

CENTRAL ELECTRICITY REGULATORY COMMISSION

EXPLANATION FOR THE NOTIFICATION ON ESCALATION RATES DATED March 27, 2009

1. The Ministry of Power (MOP), vide its Notification dated, 19.01.2005, issued *Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees*. These guidelines have been amended dated 30.3.2006 and 18.8.2006. **These guidelines provide that the CERC shall notify and update the Escalation Rate for Coal and Gas, Inflation Rate based on WPI and CPI, Discount Rate and Dollar-Rupee Exchange Variation Rate, for the purpose of bid evaluation as well as for payment.** The relevant provisions of the MOP guidelines read as under:

Clause 4.2 of guidelines provides as follows:

“In case of long term procurement with specific fuel allocation (Case 2), the procurer shall invite bids on the basis of capacity charge and net quoted heat rate. The net heat rate shall be ex-bus taking into account internal power consumption of the power station. The energy charges shall be payable as per the following formula:

Energy Charges = Net quoted heat rate X Scheduled Generation X Monthly Weighted Average price of Fuel/ Monthly Average Gross Calorific Value of Fuel.

If the price of the fuel has not been determined by the Government of India, government approved mechanism or the Fuel Regulator, the same shall have to be approved by the appropriate Regulatory Commission.

In case of coal/lignite fuel, the cost of secondary fuel oil shall be factored in the capacity charges.”

Clause 4.11 of guidelines provides as follows:

“ 4.11 Where applicable, the energy charges payable during the operation of the contract shall be related on the base energy charges specified in the bid with suitable provision for escalation. In case the bidder provides firm energy charge rates for each of the years of the contract term, the same shall be permitted in the tariffs.

1)(i) *In cases other than the cases where captive fuel source is offered or cases where the procurer mandates use of imported fuels in case 2 queries, the energy charges shall be payable in accordance with fuel escalation index used for evaluation of the bid. In case of bids based on net heat rate, the price of fuel shall be taken as stipulated under para 4.2. However, the fuel escalation will be subject to any administered price mechanism of Government or independent regulatory price fixation in case of fuel produced within the country. The applicable indices for relevant fuels shall be identified in the RFP documents.*

2)(ii) *The energy charges may feature separate non-escalable (fixed) and escalable (indexed) components in case of a procurement query where the procurer offers a captive fuel source (such as a captive coal mine) for concurrent development and production of power. The ratio of minimum and maximum energy charges (including both the non-escalable component and escalable component incorporating escalation as per index being used for evaluation) over the term of PPA shall not be less than 0.5 to avoid excessive frontloading or backloading. The index for escalable component of energy charge in such a case would be as notified by the CERC under para 5.6(vi).*

3)(iii) *In cases where the procurer mandates use of imported fuel for use in a coastal power station in case-2 procurement query, the bids may be invited for base energy charge for the first year to be escalated as per the indices identified in the RFP. Such energy charge would have following three components:*

a) Imported fuel component in US Dollars/unit.

b) Transportation of fuel component in US Dollars/unit.

c) Inland fuel handling component in Indian Rupees/unit

Each of these components may have separate non-escalable (fixed) and escalable (indexed) sub-components. The escalation indices for escalable sub-components of these three components would be as notified by the CERC under para5.6(vi).

It is clarified that the bidders would have option to quote firm energy charge rates for each of the years of the contract.”

Sub-clause (iv) of clause 5.6 is as follows:

“The bids shall be evaluated for the composite levelled tariffs combining the capacity and energy components of the tariff quoted by the bidder. In case of assorted enquiry for procurement of base load, peak load and seasonal power, the bid evaluation for each type of requirement shall be carried out separately. The capacity component of tariffs may feature separate non-escalable (fixed) and escalable (indexed) components. The index to be adopted for escalation of the escalable component shall be specified in the RFP.

