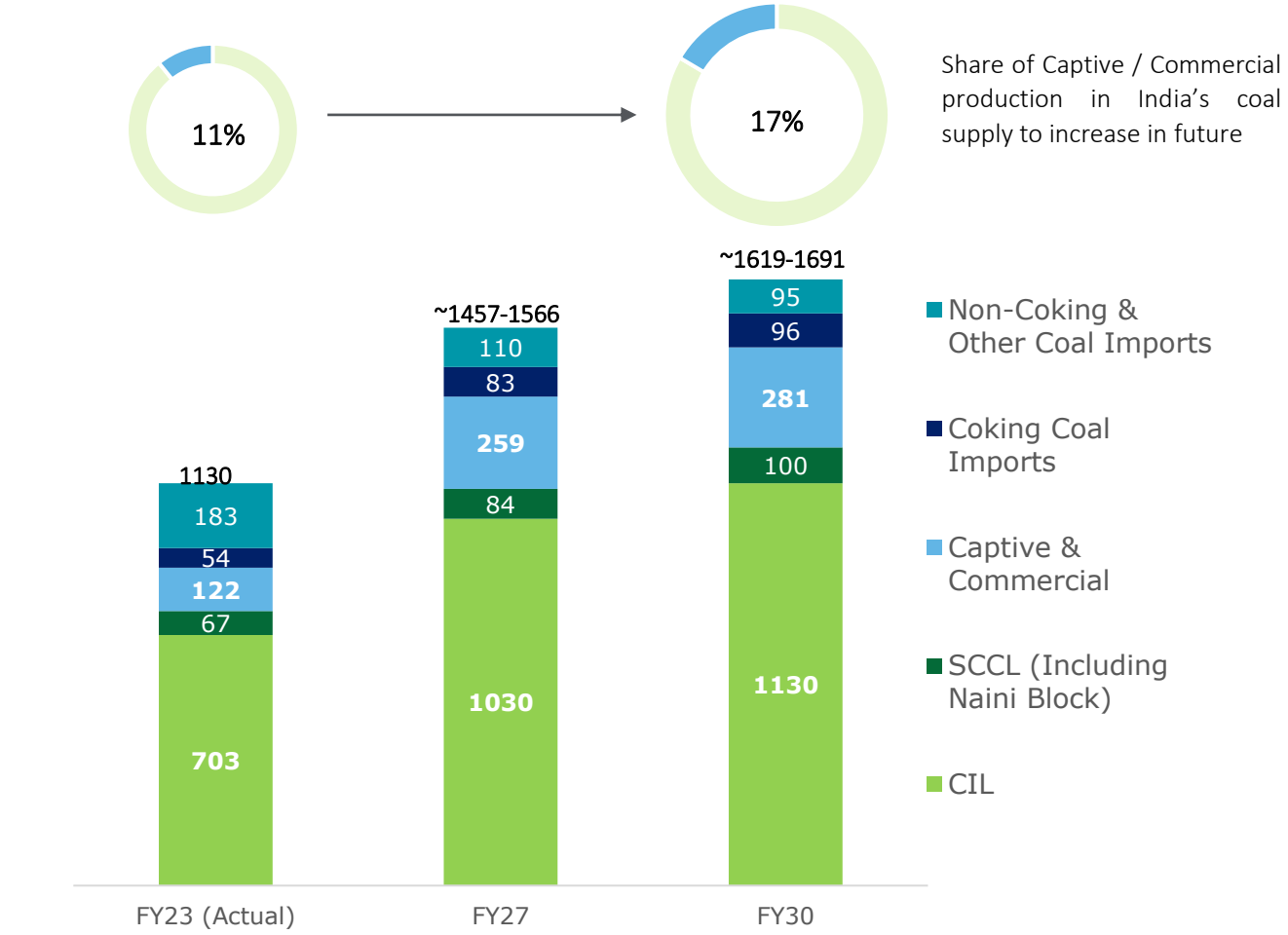
Globally, 69% of mining companies are looking at remote operation and monitoring centres, 29% at robotics and 27% at unmanned drones.

While in India, only ~25% of the mining companies are looking for remote operation & monitoring centers.



