

CoalMint[®]

**Methodology
Document for
India Coal Index**



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Introduction

Coal is the predominant source of power generation in the country and is intricately linked to its energy security. Over the period of time, coal has been the preferred choice of fuel due to its abundance, availability and affordability.

At present, 50% of India's installed capacity for power generation is coal-based.

The country procures bulk of its coal consumption domestically, while imports are necessitated to fill the supply-gap emerging from lack of coking coal reserves and to meet the high-quality material requirement of various end-user industries.

Amidst rising energy demand and a declared commitment to provide electricity to all, India is expediting coal production from the available resources.

In addition, economic growth led by higher demand for infrastructure development would further boost coal requirement in various allied industries such as cement, sponge and steel.

The demand for coal in the country is expected to be in the range of 1.3-1.5 billion tonnes by 2030.

Role of CIL

Domestic coal production in India comes from three separate sources: Coal India Ltd (CIL), Singareni Collieries Company Ltd (SCCL) and 'Others'.

The domestic production is dominated by state-owned mining companies-CIL and SCCL.

'Others' refers to mix bag of small-scale merchant and captive miners which operates coal mines allocated to them by the government. They produce only 6% of the domestic coal by volume.

Of these, CIL holds significance as it caters almost 80% of the country's total coal production. Founded in November 1975, the company had started mining activities with a modest coal production of 79 million tonne (mnt) at its year of inception.

Since then, it has emerged as one of the major coal producer in the globe and had attained its highest ever output of 622 mnt in Fy22.

