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Government of India
Ministry of Coal
O/o Nominated Authority

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Revised Standard Operating Procedure in respect of National Coal Index

The **Standard Operating procedures (SOP) for National Coal Index was issued vide** OM of even number dated 06th May 2020. Since then, a lot of progress has happened and new fact has come to notice regarding dynamic updation/revision of Import data by DGCIS till the closing of financial year. Further, development of a dedicated web-portal based on the simplified compilation procedure is under designing stage. Hence, the revised **Standard Operating Procedure (SOP) is** hereby annexed.

Yours faithfully,

Ajitesh kumar

(Ajitesh Kumar)
Deputy Secretary to the Government of India

Sr. TD, NIC, MoC :- with a request to upload Revised Standard Operating Procedure for NCI on the website of MoC for information of all the stakeholders and general public.

Revised Standard Operating Procedure for National Coal Index.

The Commercial Mining of Coal Blocks has been approved by the Cabinet Committee of Economic Affairs. In the auction process, the National Coal Index (NCI) and Representative Prices (RP) would play very important role. The concept and design of the Index as well as the Representative Prices have been developed by the Indian Statistical Institute, Kolkata.

2. **Brief Ingredients of NCI and RP**: NCI is a price index combining the prices of coal fromall the sales channels- Notified Prices, Auction Prices and Import Prices.

Majority of coal is sold through the Notified Prices. For Non Coking Coal, CIL fixes notified prices for each grade. There is price discrimination as to the Regulated Sector and Non- Regulated Sector (NRS). Again, due to cost considerations, different Notified Price dispensation has been made for WCL coal. Similarly, SCCL also notifies prices for different grades of coal with price differentiation between Regulated and Non-Regulated Sectors. In respect of Coking Coal, only certain Subsidiaries of CIL are producing. The power of notifying the prices of Coking Coal has been delegated to the Subsidiaries. The Notified Prices of each grade of coal for Regulated and NRS and for CIL (Except WCL), WCL and SCCL for Non-Coking Coal and Notified Prices for Coking Coal of different Subsidiaries of different grades-for Regulated Sector as well as NRS would be taken for the purpose of NCI as well as the RP.

Apart from sales at Notified Prices, CIL and SCCL undertake e-Auction of Coal on different platforms-MSTC and m-Junction. For the purpose of NCI and RP, the Unit Value of Coal of different Grades from auction (**both e-auction and Linkage-Auction of CIL only**) would be taken into account.

The third component of the NCI and RP is the Import Prices. For compilation of both, only import of specific type of coal from specified countries would be taken into consideration. For each month, the quantity of import and its value would be collected from DGCIS and from these two values, Unit Value of Coal would be computed for its use in NCI as well as RP.

2.1 Weights of each Price Channels in the NCI and Representative Prices: The weights of the National Coal Index have been arrived at each Sub-Sector level. The weights for NCI may be summarized as follows:

Sub-Sector	Weights of different Price Channels (%)		
	Notified Price	Auction Price	Import Price
Non Coking Top Grade	38.32	11.43	50.25
Non Coking Medium Grade	51.38	13.05	35.57
Non Coking Low Grade	45.43	54.57	0
Coking Top Grade	1.04	1.12	97.84
Coking Bottom Grade	79.69	20.31	0

2.1.1 The weight of the Notified Price Channel is further divided into a set of CIL, WCL and SCCL Notified Prices of different grades of coal and for different sectors. The detailed weights of each grade of coal are given in **Annex 1**. The Sub-Sector Indices are averaged to give Indices for Non Coking Coal and Coking Coal. The weights for consolidation are given in the following table:

Sub-Sector	Weight	Consolidated Index	Wight	Consolidated Index
Non Coking Top Grade	24.55	Non Coking Coal Index	74.23	National Coal Index
Non Coking Medium Grade	74.82			
Non Coking Low Grade	0.63			
Coking Top Grade	79.94	Coking Coal Index	25.77	
Coking Bottom Grade	20.06			

2.1.2: The weights for determining the Representative Prices are given in the following table:

Grade	Domestic Component		Total Domestic Component	Import Component
	Notified Price	Auction Price		
G1	0.00%	100.00%	56.44%	43.56%
G2	95.51%	4.49%	56.44%	43.56%
G3	93.67%	6.33%	56.44%	43.56%
G4	74.33%	25.67%	56.44%	43.56%
G5	75.16%	24.84%	56.44%	43.56%
G6	67.71%	32.29%	56.44%	43.56%
G7	90.75%	9.25%	86.76%	13.24%
G8	88.09%	11.91%	86.76%	13.24%
G9	88.36%	11.64%	86.76%	13.24%
G10	82.20%	17.80%	86.76%	13.24%
G11	91.60%	8.40%	86.76%	13.24%
G12	73.73%	26.27%	86.76%	13.24%
G13	87.96%	12.04%	86.76%	13.24%
G14	85.68%	14.32%	86.76%	13.24%
G15	67.86%	32.14%	100.00%	0.00%
G16	1.03%	98.97%	100.00%	0.00%
G17	60.27%	39.73%	100.00%	0.00%
SI	49.99%	50.01%	0.48%	99.52%
SII	100.00%	0.00%	0.48%	99.52%
WI	67.51%	32.49%	100.00%	0.00%
WII	68.58%	31.42%	100.00%	0.00%
WIII	56.27%	43.73%	100.00%	0.00%
WIV	89.20%	10.80%	100.00%	0.00%

2.1.3   The weights from Notified Price are distributed to different grades of coal from CIL, WCL and SCCL and for different sectors. Detailed distribution of weights from Notified Price Channels is given in **Annex-2**.

3.   **Data Collection**: The data set pertaining to the Notified Price Channels would be collected from the D/o Promotion of Internal Trade & Policy (DPIIT). DPIIT collects the same data for the purpose of compilation of WPI each month from the Coal Companies. On 10th of each month DPIIT gets the data of the previous month. So at any time before 20th of the month the required dataset is available.

For dataset of Auction Channel and Import Channel, the same is obtained from the Marketing Division of CIL and DGCIS, respectively. The same process would continue.

4.   **Detailed compilation process of each type of prices**: For the purpose of compilation of both NCI and RP, two Excel based templates have been designed. For use of this template, the input prices are to be collected first and kept in another Excel Sheet.

4.1: Notified Prices: For this segment, there are in total 100 different Notified Prices for computation of NCI, based on Company, Sectors and Grades. In each month, all the prices have to be checked to see if there is any variation in any of such item. For the purpose of RP, the total number of prices from this segment is 148.

4.1.1: Change in Notified Prices: Change in Notified Prices is done with effect from a fixed date. In all cases of change, the Notified Prices for each month has to be computed on the basis of the ratio of the number of days when the old and new prices were prevalent in the month.

4.2: Auction Prices: To arrive at the Unit Value of each Grade of Coal only the auction data of CIL would be considered and both e-Auction as well as Linkage Auction would be considered. Marketing Division of CIL would provide transaction level auction data for each month. The auction data is checked to see that, the following items are not there in the data set:

(i) All entries pertaining to auction of Washed Coal:
(ii) All entries pertaining to auction of Slurry, Rejects, other Coal Products;
(iii) All entries pertaining to auction where no Grade is mentioned.

The resultant data would have to be made subjected to the following validation, rigorously:

Sl No	Validation	Reason
1.	In the Grade Column, all the entries having "n" have to be assigned "NA"	These are the Coal Products. We are interested in only the Raw Coal
2.	In the Quantity Booked Column, all the entries having "No Bid" or "0" have to be Assigned "NA"	These are the transactions which didnot materialize.
3.	For each Grade, detailed item-wise check has to be made to see that the item represents only the Raw Coal. Any row containing items like "Rejects", "Slurry", "Coal Fine", "Washed Coal", "Direct Feed", "W-V", "W-VI", etc should be assigned "NA"	These are not Raw Coal. All the steps mentioned in Item 1 to 3 above, should be done by way of procedure established by ISI.
4.	In the Grade Column, there would be two types of entries-one Grade or mixture of Grades. Those rows which contain mixture of Grades should be copied to new Worksheet and the original rows should be deleted.	We require the Unit Value of each Grade. The mixture of Grades is blending of two different types of coal. Mostly, it is prevalent in WCL. The items copied in the next Worksheet, is subjected to the following two further validations.
4.1	The new Worksheet where mixed Grades are copied should be sorted on the Grades. The cases where two Grades in the mixture are the same like "G8G8", assign the Grade G8.	The mixture of Grades pertains to mixture of coal of same Grades of two mines/ siding. As two grades are same, the resultant Grades would be the same.
4.2	The cases where two Grades in the mixture are not the same. There are two types of cases:	In WCL the practice of blending is resorted to in order to attract more customers. CIL Board Resolution has

4.2.1	One Case, Grades are like "G8G9": This is the case of Mixed Grades. As per Board Resolution, the Grades are mixed in **the ratio of 60% and 40% upto 17/01/2019** and from **18/01/2019 onwards in the ratio of 73% and 27%.** *(i) The Quantity booked in the Mixed Grades is to be apportioned in the individual Grades in the said ratio.* *(ii) The Bid Value booked in the Mixed Grades is to be apportioned in the individual Grades in the ratio of Percentage*Mid GCV of Each Individual Grade*	The Quantity Booked is apportioned in the same percentage in which they weremixed. Bid Value, however, is apportioned in the ratio of the Mid-GCV Value multiplied by the respective ratio. *Note 1: One Model Calculation done by ISI in this regard is placed in Para 4.2.2 below.*
4.2.2	Other Case, where Grades are like "G8/G9" These are called the Bundled Rakes. These are mixed in the Ratio of 1/3 and 2/3. *(i) The Quantity Booked has to be apportioned into the individual Grades in the said ratio;* *(ii) The Bid Value has to be apportioned into the individual Grades in the ratio of Mid-GCV Value multiplied by the said ratio.*	Same as 4.2.1
5.	After all the work under Item 4.1 and 4.2 above, the resultant final data is combined with the data kept at Item No 4	At this stage, the whole data pertainingto e-Auction is reduced into one worksheet.

4.2.1 Illustrative Methodology suggested by ISI to segregate the Mixed Grades:

It was clarified by GM (Marketing), CIL during the virtual meeting on NCI held on 19th May 2020 that mixed grades found in the auctions data pertain to a mixture of steam and slack coal in the proportion 73% steam to 27% slack. The first grade refers to the steam component and the second grade refers to the slack component. It was decided in the meeting that in processing all the entries, where mixed Grades of such types are there, the total quantity would be divided into the respective grades in the ratio of 73% and 27%.

If allocation of the value to the constituent grades is also in the same ratio, the implied unit value of both constituents would be the same, even when the two parts have different GCV. Thus, the part with higher GCV would be assigned unduly low unit value, and the part with lower GCV would be assigned unduly high unit value. In order to avoid bias, the value share can be divided in proportion of the share of the energy values of the two parts.

As an example, 0.03 Million tonnes of G6G9 coal had been booked for sale on 19th May 2017 through spot auction run at M-Junction, for total bid value of Rs. 9.68229. The mid-range GCV for G6 and G9 are 5650 Kcal/Kg and 4750 Kcal/Kg, respectively. Therefore, the weight and value shares of G6 and G9 would be as under.

Attribute	Share of G6	Share of G9	Total
Weight (MT)	$0.73 \times 0.03 = 0.0219$	$0.27 \times 0.03 = 0.0081$	0.03
Value (Rs.Crores)	$\dfrac{0.73 \times 5650 \times 9.68229}{0.73 \times 5650 + 0.27 \times 4750}$ $= 7.38572$	$\dfrac{0.27 \times 4750 \times 9.68229}{0.73 \times 5650 + 0.27 \times 4750}$ $= 2.29657$	9.68229

The above break-up formula may be taken into consideration in bringing out the Unit Values from Auction Channel.

The same procedure may be used in respect of bundled rake grades, by replacing the fractions 0.73 and 0.27 by 1/3 and 2/3, respectively.

4.3: From the merged data, by using **sumifs** command in Excel, summation has to be made to arrive at the total quantity booked and total value of bid for each Grade. Again, each Grade is assigned one Sub-sector for NCI compilation, like- **NC Top, NC Medium, NC Low, C Top and C Bottom**. The figures thus arrived at may be further subjected to sumifs command to arrive at the Total Quantity and Total Bid Value at each of these five Sub-Sectors. From these aggregate figures, Unit Value at each of these Sub-Sectors should be computed by dividing Total Bid Value by Total Quantity Booked.

NB: Proper care has to be taken to see the unit of quantity is Tonne and that of Bid value is Rupees. The Unit Value has to be arrived at in Rs per Tonne.

4.4: Import Prices: The last important price channel for compilation of NCI and RP is the ImportPrices. For import prices, each month, on 20th DGCIS provides the Provisional Import data of the previous month. From DGCIS data, the following statistics in each month are considered:-

Import Type	ITCHS Code	Country	Import Quantity (Te)	Value of Import (Rs)	Unit Value (Rs per Te)
CokingCoal	27011910	Australia			
Bituminus Coal	27011200	SouthAfrica			
SteamCoal	27011920	SouthAfrica			
Total from South Africa					
Bituminus Coal	27011200	Indonesia			
SteamCoal	27011920	Indonesia			
Total from Indonesia					

The Australian Coking Coal would be taken as proxy for C Top Sub-Sector, South African Non-Coking Coal would be taken as proxy for NC Top and Indonesian Non-Coking Coal would be

NC Medium.

NB: For NC Low and C Bottom Sub-Sectors, there would be no component from Import Channels.

4.5: The resulting data for NCI from Import Channel would be like the following:

Sub-Sector	Represented By	Unit Value
NC Top	South African NC Coal	
NC Medium	Indonesian NC Coal	
C Top	Australian Coking Coal	

5. Substitution of Prices: In compilation of the NCI or RP, we require all the prices. If due to some reason, one price is not available, there arises a need to use a substitute value for it. Any blank item would make the corresponding contribution as zero. (This situation may happen in case of auction of certain Grades). In order to avoid this, the Unit Values are to be stored in one database for each month. In each month, the missing Unit Values from Auction Channel would be substituted by the available figures. If one Unit Value is missing for a month, we substitute it from the last month. If in last month also it is not available, we may take the value from the latest month in which value was there.

NB: Every effort has to be made to put values in each component. In the Input Price File for each month, proper comments in this regard have to be kept.

6. Compilation of Index: At this stage, all the Input Prices from each source is available. The NCI Computation Template and RP Template, prepared by ISI would be used for compiling NCI and RP.

7. Detailed Flow Chart of the Operation: The whole operation for the purpose of bringing out the NCI and RP from data collection stage to the publication stage may be summarized in the following table. This also shows the Officers responsible for each stage:

Stage	Officer Responsible	Remarks
Data Collection	Assistant Manager, O/o DDG	Notified Prices to be collected from DPIIT, Import data from DGCIS and Auction price is provided by Marketing Division of CIL
Compilation of NCI and RP	Assistant Manager, O/o DDG	Supervision by Deputy DG
Recommendation	Deputy DG	In the absence of Deputy DG, link officer to send the recommendation
Approval and Release	Deputy Secretary O/o Nominated Authority	Approval by Secretary (Coal)

8. Periodicity: The Provisional National Coal Index and Provisional Representative Prices would be complied and published for each month. Further, the Final National Coal Index and Final Representative Prices for each month would be complied and published after the finalization of Import data by DGCIS.

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APPENDIX

Development of a National Coal Index

Report commissioned by
Joint Secretary
Ministry of Coal
Government of India

On behalf of

High Power Expert Committee
Formed by the Government of India
For improvement of coal block auctions

31 August, 2019

Indian Statistical Institute

203 Barrackpore Trunk Road

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Development of a National Coal Index

1   Introduction

1.1   Background

In an email addressed to Director, Indian Statistical Institute (ISI) on 4th May 2018, Shri N.K. Sudhansu, Joint Secretary, Ministry of Coal (MoC), requested the assistance of the Indian Statistical Institute (ISI) in developing a NATIONAL COAL INDEX for the country that will reflect the movement of the price of coal in the domestic coal market. The background and scope of the proposed work was explained in this email as under.

"Ministry of coal allocates coal blocks through auction to private companies and also to Public Sector Undertakings through allotment. From the year 2015, after the cancellation of 204 coal blocks allotted between 1993 and 2011 by the supreme court, various rounds of auction have taken place and as of now about 90 blocks have either been auctioned or allotted under the Coal Mines (Special Provisions) Act 2015. The auction of blocks is done through electronic bidding under fixed bid system.

Government in the month of December 2017, decided to form a high power expert committee under the chairmanship of Shri Pratyush Sinha (Retd IAS and Ex-CVC) and consisting of experts from various fields like banking, coal, telecom etc to examine the current system of bidding and suggest measures to improve it (OM attached). The committee has held several meetings and is on the verge of finalization of the report for submission to the Ministry of Coal. One of the major recommendations of the committee is to develop a NATIONAL COAL INDEX for the country that will reflect the movement of the price of coal in the domestic coal market. This Index will be used to determine the variation in the PREMIUM either in the form of Rs/tone of coal produced by the Operators or in Percentage share of revenue of operators. The aim is to have an index that will truly reflect the market price. Today Coal market is dominated by Coal India Limited and SCCL. These account for more than 90% of the coal produced in the country. A significant amount of coal(about 20%) is also imported in India. CIL has a system of notification of coal prices at regular interval. The notified price of coal varies with the grade of coal and is used by all in the coal sector as reference price. Apart from this, a small percentage (roughly 10%) of the coal is also auctioned by CIL to various users. The auction price reflects the market demand and supply situation currently prevalent in the country. As stated above, there is also a significant component of

import of coal in the country especially for the Iron and steel sector and coastal power plants.