Captive and Commercial blocks to play an enhanced role in India's energy security

India's current and future coal supply portfolio
(Million Tonnes)



Note: *Supply potential of ~1.69 BT may slip due to operationalization of blocks. Further, production includes ~10% of vendible stock i.e., ~170 MTPA. This means* ***actual coal consumption in FY30 would be ~1.53 BT***

Key Insights

Coal Supply

- **CIL and SCCL** both major coal producers' share in total coal supply would increase from **68% in FY23 to 72% in FY30**. CIL to cross 1BT production mark by FY30.

Role of Commercial blocks

- **Captive and commercial blocks** can achieve production ranging from 250 MTPA to 400 MTPA, with **281 being MoC's realistic projection**. Share in supply portfolio to jump to 17% from current 11%.

Reduction in Coal imports

- With continued focus on import substitution (G7-G14), **Non-coking coal imports would decline to 95 MTPA by FY30** under the best effort scenario. This reduction would be compensated by CIL, SCCL and Captive/commercial blocks

Commercial coal block auctions in 2020 opened the sector to private sector investment

With a shorter auction timeline and liberal FDI & entry norms, the government expects to fulfil growing domestic demands and decrease coal imports

What has changed?

- **Change in regime:** Revenue sharing mechanism instead of regime of fixed INR per tonne
- **No end-use categorization:** Earlier only captive consumers with end-use ownership could bid
- **Liberalization of entry norms:** No eligibility conditions, only upfront payment with a ceiling
- Incentive **through rebate in revenue share** for early production and gasification or liquefaction of coal would encourage faster development of coal blocks

Need for the change

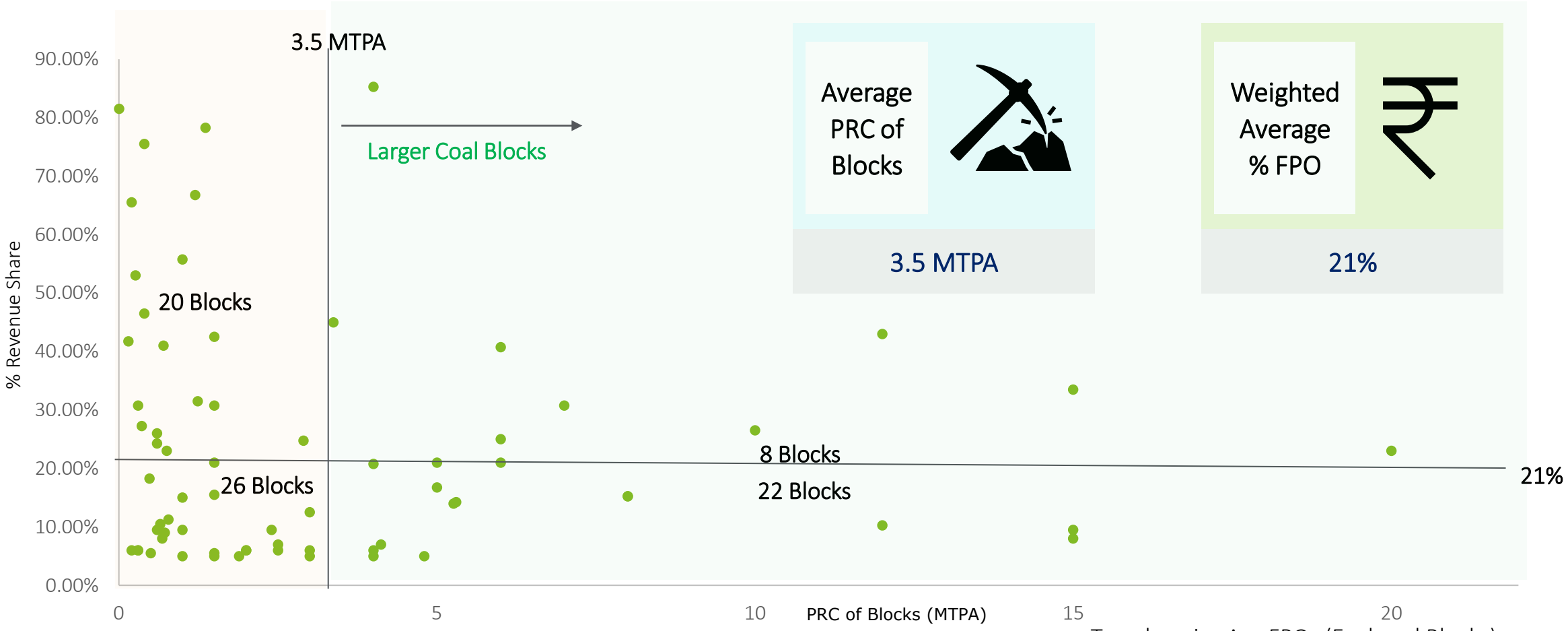
- **Enhance domestic coal supply** to meet growing demand
- Drive **Import substitution** for thermal coal
- Bring **competition, efficiency and transparency** to the sector