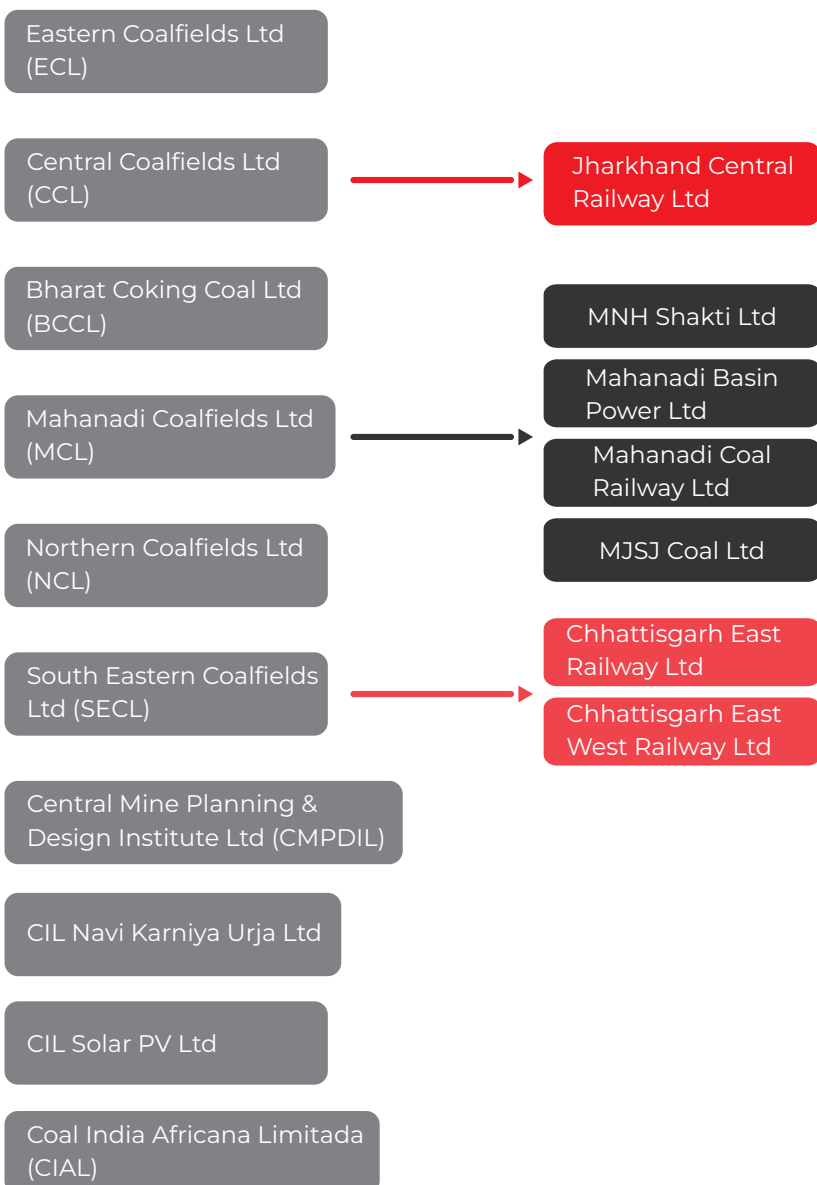
CIL Mining Structure

CIL has ten fully owned Indian subsidiary companies, and one foreign subsidiary in Mozambique namely Coal India Africana Limitada (CIAL).

Of these, the 7 coal producing subsidiaries are ECL, BCCL, CCL, WCL, MCL, SECL, and NCL.

Further, the company CIL has four Joint Venture companies- Hindustan Urvarak & Rasayan Limited, Talcher Fertilizers Ltd., CIL NTPC Urja Pvt. Ltd. and Coal Lignite Urja Vikas Private Limited.