Currently, DIPP publishes the data of WPI Coal along with various other sectors. The WPI Coal also has a system of calculation of the Index based on the notified price. However, it is not reflective of the true market conditions and only takes CIL notified price into account. There is a need to develop a National Coal Index that is forward looking and takes into account all the sources of price of coal into account with appropriate weightages. Since the Coal market in the country is not developed, the Index will have to be frequently updated in its structure. This becomes important also because the coal market in the country is being opened to private and foreign players for investment.

The committee has decided that Indian Statistical Institute being a premier Institute working in the field of statistics will be best suited to take up the job of development of Coal Index."

ISI, after due consideration, found the problem to be important and communicated its preference to take it up as a research project. A small team consisting of Dr. Nachiketa Chattopadhyay and Dr. Debasis Sengupta (referred to in this report as the ISI team) was formed for this purpose.

Through successive meetings on 24th May 2018 and 25th May 2018, JS put the ISI team in touch with officers of the Department of Industrial Policy & Promotion (DIPP), Coal India Limited (CIL), Coal Controller's Organization (CCO) for enhanced understanding of the problem and fast access to the requisite data.

In the subsequent HPEC meeting held on 31st May 2018, some preliminary expectations of the HPEC were explained to the ISI team.

After intensive consultation with CIL and CCO, the ISI team developed the first version of a national coal index and presented it to officials of CIL and CCO on 20th July 2018. Their feedback was incorporated in a modified version that was presented to Shri Pratyush Sinha, Chairman, HPEC, on 26th July 2018.

Several rounds of discussion were held with HPEC in its meetings of 14th February 2019, 7th May 2019 and 27th June 2019, where various assumptions, simplifications, modifications were discussed. On 8th August 2019, the draft index was presented before a stakeholders' meeting. The feedback received during and after that meeting were perused to fine-tune the index.

The present report is a culmination of the above exercise.

1.2 Purpose and scope of the index

At the outset of the present exercise, it had been indicated that the purpose of the National Coal Index would be to determine how premium from coal block auctions would vary with time, i.e how the revenue share determined at the time of bidding would vary over time keeping step with the changing price levels. Subsequently the Ministry informed the HPEC that the Index could also be used for developing the coal market, and also as the base indicator for the purpose of taxation.

The Index is meant to encompass all transactions of raw coal in the Indian market. This includes coking and non-coking of various grades transacted in the regulated (power and fertilizer) and non-regulated sectors. The transactions include those at notified price, coal auctions and coal imports.

Washed coal and coal products are not included.

1.3 Basic requirements

It was clarified at the outset by the HPEC to the ISI team that

- The Index should be computed on monthly basis;
- The Index should be forward looking;
- The Index should be computable soon after the end of the month;
- A provisional value of the Index should be available as early as possible;
- There should be separate indices for coking and non-coking coal.

Separate indices for the regulated and non-regulated sectors were sought initially, but the idea was dropped after several practical and conceptual difficulties arose.

1.4 The coal market in India

Indian users mostly use domestically produced coal. Imported coal accounts for only 16% of all purchases by volume (weight). The imported coal is generally of higher quality than domestic coal, and more expensive. As a result, the amount of money spent on purchase of imported coal is about the same as the amount spent on domestic coal. Major counties of origin of imported coal are Australia, South Africa and Indonesia.

The domestic production is dominated by the subsidiaries of CIL and Singareni Collieries Company Limited (SCCL). Other producers produce only 6% of the domestic coal by volume.

Most of the domestic transactions (78% by value, 82% by weight) take place at notified price. The remaining transactions happen through auctions, which started in the financial year (FY) 2015-16.

Most of the auctions are conducted by CIL. The auctions are of several types. Spot auction, which is open to all users, is the most common type of auction. There is a special spot auction where coal is transferred at a later time. There is a forward auction for general users and a special forward auction for users in the regulated sector. Exclusive and linkage auctions cater to the nonregulated sector. The volume of transactions through forward and special spot auctions is at present rather small.

1.5 Quality of coal

Since 16th January 2011, domestically produced non-coking coal are classified by its gross calorific value (GCV) into seventeen quality grades. These grades are listed below.

Grades	GCV Range (Kcal/Kg)
G1	GCV exceeding 7000
G2	GCV between 6701 & 7000
G3	GCV between 6401 & 6700
G4	GCV between 6101 & 6400
G5	GCV between 5801 & 6100
G6	GCV between 5501 & 5800
G7	GCV between 5201 &5500
G8	GCV between 4901 & 5200
G9	GCV between 4601 & 4900
G10	GCV between 4301 & 4600
G11	GCV between 4001 & 4300
G12	GCV between 3700 & 4000
G13	GCV between 3400 & 3700
G14	GCV between 3101 & 3400
G15	GCV between 2801 & 3100
G16	GCV between 2501 & 2800
G17	GCV between 2201 & 2500

Coking coal produced in India is categorized by of ash content, as follows.

Grade	Ash Content
Steel Grade I (ST-I)	Ash content < 15%
Steel Grade II (ST-II)	15%<=Ash content<18%
Washery Grade I (W-I)	18%<=Ash content<21%.
Washery Grade II (W-II)	21%<=Ash content<24%
Washery Grade III (W-III)	24%<=Ash content<28%
Washery Grade IV (W-IV)	28%<=Ash content<35%
Washery Gr. V (W-V)	35%<=Ash content<42%
Washery Gr. VI (W-VI)	42%<=Ash content<49%

Semi-coking coal produced in India is categorized on the basis of ash and moisture content, as follows.

Grade	Ash + Moisture content
Semi coking Gr. I	less than 19%
Semi coking Gr. II	Between 19% and 24%

Coking coal of grade W-V and W-VI and semi-coking coal are produced in negligible quantities.

Quality of coal is a contentious matter, as the price depends on it. Domestically transacted coal generally goes through a sampling and verification process, which can lead to change in the quality grade. This process takes a few months, particularly when there is dispute and arbitration.

Quality grades of imported coal depend on the country of origin and generally do not correspond to Indian grades.

2. Charting the terrain

2.1 Source and availability of price data

CIL and SCCL bring out price notifications for different grades of coal from time to time. Therefore, as far as these agencies are concerned, the notified price of coal is instantly and publicly available on any given day.

CIL, the largest seller in the domain of domestic auctions, communicates to CCO a monthly summary of auction transactions, including value and volume by grade category, within three weeks of the end of a month. In the case of linkage auctions, the summary of a tranche of transactions is provided from time to time. These data can be used to obtain gradewise unit values of coal for a particular month and for each type of auction.

Transaction level records of the landed value (not just the cost of free on board or FOB, but the cost with insurance and freight or CIF) and volume of coal imported through various ports are maintained by the Directorate General of Commercial Intelligence and Statistics (DGCIS), along with the country of origin, quality parameters and several other details. Of these, a monthly summary excluding the quality parameters, importer's identity and other sensitive information is made accessible by CCO. This summary, which can be used to compute unit values of coal, is generally available within 45 days of the end of the month concerned.

The DGCIS summary includes a commodity code. The commodity codes relevant for raw coal start with the four-digit code 2701. These are listed in the following table.

ITCHS CODE	COMMODITY DESCRIPTION
27012010	ANTHRACITE AGGLOMERATED
27011100	ANTHRCITE COAL W/N PULVRSD BUT NT AGLOMRTD
27011200	BITUMNS COAL W/N PULVRSD BUT NT AGLOMRTD
27011910	COKING COAL
27011990	OTHER COAL W/N PULVRSD BUT NTAGLDMRTD
27011920	STEAM COAL

These classifications are very different from the quality grade classifications, except that coking coal (code 27011990 is clearly identified. Steam coal (code 27011920) is the most commonly found commodity among non-coking varieties, and bituminous coal (code 27011200) comes second.

2.2 When and where the index can be computed

A natural choice of the agency that might compute the National Coal Index on regular (monthly) basis is the Coal Controllers' Office.

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In view of the delay in availability of auction and import data, it is reasonable to plan computation of the provisional value of the index after the auction data for the month becomes available, and the final value after the import data becomes available.

Once the procedure for computation is put in place, it would be possible to provide the provisional value of the index for a particular month after a delay of one month and the final value after a delay of two months.

The provisional value of the index for a particular month may be computed by using the notified prices of various categories of coal applicable for that month, unit values of coal of these categories booked through auction in that month, and the unit values of imported coal for the preceding month.

2.3   Price indices

A general principle of constructing a price index of multiple commodities/items is that a basket (quantities of various items) is fixed and its value is observed over different price situations. Fixing the basket essentially helps in isolating the effect of the price changes from changes in observed values so that price changes can be compared over time, which is the objective of the index formation.

Fixing the basket is the real challenge in justifying the use of a particular price index. For example, the Laspeyres index fixes the initial period basket, and the Paasche index compares the current period basket.[1] A combination of these two baskets has also been used, directly (Edgeworth–Marshall, Tornquist) or indirectly (Fisher).[2]

The basket is important since it determines the weight/ importance/ contributing factor of the individual prices in a single "representative" value.

The well-known indices, looked at as a weighted average of price relatives (price in current period over price in base period), uses some form of value share of the items in the basket as weights.

If the value share weights are determined in a suitable manner and fixed, one has the additional advantage of knowing the contribution of items (or groups of items) into the overall value. This is useful for policy interventions. Further, any subgroup index can be obtained in a coherent way (that is, using a similar form of the index) consistent with the overall index.

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[1] W. Erwin Diewert, John Greenlees, Charles R. Hulten (2010). *Price Index Concepts and Measurement*, University of Chicago Press.

[2] Bert M. Balk (2012). *Price and Quantity Index Numbers*. Cambridge University Press.

In the present context too, there is a need of various subgroup indices to be consistent with the overall index, where subgroups may be formed as per policy requirement.

The weights have to be chosen after taking into consideration the behaviour of values of items over the last few years.

The index satisfies some essential requirements:

(a) It remains unchanged if prices do not change

(b) Equi-Proportional changes in prices changes the index by the same proportion.

The price relatives are ratios of price at any given time and the price at a suitable base period. The base period is chosen as a period that is normal in terms of price movements and data quality. It is also desirable that the base period is not too far from the period of usage of the index.

The relative importance of the various commodities represented in a price index may change with time. This necessitates a change in the basket (i.e., change in relative weights assigned to various items in the basket). There is a trade-off involved in such a change. As already mentioned, for the index to be an indicator of price changes over a period of time, the same basket has to be used at the beginning and the end of that time interval. Thus, comparability of the index (as indicator of price change) at two points of time is lost if the basket is changed in between. On the other hand, the basket may become outdated over a period of time. For this reason, the weights used in a price index are changed from time to time, but not too frequently.

Usually the base year is also changed when the basket is changed.

2.4 Source of data for computation of weights

As mentioned before, CCO obtains monthly summary of imported coking and non-coking coal. This summary includes both booking volume and booking value, which may be used for computation of weights in a price index. The monthly summarized import data for FY 2014-15 to 2017-18 were made available to the ISI team by CCO.

Monthly summary of booking volume and booking value of coking and non-coking coal of various grades auctioned by CIL for FY 2015-16 to 2017-18 were provided directly by CIL. In respect of linkage auctions, the data were available in the form of tranches of transactions spread over several months.

Records of booking volumes are not recorded or compiled at CIL. The Coal Directory of India contains despatch volumes for any given year, segregated

by grade and company. Despatch volumes for any given year, segregated by sector and company are also available. These data were perused from Tables 4.12, 4.12A, 4.16 of the Coal Directories of 2014-15, 2015-16, 2016-17 and 2017-18.[3] More detailed tables containing delineation by sector, company and grade were provided to the ISI team by CIL. Similar break-up were also provided by SCCL in respect of SCCL despatches. Decomposition of the annual despatches into monthly quantities was obtained from Table 4.5 of the respective Coal Directories.

Bharat Coking Coal Limited, a subsidiary of CIL, notifies separate prices for prime coking coal (PCC) for linked washeries (LW) and high volatile medium coking (HVMC) coal for non-linked washeries (NLW). As the coking coal despatch data published in the Coal Directory of India does not delineate between these two varieties, the delineation was obtained directly from CIL/BCCL.

Value data in respect of the despatches are not available. Instead, one can use the price notifications issued by CIL, its subsidiaries and SCCL.

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[3] *Coal Directory of India 2014-15, 2015-16, 2016-17, 2017-18.*

3   Clearing the deck

3.1   No separate sub-index for regulated sector

For a sub-index to serve coal users in the regulated sector, one needs to know the proportion in which those users use coal in the three source strata (transactions at notified price, auctions and imports). However this information, in respect of spot, special spot and forward auctions and also for imports, is not held by any office. Instead of overcoming this difficulty with strong and unverifiable assumptions, the ISI team tried to get the information through a user survey conducted by CCO. Unfortunately, this survey elicited less than 8% response.

Subsequently the HPEC indicated that separate indices for regulated and non-regulated sectors may not be needed in respect of auction of coal blocks. This is because, going forward, mining would be done on a commercial basis moving away from the present captive model. In commercial mining the coal mining company would be selling coal to both the regulated and the non-regulated sectors. In view of these developments, the idea of a separate index for the regulated sector was dropped.

3.2   Modelling simplifications

Booked and despatched quantities of domestic coal may differ in quantity and value. Yet the fact is that auction data contain booking volumes and Coal Directory data contain despatch volumes. After taking into account the practical limitations of current record-keeping, booking volumes were used for auctions, despatch volumes were used for transactions at notified price and landed volumes were used for imports – for the limited purpose of computing weights for the indices.

In order to avoid double counting, e-auction despatches were subtracted from the despatch volumes, which were then treated as notified price transactions. Power and fertiliser sector despatches were delineated from other non-auction despatches, for possible pairing up with notified prices for the regulated and non-regulated sectors, respectively.

Unit value for a month was used in lieu of prices in respect of imported and auctioned coal.

Unlike other grades, the price of G-1 grade non-coking coal is often notified as a function of the GCV value. Since the other non-coking grades have a GCV band of 300 Kcal/Kg (which means the centre of the band is 150 Kcal away from the band boundaries), the average GCV for G-1 coal was taken as 7150 Kcal/Kg, which is 150 Kcal/Kg above the boundary of G-1 and G-2.

It is known that tested grade of coal often differs from declared grade, and this has an implication on the price. It was learnt through consultation with CIL and HPEC that the price adjustments do not have a significant bias in any particular direction, and accordingly the declared grade was used for computation of the index (both for computation of weights and for periodic computation of unit values of auctioned coal).

Price notifications were used to generate a time series of prices of different grades for different companies. In case of a notification becoming effective in the middle of a month, the 'notified' price applicable for that month was defined as a weighted sum of the prices applicable at the beginning and the end of the month, and the number of days falling under each price regime was used to determine the weights of the two parts.

CIL notifications provide separate prices for run of mine (ROM) coal and prices for size-sorted coal called STEAM and SLACK coal. The price difference is small. SCCL provides more detailed price structure depending on the mode/location of despatch. Despatch volumes cannot be matched with these different prices (in the current form of record keeping). Following the current practice of WPI and after consultation with HPEC, it was decided that ROM prices would be used everywhere for despatches at notified price.

Annual despatches of a particular grade of coal by a particular company to a particular sector were decomposed into monthly quantities in a proportionate manner from Table 4.5 of the respective Coal Directories.

Linkage auction booking volumes and values for a particular grade and sector, available from data on tranches spanning several months, were also broken up proportionately into months.

A major issue regarding coal quality was that grades of domestic and imported coal do not match. A broad grouping of quality grades can alleviate the problem. In the absence of any universally acceptable standard on this issue (exemplified by non-existence of global and several changes in the grading system in India), the ISI team chose to use the grouping used for the wholesale price index (WPI) by the Department of Industrial Policy an Promotion (DIPP) of the Ministry of Commerce and Industry. This system uses a single grade of coking coal and three grade ranges of non-coking coal. In this report, best quality group (G-1 to G-6) is referred to as the top grade, the poorest quality group (G-15 to G-17) is referred to as the bottom grade and the intermediate quality group (G-7 to G-14) is called the middle grade.

The standard practice in respect of computation of price indices is that prices with low volumes of transaction are ignored. From this consideration, the ISI team chose to leave out the following from the computation.

- Domestic producers other than CIL and SCCL
- Coal auctioned by SCCL
- Semi-coking and weakly coking coal
- Minor countries of origin in respect of imported coal (all countries other than Australia for coking coal and all countries barring South Africa and Indonesia for non-coking coal)
- Imported items other than those bearing item codes 27011910 (Coking coal), 27011920 (STEAM COAL) and 27011200 (BITUMNS COAL W/N PULVRSD BUT NT AGLOMRTD).
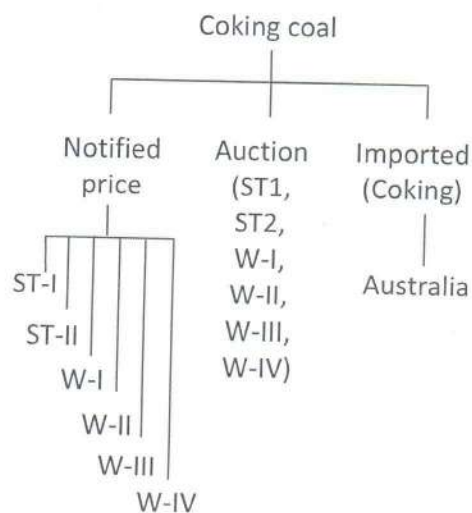
The latter two varieties of imported coal were simply clubbed as non-coking coal. On the basis of further analysis reported below, these two categories of coal were treated as top grade if the country of origin is South Africa and as middle grade if the country of origin is Indonesia.

All forms of auction for a given grade category were merged for simplification.