Likely impact on coal sector

- Self-Reliance in thermal coal
- **Increase participation of private sector** in coal production necessitating the need for an **open market or exchange** for coal commodity trading
- Domestic players **may redefine their business models** based on level of interest from investors

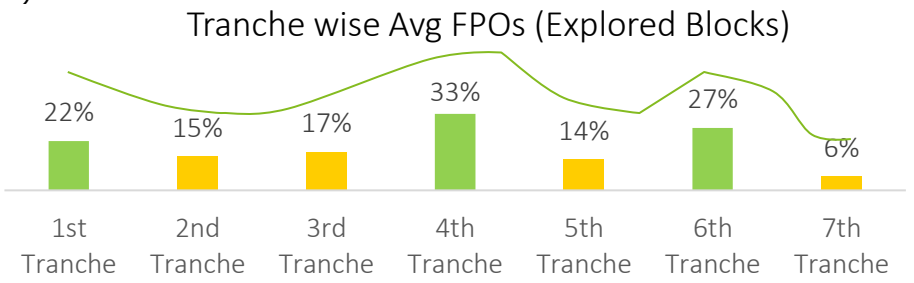
Source: Secondary Research

Revenue Share (%) vs PRC distribution of explored blocks till 7th tranche



~60% of the blocks, explored and partially explored, have PRC of <3.5 MTPA i.e., are smaller coal blocks in terms of economies of scale.

The above representation excludes Namchik Namphuk and Garampani blocks for ease of representation as these blocks fetched 344.75% and 288.75% FPO (Final Price Offer) respectively.



Key Challenges faced by Commercial Coal Miners

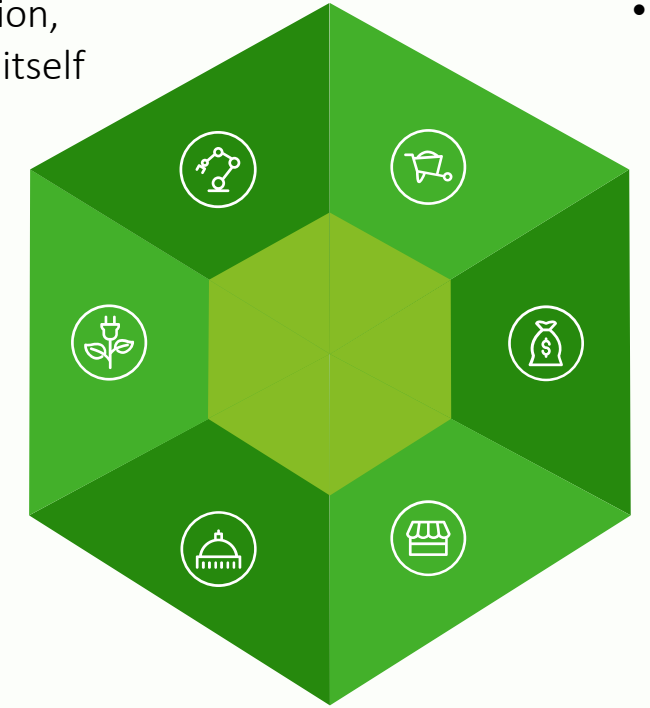
Multiple challenges exist across the value chain from issues in operationalization to price volatility of international markets

Land Acquisition & Operationalization

- ***Long extensive process*** for land acquisition, often for secondary land, not the mine itself
- Issues in obtaining EC & FC

End Markets

- Long term FSAs with existing coal producers is a hindrance to ***commercial coal block owners struggling to secure long term assured offtake***