Subsidiaries



Joint Ventures

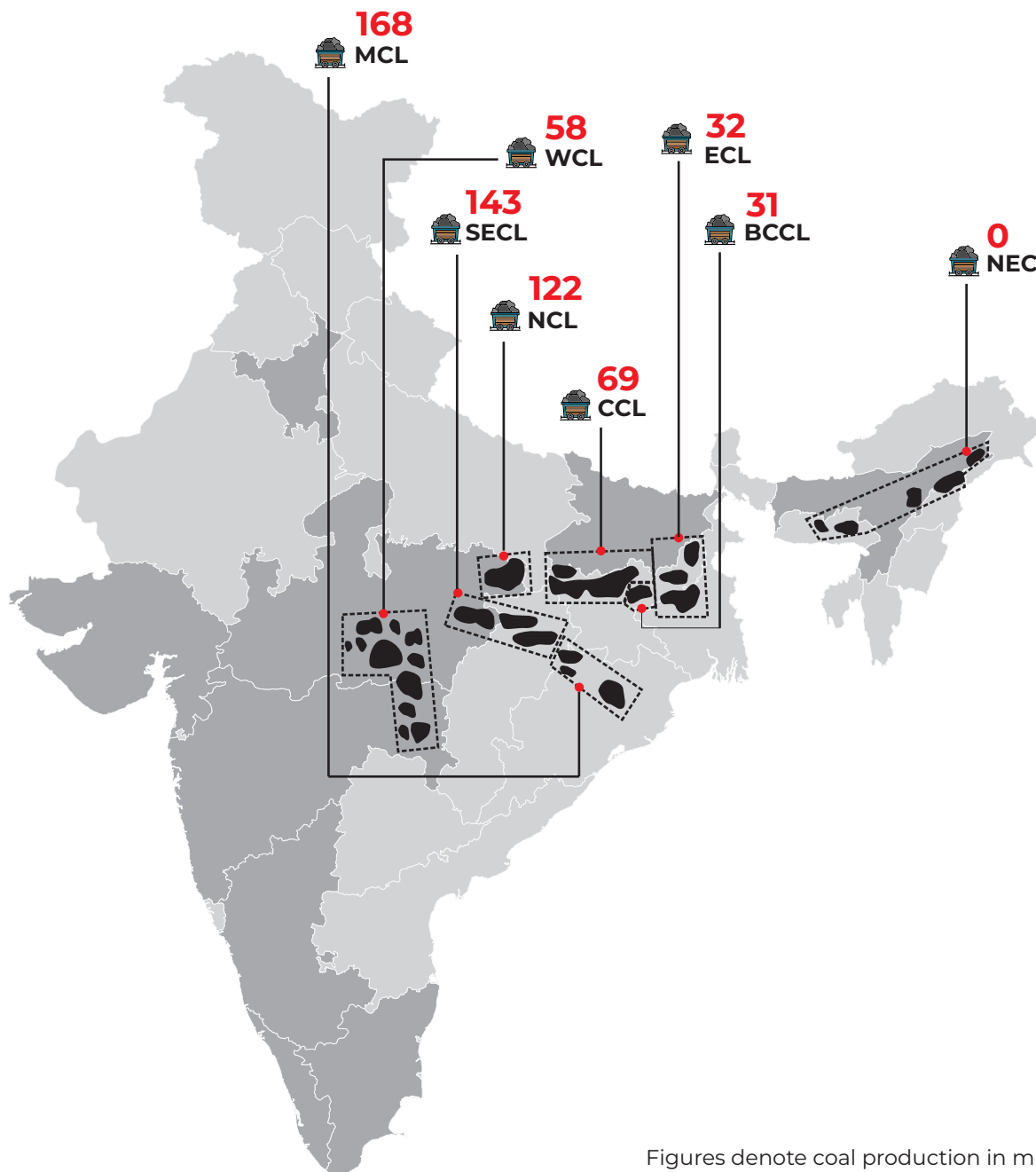


That apart, CIL also operates coal mines in Assam under its flagship company named North Eastern Coalfields (NEC).

CIL carries out coal mining activities through its subsidiaries in 84 mining areas that are spread over eight states of India. As on 1 April 2022, CIL has 318 mines of which 141 are underground, 158 opencast, and 19 mixed mines.

These companies operate mining operation at varied volumes depending upon allocation of mines and the available geological reserves, and are responsible coal extraction and sales to the customers.

CIL Coal Producing Subsidiaries



Figures denote coal production in mn t for FY'22

Coal Sale Mechanism

CIL has two broad channels for coal sales: Fuel Supply Agreements (FSAs) and E-Auctions.

Of these, majority of the coal is sold through the FSAs. These include long term supply contracts meant for thermal power plants and other large scale industries, which require uninterrupted coal supply for running their operations.

CIL also conducts linkage auctions on a timely basis for both power and non-power sectors, which also comes under FSAs.

Coal procurement via regular e-auctions is based on forward-based bidding process. This route of coal sale is applicable to the entire gamut of buyers including traders but is extensively used by small-scale industries to satiate their demand.

The basic difference between linkage auction and regular auctions is the tenure of coal allocation. The regular auctions offer coal for a short duration, whereas linkage auctions

Earlier, there were five separate auction windows which cater to the requirement of different set of customers. These were: Spot, Exclusive and Special Forward, Special Spot, and Special Spot for 'Coal Importers'.

However, by introducing reforms in the existing sales process, these auctions have been merged under a single window under Spot scheme from March, 2022 onwards.

Price Channels

In order to carry out sale via FSAs, CIL board has defined fix prices against the set of non-coking and coking coal grades which is termed as 'notified price'. These prices are revised rarely to relief industries from the adverse impact of hike in power costs.

Further, the non-coking coal grades are classified on the basis of gross calorific value into 17 different grades. The notified prices are set as per the GCV content.

Non-Coking Coal Classification

	GCV Range
G1	Exceeding 7000
G2	Exceeding 6700 and not exceeding 7000
G3	Exceeding 6400 and not exceeding 6700
G4	Exceeding 6100 and not exceeding 6400

GCV-Gross Calorific Value in kCal/kg

Grade	GCV Range
G5	Exceeding 5800 and not exceeding 6100
G6	Exceeding 5500 and not exceeding 5800
G7	Exceeding 5200 and not exceeding 5500
G8	Exceeding 4900 and not exceeding 5200
G9	Exceeding 4600 and not exceeding 4900
G10	Exceeding 4300 and not exceeding 4600
G11	Exceeding 4000 and not exceeding 4300
G12	Exceeding 3700 and not exceeding 4000
G13	Exceeding 3400 and not exceeding 3700
G14	Exceeding 3100 and not exceeding 3400
G15	Exceeding 2800 and not exceeding 3100
G16	Exceeding 2500 and not exceeding 2800
G17	Exceeding 2200 and not exceeding 2500

GCV-Gross Calorific Value in kCal/kg

On the other hand, coking coal grades are classified on the basis of ash content. Alike non-coking coal, the power of notifying the prices of coking coal has been delegated to the subsidiaries.