For the purpose of bid evaluation in cases other than where a captive fuel source is offered, median escalation rate of the relevant fuel index (as identified in the RFP) in the international market or domestic market for the last 30 years for coal and 15 years for gas/LNG (as per CERC’s notification in (vi) below) shall be used for escalating the energy charge (or the derived energy charge in cases referred to in para 4.2) quoted by the bidder. If data of 30/15 years are not available, the same shall be taken for maximum number of available years. The provisions of para 4.11 (iii) would also apply to evaluation of bids in cases where procurer mandates use of imported fuel for coastal power stations. However, in cases where the bidder quotes firm energy charges for each of the years of proposed supply, the energy charges proposed by the bidder shall be adopted for bid evaluation.

Where the procurer offers a captive fuel source (such as a captive coal mine) for concurrent development and production of power, the provisions of para 4.11 (ii) would apply.

The rate for discounting the combination of fixed and variable charges for computing the levelled tariff shall be as notified by CERC keeping in view prevailing rate for 10 year Government of India securities. This rate is to be specified in the RFP.”

2.The clause 5.6(vi) of the guidelines provide for following escalation rates to be notified by CERC every six months separately for the purpose of bid evaluation and payment:

- (i) Escalation rate for domestic coal. (Separately for evaluation and payment)
- (ii) Escalation rate for domestic gas. (Separately for evaluation and payment)

- (iii) Escalation rates for different escalable sub-components of energy charge for plants based on imported coal. (Separately for evaluation and payment)
- (iv) Escalation rate for different escalable sub-components of energy charge for plants based on imported gas. (Separately for evaluation and payment)
- (v) Inflation rate to be applied to indexed capacity charge component.
- (vi) Inflation rate to be applied to indexed energy charge component in cases of captive fuel source.
- (vii) Discount rate to be used for bid evaluation.
- (viii) Dollar-Rupee exchange variation rate (For the purpose of evaluation)

3. The Commission, in its earlier notifications, has published the above rates excluding (ii) & (iv). The Commission, in the present notification too, has published the same.

4. The methodology that was used for computing the rates published in the earlier notification dated 24.11.2006 has been used for computing the rates published in the present notification. The methodology can be seen in the consultant's report (Revised as on 22 November 2006) and in the Explanation (General)- Revised in November 2006 available on CERC website (www.cercind.gov.in).

5. The annual inflation rates and escalation rates for bid evaluation have been computed based on the time series data (twelve calendar year data) i.e. for the period from 1997 to 2008. The Dollar-Rupee Exchange Variation Rate has been computed based on the data for the period from 1998 to 2008 keeping volatility of the Dollar with the Rupee. A mean approach has been applied on the data series. Further, to smoothen out the data series, the annual escalation factors have been calculated on data points obtained using a three years moving average on annual calendar year data.

6. The annual escalation rates for payment have been computed based on latest twelve months data (weekly/monthly). The data for the period from Jan to June 2008 and July to Dec 2008 has been taken for computing the inflation rate for indexed capacity charge and escalation rates for inland handling subcomponent of energy charge & indexed energy charge

for captive mine coal. The data for the period from March to August 2008 and from September 2008 to February 2009 has been taken for computing the escalation rates for imported coal and transportation of imported coal i.e. bunker fuel. Based on two average index values for the appropriate six months period, a half-yearly escalation rate has been computed. The annual escalation rate has been computed by multiplying the half-yearly escalation rate by two.

7. The escalation rate for evaluation of energy charge component of domestic coal based bids invited under clause 4.2 of the Competitive Bidding Guidelines has been computed. As per clause 4.2 of the Competitive Bidding Guidelines quoted above, in case of long term procurement with specific fuel allocation (Case 2), the procurer shall invite bids on the basis of capacity charge and net quoted heat rate. The energy charges shall be payable as per the formula given under clause 4.2 of the guidelines, therefore, the escalation rate for energy charge component of domestic coal for payment is not published in the present notification.

8. The data series and calculation of escalation rates etc has been provided below:

A: Escalation Rates for Bid Evaluation:

(1) Inflation Rate To Be Applied To Indexed Capacity Charge Component (For Evaluation)

A hybrid index comprising of the Wholesale Price Index (WPI) and the Consumer Price Index (CPI) has been considered for arriving at the inflation rate as follows:

$$0.6 * \text{Inflation based on WPI} + 0.4 * \text{Inflation based on CPI}$$

A mean approach has been applied on the data series. Further, to smoothen out the data series, the annual escalation factors have been calculated on data points obtained using a three year moving average on the annual calendar year data. The inflation rate for bid evaluation has been computed based on the data for the period from 1997 to 2008 (both inclusive). The computation can be seen in the following table.