Issues in Logistics

- Coupled with ***limited loading facilities,*** rake availability is a challenge with projected ***additional requirement of ~99,000 wagons by FY30***

Price Volatility

- As opposed to recent high international prices of coal, ***competitiveness on energy basis to remain a challenge for domestic miners*** with long term prices forecasted to settle at USD 60 /T* to USD 89 /T#

Limited Ecosystem Maturity

- ***Limited options of indigenous HEMM manufacturers*** & maintenance ecosystem

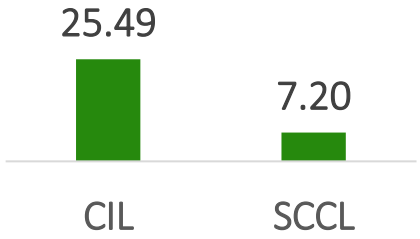
Technology Adoption

- ***Limited deployment*** of Mass Production Technologies & adoption of digital interventions

**Long term forecast for Indonesian Coal, CIF* *# Long term forecast for Australian Coal, CIF*

Underground Commercial Coal Miners – MDO is a potential solution

UG mining contribution is low (4%) due to various challenges



~1 MT by Others (Figures in MT for FY22)

Challenges

- *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.*
- *High capital & operating cost*

Improving operational efficiency through MDO deployment for UG mines

- Engaging MDOs for existing and abandoned mines to infuse efficiency and expertise
- MDO with revenue sharing model
- Deployment of Mass Production Technologies (MPT) such as CM & PSLW
- Push for indigenization of UG Machines and technology

Snapshot of pool of Mining Contractors

Name of Players	Geographical Footprint	Value Proposition	Experience	Major Clients
Bhushilp	• Western region	• Maintenance contractor • Recently undertaken coal production in UG	30+ years	• WCL - Tandsi
Coherent	• Eastern region	• L/W production experience	7+ years (Formerly Gayatri Projects Pvt Ltd.)	• ECL
Delta construction	• Pan India	• Shaft sinking • Metal experience	30+ years	• SCCL • HCL • MOIL • OMC
Gainwell	• Pan India	• Manufacturer of UG Room and Pillar equipment • Experience of Continuous Miner	80+ years	• ECL • Tata Steel • SCCL
Maheshwaree (EOI submitted in name of **VM Indo Mine**)	• Pan India	• Experience in UG both coal and metals • End-to-end mining solutions including exploration	40+ years	• JSW • MOIL • TATA STEEL • UCIL
Singh & sons	• Pan India	• Having presence in nearby area	35+ years	• WCL • SECL • Ambuja • Hindalco
SMS	• Pan India	• Experience in UG both coal and metals • Experience of Continuous Miner	50+ years	• HCL • HZL • MOI
Technoblast	• Pan India	• Experience of Continuous Miner • Global partnerships • Past association with Jindal • Having presence in nearby area	15+ years	• Ambuja • Hindalco • Sarda

Way Forward – Role of key stakeholders in the evolving commercial coal mining landscape

	Commercial Coal Miners	Government	Ecosystem Partners
Short Term (up to 2030)	Focus on import substitution (existing potential of ~60-80 MT) Long term offtake agreements replacing MCL & SECL linkages which are expiring in FY25 & FY27 (potential of ~21 MT) Adoption of digital interventions like IoT, sensor enablement	Aiding development of logistics infrastructure for commercial miners (such as Public Freight Terminals for loading, etc.) Grant of permission for UG development after Stage-I (in-principal) approval as in case of linear projects Abolition of non-creditable taxes	Availability of long-term contract services as opposed to existing MDO model which is capital intensive Sector-focused digital services Skill ecosystem development for Future of Work in coal sector
Mid-Long Term (beyond 2030)	Identification of competitive international markets Setting up of washeries to cater to domestic as well as international markets Long term FSAs with power producers (post expiry of existing FSAs)	Incentivizing exploration through grant of exploration cum mining rights PLIs & tax reliefs for indigenous manufacturing of mining machinery Extension of RoDTEP scheme for coal to promote exports	Development of manufacturing & maintenance ecosystem for mining machinery Commercialization & wide-scale adoption of alternate usages of coal (such as coal gasification)

Deloitte.

Thank You

Tushar Chakraborty
Director
Deloitte India
Email: tchakraborty@deloitte.com