Coking Coal Classification

Grade	Ash Content
Steel Grade I (ST-I)	Ash not exceeding 15%
Steel Grade II (ST-II)	Ash exceeding 15% but not exceeding 18%
Washery Grade I (W-I)	Ash exceeding 18% but not exceeding 21%
Washery Grade II (W-II)	Ash exceeding 21% but not exceeding 24%
Washery Grade III (W-III)	Ash exceeding 24% but not exceeding 28%
Washery Grade IV (W-IV)	Ash exceeding 28% but not exceeding 35%
Washery Grade V (W-V)	Ash exceeding 35% but not exceeding 42%
Washery Grade VI (W-VI)	Ash exceeding 42% but not exceeding 49%

For sales via E-auction, CIL subsidiaries' set reserve (floor) price for bidding process by adding an upper cap on the notified price of coal offered for sale.

For instance, the notified price of G11 coal is INR 1155/t, CIL subsidiary-South Eastern Coalfields (SECL) adds an upper cap of 20% on the notified price, so that the reserve price of coal becomes INR 1,386/t.

The individual subsidiaries decide of their own to affix the quantum of upper cap to be applied for fixing the reserve price. Accordingly, the reserve price of coal varies across the different subsidiaries.

Why Index is needed?

The domestic coal structure in India is grappled with inconsistencies.

Firstly, the coal grades are defined in range of GCV, so it is difficult to compute coal value accurate to a fixed GCV value.

Secondly, there is discrepancy with regards to coal pricing too.

Notably, CIL notified price are defined separately for regulated (power) and non-regulated sector. Adding to that, due to cost considerations, different notified price dispensation has been made for WCL coal.

In addition, the individual subsidiaries of CIL produce different grades of coal depending on the available reserves. Besides, these coal grades are not offered on a consistent basis in the auctions for which there is variable reserve prices.

So, there remains an absence of efficient mechanism to monitor the market condition and to compare the domestic prices.

Definition of Indian Coal Index

In order to address the discrepancy in coal pricing and gradation structure, Indian Coal Index has been formulated.

The Index is meant to encompass transactions of sale via regular auctions (excluding linkage auctions) conducted by CIL subsidiaries by collecting the bid prices quoted against the offered lot of coal in a month.

These auctions cover around 20% of the total volume that is produced annually by CIL.

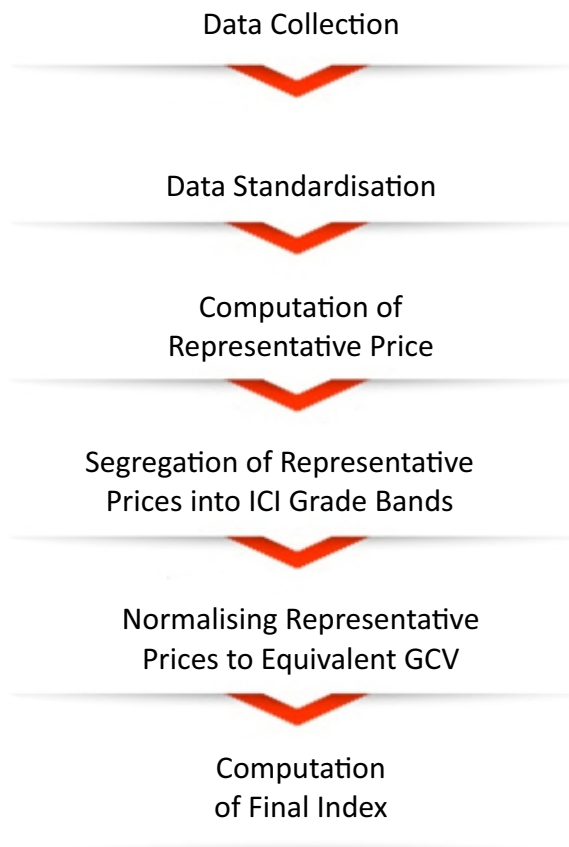
Since, notified price is of fixed nature, the bid prices offer true reflective of market condition as the bidding encapsulates real-time data based on prevailing supply-demand dynamics.