Table-1: INFLATION RATE TO BE APPLIED TO INDEXED CAPACITY CHARGE COMPONENT (FOR EVALUATION)							
Wholesale Price Index for All Commodities (Base 1993-94=100)				Consumer Price Index for Industrial Workers (Base 2001=100)			
Year	Index	3 yr Moving Avg	Escalation Rate	Year	Index	3 yr Moving Avg	Escalation Rate
1997	131.3			1997	77		
1998	138.9			1998	87		
1999	143.8	138.0		1999	92	85.4	
2000	152.8	145.2	5.19%	2000	95	91.4	7.01%
2001	160.7	152.4	5.01%	2001	99	95.2	4.14%
2002	164.7	159.4	4.57%	2002	103	99.1	4.03%
2003	173.4	166.3	4.31%	2003	107	103.0	3.96%
2004	184.9	174.3	4.85%	2004	111	107.1	3.95%
2005	193.7	184.0	5.54%	2005	116	111.3	3.95%
2006	203.0	193.9	5.37%	2006	123	116.6	4.76%
2007	212.8	203.2	4.80%	2007	131	123.1	5.63%
2008	232.2	216.0	6.31%	2008	142	131.8	7.01%
		Mean	5.11%			Mean	4.94%
				Mean Escalation Rate	Weight	Contribution to Index	
Wholesale Price Index for All Commodities				5.11%	0.6	3.06%	
Consumer Price Index for Industrial Workers				4.94%	0.4	1.98%	
Inflation Rate for indexed capacity charge						5.04%	

(2) Discount Rate to be used for bid evaluation

Weighted Average Cost of Capital (WACC) has been considered as discount rate. The WACC has been computed as under:

$$\text{WACC} = \text{Cost of Debt} + \text{Cost of Equity}$$

Where,

$$\text{Cost of Debt} = 0.70 (\text{Market Rate}) \times (1 - \text{Corporate Tax Rate})$$

$$\text{Cost of Equity} = 0.30 (\text{Risk Free Rate} + b(\text{Risk Premium}))$$

The computation of WACC can be seen in the following table.

Table-2: DISCOUNT RATE TO BE USED FOR BID EVALUATION		
	Cost of Debt/Equity	WACC
1. Cost of Debt		
0.70(MR)x(1-CTR)	5.39	
2. Cost of Equity		
0.30((RF+b(RP)))	4.80	
Discount Rate (1+2)		10.19
Discount Rate has been computed based on the following assumptions		
Components of Debt/Equity		Assumptions (%)
Debt		70.00
Equity		30.00
Corporate Tax Rate (CTR)		30.00
Risk Free rate (RF)		7.86
Beta (b)		1.00
Equity Market Risk Premium (RP)		8.14
Market Rate of Interest (MR)		11.00

The Debt and Equity of 70:30 has been assumed based on CERC norms on Debt and Equity in its Tariff Regulations 2009-14. The basic corporate tax rate for the year 2008-09 (i.e. excluding surcharge and cess) has been assumed while computing the discount rate. The 10 year GOI securities rate for the year 2008 has been taken as risk free rate. There is no appropriate beta value representing the power sector, hence beta value of 1 has been assumed. The Equity market risk premium is derived from risk free rate for the year 2008 and the CERC norm for ROE (i.e. 16% post tax) in its tariff regulations 2009-14.

(3) Dollar-Rupee Exchange Variation Rate (For Evaluation)

The exchange rate of the Indian Rupee vis-à-vis the US Dollar has been taken from the website of the Reserve Bank of India. The data has been taken for the period from the Calendar Year 1998 to 2008 (both inclusive). A mean approach has been applied on data series. Further, to smoothen out the data series, the annual escalation factors have been calculated on data points obtained using a three year moving average on the annual calendar year data. The computation of exchange variation rate can be seen in the following table.

