Development of Modified Composite Index for Imported Coal for Payment Purposes

1.0 Computation of Escalation Rates for Imported Coal

CERC notifies escalation rates for various parameters, including for imported coal, both for *bid evaluation* and *payment* purposes, as required by Ministry of Power (MOP) Notification dated 19.01.2005 (as amended from time to time) on Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees. Since steam coal imports are from many countries, this is done in two steps; (i) *Development of a composite index* for imported coal and working out corresponding escalation indices, and (ii) *Application of a suitable methodology* for computation of escalation. The index and methodologies used for **bid evaluation** and **payment purposes** accordingly vary.

1.1 Development of a composite index for imported coal

Composite index was developed as coal could be procured by the developers from any source, and data on price indices are available only for a few sources. A composite index is also expected to promote efficiency in procurement. Development of the composite index for imported coal involves selection of suitable indices and combining them appropriately. For this, CERC has been using the methodology developed by the consultant Ernst & Young[1]. The methodology was put on the website of the Commission and finalised after stakeholders' consultations. The methodology (revised version 2006) is available   at: http://www.cercind.gov.in/22112006/ConsultantReport_Revised_Nov22%5B1%5D.pdf. and can be downloaded. However, the composite index so developed is used for *payment purposes* only. The escalation rate for imported coal for the purpose of *payment* is currently being calculated using a composite index, constructed with 50% weight to API4 index (price of South African Coal), 25% weight to Barlow Jonker Index/Coalfax (price of Australian Coal), and 25% weight to GlobalCOAL (price of Australian Coal).

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[1] Consultant's Report, Revised as on 22, November 2006

Reasons for using a composite index and these weights are extracted in Appendix-A to this Annex from the Consultant's Report.

The escalation rate for imported coal for the purpose of ***bid evaluation*** is being computed using only   Barlow Jonker Index (rechristened as Coalfax since 2009) time series data. This is because the model for escalation rate determination for bid evaluation uses time series data of the past 12 years, available for Barlow Jonker Index only. Thus, composite index for coal is used for payment purposes only.

1.2 Computation of Escalation- methodology

For computation of escalation rates for various parameters for ***bid evaluation*** purposes, including for imported coal,   CERC has been using a statistical linear-time series model, developed with the help of Indian Statistical Institute (ISI), Kolkata. Computation of escalation rate for payment purposes uses a simple methodology i.e. previous one year data is divided into two parts, and difference in the average value of the first six months and last six months indicates the six monthly inflation. The escalation rate determination   methodology   (revised   version)   is   available   at http://www.cercind.gov.in/2010/December/Explanation_for_the_Notification_28.12.2010.pdf . This covers methodology both for *bid evaluation* and *payment*.

1.3 Need for review of the existing Composite Index for Imported Coal

Indonesian coal now forms significant part of the import of steam coal in India (above 75% in the last two years) and price index developers, such as Platts, are now publishing Indonesian coal price index (Platts-Indo Coal).   The index is linked to international coal prices, as the policy of the Indonesian Government requires the coal exporters to align export prices to international prices. Keeping in view these developments, and also the request by some   power producers in India, who are importing coal from Indonesia or have made contracts to import coal from Indonesia, it has been decided to   include Indonesian coal prices in the indices while computing escalation rate for imported coal (*for payment purposes*). The proposed revision in the methodology aims to incorporate the Indonesian coal price index in the index and make it relevant by assigning appropriate weights to other indices that are used to compute Composite Index.

1.4 Index for imported coal for *bid evaluation*

As already mentioned, the escalation rate for imported coal for **bid evaluation** is being estimated using a statistical model that requires 12 year time series data, and currently it uses Barlow Jonker Index/Coalfax (Price index for Australian Coal) time series data. For Indonesian coal, weekly price index is available from July 2006 onwards and daily price index is available from July 2010 onwards. The time series data for the API 4 (price index of South African Coal) is available only from 2004 onwards, and for the GlobalCOAL (one of the Australian price index), data is available from 2002 onwards. Thus, the data series for Indonesian coal, API 4, and GlobalCOAL are less than 12 years, the minimum that is needed to estimate the escalation rate as per the methodology. Therefore, it is proposed to **continue to use Barlow Jonker Index / Coalfax (Price index for Australian Coal)** for estimating the escalation rate for imported coal for the purpose of bid evaluation.

1.5 Development of the Modified Composite Index (modified) for imported coal for *payment purposes*- **proposed methodology**

Latest data for one year is sufficient for computing the escalation rate for imported coal sub-component for the purpose of payment. The composite index, that currently includes only Australian and South African Coal prices, is proposed to be modified to include Indonesian coal prices in the index.