These prices include non-coking coal grades, whereas coking coal grades are excluded. The index has been prepared with an objective to provide base indicator for comparison and align the domestic coal grades with the global specifications.

Methodology

- The process involves collection of data comprising bid prices and sale volume across various coal auctions conducted by CIL subsidiaries.
- After data standardization, Representative Price (RP) is calculated against each grade by using suitable weights.
- Thereafter, these individual grade-wise prices are clubbed into sub-categories, and further normalized to derive final index for various GCV bands by applying weights.

Methodology Flow Process



The weights used are volume-based, but are applied differently for computation of RPs and final indices.

- In case of RP, the weights are based on sale volume taken for individual subsidiaries.
- For Final index, the weights are based on sale volume taken for individual grades.

Price Index

The various non-coking grades are segregated into five sub-categories which form distinct price index for computation. These are:

- Premium High Grade (G 6000)
- High Grade (G 5500)
- Medium Grade (G 4800)
- Moderate Low Grade (G 3500)
- Low Grade (G 2600)

Classification of India Coal Index (ICI)

India Non Coking Coal Grades	Mid CV	Final Price Index
G1	7150	Premium High Grade (G 6000) Index
G2	6850	
G3	6550	
G4	6250	
G5	5950	
G6	5650	High Grade (G 5500) Index
G7	5350	
G8	5050	Medium (G 4800) Index
G9	4750	
G10	4450	
G11	4150	

Classification of India Coal Index (ICI)

India Non Coking Coal Grades	Mid CV	Final Price Index
G12	3850	Moderate Low (G 3500) Index
G13	3550	
G14	3250	
G15	2950	Low (G 2600) Index
G16	2650	
G17	2350	

Computation

Let us consider the calculation of Premium High Grade (G 6000) for understanding the computation process.

Step-I: Calculation of Representative Price

First, weighted average bid prices for various grades falling under Premium Grade Index (in this case G1, G2, G3, G4 and G5) are calculated across various subsidiaries.

For instance, SECL, ECL and MCL had offered G1 coal in the auction, then Representative Price of G1 is computed by adding product of weight and bid price for the individual subsidiary.

The weight for individual subsidiary would be:

$$w_{SECL} = \frac{q_{SECL}}{q_{SECL} + q_{MCL} + q_{NCL}}$$

$$w_{MCL} = \frac{q_{MCL}}{q_{SECL} + q_{MCL} + q_{NCL}}$$

$$w_{NCL} = \frac{q_{NCL}}{q_{SECL} + q_{MCL} + q_{NCL}}$$

W-weight of individual subsidiary
q-quantity sold in the auction

Representative Price for G1, $RP1 = w_{SECL} \times b_{SECL} + w_{MCL} \times b_{MCL} + w_{NCL} \times b_{NCL}$
b-bid price

The process is repeated each for G2, G3, G4 and G5 grades.

Step-II: Normalising Representative Price to equivalent GCV

In this process, normalized price equivalent to the base index price is computed from the RP of individual grades by using below formula.

Formula for normalization:

$$N = R \times \frac{\text{Equivalent GCV}}{\text{Mid CV of Individual grade}}$$

N-normalised price

Step-III: Calculation of Final Index

The normalized values for individual grades are integrated into the final index by adding product of weight and normalized prices.

The weight for individual grades is calculated as:

$$W1 = \frac{q1}{q1+q2+q3+q4+q5} \qquad W2 = \frac{q2}{q1+q2+q3+q4+q5}$$

$$W3 = \frac{q3}{q1+q2+q3+q4+q5} \qquad W4 = \frac{q4}{q1+q2+q3+q4+q5}$$

$$W5 = \frac{q5}{q1+q2+q3+q4+q5} \qquad \text{* suffix indicate grades.}$$

Finally, the Index Price for Premium Grade= W1 X N1+ W2 X N2+ W3 X N3+ W4 X N4+ W5 X N5

The whole process is repeated for computing remaining indices.