Year	Rupees per unit of US Dollar	3 years moving average rate	Exchange Variation rate (%)
1998	41.27		
1999	43.05		
2000	44.94	43.09	
2001	47.19	45.06	4.58
2002	48.60	46.91	4.10
2003	46.58	47.46	1.17
2004	45.32	46.83	-1.31
2005	44.10	45.33	-3.20
2006	45.33	44.92	-0.92
2007	41.29	43.58	-2.99
2008	43.42	43.35	-0.52
		Mean	0.11

(4.1) Escalation Rate for Imported Coal component (For Evaluation)

Component Index	Data Series	Mean Escalation Rate	Weight	Contribution to Index (%)
Barlow Jonker Index	12 Years (Jan 1997 to Dec 2008)	14.53%	1.00	14.53%
Proposed Escalation Rate				14.53%

(4.2) Escalation Rate for Transportation of Coal component (For Evaluation)

Component Index	Data Series	Mean Escalation Rate	Weight	Contribution to Index (%)
Singapore 380 CST Bunker Fuel Index	12 Years (Jan 1997 to Dec 2008)	17.95%	1.00	17.95%
Proposed Escalation Rate				17.95%

(4.3) Escalation Rate for Inland Handling of Coal component (For Evaluation)

Component Index	Data Series	Mean Escalation Rate	Weight	Contribution to Index (%)
Mean Escalation of WPI series	12 Years (Jan 1997 to Dec 2008)	5.11%	0.60	3.07%
Mean Escalation of CPI-IW series	12 Years (Jan 1997 to Dec 2008)	4.94%	0.40	1.98%
Proposed Escalation Rate				5.04%

(5) Escalation Rate for Captive Mine Coal (For Evaluation)

Using CPI for industrial workers, WPI for all commodities and disaggregated WPI series for various commodities used in the captive mining, the escalation rate for captive mine coal has been computed as under.

Table-5: INFLATION RATE TO BE APPLIED TO INDEXED ENERGY CHARGE COMPONENT IN CASE OF CAPTIVE MINE COAL SOURCE (FOR EVALUATION)				
S.No	Component Index	Mean Escalation Rate	Weight	Contribution to Index
1	Mean Escalation of WPI series for Tyres	0.80%	0.10	0.08%
2	Mean Escalation of WPI series for Heavy Machinery and Parts	4.71%	0.25	1.18%
3	Mean Escalation of WPI series for HSD Oil	13.59%	0.25	3.40%
4	Mean Escalation of WPI series for Matches, Explosives & Other Chemicals	1.98%	0.10	0.20%
5	Mean Escalation of WPI series for All Commodities	5.11%	0.10	0.51%
6	Mean Escalation of CPI-IW series	4.94%	0.20	0.99%
	Escalation Rate for Captive Mine Coal			6.35%

Wholesale Price Index for Tyres (Base 1993-94=100)			
Year	Index	3 yr Moving Avg	Escalation Rate
1997	131.1		
1998	130.5		
1999	128.0	129.9	
2000	127.5	128.7	-0.92%
2001	123.2	126.2	-1.89%
2002	126.3	125.7	-0.45%
2003	120.6	123.4	-1.83%
2004	120.0	122.3	-0.86%
2005	121.4	120.7	-1.34%
2006	127.7	123.0	1.97%
2007	139.3	129.5	5.22%
2008	149.7	138.9	7.28%
		Mean	0.80%

Wholesale Price Index for Heavy Machinery and Parts (Base 1993-94=100)			
Year	Index	3 yr Moving Avg	Escalation Rate
1997	133.1		
1998	138.0		
1999	142.3	137.8	
2000	148.3	142.9	3.68%
2001	158.1	149.6	4.69%
2002	161.3	155.9	4.23%
2003	167.8	162.4	4.17%
2004	178.7	169.3	4.23%
2005	197.8	181.4	7.19%
2006	200.1	192.2	5.94%
2007	206.0	201.3	4.73%
2008	219.3	208.4	3.55%
		Mean	4.71%