The data on import of steam coal in India from various countries for the last three years (2010-13) can be seen in the Appendix B to this Annexure. It can be observed from the table in the Appendix that in 2010-11, about 73% coal was imported from Indonesia and 24% from South Africa. Data on average import of steam coal for the last 3 years shows about 76% from Indonesia and 19% from South Africa. The import from Australia was insignificant, the average for last three years being around 1%.

Considering the above import statistics and other criteria (stated below), it is proposed to reconstitute the Composite Index as follows:

(i) Weight assignments: 50% weight to Indonesian coal- Platts Indo Coal index, 25% weight to South African Coal- API 4 index, and 25% weight to Australian Coal (with 12.5% weight each to Coalfax index and GlobalCOAL index). Both Coalfax and GlobalCOAL are currently in use.

(ii) Calorific value harmonization across indices and normalization: Indonesian coal calorific values given in the Platts index are on gross as received (GAR) basis, and that of API-4, Coalfax and Globalcoal are on gross air dried (GAD) basis. To maintain consistency, Indonesian coal calorific value was also converted to GAD basis. Considering that available API-4, Coalfax, GlobalCOAL, and Platts-Indo Coal indices are for 6000, 6700, 6700, and 5900 Kcal/ kg coals, and whereas, steam coal imports from Indonesia for use in power plants can be of different caloric values but in all likelihood not exceed 5000 Kcal/ kg, it is proposed to normalize the indices for 5000 Kcal/kg. Since indices are actually real prices, normalization can be done easily.

(iii) The Australian coal index is proposed to be retained in the composite index despite insignificant steam coal imports. This is because many contracts still use Australian coal index, and it keeps open the possibility of use of Australian coal. Australian coal index is acceptable for a variety of contracts- future coal contracts for example. It can also help diversify the supply sources.

(iv) The composite index can be reviewed periodically and indices of other coal exporting countries added once they have at least 10% share in the coal imports in India, and subject to availability of reliable price indices as per the requirement.

1.6 Modified Composite Index Development and Computation of Escalation; example of the methodology

The impact of the revised methodology for development of composite index for *payment purposes* is shown below using the one year data from March 2012 to February 2013. The revised index *in this example* becomes applicable from April, 2013.

It is to be noted that in case of API-4, Coalfax and GlobalCOAL, calorific value (CV) is given on gross air dried (GAD) basis[2], which includes inherent moisture only (IM),

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[2] Inherent moisture (bed moisture, equilibrium moisture, capacity moisture) is assumed to be the water held within the pore system and capillaries of coal. Surface moisture (free moisture) is, as the term implies, water held on the surface of the coal. Total moisture is the moisture determined as the loss in weight in an air atmosphere under rigidly controlled conditions of temperature, time, and airflow (ASTM D-3302) and is the sum of inherent moisture and free moisture and is also the sum of the air-dry loss and residual moisture. Air-dry loss moisture is the loss in weight resulting from the partial drying of coal, and residual moisture is that remaining in the sample after determining the air-dry loss moisture. As-received moisture also is equal to the total

whereas in case of Platts indo Coal, CV is on gross as received (GAR) basis, which includes total moisture (TM). For consistency, Platts Indo coal index was converted from GAR (K cal/kg of 5900) to GAD (6883 kcal/kg). While converting TM and IM were taken from the Platts methodology and specifications guide as 16% and 2% respectively. TM of 16% is the mid value of the range of 15-17% given in the document.

Since indices are real prices, normalization was achieved by converting the given prices to 5000 kcal.

Table-1 shows Composite Index for Imported Coal as per the current methodology, and Table-2 shows Composite Index for Imported Coal as per the proposed revised methodology.

Table-1: Composite Price Index for Imported Coal Using Current Methodology

Index	API-4	Coalfax	GlobalCOAL	Composite Series*
Kcal/Kg, GAD	6000	6700	6700	
Escalation based on Actual Index (CV and GAD/GAR as it is)				
Average Index (Mar 12 - Aug 12)	93.57	96.56	96.06	94.94
Average Index (Sept 12 - Feb 13)	85.94	89.38	89.79	87.76
Half-Yearly Escalation				-7.56%
Annual Escalation				**-15.12%**
*Composite series using weightage of 50% to API4 (Price of South African Coal), 25% to Coalfax (Price of Australian Coal) and 25% to GlobalCOAL (Price of Australian Coal).				

moisture, or is the sum of the inherent and free moisture present in the coal at the time of the analysis. (http://www.miningknowhow.info/glossary-of-terms/moisture)

**Table-2: Composite Price Index for Imported Coal using Proposed Revised Methodology
(that includes Indonesian coal also)**