Assumption

- The coal index is based on 100% auction price weightage.
- The data-set covers entire variety of regular auctions viz. spot, special forward, exclusive, special spot and special spot for coal importers.
- Data for linkage auctions is excluded.

- Only non-coking grades are included.
- Bid price for computation excludes taxes and other statutory charges in the landed price of coal.
- RP of individual grades are taken as mid CV for normalization.
- In case WCL auction where mix grades are offered, the higher GCV grade is taken for computation. Example: Bid price for G8G9 grade is assumed for the higher GCV-G8.
- Under the circumstances when none of the subsidiaries offer coal in a particular index slab, then the particular index for that month would be rolled-over.

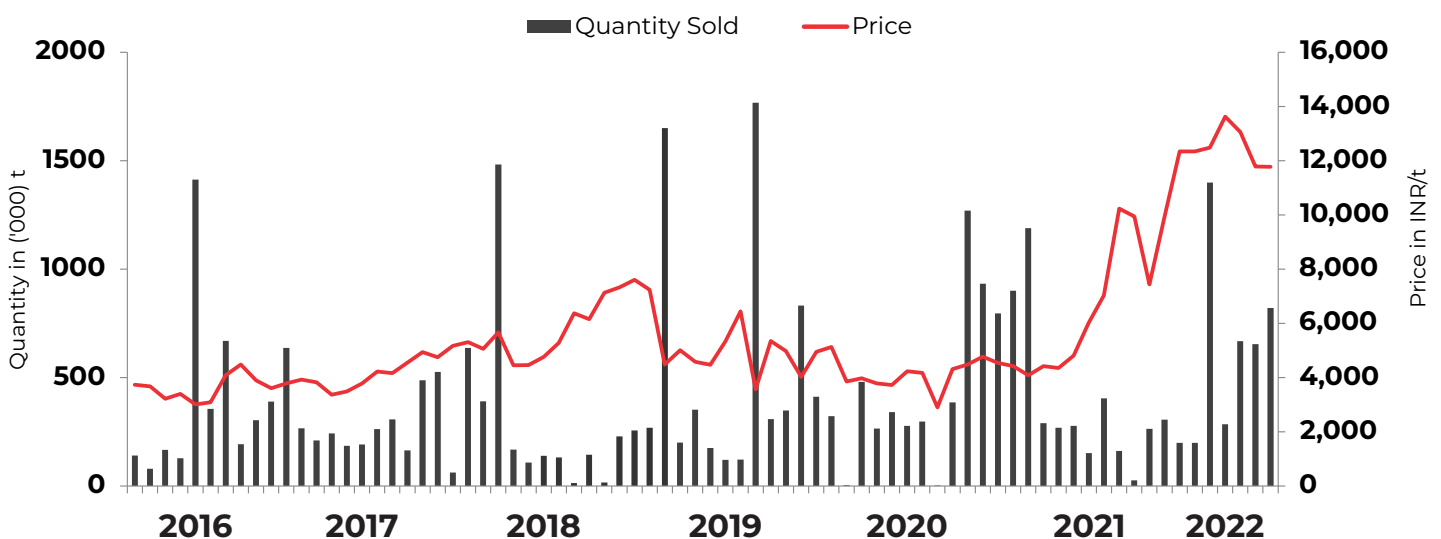
Periodicity

The indices for various GCV slabs will be published on a monthly basis by the second week.

By using the standard operating methodology, past indices from April, 2016 have been calculated.