Wholesale Price Index for HSD Oil (Base 1993-94=100)			
Year	Index	3 yr Moving Avg	Escalation Rate
1997	136.6		
1998	153.6		
1999	159.6	149.9	
2000	218.0	177.1	18.10%
2001	251.8	209.8	18.49%
2002	261.8	243.9	16.24%
2003	294.5	269.4	10.46%
2004	343.6	300.0	11.36%
2005	414.9	351.0	17.01%
2006	466.3	408.3	16.32%
2007	451.8	444.3	8.83%
2008	487.9	468.7	5.48%
		Mean	13.59%

Wholesale Price Index for Matches, Explosives & Other Chemicals (Base 1993-94=100)			
Year	Index	3 yr Moving Avg	Escalation Rate
1997	116.0		
1998	123.2		
1999	122.9	120.7	
2000	122.8	123.0	1.88%
2001	126.8	124.2	0.98%
2002	128.1	125.9	1.40%
2003	129.2	128.0	1.69%
2004	129.3	128.9	0.65%
2005	127.8	128.8	-0.08%
2006	134.0	130.4	1.24%
2007	141.9	134.5	3.21%
2008	155.4	143.7	6.83%
		Mean	1.98%

(6) Escalation Rate for evaluation of energy charge component of domestic coal based bids invited under clause 4.2 of the Competitive Bidding Guidelines

WPI for non-coking coal has been used for computing the escalation rate for evaluation of energy charge component of domestic coal as under:

Table-6: ESCALATION RATE FOR EVALUATION OF ENERGY CHARGE COMPONENT OF DOMESTIC COAL BASED BIDS INVITED UNDER CLAUSE 4.2 OF THE COMPETITIVE BIDDING GUIDELINES			
Year	WPI for Non-Coking Coal	3 Year Moving Average	Escalation Rate
1997	134.6		
1998	142.4		
1999	146.1	141.0	
2000	151.3	146.6	3.95
2001	180.9	159.4	8.76
2002	183.6	171.9	7.84
2003	192.5	185.7	7.98
2004	217.7	197.9	6.61
2005	232.8	214.3	8.29
2006	232.8	227.8	6.28
2007	233.9	233.2	2.36
2008	254.0	240.2	3.03
		Mean	6.12

B: Escalation Rates for Payment

(1) Inflation Rate To Be Applied To Indexed Capacity Charge Component (For Payment)

As mentioned above, the annual escalation rate for payment has been computed based on latest twelve months data. A hybrid index comprising of the Wholesale Price Index (WPI) and the Consumer Price Index (CPI) has been considered for arriving at the inflation rate as follows:

$$0.6 * \text{Inflation based on WPI} + 0.4 * \text{Inflation based on CPI}$$

The computation of inflation rate can be seen in the following table.

Period		WPI	CPI
2008-01		218.1	134.0
2008-02		219.9	135.0
2008-03		225.5	137.0
2008-04		228.5	138.0
2008-05		231.1	139.0
2008-06		237.4	140.0
2008-07		240.0	143.0
2008-08		241.2	145.0
2008-09		241.5	146.0
2008-10		239.0	148.0
2008-11		234.2	148.0
2008-12		229.7	147.0
Average Index (Jan 08-Jun 08)		226.8	137.2
Average Index (July 08-Dec 08)		237.6	146.2
Half-Yearly Inflation		4.79%	6.56%
Annual Inflation		9.57%	13.12%
		WPI Component	CPI Component
Capacity Esc Weights	1	0.6	0.4
Half-Yearly Inflation	5.50%	2.87%	2.62%
Annual Inflation	10.99%	5.74%	5.25%

(2.1) Escalation Rate for Imported Coal component (For Payment)

Component Index	Data Series	Mean Escalation Rate (%)	Weight	Contribution to Index (%)
API 4	52 weekly data points from March 2008 to February 2009 (Friday Series)	-59.71%	0.50	-29.86%
BJI	52 weekly data points from March 2008 to February 2009 (Thursday Series)	-65.50%	0.25	-16.38%
Global Coal	52 weekly data points from March 2008 to February 2009 (Friday Series)	-71.37%	0.25	-17.84%
Proposed Escalation Rate				-64.07%