3.3 Price channels used for the index

While prices of a variety of coal items would have to be represented in the National Coal Index, there would be variety of prices for a given item too. For example, the spot auction price of G-1 grade coal would be different from its notified price prevailing at the time. Thus, wherever there is scope for a separate price of a coal item, one has to track that price and assign a weight. In this report, the series of prices of a particular coal item transacted in a particular mode, which is assigned a fixed weight, is referred to as a price channel.

After elimination of the price channels in the manner mentioned above, the remaining channels for coking coal are organized as shown in the following diagram.

Coking coal

Notified price
- ST-I
- ST-II
- W-I
- W-II
- W-III
- W-IV

Auction (ST1, ST2, W-I, W-II, W-III, W-IV)

Imported (Coking)
- Australia

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Likewise, the simplified price channels for non-coking coal and shown in the following diagram.

Non-coking coal

```
                          Non-coking coal
                                |
          ┌─────────────────────┼──────────────────────┐
       Top grade            Middle grade            Bottom grade
          |                     |                        |
   ┌──────┼──────┐       ┌──────┼──────┐          ┌──────┼──────┐
Notified  Auction  Imported  Notified  Auction  Imported  Notified  Auction
 price   (G-1,    (Steam,    price    (G-7,     (Steam,    price    (G-15,
         G-2,     Bituminous)          G-8,      Bituminous)         G-16,
         G-3,                          G-9,                          G-17)
         G-4,                          G-10,
  G-1    G-5,              G-7         G-11,
         G6)               G-8         G-12,            G-15
  G-2                      G-9         G-13,
                           G-10        G-14)            G-16
  G-3            South      G-11                Indonesia
                Africa      G-12
  G-4                       G-13                          G-17
  G-5                       G-14
    G-6
```
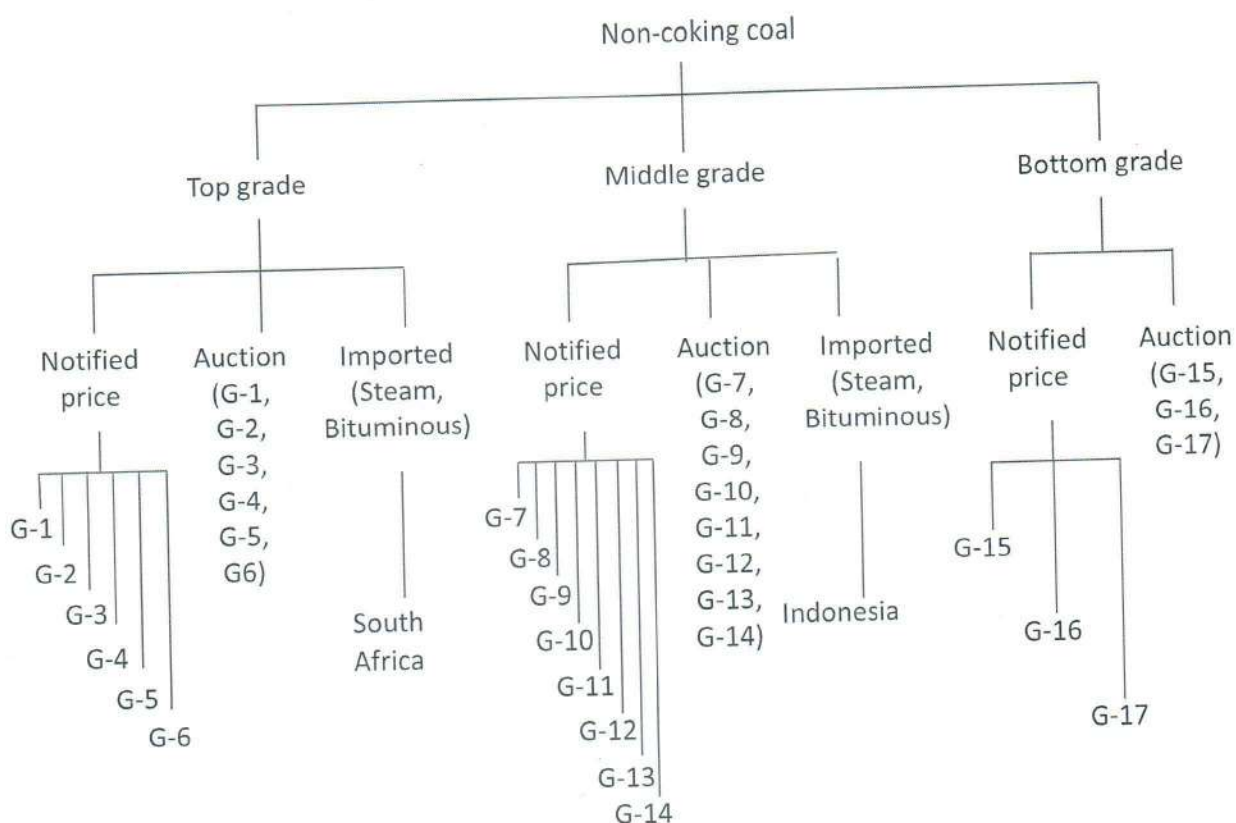
These two diagrams are still simplistic in the sense that they do not show the following sub-channels.

- Sub-channels for different grades within a group of grades for notified price transactions
- Sub-channels for different companies having different prices for the same grade
- Sub-channels for PCC (LW) and HVMC (NLW) coking coal of different grades, for which BCCL notifies separate prices

The complete list of all the price channels is given in the appendix.

### 3.4   Matching imported coal with domestic grades

As the DGCIS data made available to ISI through CCO are aggregated and no information about GCV and price is available, the ISI team chose to carry out an indicative analysis of privately owned and unverified data available from the website https://www.seair.co.in/. The data related to individual transactions of steam coal imports during the period December 2015 to

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November 2016. The following is a summary of the GCV values imported from Indonesia, Australia and South Africa.

Non-coking coal grade category	Percentage by volume		
	Indonesia	Australia	South Africa
Low (GCV < 3100 Kcal/Kg)	0%	0%	0%
Middle (GCV between 3100 and 5500 Kcal/Kg)	76%	0%	1%
High (GCV > 5500 Kcal/Kg)	24%	100%	99%

Thus, if one decides to use DGCIS data on coal imports, which does not contain GCV information, one may use the country of origin as an indicator of quality grade. In particular, shipments from Indonesia may be regarded as 'middle grade' and shipments from South Africa and Australia as 'top grade'.

The price distribution of steam and bituminous coal imported from the three countries during the periods April 2014 to March 2018, as per DGCIS records, is shown below.
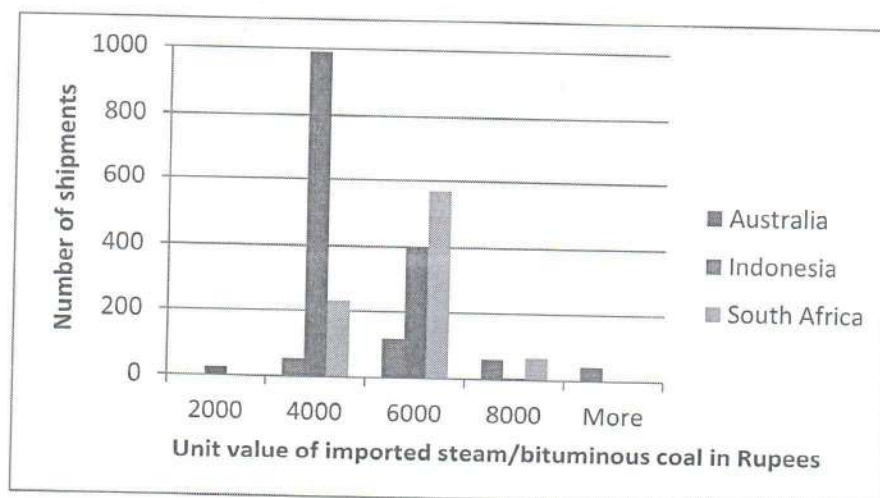
It transpires that imports from Indonesia are more often in the rage of lower unit value, while imports from South Africa and Australia are more often in the higher range of unit value. This confirms the finding from previous (private) data that imports from Indonesia are mostly middle grade and those from South Africa are mostly top grade. Non-coking coal imports from Australia may be ignored for low volume.

This finding was presented in the HPEC meeting of 27th June 2019 and it found consonance with the experience of some members.

It was decided that non-coking coal imported from South Africa and Indonesia would be treated as belonging to top and middle grades, respectively.

Analysis of the above DGCIS data also revealed that Australia is the country of main relevance for computation of coking coal index.

3.5 Foreign indices or DGCIS data with adjustment?

It had been suggested that foreign coal indices may be used in lieu of the imported component of the sub-index for coking coal and non-coking coal of top and middle grades. The choice narrows down to just one country in each case. For South African coal, Shri Partha Bhattacharyya had suggested the use of Argus/McCloskey's API-4 price assessment for coal exported through Richards Bay terminal. Cement Manufacturers' Association (CMA) had more specifically suggested and provided to the ISI team the Richards Bay FOB (6000 Kcal/Kg NAR) price data, which represents top grade non-coking coal imports most appropriately. This price is available in the form of multiple quotations for every month. The representative price for a particular month was chosen as the geometric mean of all the quotations in that month. A comparative plot of this price (API-4 6000), after conversion from USD to INR by using the contemporary conversion rate, with the landed unit value (CIF) of steam and bituminous coal imported from South Africa (DGCIS) revealed that the movement of the latter series lags the former by a month. This lag may have been due to transportation delay. The plot given below compares the DGCIS landed unit value of South African steam and bituminous coal with lagged API-4 6000 price.
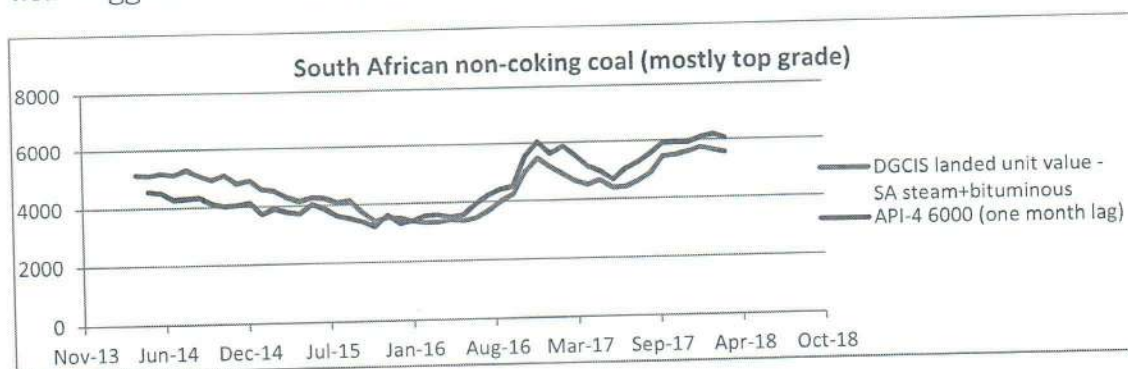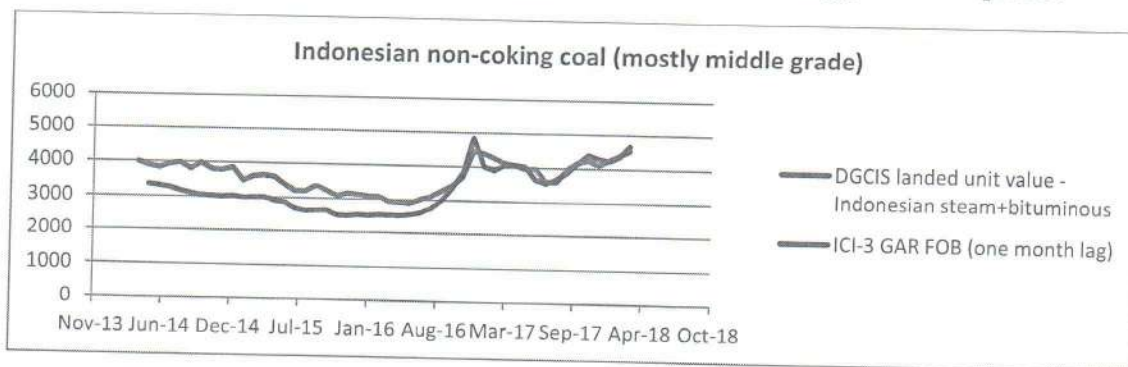

The two series have moved somewhat similarly, though the DGCIS series has had less fluctuation and slower increase overall. The smaller fluctuation is further brought out by the first differences of the logged series, shown in the following plot.

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## South African non-coking coal (mostly top grade)
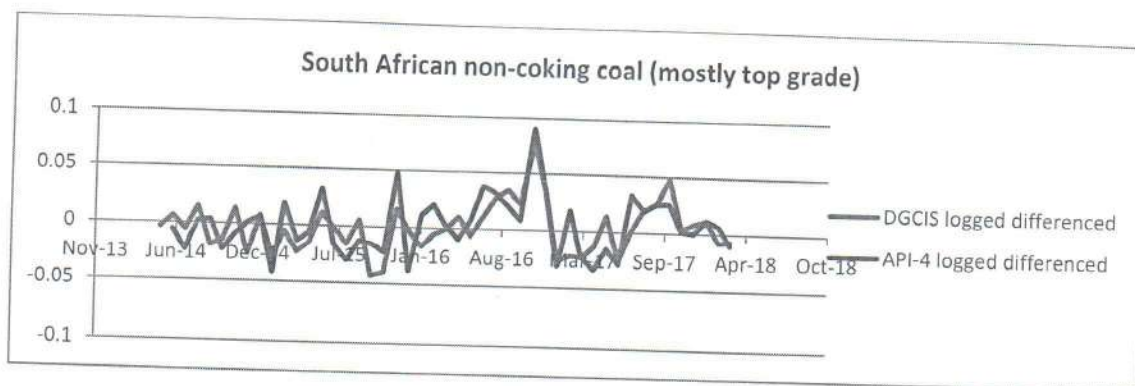
Turning to Indonesian coal, Shri Partha Bhattacharyya suggested the use of the Indonesian index. CMA specifically suggested the ICI-4 (4200 Kcal/Kg GAR) FOB price assessment as the best representative of middle grade equivalent of imports. Two other possible choices are ICI-3 (5000 Kcal/Kg GAR) and ICI-5 (3400 Kcal/Kg GAR). Analysis of the https://www.seair.co.in/ data produces the following summary of dollar values of non-coking coal imported from Indonesia.

GCV range (Kcal/Kg)	Value (Million USD)	Suitable Indonesian index
Less than 3600	3.62	ICI-5 (3400 Kcal/Kg GAR)
Between 3600 and 4600	20. 60	ICI-4 (4200 Kcal/Kg GAR)
Above 4600	57.97	ICI-3 (5000 Kcal/Kg GAR)

It transpires that the best representative price assessment would be ICI-3 (5000 Kcal/Kg GAR), provided by CMA to the ISI team. This series is available in the form of daily USD value. The monthly geometric mean was computed and then converted from USD to INR by using the contemporary conversion rate. When this monthly ICI-3 series was compared with the landed unit value (CIF) of steam and bituminous coal imported from Indonesia (DGCIS), movements of the DGCIS series was found to lag the movements of the ICI-3 series by one month. This lag is also likely due to transportation delay. The plot given below compares the DGCIS landed unit value of Indonesian steam and bituminous coal with lagged ICI-3 price.

Indonesian non-coking coal (mostly middle grade)

The two series have moved somewhat similarly, though the DGCIS series has moved over a narrower range. The first differences of the logged series, shown below, also show greater fluctuation of ICI-3.

Indonesian non-coking coal (mostly middle grade)
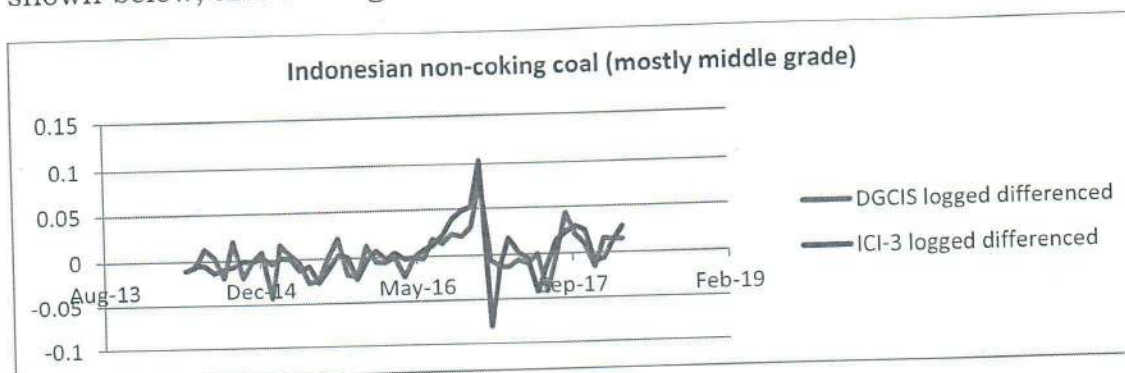
The ISI team has attempted a similar analysis for coking coal but could not succeed. Shri Partha Bhattacharyya suggested the use of the Newcastle index, but apparently that is for non-coking coal. Indian imports of coking coal are mostly from Australia, for which no prominent index could be located.

Thus, the following conclusions are in order.