Historical Price Trend

India: Premium High Grade (G 6000) Index



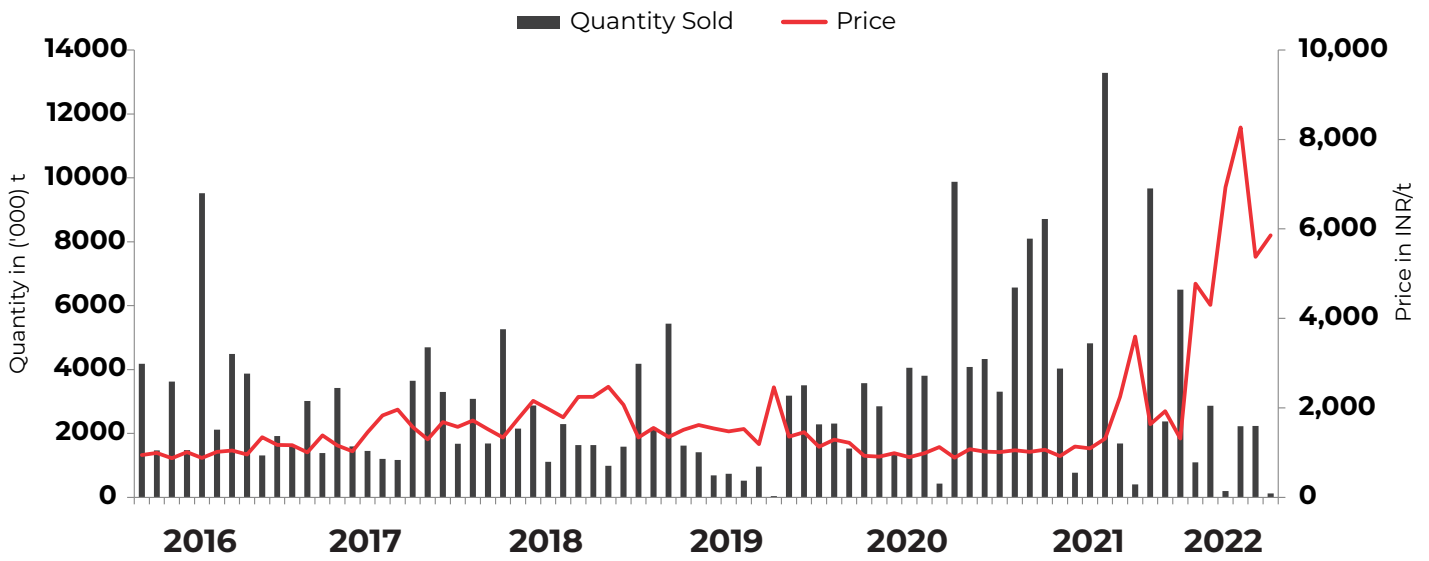
India: High Grade (G 5500) Index



India: Medium Grade (G 4800) Index



India: Moderate Low Grade (G 3500) Index



India: Low Grade (G 2600) Index



Miscellaneous Aspects of India Coal Index

Rationale Publication

A rationale for the assessment carried out would include a summary of the type and number of data points considered for price calculation and reasons for exclusion of deals, if any, are published on the day of publication of prices to provide transparency to the assessment process.

Correction of Assessments

CoalMint will publish corrections of assessments if an error has resulted due to faulty entry of data or an unintentional omission of data point in the price calculation process. However, prices will not be corrected or updated in any manner if new deals or bids/offers become available after the weekly timestamp.

Record Keeping

Records of price sheets used in assessment, calculation, rationale and notes taken by reporters during the data collection and discussion process with contacts are stored securely in physical or electronic forms for a reasonable period of time.

Methodology Review

The basic purpose of any pricing process is to accurately reflect market fundamentals and as such the methodology is open to review as market conditions and modes of trading and pricing contracts change. Noticeable changes in chemical specifications of scrap exported from India will also trigger a review in CoalMint's methodology.

Once editors and the management decide to review the methodology, sufficient time will be provided to external stakeholders to comment on the proposed methodology changes via email or other appropriate communication tools. Any final change in the methodology will only be made after completing an external consultation process.

Similarly, the decision to add or cease an assessment will also be taken after due consultation with the external stakeholders.

The logo for CoalMint, featuring the word "CoalMint" in a white, sans-serif font. The letter "i" in "Mint" has a red dot above it. A registered trademark symbol (®) is located at the top right of the word.

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