Index	API-4	Coalfax	Global COAL	Platts Indo Coal	Composite Series*
Kcal/Kg, GAD	6000	6700	6700	6883	
Escalation based on Actual index (CV on GAD basis)					
Average Index (Mar 12 - Aug 12)	93.57	96.56	96.06	82.63	88.78
Average Index (Sept 12 - Feb 13)	85.94	89.38	89.79	72.17	79.96
Half-Yearly Escalation					-9.93%
Annual Escalation					**-19.87%**
Escalation based on Converted index (CV normalised for GAD 5000 kcal)					
Mar 12 - Aug 12	**77.97**	**72.06**	**71.69**	**60.02**	67.47
Sept 12 - Feb 13	**71.62**	**66.70**	**67.01**	**52.42**	60.83
Half-Yearly Escalation					-9.85%
Annual Escalation					**-19.69%**

*Composite series using weightage of 25% to API4 (Price of South African Coal), 12.5% to Coalfax (Price of Australian Coal), 12.5% to GlobalCOAL (Price of Australian Coal) and 50% to Platts Index (Price of Indonesian Coal).

Note: 1. In case of API-4, Coalfax and GlobalCOAL CV is given in GAD where as in case of Platts indo coal is given in GAR. Therefore, Platts Indo coal index converted from GAR (K cal/kg of 5900) to GAD (6883 kcal/kg). While converting TM and IM are being taken from the Platts methodology and specifications guide as 16% and 2% respectively. TM of 16% is the mid value of the range of 15-17% given in the document.

2. Since indices are real prices, normalization was achieved by converting the given prices to 5000 kcal.

It can be seen that in the example, the escalation rate for payment purposes is -19.69 as per the proposed methodology, as against -15.12 as per existing methodology.

Appendix – A: Reasons for adopting the Composite Index[3]

"3.1.3 Recommended Index

Based on the feedback / comments obtained from stakeholders / other market participants, and a review of the available options, the hybrid index as proposed for payments for imported coal is as follows.

Name of Index	Description	Supplier/ Publisher	Commencement Date	Weight proposed
Richards Bay – API 4	Spot FOB Richards Bay, at 6000kcal/kg GAD to European market	Argus	2004	50%
GlobalCOAL Newcastle	Spot FOB Newcastle 6700kcal/kg GAD	GlobalCoal	2002	25%
Barlow Jonker Index	Spot FOB Newcastle 6700kcal/kg GAD	Barlow Jonker	1986	25%

As both API 4 and GlobalCOAL *Newcastle have a very short history, they do not lend suitable for past historical trends. Thus for the purposes of bid evaluation, only Barlow Jonker Index is proposed to be used. The other components will be incorporated only when they have a sufficiently long history.*

3.1.4 Reasons for Recommendations

o *Origin of Indices*

- *Australia /Indonesia is likely to be the primary source of much of the coal supplies to India for the volumes involved;*

- *For Indonesian coal supplies, the current practice is to adopt Australian coal indices for contracts. Indonesian indices currently available are unreliable and have very short history;*

- *South African coal exports currently are largely to the European markets. Published indices for South Africa are based exclusively on sales of coal to Europe. This however may change in the future with the trade from Asia increasing as the market dynamics change.*

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[3] As per Consultant's report;
http://www.cercind.gov.in/22112006/ConsultantReport_Revised_Nov22%5B1%5D.pdf.

- *Though Australian indices might be the most representative with respect to coal import to India at present and may be also in the future, it is suggested that the presence of only one source country in the proposed index would give wrong signals to the market and may lead to monopoly like behaviour by Australian suppliers. In the absence of reliable Indonesian indices, an equal weightage to South Africa has been proposed to encourage source diversity.*

o *Choice of indices*
- *Among coal indices, a combination of API 4 (50%), BJI (25%) and GlobalCOAL Newcastle (25%) are proposed to ensure an equal weightings to Australian and South African indices. volumes at this stage are largely reflected in the weightages. This has been done accepting the views of stakeholders that the underlying index components should be tradable. Thus the illiquid ACR Asia has not been dropped even though it is the most representative in terms of the volume of coal trade captured. A combination of indices also ensures that in event one of them is discontinued, the others are still available for computing the reference prices;*
- *The JPU index is the sole index reflecting long term contracts. However the discontinuation of the JPU reference system and progressively diminishing importance make it an inappropriate choice;*
- *The Australian Mining PPI index has not been considered based on the feedback that no suppliers are willing to base seaborne trade on this index and the practice was limited to domestic coal contracts in Australia. In addition it was felt that backward integration though a natural strategy was not a feasible option in the current market scenario.*
- *The choice of indices is based on stakeholder's inputs to allow for generators to enter into back to back fuel supply arrangements. Thus the choice of indices has been revised taking into account acceptability of the proposed index by global coal suppliers in fuel supply arrangements.*
- *Use of spot indices only to allow for tradability has been done considering the inputs from developers that given tradable indices as escalation benchmarks, they will be able to negotiate a higher proportion of the coal contract under the non-escalable portion."*