- The most suitable price assessments for imported South African top grade non-coking coal and imported Indonesian middle grade non-coking coal appears to be API-4 and ICI-3, respectively.
- Both of these assessments are made by private agencies.
- When these price assessments are converted to monthly rupee values, these are similar to the unit values of the corresponding categories of imported coal computed from DGCIS data, though the latter series lag by a month.
- The foreign price assessments have greater fluctuations and faster rise over the four years than the corresponding DGCIS unit values.
- The main advantage of the DGCIS unit value is that it is more relevant for the Indian market. The perceived advantage of foreign assessments is that, as they cater to a larger market, they might be less prone to volatility. However, the above analysis shows that the foreign series did not have smaller fluctuations than the DGCIS series during 2014-15 to 2017-18. On the other hand, the faster rise of the foreign price assessments during the period of study exemplify how that their lack of relevance to the Indian market, if ignored, can drive up the coal index unduly and affect Indian users adversely.
- Unit values from auctions conducted in a particular month are expected to be available about a month after the end of that month. There would be a delay of another month before the CCO receives the

DGCIS data for the month. The advantages of the domestic computations, mentioned above, make it well worth the wait.

- The effect of freight and insurance charges on price relatives should be minimal, as these appear both in the numerator and the denominator. The only effect is on the weights, which may be higher for CIF.
- Even though the DGCIS unit values are CIF, these do not appear to be unduly inflated. In fact they are often smaller than the foreign price assessments. Thus, there is no strong case for discounting them for freight and insurance.
- Another argument against discounting landed prices of imported coal is that the landed price already excludes domestic transport cost – just like domestic coal. Further discounting them would disrupt this parity.

Therefore, the ISI team used CIF unit values of imported coal as calculated from DGCIS data, instead of foreign price assessments.

4 The overall model

4.1 The index

The ISI team used a weighted average of price relatives, where weights are fixed on the basis of past value shares, as mentioned earlier. According to this scheme, National Coal Index at the ith month for all categories of coal is

$$C_i = w_k K_i + w_n N_i,$$

where, K_i is coking coal index at the ith month, N_i is non-coking coal index at the ith month, and w_k and w_n are positive weights such that $w_k + w_n = 1$.

The coking coal index for the ith month is

$$K_i = w_{tk} K_{ti} + w_{ak} K_{ai} + w_{mk} K_{mi},$$

where K_{ti}, K_{ai} and K_{mi} are indices (at the ith month) of coking coal transactions at notified price, through auctions and through imports, respectively, and w_{tk}, w_{ak} and w_{mk} are the corresponding positive weights, with $w_{tk} + w_{ak} + w_{mk} = 1$. The index (at the ith month) of coking coal transactions at notified price is

$$K_{ti} = w_{1tk} K_{1ti} + w_{2tk} K_{2ti} + \cdots + w_{6tk} K_{6ti},$$

where $K_{1ti}, K_{2ti}, \ldots, K_{6ti}$ are indices (at the ith month) of coking coal transactions at notified price for quality grade numbers $1, 2, \ldots, 6$ (i.e., grades ST-I, ST_II, W-I, W-II, W-III and W-IV), and $w_{1tk}, w_{2tk}, \ldots, w_{6tk}$ are the corresponding positive weights, with $w_{1tk} + w_{2tk} + \cdots + w_{6tk} = 1$. The index (at the ith month) of coking coal transactions at notified price for quality grade number 1 (i.e., grade ST-I) is

$$K_{1ti} = w_{11tk} \frac{P_{11tki}}{P_{11tk0}} + w_{21tk} \frac{P_{21tki}}{P_{21tk0}},$$

where P_{11tki}, P_{21tki} are prices (at the ith month) notified by BCCL for coking coal with quality grade number 1 (i.e., grade ST-I) for regulated and non-regulated sectors, respectively; P_{11tk0}, P_{21tk0} are the corresponding notified prices at the base period; and w_{11tk}, w_{21tk} are the corresponding positive weights, with $w_{11tk} + w_{21tk} = 1$. The index (at the ith month) of coking coal transactions of other grades at notified price, namely $K_{2tki}, K_{3tki}, \ldots K_{6tki}$, have similar expressions, but the number of summands for $K_{3tki}, \ldots K_{6tki}$ are larger because of the larger number of price channels for them (see Appendix).

The index (at the ith month) of coking coal transactions through auctions is

$$K_{ai} = \frac{P_{ai}}{P_{a0}}$$

where P_{ai} is the unit value of all grades of coking coal transacted in the ith month through exclusive, forward, special forward, spot, special spot and linkage auctions taken together, and P_{a0} is the corresponding unit value at the base period.

The index (at the ith month) of coking coal transactions through imports is

$$K_{mi} = \frac{P_{mi}}{P_{m0}}$$

where P_{mi} is the unit value of all coking coal imported in the ith month from Australia and P_{m0} is the corresponding unit value at the base period.

The non-coking coal index for the ith month is

$$N_i = w_{1n}N_{1i} + w_{2n}N_{2i} + w_{3n}N_{3i},$$

where N_{1i}, N_{2i} and N_{3i} are indices (at the ith month) of non-coking coal for top, middle and bottom grade categories, respectively, and w_{1n}, w_{2n} and w_{3n} are the corresponding positive weights, with $w_{1n} + w_{2n} + w_{3n} = 1$. The index (at the ith month) of non-coking coal of top grade category is

$$N_{1i} = w_{t1n}N_{t1i} + w_{a1n}N_{a1i} + w_{m1n}N_{m1i},$$

where N_{t1i}, N_{a1i} and N_{m1i} are indices (at the ith month) of top-grade non-coking coal transactions at notified price, through auctions and through imports, respectively, and w_{t1n}, w_{a1n} and w_{m1n} are the corresponding positive weights, with $w_{t1n} + w_{a1n} + w_{m1n} = 1$. The index (at the ith month) of top-grade non-coking coal transactions at notified price is

$$N_{t1i} = w_{1t1n}\frac{P_{1t1ni}}{P_{1t1n0}} + w_{2t1n}\frac{P_{2t1ni}}{P_{2t1n0}} + \cdots,$$

where $P_{1t1ni}, P_{2t1ni}, \ldots$ are notified prices (at the ith month) of different varieties of top-grade non-coking coal for which there is separate notified price (e.g., price of G-1 coal for regulated sector applicable to non-WCL subsidiaries of CIL, the corresponding price for the non-regulated sector; see Appendix for complete list); $P_{1t1n0}, P_{2t1n0}, \ldots$ are the corresponding notified prices at the base period; and $w_{1t1n}, w_{2t1n}, \ldots$ are the corresponding positive weights, with $w_{1t1n} + w_{2t1n} + \cdots = 1$.

The index (at the ith month) of top-grade non-coking coal transactions through auctions is

$$N_{a1i} = \frac{P_{a1i}}{P_{a10}}$$

where P_{a1i} is the unit value of all varieties of top-grade non-coking coal transacted in the ith month through exclusive, forward, special forward, spot, special spot and linkage auctions taken together, and P_{a10} is the corresponding unit value at the base period.

The index (at the ith month) of imported top-grade non-coking coal is

$$N_{m1i} = \frac{P_{m1i}}{P_{m10}}$$

where P_{m1i} is the unit value of all steam and bituminous coal imported from South Africa in the ith month, and P_{a10} is the corresponding unit value at the base period.

The descriptions of indices of non-coking coal of middle and bottom grade categories are similar, with the exception that the import component is absent in the case of the bottom grade category (G-15, G-16 and G-17).

All the weights mentioned above are determined by the shares of total values of the different price channels mentioned above, averaged over the years 2015-16, 2016-17 and 2017-18.

4.2 Base period

For notified price dispatches, monthly break up is available only at aggregated level. This means there is little scope for studying seasonality or choosing of any particular month for the base period. A complete year would be a better choice to avoid seasonal bias.

The base year should have 'normal' production, trade and price variation. There is no observable reason to disqualify any particular year from this consideration.

Another consideration is that data should be reliable. Most of the data are collected from similar sources (DGCIS, CIL, SCCL and Coal Directory). Therefore, there is no reason to prefer any particular year.

Yet another consideration is that the base year should be as recent as possible for a forward looking index. From this consideration, 2017-18 may be preferred.

Geometric mean of monthly unit values of the base year 2017-18 is used in the denominator of the sub-indices for different price channels.

4.3 Is the index forward looking?

Only four year of data were available, out of which 2014-15 did not have any transaction through auction. Over this period, no major movement in the proportion of aggregate values in various price channels was observed. Also since the monthly information on domestic dispatches were only apportioned values of yearly aggregates, there is hardly any scope of model-based forecasting of future weights. Under the circumstances, the only option was to use three-year average values for weights.

It is suggested that the weights used in the coal index be revised every four years, and also that these weights be computed from the transactions data spanning four consecutive years, using the methodology described in this report. The first revision would involve transactions data of the financial years 2016-17, 2017-18, 2018-19 and 2019-20. CCO may complete computation of the revised weights by 31st December 2021. After the revision is made, the results should be double-checked before making the new weights effective from 1st April 2022. The same cycle may be repeated after another four years.

4.4 Sub-indices

The National Coal Indices comes with a number of sub-indices. The sub-indices at the top level are those for coking and non-coking coal. The index for non-coking coal is itself a composite index consisting of sub-indices for top, middle and bottom grades. Each of these sub-indices have further sub-indices accounting for the notified-price, auction and import components. In the case of bottom grade coal there are just two sub-indices as there is no import component.

Some potential users have suggested the utilization of these sub-indices for greater relevance to a particular coal block being auctioned. The HPEC may take a call on whether this should be done in lieu of a single index.

5   Some recommendations

User side data would have been very relevant for the coal index, but it could not be captured in the present set-up. This may be planned for a future revision of the index.

Supply side data on individual transactions at notified price would have brought more parity among different types of transaction. This should be feasible with some effort in future.

The rationale and the procedure for construction of the national coal index have been documented here. There has been complete transparency about data used for determining commodity basket and data needed to be used for periodic computation of index. In this context, one needs to ensure that the notified prices used in the coal indices should be determined independently of the values of the indices to avoid circularity.

A set of worksheets containing implementation of the computations needed for the coal index is attached. This MS-Excel file, together with the report, may be put in the public domain, so that there can be verification, suggestions and scope for improvement.

Manual checking, cleaning and validating the data for the present exercise had been a considerable task for the ISI team. The same exercise should be carried out by CCO at the time of revision of weights. Similar scrutiny and diligence is also needed for monthly computation of the coal index, to be made by determining appropriate prices and unit values for the respective price channels.

Appendix: Full list of price channels

The complete list of price channels used for the National Coal Index, along with its nested structure, is given below.

Indian coal
- Coking
  - Coking, notified
    - Coking, notified , ST-I
      - Prime coking, regulated, BCCL ST-I
      - Prime coking, non-regulated, BCCL ST-I
    - Coking, notified , ST-II
      - Prime coking, regulated, BCCL ST-II
      - Prime coking, non-regulated, BCCL ST-II
    - Coking, notified , W-I
      - Prime coking, regulated, BCCL W-I
      - Prime coking, non-regulated, BCCL W-I
    - Coking, notified , W-II
      - Prime coking, regulated, BCCL W-II
      - HVMC, regulated, BCCL W-II
      - Prime coking, non-regulated, BCCL W-II
      - HVMC, non-regulated, BCCL W-II
      - Coking, regulated, ECL W-II
      - Coking, non-regulated, ECL W-II
      - Coking, non-regulated, WCL W-II
    - Coking, notified , W-III
      - Prime coking, regulated, BCCL W-III
      - HVMC, regulated, BCCL W-III
      - Prime coking, non-regulated, BCCL W-III
      - HVMC, non-regulated, BCCL W-III
      - Coking, non-regulated, CCL W-III
      - Coking, non-regulated, ECL W-III
    - Coking, notified , W-IV
      - Prime coking, regulated, BCCL W-IV
      - HVMC, regulated, BCCL W-IV
      - Prime coking, non-regulated, BCCL W-IV
      - HVMC, non-regulated, BCCL W-IV
      - Coking, regulated, CCL W-IV
      - Coking, non-regulated, CCL W-IV
  - Coking, auction
    - Exclusive, forward, special forward, spot, special spot, linkage
  - Coking, imported
    - Coking coal imported from Australia
- Non-coking
  - Non-coking, top grade (G-1 to G-6 or imported)
    - Non-coking, top grade, notified
      - Non-coking, regulated, CIL (excl WCL) G-1
      - Non-coking, non-regulated, CIL (excl WCL) G-1
      - Non-coking, regulated, CIL (excl WCL) G-2
      - Non-coking, non-regulated, CIL (excl WCL) G-2

- Non-coking, regulated, CIL (excl WCL) G-3
- Non-coking, non-regulated, CIL (excl WCL) G-3
- Non-coking, regulated, CIL (excl WCL) G-4
- Non-coking, non-regulated, CIL (excl WCL) G-4
- Non-coking, non-regulated, WCL G-4
- Non-coking, regulated, CIL (excl WCL) G-5
- Non-coking, regulated, WCL G-5
- Non-coking, regulated, SCCL G-5
- Non-coking, non-regulated, CIL (excl WCL) G-5
- Non-coking, non-regulated, WCL G-5
- Non-coking, non-regulated, SCCL G-5
- Non-coking, regulated, CIL (excl WCL) G-6
- Non-coking, regulated, WCL G-6
- Non-coking, non-regulated, CIL (excl WCL) G-6
- Non-coking, non-regulated, WCL G-6
- Non-coking, top grade, auction
  - Exclusive, forward, special forward, spot, special spot, linkage
- Non-coking, top grade, imported
  - Steam and bituminous coal imported from South Africa
- Non-coking, middle grade (G-7-G-14 or imported)
  - Non-coking, middle grade, notified
    - Non-coking, regulated, WCL G-7
    - Non-coking, regulated, SCCL G-7
    - Non-coking, non-regulated, CIL (excl WCL) G-7
    - Non-coking, non-regulated, WCL G-7
    - Non-coking, non-regulated, SCCL G-7
    - Non-coking, regulated, CIL (excl WCL) G-8
    - Non-coking, regulated, WCL G-8
    - Non-coking, regulated, SCCL G-8
    - Non-coking, non-regulated, CIL (excl WCL) G-8
    - Non-coking, non-regulated, WCL G-8
    - Non-coking, non-regulated, SCCL G-8
    - Non-coking, regulated, CIL (excl WCL) G-9
    - Non-coking, regulated, WCL G-9
    - Non-coking, regulated, SCCL G-9
    - Non-coking, non-regulated, CIL (excl WCL) G-9
    - Non-coking, non-regulated, WCL G-9
    - Non-coking, non-regulated, SCCL G-9
    - Non-coking, regulated, CIL (excl WCL) G-10
    - Non-coking, regulated, WCL G-10
    - Non-coking, non-regulated, CIL (excl WCL) G-10
    - Non-coking, regulated, SCCL G-10
    - Non-coking, non-regulated, WCL G-10
    - Non-coking, non-regulated, SCCL G-10
    - Non-coking, regulated, CIL (excl WCL) G-11
    - Non-coking, regulated, WCL G-11
    - Non-coking, regulated, SCCL G-11
    - Non-coking, non-regulated, CIL (excl WCL) G-11
    - Non-coking, non-regulated, WCL G-11

- Non-coking, non-regulated, SCCL G-11
- Non-coking, regulated, CIL (excl WCL) G-12
- Non-coking, regulated, WCL G-12
- Non-coking, regulated, SCCL G-12
- Non-coking, non-regulated, CIL (excl WCL) G-12
- Non-coking, non-regulated, WCL G-12
- Non-coking, non-regulated, SCCL G-12
- Non-coking, regulated, CIL (excl WCL) G-13
- Non-coking, regulated, WCL G-13
- Non-coking, regulated, SCCL G-13
- Non-coking, non-regulated, CIL (excl WCL) G-13
- Non-coking, non-regulated, WCL G-13
- Non-coking, non-regulated, SCCL G-13
- Non-coking, regulated, CIL (excl WCL) G-14
- Non-coking, regulated, SCCL G-14
- Non-coking, non-regulated, CIL (excl WCL) G-14
- Non-coking, non-regulated, SCCL G-14
        - Non-coking, middle grade, auction
            - Exclusive, forward, special forward, spot, special spot, linkage
        - Non-coking, middle grade, imported
            - Steam and bituminous coal imported from Indonesia
    - Non-coking, bottom grade (G-15-G-17)
        - Non-coking, bottom grade, notified
            - Non-coking, regulated, CIL (excl WCL) G-15
            - Non-coking, regulated, SCCL G-15
            - Non-coking, non-regulated, CIL (excl WCL) G-15
            - Non-coking, non-regulated, SCCL G-15
            - Non-coking, regulated, CIL (excl WCL) G-16
            - Non-coking, regulated, SCCL G-16
            - Non-coking, non-regulated, CIL (excl WCL) G-16
            - Non-coking, non-regulated, SCCL G-16
            - Non-coking, regulated, CIL (excl WCL) G-17
            - Non-coking, regulated, SCCL G-17
            - Non-coking, non-regulated, CIL (excl WCL) G-17
            - Non-coking, non-regulated, SCCL G-17
        - Non-coking, bottom grade, auction
            - Exclusive, forward, special forward, spot, special spot, linkage

Development of a National Coal Index:

Modifications and extensions

Supplement to Report commissioned by
Joint Secretary
Ministry of Coal
Government of India

On behalf of

High Power Expert Committee
formed by the Government of India
for improvement of coal block auctions

4 March, 2020

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S1 Background

This annexure was necessitated by feedback received on the proposed National Coal Index from various stakeholders subsequent to the submission of the main report, and deliberations held at the Ministry of Coal on 24 February 2020, 27 February 2020 and 2 March 2020. Suggestions on the issue of smaller groups of grades necessitated additional analysis, and even some change in the proposed index. These analysis and the resulting conclusions and recommendations are given in the next two sections. Section S4 contains recommendations for the computation of a base bid price for various grades, as specifically sought by the Ministry, for use in coal block auctions. An example is given in Section S5. Answers to some additional queries are compiled in the Appendix.