(2.2) Escalation Rate for Transportation of Coal component (For Payment)

Component Index	Data Series	Mean Escalation Rate (%)	Weight	Contribution to Index (%)
Singapore 380 CST Bunker Fuel Index	Monthly data points from March 2008 to February 2009	-89.75%	1.00	-89.75%
Proposed Escalation Rate				-89.75%

(2.3) Escalation Rate for Inland Handling of Coal component (For Payment)

ESCALATION RATE FOR INLAND HANDLING SUB-COMPONENT (FOR PAYMENT)				
Period		WPI	CPI	
2008-01		218.1	134.0	
2008-02		219.9	135.0	
2008-03		225.5	137.0	
2008-04		228.5	138.0	
2008-05		231.1	139.0	
2008-06		237.4	140.0	
2008-07		240.0	143.0	
2008-08		241.2	145.0	
2008-09		241.5	146.0	
2008-10		239.0	148.0	
2008-11		234.2	148.0	
2008-12		229.7	147.0	
Average Index (Jan 08-Jun 08)		226.8	137.2	
Average Index (July 08-Dec 08)		237.6	146.2	
Half-Yearly Inflation		4.79%	6.56%	
Annual Inflation		9.57%	13.12%	
		WPI Component	CPI Component	
Capacity Esc Weights	1	0.6	0.4	
Half-Yearly Inflation	5.50%	2.87%	2.62%	
Annual Inflation	10.99%	5.74%	5.25%	

(3) Escalation Rate for Captive Mine Coal (For Payment)

Table-3: INFLATION RATE TO BE APPLIED TO INDEXED ENERGY CHARGE COMPONENT IN CASE OF CAPTIVE MINE COAL SOURCE (FOR PAYMENT)							
Period		WPI	CPI	Wholesale Price Index			
				Tyres	Matches Explosive	Heavy Machinery & Parts	High Speed Diesel Oil
2008-01		218.1	134.0	148.8	148.0	208.9	449.5
2008-02		219.9	135.0	148.8	148.0	209.1	456.9
2008-03		225.5	137.0	148.8	149.0	209.6	465.8
2008-04		228.5	138.0	148.9	153.5	218.6	465.8
2008-05		231.1	139.0	149.3	154.6	222.1	465.8
2008-06		237.4	140.0	149.3	154.5	222.6	511.5
2008-07		240.0	143.0	149.3	154.5	222.6	511.5
2008-08		241.2	145.0	149.3	154.5	222.6	511.5
2008-09		241.5	146.0	150.6	159.9	223.5	511.5
2008-10		239.0	148.0	151.0	163.0	223.9	511.5
2008-11		234.2	148.0	151.0	163.0	224.6	511.5
2008-12		229.7	147.0	151.0	161.8	223.0	482.3
Average Index (Jan 08-Jun 08)		226.75	137.17	148.98	151.27	215.15	469.22
Average Index (July 08-Dec 08)		237.60	146.17	150.37	159.45	223.37	506.63
Half-Yearly Inflation		4.79%	6.56%	0.93%	5.41%	3.82%	7.97%
Annual Inflation		9.57%	13.12%	1.86%	10.82%	7.64%	15.95%
		WPI Component	CPI Component	Tyres Component	Explosives Component	Machinery Component	HSD Component
Captive Mining Weights	1	0.1	0.2	0.1	0.1	0.25	0.25
Half-Yearly Inflation	5.37%	0.48%	1.31%	0.09%	0.54%	0.95%	1.99%
Annual Inflation	10.75%	0.96%	2.62%	0.19%	1.08%	1.91%	3.99%

The data series for API 4, Global Coal Index, Barlow Jonker Index and Singapore 380 CST Bunker Fuel Price index has been analysed by CERC. The data is not made available for public dissemination since it is paid for and is sourced on a single user subscription.

Explanation regarding escalation rates for various sub-components of energy charges for imported coal based projects and escalable energy charge component of captive coal mine based projects is provided in the consultant's report (Revised on 22 November 2006).