Appendix – B: Import of Steam Coal into India, 2010-11 to 2012-13

S.No.	Country	Import of Steam Coal (Thousand Tonnes)			% to total Import of Coal			Average of last 3 Yrs
		2010-11	2011-12	2012-13 (Apr-Dec)	2010-11	2011-12	2012-13 (Apr-Dec)	
1	INDONESIA	30870.22	42701.69	54793.27	73.44%	77.25%	77.93%	76.20%
2	SOUTH AFRICA	9899.89	10224.81	11189.86	23.55%	18.50%	15.91%	19.32%
3	U S A	289.10	289.16	2287.98	0.69%	0.52%	3.25%	1.49%
4	AUSTRALIA	198.65	895.33	1228.96	0.47%	1.62%	1.75%	1.28%
5	RUSSIA		535.86	20.30	0.00%	0.97%	0.03%	0.33%
6	UNSPECIFIED	309.71	51.12	46.56	0.74%	0.09%	0.07%	0.30%
7	PHILIPPINES	212.38	60.55	57.05	0.51%	0.11%	0.08%	0.23%
8	CHINA P RP	125.31	139.35	16.31	0.30%	0.25%	0.02%	0.19%
9	COLOMBIA	100.00		163.58	0.24%	0.00%	0.23%	0.16%
10	CANADA			133.49	0.00%	0.00%	0.19%	0.06%
11	AUSTRIA		65.50		0.00%	0.12%	0.00%	0.04%
12	SINGAPORE	10.00		65.39	0.02%	0.00%	0.09%	0.04%
13	BENIN		8.00	65.00	0.00%	0.01%	0.09%	0.04%
14	COTE D' IVOIRE		45.50	8.00	0.00%	0.08%	0.01%	0.03%
15	JAPAN		27.00	29.80	0.00%	0.05%	0.04%	0.03%
16	TAIWAN		49.05		0.00%	0.09%	0.00%	0.03%
17	SAUDI ARAB	2.00	18.00	35.60	0.00%	0.03%	0.05%	0.03%
18	MALAYSIA		37.10	6.00	0.00%	0.07%	0.01%	0.03%
19	IRAN		35.90		0.00%	0.06%	0.00%	0.02%
20	MONGOLIA			34.41	0.00%	0.00%	0.05%	0.02%
21	MOZAMBIQUE		11.39	16.02	0.00%	0.02%	0.02%	0.01%
22	U ARAB EMTS	10.00	4.50	5.00	0.02%	0.01%	0.01%	0.01%
23	THAILAND		7.50	16.00	0.00%	0.01%	0.02%	0.01%
24	GHANA			24.80	0.00%	0.00%	0.04%	0.01%
25	SRI LANKA DSR	5.00		15.00	0.01%	0.00%	0.02%	0.01%
26	ITALY			20.00	0.00%	0.00%	0.03%	0.01%
27	GUINEA BISSAU		7.50	9.50	0.00%	0.01%	0.01%	0.01%

28	UKRAINE		10.00	5.00	0.00%	0.02%	0.01%	0.01%
29	BAHARAIN IS		12.75		0.00%	0.02%	0.00%	0.01%
30	IRELAND		10.00		0.00%	0.02%	0.00%	0.01%
31	TURKEY		7.50		0.00%	0.01%	0.00%	0.00%
32	NETHERLAND	5.00			0.01%	0.00%	0.00%	0.00%
33	KOREA RP		5.00	1.00	0.00%	0.01%	0.00%	0.00%
34	PORTUGAL		5.00		0.00%	0.01%	0.00%	0.00%
35	ZIMBABWE		5.00		0.00%	0.01%	0.00%	0.00%
36	TANZANIA REP			6.00	0.00%	0.00%	0.01%	0.00%
37	U K			5.00	0.00%	0.00%	0.01%	0.00%
38	PAKISTAN IR	0.05	0.26	3.10	0.00%	0.00%	0.00%	0.00%
39	MALI			2.91	0.00%	0.00%	0.00%	0.00%
40	MOROCCO		2.00		0.00%	0.00%	0.00%	0.00%
41	EGYPT A RP		2.00		0.00%	0.00%	0.00%	0.00%
42	GERMANY		1.87		0.00%	0.00%	0.00%	0.00%
43	SWEDEN			2.00	0.00%	0.00%	0.00%	0.00%
44	NIGERIA		1.00		0.00%	0.00%	0.00%	0.00%
45	VIETNAM SOC REP			1.00	0.00%	0.00%	0.00%	0.00%
46	MYANMAR		0.50		0.00%	0.00%	0.00%	0.00%
47	AFGHANISTAN TIS	0.04			0.00%	0.00%	0.00%	0.00%
48	VENEZUELA			0.04	0.00%	0.00%	0.00%	0.00%
	Total	42037.35	55277.69	70313.93	100.00%	100.00%	100.00%	100.00%

Source: Ministry of Commerce & Industry