S2 No smaller groups of grades for non-coking coal

It is understandable that a potential bidder of a coal block would prefer a coal index that is as relevant to the characteristics of that block as possible. Shortage of data makes it impractical to look for mine-specific or even grade-specific index. A major hindrance to computation of grade-specific indices is that data on imported coal are generally not delineated by domestic grades.

A noteworthy suggestion received from various sources was that the middle grade group be further subdivided into two parts. In order to address this issue, data on grade distribution of 50 Indian mines, compiled on 17 February 2020, was provided by the Ministry of Coal. A summary of the data is given in the following table.

Non-coking coal grade	Extractable reserves of 50 mines (total 4633 MT)
G1-G3 (>6400 Kcal/Kg)	0.0%
G4 (6101-6400 Kcal/Kg)	0.0%
G5 (5801-6100 Kcal/Kg)	0.0%
G6 (5501-5800 Kcal/Kg)	1.3%
G7 (5201-5500 Kcal/Kg)	0.5%
G8 (4901-5200 Kcal/Kg)	5.4%
G9 (4601-4900 Kcal/Kg)	2.0%
G10 (4301-4600 Kcal/Kg)	5.4%
G11 (4001-4300 Kcal/Kg)	48.6%
G12 (3701-4000 Kcal/Kg)	21.0%
G13 (3401-3700 Kcal/Kg)	12.6%
G14 (3101-3400 Kcal/Kg)	3.1%
G15 (2801-3100 Kcal/Kg)	0.0%

A pictorial representation of the middle part of the table is given in the following bar chart.
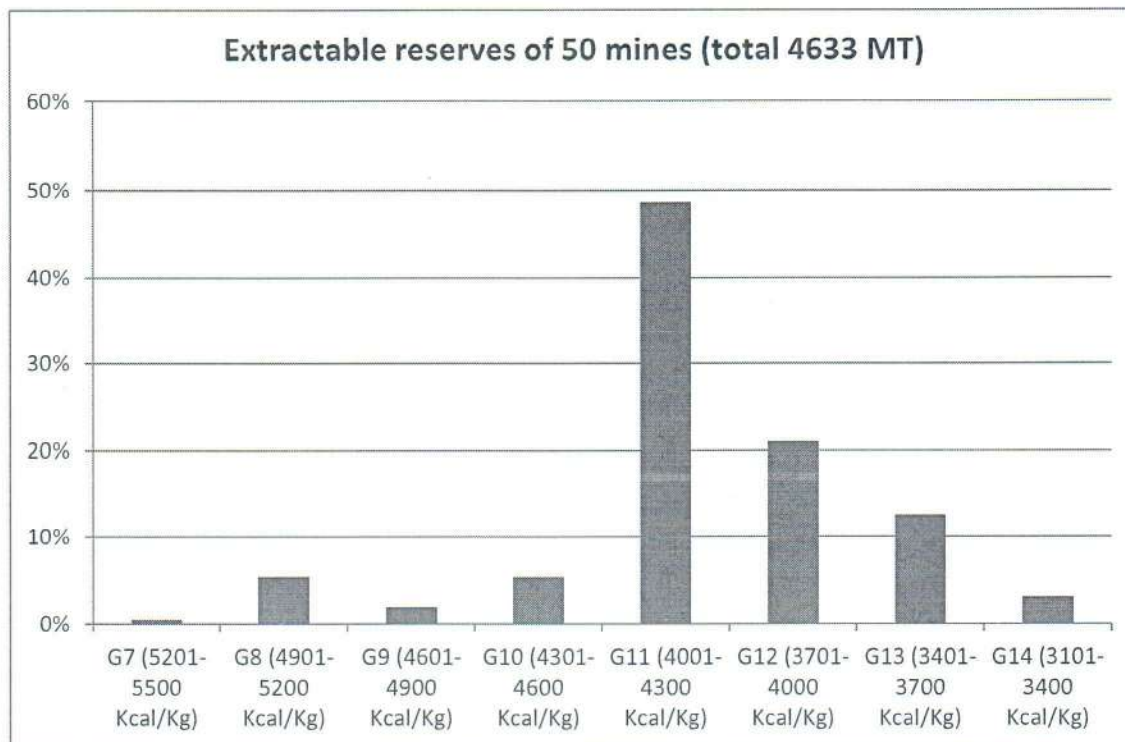
It is clear that most of the middle grade reserves are of grades G11 to G13, though there are smaller reserves of some neighbouring grades. Interestingly, about half the reserves of non-coking coal is of the G11 category, which lies at the centre of the middle grade group. Thus, any partition of this group would be dominated by the G11 grade category. The least imbalance between the partitions would occur if the grades G7 to G11 are kept in one subgroup and G12 to G14 are kept in another. On the other hand, the grade groups would be evenly split if the upper middle grade group contains the grades G7 to G10 and the lower middle grade group contains the grades G11 to G14. Another advantage of the latter partition is that it allows most of the coal reserves to fall in the lower middle grade group.

Splitting the middle grade group would inevitably necessitate the splitting of the Indonesian imports (the only part of the imported coal used for the middle grade group, as mentioned in Section 3.4 of the main report) by value and volume.

In order to assess how difficult this exercise would be, data from some private sources were compiled. The first set were the partial data (amounting to only 1.9 MT) of 2016 Indonesian imports, mentioned in Section 3.4 of the main report. The second set, provided by the Ministry of Coal, pertained to 2017-18 imports from all countries, segregated by GCV ranges not matching the Indian grades. The summary of these data, along with the grade data of the previous table, are provided in the following table.

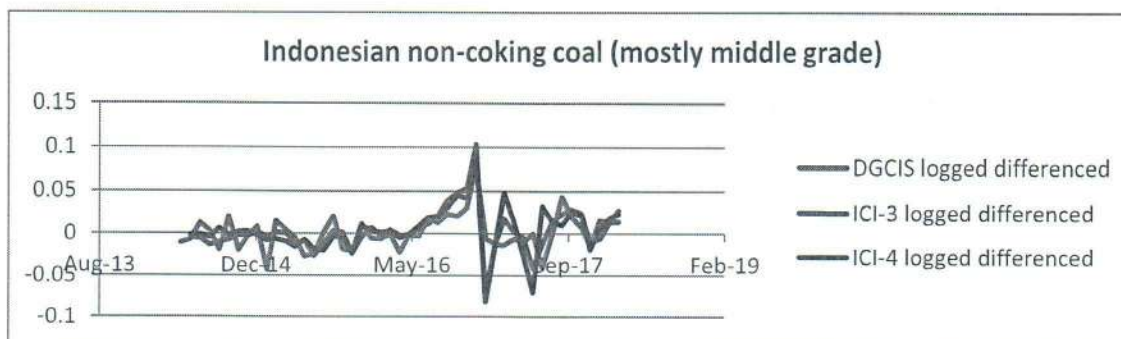| Non-coking coal grade (GCV range in Kcal/Kg)	Extractable reserves of 50 mines (2020, total 4633 MT)	Sample of Indonesian imports (2016, private data, total 1.9 MT, web-scraped by ISI)	Non-coking coal grade (Kcal/Kg)	All imports (2017-18, private data, total 152.1 MT, from MoC)
	% by weight	% by weight		% by weight
G1-G3 (>6400)	0.0%	0.0%	>6200	3.6%
G4 (6101-6400)	0.0%	0.5%		
G5 (5801-6100)	0.0%	0.0%	5600-6200	4.8%
G6 (5501-5800)	1.3%	14.8%		
G7 (5201-5500)	**0.5%**	**27.8%**	5000-5600	**17.6%**
G8 (4901-5200)	**5.4%**	**16.9%**		
G9 (4601-4900)	**2.0%**	**1.6%**	4200-5000	**28.0%**
G10 (4301-4600)	**5.4%**	**0.4%**		
G11 (4001-4300)	**48.6%**	**14.6%**	<4200	**46.0%**
G12 (3701-4000)	**21.0%**	**15.8%**		
G13 (3401-3700)	**12.6%**	**3.3%**		
G14 (3101-3400)	**3.1%**	**3.5%**		
G15 (2801-3100)	0.0%	0.8%		

It is clear from the above table that Indonesian imports are spread over a wide variety of Indian grades, and not restricted to only part of the middle grade group. If the grade groups G7-G10 and G11-D14 are used in the two partitions, then the Indonesian imports are divided almost evenly (by weight) into these two categories. A break-up by value is not available though.

It is worth mentioning here that two major group boundaries of the last two columns are 5000 Kcal/Kg and 4200 Kcal/Kg, which correspond to Indonesian indices ICI-3 and ICI-4, respectively. The following figure, which is an extension of the figure given at the bottom of page 18 of the main report, shows monthly values of the DGCIS landed unit value of Indonesian steam and bituminous coal and ICI-3 and ICI-4 prices at one month lag. The movements of the latter series go hand in hand.

Indonesian non-coking coal (mostly middle grade)

DGCIS landed unit value - Indonesian steam+bituminous
ICI-3 GAR FOB (one month lag)
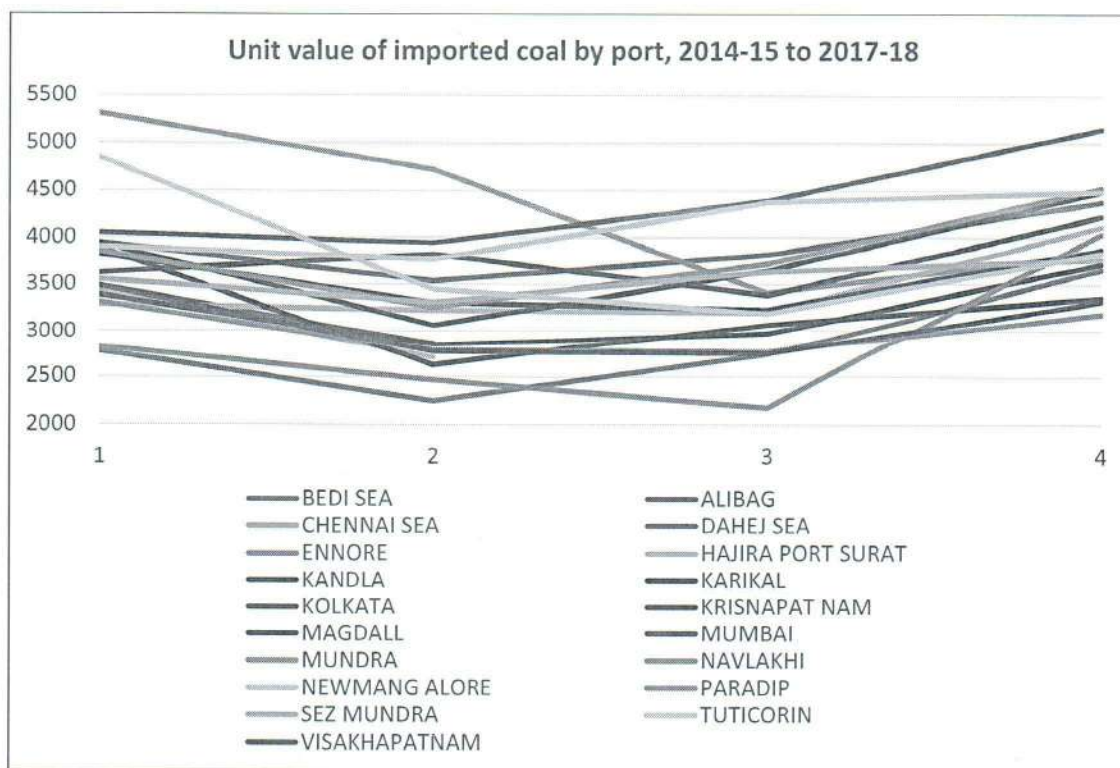ICI-4 GAR FOB (one month lag)
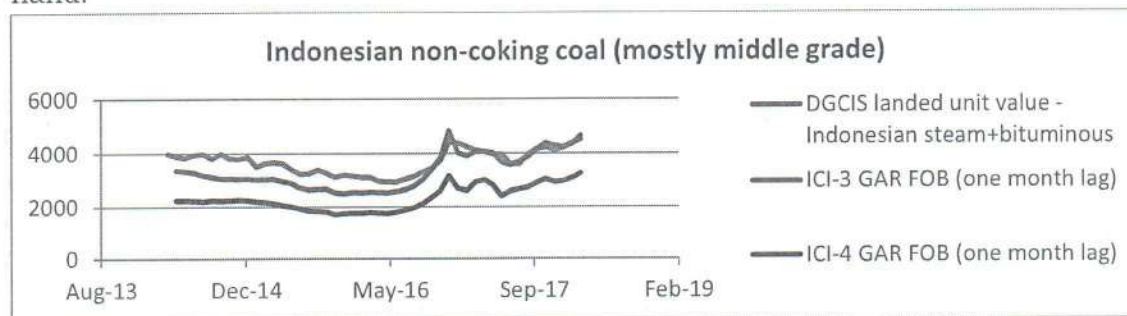
This fact is brought out more clearly by the log-differences of the successive monthly data, plotted next. This plot is a generalization of the plot given on top of page 19 of the main report.

Indonesian non-coking coal (mostly middle grade)

(Chart showing DGCIS logged differenced, ICI-3 logged differenced, ICI-4 logged differenced; y-axis from -0.1 to 0.15; x-axis Aug-13, Dec-14, May-16, Sep-17, Feb-19)

It is clear that the monthly unit values of landed coal from Malaysia, obtained from the DGCIS data, adequately track the movements of ICI-3 and ICI-4. Thus there is no ground for suspecting that movement of some segment of Indonesian imports would not be adequately tracked by the DGCIS unit values.

Another rationale for partitioning the middle grade group of non-coking coal is that upper and lower partitions might have different value shares of imported coal. Direct information of the grades of landed coal is not available. In search for a proxy for the grades of coal imported from Indonesia, the port of entry of the imported coal was investigated. The following figure shows averaged unit values of coal entering through various ports over four recent years, according to DGCIS.

Unit value of imported coal by port, 2014-15 to 2017-18

(Chart with y-axis from 2000 to 5500, x-axis 1 to 4; legend: BEDI SEA, ALIBAG, CHENNAI SEA, DAHEJ SEA, ENNORE, HAJIRA PORT SURAT, KANDLA, KARIKAL, KOLKATA, KRISNAPAT NAM, MAGDALL, MUMBAI, MUNDRA, NAVLAKHI, NEWMANG ALORE, PARADIP, SEZ MUNDRA, TUTICORIN, VISAKHAPATNAM)

There are too many intersections among the lines. There is no natural clusters of ports with predominantly higher or lower unit values of imported coal, which could be used for segregating high value and low value imports (as proxies for higher and lower grade coal, respectively).

Given the limited utility and sheer impracticality of partitioning the imported coal from Indonesia into suitable grade categories, one might still argue for partitioning at least the domestic transactions of middle coal, as the GCV range covered by this group (3100 Kcal/Kg to 5500 Kcal/Kg). If it is assumed that imported coal occupies the same value share of upper and lower middle grade groups, the value shares of transactions at notified price and auctions in the two groups are as under.

Type of transaction	Share by value	
	Non-coking, G7 to G10	Non-coking, G11 to G14
Notified price	53.18%	49.52%
Auction	11.28%	14.93%
Import	35.55%	

There is not much difference between the share patterns in the two categories.

In summary, it may be concluded that

- There is no objective way of splitting Indonesian imports into upper and lower middle grade categories.
- There is no need to split them, as far as tracking price *movements* is concerned.
- Shares of notified price and auction in domestic value of coal do not differ much between upper and lower middle grades.

Thus, no partitioning of the middle grade group is recommended.

S3 Two groups of grades for coking coal

It was pointed out from CCO that washery grade coking coal (grades W-I, W-II, W-III and W-IV) is of much poorer quality than imported coking coal. Further, the data of 50 coal mines mentioned in Section S2, as well as the coal auction data, reveal that these grades are more prevalent in India than finer grades (ST-I and ST-II). Thus, there is a good rationale for not allowing the high price of imported coking coal to distort the bidding process of coal blocks with washery grade coal.

This requirement is easier to handle, as there is no need to subdivide imports. One can have a top grade group consisting of ST-I and ST-I and a bottom grade group consisting of W-I, W-II, W-III and W-IV, and treat all coking coal imported from Australia (the only country of origin of imported coking coal considered for the National Coal Index, as mentioned in Section 3.4 of the main report) as belonging to the top grade group.

This change would necessitate two coking coal indices instead of a single one. In particular, the classification diagram of coking coal given Section 3.3 (page 14) would have to be modified as shown in the following tree diagram.
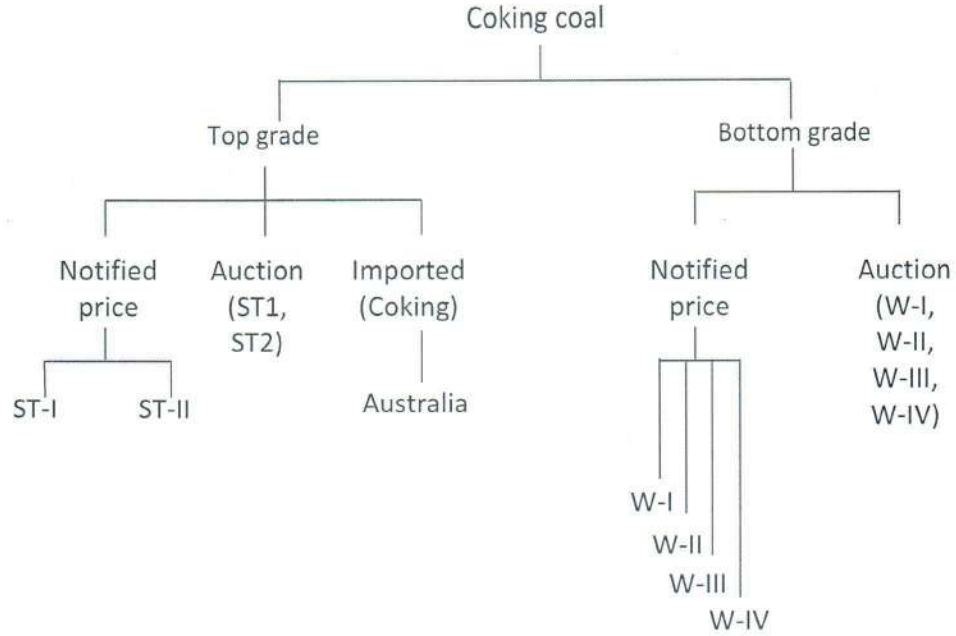
The model of the coking coal index given in Section 4.1 would have to be changed as follows. The coking coal index for the ith month is

$$K_i = w_{1k}K_{1i} + w_{2k}K_{2i},$$

where K_{1i} and K_{2i} are indices (at the ith month) of coking coal for top and bottom grade categories, respectively, and w_{1k} and w_{2k} are the corresponding positive weights, with $w_{1k} + w_{2k} = 1$. The index (at the ith month) of coking coal of top grade group is

$$K_{1i} = w_{t1k}K_{t1i} + w_{a1k}K_{a1i} + w_{m1k}K_{m1i},$$

where K_{t1i}, K_{a1i} and K_{m1i} are indices (at the ith month) of top grade coking coal transactions at notified price, through auctions and through imports, respectively, and w_{t1k}, w_{a1k} and w_{m1k} are the corresponding positive weights, with $w_{t1k} + w_{a1k} + w_{m1k} = 1$. The index (at the ith month) of top grade coking coal transactions at notified price is

$$K_{t1i} = w_{1t1k}K_{1t1i} + w_{2t1k}K_{2t1i} + \cdots + w_{8t1k}K_{8t1i},$$

where $K_{1t1i}, K_{2t1i}, \ldots, K_{8t1i}$ are indices (at the ith month) of the eight types of coking coal transactions of quality grades ST-I, ST-II, for regulated and non-regulated sectors, at prices notified for BCCL and CCL (8 types resulting from 2 grades, 2 sectors and 2 companies), and $w_{1t1k}, w_{2t1k}, \ldots, w_{8t1k}$ are the corresponding positive weights, with $w_{1t1k} + w_{2t1k} + \cdots + w_{8t1k} = 1$. The index (at the ith month) of top grade coking coal transactions at notified price for type number 1 (i.e., grade ST-I, regulated sector, BCCL) is

$$K_{1t1i} = \frac{P_{1t1ki}}{P_{1t1k0}},$$

where P_{1t1ki} is the price (at the ith month) notified by BCCL for ST-I grade coking coal for the regulated sector, and P_{1t1k0} is the corresponding notified price at the base period. The indices (at the ith month) of top grade coking coal transactions of the other types (i.e., other grade or company or sector) have similar expressions.

The index (at the ith month) of top grade coking coal transactions through auctions is

$$K_{a1i} = \frac{P_{a1ki}}{P_{a1k0}}$$

where P_{a1ki} is the unit value of all top grade (ST-I or ST-II) coking coal transacted in the ith month through exclusive, forward, special forward, spot, special spot and linkage auctions taken together, and P_{a1k0} is the corresponding unit value at the base period.

The index (at the ith month) of coking coal transactions through imports is

$$K_{m1i} = \frac{P_{m1ki}}{P_{m1k0}}$$

where P_{m1ki} is the unit value of all coking coal imported in the ith month from Australia and P_{m1k0} is the corresponding unit value at the base period.

The index (at the ith month) of coking coal of bottom grade group is

$$K_{2i} = w_{t2k} K_{t2i} + w_{a2k} K_{a2i},$$

where K_{t2i} and K_{a2i} are indices (at the ith month) of bottom grade coking coal transactions at notified price and through auctions, respectively, and w_{t2k} and w_{a2k} are the corresponding positive weights, with $w_{t2k} + w_{a2k} = 1$. The index (at the ith month) of bottom grade coking coal transactions at notified price is

$$K_{t2i} = w_{1t2k} K_{1t2i} + w_{2t2k} K_{2t2i} + \cdots,$$

where $K_{1t2i}, K_{2t2i}, \dots$ are indices (at the ith month) of the various types of coking coal transactions of quality grades W-I, W-II, W-III and W-IV, for regulated and non-regulated sectors, at prices notified by BCCL (separately for prime coking coal and HVMC coking coal), WCL, ECL and CCL, and $w_{1t2k}, w_{2t2k}, \dots$ are the corresponding positive weights, with $w_{1t2k} + w_{2t2k} + \cdots = 1$. There are 38 terms in this sum for the 38 combinations of company, sector and grade of coal belonging to the bottom grade group of coking coal

(see list below). The index (at the ith month) of bottom grade coking coal transactions at notified price for type number j (a particular combination of grade, company and sector) is

$$K_{jt2i} = \frac{P_{jt2ki}}{P_{jt2k0}},$$

where P_{jt1ki} is the notified price (at the ith month) of the jth type of bottom grade coking coal, and P_{jt1k0} is the corresponding notified price at the base period, and j ranges from 1 to 38.

The index (at the ith month) of bottom grade coking coal transactions through auctions is

$$K_{a2i} = \frac{P_{a2ki}}{P_{a2k0}}$$

where P_{a2ki} is the unit value of all bottom grade (W-I, W-II, W-III or W-IV) coking coal transacted in the ith month through exclusive, forward, special forward, spot, special spot and linkage auctions taken together, and P_{a2k0} is the corresponding unit value at the base period.

The complete list of price channels used for the National Coal Index, along with its nested structure, had been given in the Appendix of the main report. The nested structure of the coking coal part would have to be revised as shown in the next page.

Modified list of price channels of coking coal

- Coking
  - Coking, top grade (ST-I and ST-II or imported)
    - Coking, top grade, notified
      - Prime coking, regulated, BCCL ST-I
      - Prime coking, non-regulated, BCCL ST-I
      - Prime coking, regulated, BCCL ST-II
      - Prime coking, non-regulated, BCCL ST-II
    - Coking, top grade, auction
      - Exclusive, forward, special forward, spot, special spot, linkage
    - Coking, top grade, imported
      - Coking coal imported from Australia
    - Coking, bottom grade, notified
      - Prime coking, regulated, BCCL W-I
      - Prime coking, non-regulated, BCCL W-I
      - Prime coking, regulated, BCCL W-II
      - HVMC, regulated, BCCL W-II
      - Prime coking, non-regulated, BCCL W-II
      - HVMC, non-regulated, BCCL W-II
      - Coking, regulated, ECL W-II
      - Coking, non-regulated, ECL W-II
      - Coking, non-regulated, WCL W-II
      - Prime coking, regulated, BCCL W-III
      - HVMC, regulated, BCCL W-III
      - Prime coking, non-regulated, BCCL W-III
      - HVMC, non-regulated, BCCL W-III
      - Coking, non-regulated, CCL W-III
      - Coking, non-regulated, ECL W-III
      - Prime coking, regulated, BCCL W-IV
      - HVMC, regulated, BCCL W-IV
      - Prime coking, non-regulated, BCCL W-IV
      - HVMC, non-regulated, BCCL W-IV
      - Coking, regulated, CCL W-IV
      - Coking, non-regulated, CCL W-IV
    - Coking, bottom grade, auction
      - Exclusive, forward, special forward, spot, special spot, linkage

S4 Computation of base bid price

Bidding of coal blocks would have to be on the basis of a price relevant for the grades of coal extractible from that block. This price should be specified for every domestic grade of coal. The price for a particular grade should be reflective of prevailing market prices relevant for the day of the bidding. This price is referred to here as *base bid price* and a mechanism is suggested for computing it.

For $j = 1, ..., 17$, the representative notified price of grade Gj non-coking coal in the ith month is

$$p_{tjni} = v_{1tjn}p_{1tjni} + v_{2tjn}p_{2tjni} + \cdots,$$

where $p_{1tjni}, p_{2tjni}, ...$ are different notified prices (at the ith month) of grade Gj non-coking coal, and $v_{1tjn}, v_{2tjn}, ...$ are the corresponding positive weights, with $v_{1tjn} + v_{2tjn} + \cdots = 1$. These weights are proportional to the quantities $q_{1tjn}, q_{2tjn}, ...$ of grade Gj non-coking coal dispatched (during the base period for computation of this price) at notified prices $p_{1tjni}, p_{2tjni}, ...$, respectively.

For $j = 1, ..., 17$, the unit value of grade Gj non-coking coal sold through auction in the ith month, denoted by p_{ajni}, is the ratio of value and quantity of all coal of grade Gj booked through auction in the ith month.

For $j = 1, ..., 17$, the representative domestic price of non-coking coal of grade Gj in the ith month is

$$p_{djni} = v_{tjn}p_{tjni} + v_{ajn}p_{ajni},$$

where v_{tjn} and v_{ajn} are the shares of notified price and auction, respectively, of grade Gj non-coking coal in the base period, given by

$$v_{tjn} = \frac{q_{1tjn} + q_{2tjn} + \cdots}{(q_{1tjn} + q_{2tjn} + \cdots) + q_{ajn}},$$

$$v_{ajn} = \frac{q_{ajn}}{(q_{1tjn} + q_{2tjn} + \cdots) + q_{ajn}},$$

and, for $j = 1, 2, ..., 17$, q_{ajn} is the quantity of non-coking coal of grade Gj booked through auctions during the base period, while the quantities $q_{1tjn}, q_{2tjn}, ...$ are as explained above.

For $j = 1, ..., 14$, imputed unit value of grade Gj of non-coking coal imported in the ith month is

$$p_{mjni} = \begin{cases} f_{jn}p_{mni}^{(1)} & \text{for } 1 \leq j \leq 6, \\ f_{jn}p_{mni}^{(2)} & \text{for } 7 \leq j \leq 14, \end{cases}$$

where $p_{mni}^{(1)}$ and $p_{mni}^{(2)}$ are the unit values of all steam and bituminous coal imported from South Africa and Indonesia, respectively, in the ith month, and f_{jn} is the quality conversion factor for grade Gj.

Quality conversion factors of all the domestic grades of non-coking coal are given in the following table.

Grade/Group	Representative GCV (Kcal/Kg)	Quality conversion factor
G1	7150	$f_{1n} = 7150/6400 = 1.117$
G2	6850	$f_{2n} = 6850/6400 = 1.070$
G3	6550	$f_{3n} = 6550/6400 = 1.023$
G4	6250	$f_{4n} = 6250/6400 = 0.977$
G5	5950	$f_{5n} = 5950/6400 = 0.930$
G6	5650	$f_{6n} = 5650/6400 = 0.883$
G1-G6 (top)	6400	1
G7	5350	$f_{7n} = 7150/4300 = 1.244$
G8	5050	$f_{8n} = 5050/4300 = 1.174$
G9	4750	$f_{9n} = 4750/4300 = 1.105$
G10	4450	$f_{10n} = 4450/4300 = 0.035$
G11	4150	$f_{11n} = 4150/4300 = 0.965$
G12	3850	$f_{12n} = 3850/4300 = 0.895$
G13	3550	$f_{13n} = 3550/4300 = 0.826$
G14	3250	$f_{14n} = 3250/4300 = 0.756$
G7-G14 (middle)	4300	1
G15	2950	$f_{15n} = 2950/2650 = 1.113$
G16	2650	$f_{16n} = 2650/2650 = 1.000$
G17	2350	$f_{17n} = 2350/2650 = 0.887$
G15-G17 (bottom)	2650	1

Finally, the base bid price for non-coking coal of grade Gj in the ith month is

$$
p_{jni} = \begin{cases}
v_{djn}^{(1)} p_{djni} + v_{mjn}^{(1)} p_{mjni} & \text{for } 1 \le j \le 6, \\
v_{djn}^{(2)} p_{djni} + v_{mjn}^{(2)} p_{mjni} & \text{for } 7 \le j \le 14, \\
p_{djni} & \text{for } 15 \le j \le 17,
\end{cases}
$$

where

$$
v_{djn}^{(1)} = \frac{[(q_{1t1n} + q_{2t1n} + \cdots) + q_{a1n}] + \cdots + [(q_{1t6n} + q_{2t6n} + \cdots) + q_{a6n}]}{[(q_{1t1n} + q_{2t1n} + \cdots) + q_{a1n}] + \cdots + [(q_{1t6n} + q_{2t6n} + \cdots) + q_{a6n}] + q_{mn}^{(1)}},
$$

$$
v_{mjn}^{(1)} = 1 - v_{djn}^{(1)},
$$

$$
v_{djn}^{(2)} = \frac{\sum_{j=7}^{14} \left(q_{1tjn} + q_{2tjn} + \cdots \right)}{\sum_{j=7}^{14} \left(q_{1tjn} + q_{2tjn} + \cdots \right) + q_{mn}^{(2)}},
$$

$$
v_{mjn}^{(2)} = 1 - v_{djn}^{(2)},
$$

and $q_{mn}^{(1)}$ and $q_{mn}^{(2)}$ are the quantities of steam and bituminous coal imported from South Africa and Indonesia, respectively, during the base period.

The representative notified prices of coking coal of grades ST-I, ST-II, W-I, W-II, W-III and W-IV (indicated here by serial numbers 1, 2, 3, 4, 5 and 6, respectively) in the ith month are

$$p_{tjki} = v_{1tjk}p_{1tjki} + v_{2tjk}p_{2tjki} + \cdots,$$

where, for $j = 1,2,\ldots,6$, $p_{1tjki}, p_{2tjki}, \ldots$ are different notified prices (at the ith month) of grade j coking coal, and $v_{1tjk}, v_{2tjk}, \ldots$ are the corresponding positive weights, with $v_{1tjk} + v_{2tjk} + \cdots = 1$. These weights are proportional to the quantities $q_{1tjk}, q_{2tjk}, \ldots$ of grade j coking coal dispatched (during the base period for computation of this price) at notified prices $p_{1tjki}, p_{2tjki}, \ldots$, respectively.

For $j = 1,\ldots,6$, the unit value of grade j coking coal sold through auction in the ith month, denoted by p_{ajki}, is the ratio of value and quantity of all coking coal of grade j booked through auction in the ith month.

For $j = 1,\ldots,6$, the representative domestic price of coking coal of grade j in the ith month is

$$p_{djki} = v_{tjk}p_{tjki} + v_{ajk}p_{ajki},$$

where v_{tjk} and v_{ajk} are the shares of notified price and auction, respectively, of grade j coking coal in the base period, given by

$$v_{tjk} = \frac{q_{1tjk} + q_{2tjk} + \cdots}{\left(q_{1tjk} + q_{2tjk} + \cdots\right) + q_{ajk}},$$

$$v_{ajk} = \frac{q_{ajk}}{\left(q_{1tjk} + q_{2tjk} + \cdots\right) + q_{ajk}},$$

and, for $j = 1,2,\ldots,6$, q_{ajk} is the quantity of coking coal of grade j booked through auctions during the base period, while the quantities $q_{1tjk}, q_{2tjk}, \ldots$ are as explained above.

The imputed unit values of grades 1 and 2 (i.e., ST-I and ST-II) of coking coal imported in the ith month are

$$p_{mjki} = f_{jk}p_{mki}, \quad j = 1,2,$$

where p_{mki} is the unit value of all coking coal imported from Australia in the ith month, and f_{1k} and f_{2k} are the quality conversion factors for grades ST-I and ST-II, respectively, given by

$$f_{1k} = \frac{p_{t1k0}}{\sqrt{p_{t1k0}p_{t2k0}}}, \qquad f_{2k} = \frac{p_{t2k0}}{\sqrt{p_{t1k0}p_{t2k0}}},$$

p_{t1k0} and p_{t2k0} being the representative notified prices of coking coal of grades ST-I and ST-II, respectively, in the base period.

Finally, the base bid price for coking coal of grade j in the ith month is

$$p_{jki} = \begin{cases} v_{djk}p_{djki} + v_{mjk}p_{mjki} & \text{for } j = 1,2 \text{ (STI and STII)}, \\ p_{djki} & \text{for } 3 \leq j \leq 6 \text{ (WI to WIV)}, \end{cases}$$

where

$$v_{djk} = \frac{[(q_{1t1k} + q_{2t1k} + \cdots) + q_{a1k}] + [(q_{1t2k} + q_{2t2k} + \cdots) + q_{a2k}]}{[(q_{1t1k} + q_{2t1k} + \cdots) + q_{a1k}] + [(q_{1t2k} + q_{2t2k} + \cdots) + q_{a2k}] + q_{mk}},$$

$$v_{mjk} = 1 - v_{djk},$$

and q_{mk} is the quantity of coking coal imported from Australia during the base period.

S5 Sample computations

Values of the National Coal Indices for the three grade groups of non-coking coal (N_{1i}, N_{2i} and N_{3i}, described in Section 4.1 of the main report) and the two grade groups of coking coal (K_{1i} and K_{2i}, described in Section S3) for the years 2015-16, 2016-17 and 2017-18 are shown below. The calculations are obtained from implementation of the computational formulae in the MS-Excel accompanying this supplementary report, which is an update of the file that had accompanied the main report. The graph of K_{1i} starts only from October 2016, when auction of ST-II grade coal started.
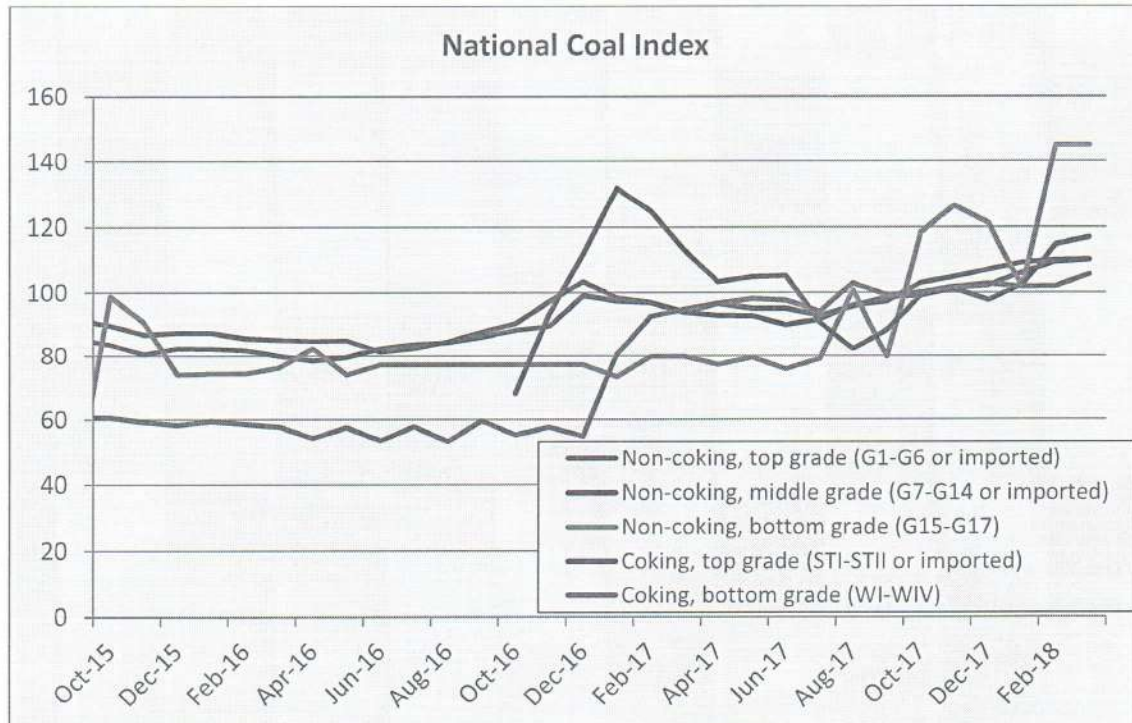
As an example of computation of base bid price described in Section S4, the trajectory of the base price of grade G11 coal (p_{jni} for $j = 11$) for the study years is plotted in the next chart. This graph is accompanied by the graphs of imputed unit value of G11 coal imported from Indonesia (p_{mjni} for $j = 11$), unit value of domestic G11 coal (p_{djni} for $j = 11$), representative notified price of G11 coal (p_{tjni} for $j = 11$) and unit value of auctioned coal (p_{ajni} for $j = 11$). These calculations are also obtained from implementation of the computational formulae in the MS-Excel accompanying this supplementary report.
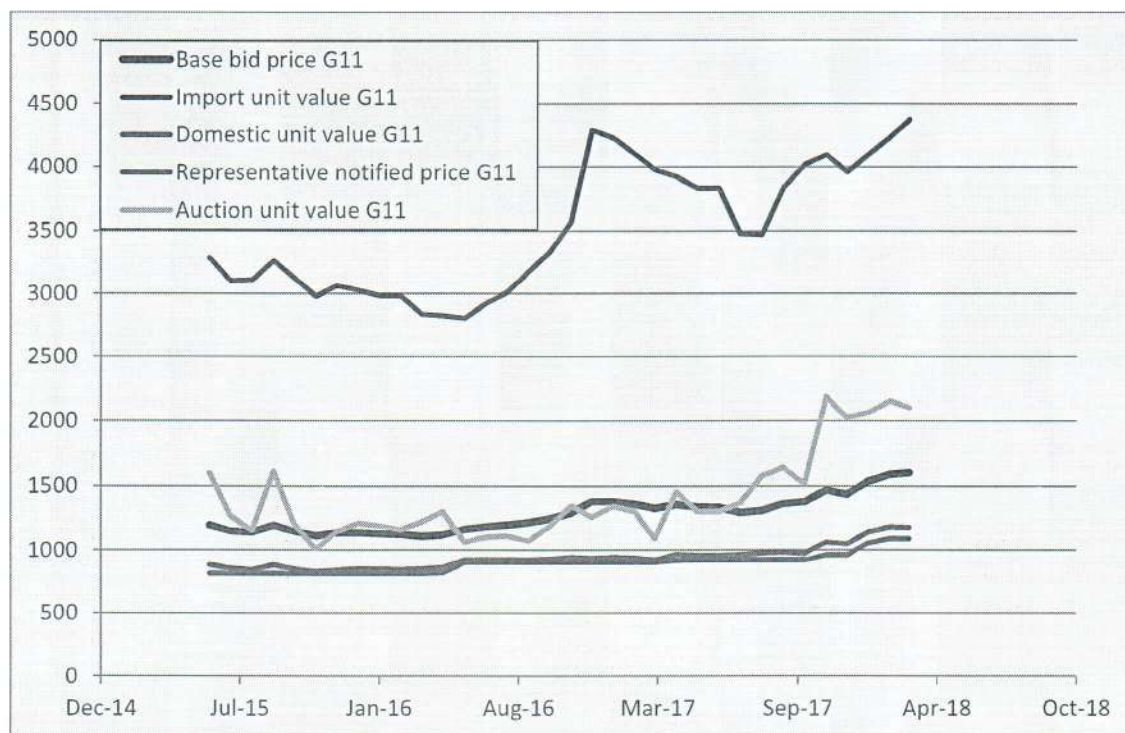
It may be noted that if a G11 coal block is auctioned in the month i_1 and a certain quantity of that coal is produced/sold in month i_2, then the deemed price of that coal for revenue sharing would be

$$p_{jni_1} \times \frac{N_{2i_2}}{N_{2i_1}}$$

for $j = 11$. Bidders would be expected to quote a percentage of the base bid price p_{jni_1} as the government's share of revenue.

It is only natural that the base price computed in this manner would ignore certain heterogeneities, e.g., in respect of location, cost of mining, existing infrastructure around the coal block, variation of grades etc. A National Coal Index/base bid price cannot be expected to be adapted to each detail of every coal block. The ministry may decide whether to ask bidders to consider these issues on the basis of block-specific information, before they quote a percentage.

Appendix: Answers to some additional queries

Questions on grouping and sub-indices

Q1: *Shouldn't one use relevant sub-indices rather than a single coal index?*

A: The overall coal index comes with several sub-indices (e.g., non-coking coal index, coking coal index, top, middle and bottom grade non-coking coal indices, top and bottom grade coking coal index). The phrase *National Coal Index* (NCI) refers to all of them collectively. For the purpose of bidding, one can use a sub-index that is most relevant for a coal block.

Q2: *Shouldn't there be smaller groups of grades?*

A: This issue has been discussed in detail in Sections S2 and S3 of the supplementary report. Coking coal is now divided into two grade groups and the rationale for keeping just three grade groups for non-coking coal has been explained. Use of a single index for a group of grades only means that the price *movements* of different grades in that group are assumed to be similar. It does not mean the prices are the same. Separate base bid prices for every domestic grade (explained in Section S4 of the supplementary report) should address the concern.

Q3: *Why not have separate indices for the regulated and the non-regulated sectors?*

A: This is because there is no available data on the shares of regulated and non-regulated sectors among auctioned and imported coal.

Q4: *Wouldn't a single index for regulated and non-regulated sectors make the index excessively attractive for miners selling in the non-regulated sector at the expense of the energy sector?*

A: Use of a single index for regulated and non-regulated sectors does not necessarily imply the above scenario. The index is not a price. It is a unit-free quantity meant to track movements, which is assumed to be similar in regulated and unregulated sectors. Whether any particular sector is differentially affected would depend on the government's policy on captive and commercial mining.

Q5: *Shouldn't Indonesian imports be given weightage in the top grade group of non-coking coal index also?*

A: As mentioned in Section S2 of the supplementary report, delineation of Indonesian imports by Indian grades is not available. Since only small quantities of coal imported from Indonesia fall in the top and bottom grade categories, it is expected that ignoring these would not have much impact.

Q6: *Shouldn't there be a separate sub-index for domestic coal?*

A: For every group of grades, sub-indices for coal transacted at notified price and through auctions are actually computed, along with a sub-index for imported coal matching that group, as building blocks for the eventual index for that group. These can even be combined to form a domestic coal index for a group of grades. However, such an index does not reflect the entire range of market transactions, and would not be suitable for coal block auctions.

Q7: *Shouldn't transactions through auction be delineated by type of auction (e.g., treat linkage auction separately), grade of coal and regulated/non-regulated sector?*

A: Delineation by grade groups is already there. Delineation by regulated or non-regulated sector is not possible for some types of auctions, particularly because some bidders re-sell the coal to another party. This delineation would serve no purpose, as the attempt for similar delineation of imported has proved futile. Delineation by type of auction would decimate volume of transaction, leading to possibly no transaction for some types in some months.

Q8: *Why should auction of W-IV mine be affected by change of price in much higher grade coal, which is not relevant?*

A: The coking coal index has now been subdivided into separate indices for higher and lower grades; see Section S4 of the supplementary report.

Questions on frequency of computation weights/index and lag

Q9: *Shouldn't the weights be revised more frequently (say, every quarter, every year, every two years or every three years)?*

A: Frequent changes in weights (i.e., changes in the basket) make the index unusable for tracking prices. This may scuttle the very purpose of the price index, and dissuade potential bidders from participating as they would face more uncertainty in assessing how much revenue would actually be shared with the government.

Q10: *Why is the index not made available at weekly or fortnightly intervals, with a delay of one to two weeks?*

A: The frequency of computation and the proposed lag are based on logistical considerations of data availability regarding auction and import transactions.

Q11: *The index would lose relevance if it can only be computed provisionally after one month and finally after two months. Why can't final computation be faster?*

A: The reasons why faster computation is infeasible are explained in Section 2.2 of the main report. The index can definitely be used for revenue sharing with the government, which had been the original purpose of the index, and possibly by buyers and sellers for retrospective settlement of bills.

Q12: *Isn't it better to compute the index on quarterly basis and publish it soon after the end of the quarter itself, using final data of the first two months of the quarter and provisional data of the last month?*

A: It is true that the index would have more stability if auctions and imports are aggregated over a larger period. However, use of provisional figures, even if it is for only one of the three months, would hurt credibility of the index. Some delay is inevitable as import data would generally not be available even after one month.

Q13: *Wouldn't frozen weights make the NCI vulnerable to steep hike in international prices possibly concurrent with reduced imports?*

A: This risk cannot be ruled out, but needs to be weighed against the fact that frequently changing weights (i.e., the basket) would make the coal index lose its value as a reliable tracker of coal prices. There may be benefit too in case the scenario is reversed (with international price falling sharply).

Questions on scope of computation

Q14: *Shouldn't the import component be excluded from computation of the NCI?*

A: Imported coal comprises a large part of the Indian coal market. If the NCI is to track the market prices, it cannot afford to leave out the price of imported coal.

Q15: *Why is washed coal not given weightage?*

A: The HPEC decided to treat washed coal as a separate commodity.

Q16: *Shouldn't the emerging sector of private mining be included in the computation of the NCI?*

A: Impact of private mining is not yet significant in the coal market of India. There is provision of revising the weights of the NCI after a few years. If coal transactions from commercial mining become significant by that time, it can definitely be included.

Q17: *Shouln't coking coal grades with high ash content (such as W-III and W-IV) be excluded from the NCI?*

A: The coking coal grades are now subdivided into higher and lower quality groups. Coal of grade W-III and W-IV would be part of the coking coal index of the bottom group, which excludes imports. Since some Indian mines have coal of W-IV quality, this grade cannot be excluded altogether.

Q18: *The NCI makes use of prices notified by SCCL and CIL/subsidiaries and auction prices of CIL only. Shouldn't it be more broadly based?*

A: As mentioned in Section 1.4 of the main report, producers other than CIL and SCCL produce only 6% of the domestic coal by volume. More data sources mean more vulnerability of the coal index to disruption in channels of information.

Q19: *Should Meghalaya and Garo Hill coal prices be utilized?*

A: Currently the index used all CIL transactions and SCCL transactions at notified price but ignores players with smaller volumes for reasons given above.

Q20: *Why not look beyond South African imports for top grade non-coking coal index?*

A: Inclusion of minor sources would lead to higher risk of grade mismatch without much improvement in representation. If other countries of origin become more important, suitable adjustment to the index may be made in the next revision.

Q21: *Why not use all imports above 5500 Kcal/Kg for top grade non-coking coal index?*

A: Grade-delineated import data are not shared officially by DGCIS.

Q22: *Why not use last 10 years' data for computation of weights, so that the effect of auction and imports is less?*

A: It would be prudent to use recent data for accurate representation of the current Indian market.

Questions on how to deal with imported coal

Q23: *Why can't quality grade information of imported coal be disclosed by DGCIS after suppressing details such as importer name?*

A: This matter may be taken up with DGCIS for future improvement of the index.

Q24: *Why not use ICI and API indices in respect of foreign imports, instead of DGCIS customs data?*

A: The DGCIS data represent coal purchased for use in India, which is most relevant for an Indian index. On the one hand, the weightage given to imports have to be determined from the DGCIS data. On the other hand, as far as price movements are concerned, DGCIS values have been observed to move in step with foreign indices, as mentioned in Section 3.5 of the main report.

Q25: *Why not use ICI and API indices in respect of foreign imports, in addition to DGCIS customs data?*

A: The weights allotted to notified price, auction and DGCIS customs data are in terms of the value shares of these modes of transaction in the Indian marketplace. It is hard to think of a realistic model that would justify giving some weight to foreign indices in addition to weight given to DGCIS import values.

Q26: *Shouldn't ICI-4 be used for non-coking import rather than ICI-3 (or at least an average of the two)?*

A: The index used DGCIS data on unit value of landed coal, rather than ICI-3 and ICI-4 that is relevant for India. In any case, the analysis reported in Section S2 of the supplementary report shows that ICI-3 and ICI-4 have movements similar to those of the DGCIS values.

Q27: *Why does the top grade non-coking coal index use API-4, which is not a completely free market index?*

A: API-4 was used in the main report only for comparison. The index uses only DGCIS data on coal imported to India.

Q28: *Why is FOB value of imported coal not used in place of CIF?*

A: The reasons have been explained in detail in Section 3.5 of the main report and summarized at the end of that section.

Q29: *Why not adjust for the lag between ICI-3/ICI-4 and DGCIS landed value?*

A: The correspondence between the movements of the three series, mentioned and plotted in Section S2 of the supplementary report, is observed only after the ICI-3 and ICI-4 series are lagged by one month.

Questions on choices and assumptions made

Q30: *Why ignore the various charges and taxes that are levied over and above the notified price?*

A: Proportional charges generally do not alter the price movement pattern. Further, all domestic transactions are treated similarly. Local transportation and other charges beyond port of entry of imported coal are also excluded for parity.

Q31: *Shouldn't one take into account the actual grade of transacted coal rather than the initially declared/committed grade for the purpose of revenue sharing?*

A: The amount of revenue shared with the government will involve the NCI, the base bid price (discussed in Section S4 of the supplementary report) and how these two are used for revenue sharing of a particular coal block. Appropriate use may be ensured through the nature of contract.

Q32: *Why not use actually dispatched volume of auctioned coal instead of booking volume?*

A: Actually dispatched volume would be known much later (which would delay computation) and would require a better data collection system than what is available today.

Q33: *Why use booking price for the month of auction, when it is meant only for a future transaction?*

A: The booking price reflects the current price and is easier to capture. Data on actual dispatches linked to a particular auction transaction are not available as of now.

Q34: *Why are indices for notified price and auction transactions of a particular grade group computed differently?*

A: The difference is because of availability of data. For notified price transactions, grade-specific prices are readily available but quantities are not. Therefore, grade-specific indices are computed and then combined for the group. On the other hand, for auctioned coal quantity as well as value is available after a lag, thus making it possible to compute unit value for the entire grade group in the relevant month.

Q35: *Why can't 2020-21 be used as base year?*

A: There is no data available for making this choice a practical option.

Q36: *Why was the base year chosen as 2017-18, when there was shortage of coal supply?*

A: The reasons have been explained in detail in Section 4.2 of the main report. The data did not show considerable abnormality for that year.

Q37: *Shouldn't exchange rate differences between base period and later be factored in for imported coal?*

A: DGCIS unit values of imported coal are indeed computed by using the exchange rate prevailing in the relevant month. What matters for the NCI is the INR price, so that there is comparability across sectors.

Q38: *Shouldn't there be adjustment of domestically computed GCV on ADB basis, to match the ARB basis for imported coal?*

A: For domestic grades, information on moisture is generally not available. Thus, only approximate adjustment is possible. Grades are in any case matched approximately by grouping of domestic grades and singling out source countries of import. This exercise would not be affected by small differences in the methods of GCV calculation, if any. The National Coal Index has been designed on the basis of the prevailing system of data reporting. Improvement in that system would surely benefit calculation of the index in future.

Q39: *Shouldn't regional differences in costs of operation be factored in?*

A: Existing data availability does not permit this. It is expected that the bids of specific blocks would factor in these differences.

Other questions

Q40: *How to future proof the index against proliferation of private miners, SHAKTI linkage auctions and change in quality grading system?*

A: The methodology for the index computation can accommodate redistribution of weights to existing and new price channels, once data for the same become available. If there is a major change in gradation, this exercise will have to be done and possibly a new base year may be used.

Q41: *What is the methodology for fixing notified prices?*

A: Section 5 of the main report emphasizes the need to ensure that the notified prices used in the NCI are determined independently of the values of the NCI to avoid circularity. Public documentation of the methodology for determining notified prices can be a way of ensuring this.

Q42: *Shouldn't the base year be changed every time there is change in the composition of the index?*

A: It is indeed important to re-examine the base year selection along with the occasional exercises to revise the composition of the index.

Q43: *How will the NCI be used to determine the notional price for revenue sharing?*

A: The coal index will have to be used together with the base bid price in the manner described in Section S5 of the supplementary report.

Q44: *Can the base price be computed one only and adjusted through the coal index whenever there is a coal block auction?*

A: This would not be a goo strategy. Suppose in March 2021 these is a big rise in auction price of G11 coal and a big fall in auction price of G7 coal, such that the value of the index of middle grade non-coking coal remains the same. The resulting effect on the base bid price of G11 and G7 may not be much. However, fresh computation of base bid price (as in Section S4) would reflect the rise in G11 price and fall in G7 price.

Q45: *Shouldn't export of coal mined from auctioned coal blocks be prohibited?*

A: The coal index does not take into account these futuristic transactions.

Q46: *Shouldn't the current constitution and capacity of CCO be improved to ensure that it is equipped to efficiently and reliably carry out the computation of the NCI on a regular basis?*

A: The government may take a decision on this matter.

Q47: *Why not compute the index for the last five years of available data and have a dry run for another six months to one year before using it for coal block auctions?*

A: Sample calculations of the index as well as base price have been given in Section S5 of the supplementary report. Data available since 2015-16 have been used, as auction data had not been relevant earlier. The government can decide on when to use the index for coal block auctions.

Q48: How can *taxation be based on the NCI, which can only produce deemed (not actual) values of transaction?*

A: The government may take a decision on this matter.

Q49: Can the main report be uploaded as a searchable pdf document and the associated calculations in spreadsheet format?

A: The government may take a decision on this matter.

List of Notified Prices for NCI along with their Weights

Sl No	Notified Prices	Weight
1	Non-coking, regulated, CIL (excl WCL) G1	0.00002
2	Non-coking, non-regulated, CIL (excl WCL) G1	0.00027
3	Non-coking, regulated, CIL (excl WCL) G2	0.01570
4	Non-coking, non-regulated, CIL (excl WCL) G2	0.00203
5	Non-coking, regulated, CIL (excl WCL) G3	0.12816
6	Non-coking, non-regulated, CIL (excl WCL) G3	0.02841
7	Non-coking, regulated, CIL (excl WCL) G4	0.36506
8	Non-coking, non-regulated, CIL (excl WCL) G4	0.02831
9	Non-coking, non-regulated, WCL G4	0.00011
10	Non-coking, regulated, CIL (excl WCL) G5	0.23184
11	Non-coking, regulated, WCL G5	0.00245
12	Non-coking, regulated, SCCL G5	0.02324
13	Non-coking, non-regulated, CIL (excl WCL) G5	0.01669
14	Non-coking, non-regulated, WCL G5	0.00153
15	Non-coking, non-regulated, SCCL G5	0.00337
16	Non-coking, regulated, CIL (excl WCL) G6	0.12271
17	Non-coking, regulated, WCL G6	0.00759
18	Non-coking, non-regulated, CIL (excl WCL) G6	0.01733
19	Non-coking, non-regulated, WCL G6	0.00518
20	Non-coking, regulated, CIL (excl WCL) G7	0.04798
21	Non-coking, regulated, WCL G7	0.00514
22	Non-coking, regulated, SCCL G7	0.03472
23	Non-coking, non-regulated, CIL (excl WCL) G7	0.00585
24	Non-coking, non-regulated, WCL G7	0.00161
25	Non-coking, non-regulated, SCCL G7	0.00691
26	Non-coking, regulated, CIL (excl WCL) G8	0.05111
27	Non-coking, regulated, WCL G8	0.01896
28	Non-coking, regulated, SCCL G8	0.02954
29	Non-coking, non-regulated, CIL (excl WCL) G8	0.01094
30	Non-coking, non-regulated, WCL G8	0.00407
31	Non-coking, non-regulated, SCCL G8	0.00171
32	Non-coking, regulated, CIL (excl WCL) G9	0.04540
33	Non-coking, regulated, WCL G9	0.03862
34	Non-coking, regulated, SCCL G9	0.03494
35	Non-coking, non-regulated, CIL (excl WCL) G9	0.00336
36	Non-coking, non-regulated, WCL G9	0.00732
37	Non-coking, non-regulated, SCCL G9	0.00682
38	Non-coking, regulated, CIL (excl WCL) G10	0.07920

39	Non-coking, regulated, WCL G10	0.01287
40	Non-coking, regulated, SCCL G10	0.05639
41	Non-coking, non-regulated, CIL (excl WCL) G10	0.01035
42	Non-coking, non-regulated, WCL G10	0.00350
43	Non-coking, non-regulated, SCCL G10	0.00636
44	Non-coking, regulated, CIL (excl WCL) G11	0.15828
45	Non-coking, regulated, WCL G11	0.01011
46	Non-coking, regulated, SCCL G11	0.03342
47	Non-coking, non-regulated, CIL (excl WCL) G11	0.01792
48	Non-coking, non-regulated, WCL G11	0.00181
49	Non-coking, non-regulated, SCCL G11	0.00582
50	Non-coking, regulated, CIL (excl WCL) G12	0.09285
51	Non-coking, regulated, WCL G12	0.00119
52	Non-coking, regulated, SCCL G12	0.00021
53	Non-coking, non-regulated, CIL (excl WCL) G12	0.01871
54	Non-coking, non-regulated, WCL G12	0.00026
55	Non-coking, non-regulated, SCCL G12	0.00001
56	Non-coking, regulated, CIL (excl WCL) G13	0.07462
57	Non-coking, regulated, WCL G13	0.00010
58	Non-coking, regulated, SCCL G13	0.02773
59	Non-coking, non-regulated, CIL (excl WCL) G13	0.01655
60	Non-coking, non-regulated, WCL G13	0.00002
61	Non-coking, non-regulated, SCCL G13	0.00411
62	Non-coking, regulated, CIL (excl WCL) G14	0.01065
63	Non-coking, regulated, SCCL G14	0.00044
64	Non-coking, non-regulated, CIL (excl WCL) G14	0.00144
65	Non-coking, non-regulated, SCCL G14	0.00013
66	Non-coking, regulated, CIL (excl WCL) G15	0.17377
67	Non-coking, regulated, SCCL G15	0.56508
68	Non-coking, non-regulated, CIL (excl WCL) G15	0.02466
69	Non-coking, non-regulated, SCCL G15	0.06884
70	Non-coking, regulated, CIL (excl WCL) G16	0.00281
71	Non-coking, regulated, SCCL G16	0.03554
72	Non-coking, non-regulated, CIL (excl WCL) G16	0.00017
73	Non-coking, non-regulated, SCCL G16	0.01375
74	Non-coking, regulated, CIL (excl WCL) G17	0.03427
75	Non-coking, regulated, SCCL G17	0.06592
76	Non-coking, non-regulated, CIL (excl WCL) G17	0.00501
77	Non-coking, non-regulated, SCCL G17	0.01017
78	Prime coking, regulated, BCCL ST I	0.03607
79	Prime coking, non-regulated, BCCL ST I	0.04289
80	Prime coking, regulated, BCCL ST II	0.06296

81	Prime coking, non-regulated, BCCL ST II	0.85809
82	Prime coking, regulated, BCCL W-I	0.00086
83	Prime coking, non-regulated, BCCL W-I	0.00714
84	Prime coking, regulated, BCCL W-II	0.03587
85	HVMC, regulated, BCCL W-II	0.00150
86	Prime coking, non-regulated, BCCL W-II	0.04545
87	HVMC, non-regulated, BCCL W-II	0.00560
88	Coking, non-regulated, WCL W-II	0.00386
89	Prime coking, regulated, BCCL W-III	0.02379
90	HVMC, regulated, BCCL W-III	0.07954
91	Prime coking, non-regulated, BCCL W-III	0.00820
92	HVMC, non-regulated, BCCL W-III	0.00692
93	Coking, non-regulated, CCL W-III	0.06821
94	Coking, non-regulated, ECL W-III	0.00026
95	Prime coking, regulated, BCCL W-IV	0.18177
96	HVMC, regulated, BCCL W-IV	0.22036
97	Prime coking, non-regulated, BCCL W-IV	0.00328
98	HVMC, non-regulated, BCCL W-IV	0.00762
99	Coking, regulated, CCL W-IV	0.27644
100	Coking, non-regulated, CCL W-IV	0.02333

List of Notified Prices for Representative Prices with their Weights

Sl No	Name of price category	Weight
1	Non-coking, regulated, CIL (excl WCL) G1	0.16667
2	Non-coking, regulated, WCL G1	0.16667
3	Non-coking, regulated, SCCL G1	0.16667
4	Non-coking, non-regulated, CIL (excl WCL) G1	0.16667
5	Non-coking, non-regulated, WCL G1	0.16667
6	Non-coking, non-regulated, SCCL G1	0.16667
7	Non-coking, regulated, CIL (excl WCL) G2	0.8923
8	Non-coking, regulated, WCL G2	0
9	Non-coking, regulated, SCCL G2	0
10	Non-coking, non-regulated, CIL (excl WCL) G2	0.1077
11	Non-coking, non-regulated, WCL G2	0
12	Non-coking, non-regulated, SCCL G2	0
13	Non-coking, regulated, CIL (excl WCL) G3	0.8923
14	Non-coking, regulated, WCL G3	0
15	Non-coking, regulated, SCCL G3	0
16	Non-coking, non-regulated, CIL (excl WCL) G3	0.1077
17	Non-coking, non-regulated, WCL G3	0
18	Non-coking, non-regulated, SCCL G3	0
19	Non-coking, regulated, CIL (excl WCL) G4	0.8923
20	Non-coking, regulated, WCL G4	0
21	Non-coking, regulated, SCCL G4	0
22	Non-coking, non-regulated, CIL (excl WCL) G4	0.1077
23	Non-coking, non-regulated, WCL G4	0
24	Non-coking, non-regulated, SCCL G4	0
25	Non-coking, regulated, CIL (excl WCL) G5	0.73359
26	Non-coking, regulated, WCL G5	0
27	Non-coking, regulated, SCCL G5	0.17787
28	Non-coking, non-regulated, CIL (excl WCL) G5	0.08854
29	Non-coking, non-regulated, WCL G5	0
30	Non-coking, non-regulated, SCCL G5	0
31	Non-coking, regulated, CIL (excl WCL) G6	0.86704
32	Non-coking, regulated, WCL G6	0.02399
33	Non-coking, regulated, SCCL G6	0
34	Non-coking, non-regulated, CIL (excl WCL) G6	0.10465
35	Non-coking, non-regulated, WCL G6	0.00431
36	Non-coking, non-regulated, SCCL G6	0
37	Non-coking, regulated, CIL (excl WCL) G7	0.75099
38	Non-coking, regulated, WCL G7	0.0036

39	Non-coking, regulated, SCCL G7	0.15413
40	Non-coking, non-regulated, CIL (excl WCL) G7	0.09064
41	Non-coking, non-regulated, WCL G7	0.00065
42	Non-coking, non-regulated, SCCL G7	0
43	Non-coking, regulated, CIL (excl WCL) G8	0.54075
44	Non-coking, regulated, WCL G8	0.0467
45	Non-coking, regulated, SCCL G8	0.3389
46	Non-coking, non-regulated, CIL (excl WCL) G8	0.06527
47	Non-coking, non-regulated, WCL G8	0.00839
48	Non-coking, non-regulated, SCCL G8	0
49	Non-coking, regulated, CIL (excl WCL) G9	0.36709
50	Non-coking, regulated, WCL G9	0.18754
51	Non-coking, regulated, SCCL G9	0.36738
52	Non-coking, non-regulated, CIL (excl WCL) G9	0.04431
53	Non-coking, non-regulated, WCL G9	0.03369
54	Non-coking, non-regulated, SCCL G9	0
55	Non-coking, regulated, CIL (excl WCL) G10	0.46892
56	Non-coking, regulated, WCL G10	0.1242
57	Non-coking, regulated, SCCL G10	0.32796
58	Non-coking, non-regulated, CIL (excl WCL) G10	0.0566
59	Non-coking, non-regulated, WCL G10	0.02231
60	Non-coking, non-regulated, SCCL G10	0
61	Non-coking, regulated, CIL (excl WCL) G11	0.67167
62	Non-coking, regulated, WCL G11	0.10335
63	Non-coking, regulated, SCCL G11	0.12535
64	Non-coking, non-regulated, CIL (excl WCL) G11	0.08107
65	Non-coking, non-regulated, WCL G11	0.01856
66	Non-coking, non-regulated, SCCL G11	0
67	Non-coking, regulated, CIL (excl WCL) G12	0.83936
68	Non-coking, regulated, WCL G12	0.04663
69	Non-coking, regulated, SCCL G12	0.00432
70	Non-coking, non-regulated, CIL (excl WCL) G12	0.10131
71	Non-coking, non-regulated, WCL G12	0.00838
72	Non-coking, non-regulated, SCCL G12	0
73	Non-coking, regulated, CIL (excl WCL) G13	0.64226
74	Non-coking, regulated, WCL G13	0.00228
75	Non-coking, regulated, SCCL G13	0.27753
76	Non-coking, non-regulated, CIL (excl WCL) G13	0.07752
77	Non-coking, non-regulated, WCL G13	0.00041
78	Non-coking, non-regulated, SCCL G13	0
79	Non-coking, regulated, CIL (excl WCL) G14	0.8923
80	Non-coking, regulated, WCL G14	0

81	Non-coking, regulated, SCCL G14	0
82	Non-coking, non-regulated, CIL (excl WCL) G14	0.1077
83	Non-coking, non-regulated, WCL G14	0
84	Non-coking, non-regulated, SCCL G14	0
85	Non-coking, regulated, CIL (excl WCL) G15	0.36165
86	Non-coking, regulated, WCL G15	0
87	Non-coking, regulated, SCCL G15	0.5947
88	Non-coking, non-regulated, CIL (excl WCL) G15	0.04365
89	Non-coking, non-regulated, WCL G15	0
90	Non-coking, non-regulated, SCCL G15	0
91	Non-coking, regulated, CIL (excl WCL) G16	0.8923
92	Non-coking, regulated, WCL G16	0
93	Non-coking, regulated, SCCL G16	0
94	Non-coking, non-regulated, CIL (excl WCL) G16	0.1077
95	Non-coking, non-regulated, WCL G16	0
96	Non-coking, non-regulated, SCCL G16	0
97	Non-coking, regulated, CIL (excl WCL) G17	0.56142
98	Non-coking, regulated, WCL G17	0
99	Non-coking, regulated, SCCL G17	0.37081
100	Non-coking, non-regulated, CIL (excl WCL) G17	0.06776
101	Non-coking, non-regulated, WCL G17	0
102	Non-coking, non-regulated, SCCL G17	0
103	Prime coking, regulated, BCCL ST-I	0.99276
104	Prime coking, non-regulated, BCCL ST-I	0.00724
105	Coking, regulated, CCL ST-I	0
106	Coking, non-regulated, CCL ST-I	0
107	Prime coking, regulated, BCCL ST-II	0.99276
108	Prime coking, non-regulated, BCCL ST-II	0.00724
109	Coking, regulated, CCL ST-II	0
110	Coking, non-regulated, CCL ST-II	0
111	Prime coking, regulated, BCCL W-I	0.99276
112	HVMC, regulated, BCCL W-I	0
113	Prime coking, non-regulated, BCCL W-I	0.00724
114	HVMC, non-regulated, BCCL W-I	0
115	Coking, regulated, CCL W-I	0
116	Coking, non-regulated, CCL W-I	0
117	Coking, regulated, ECL W-I	0
118	Coking, non-regulated, ECL W-I	0
119	Coking, regulated, WCL W-I	0
120	Coking, non-regulated, WCL W-I	0
121	Prime coking, regulated, BCCL W-II	0.99276
122	HVMC, regulated, BCCL W-II	0

123	Prime coking, non-regulated, BCCL W-II	0.00724
124	HVMC, non-regulated, BCCL W-II	0
125	Coking, regulated, CCL W-II	0
126	Coking, non-regulated, CCL W-II	0
127	Coking, regulated, ECL W-II	0
128	Coking, non-regulated, ECL W-II	0
129	Coking, regulated, WCL W-II	0
130	Coking, non-regulated, WCL W-II	0
131	Prime coking, regulated, BCCL W-III	0.99276
132	HVMC, regulated, BCCL W-III	0
133	Prime coking, non-regulated, BCCL W-III	0.00724
134	HVMC, non-regulated, BCCL W-III	0
135	Coking, regulated, CCL W-III	0
136	Coking, non-regulated, CCL W-III	0
137	Coking, regulated, ECL W-III	0
138	Coking, non-regulated, ECL W-III	0
139	Coking, regulated, WCL W-III	0
140	Coking, non-regulated, WCL W-III	0
141	Prime coking, regulated, BCCL W-IV	0.65618
142	HVMC, regulated, BCCL W-IV	0
143	Prime coking, non-regulated, BCCL W-IV	0.00479
144	HVMC, non-regulated, BCCL W-IV	0
145	Coking, regulated, CCL W-IV	0.33903
146	Coking, non-regulated, CCL W-IV	0
147	Coking, regulated, ECL W-IV	0
148	Coking, non-regulated, ECL W-IV	0