

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Coram:

- 1. Dr.Pramod Deo, Chairperson**
- 2. Shri S.Jayaraman, Member**
- 3. Shri.V.S.Verma, Member**

Date of Public Hearing : 19.1.2012

In the matter of

Methodology for computing Annual Escalation Rate for Escalable Transmission Charges for Evaluation and Per Annum Inflation Rate for Payment of Escalable Transmission Charges.

Following were present:

1. Shri Satyaroop Panigrahy, NCC Infrastructure Holdings, Ltd
2. Shri Jaikishan, Marquis Energy Exchange Ltd
3. Shri Niraj Chandreker, Visa Power Ltd
4. Shri U.K.Tyagi, PGCIL
5. Shri Prashant Sharma, PGCIL
6. Shri V.K.Singh, REC Transmission Projects Company Ltd

1. Background

1.1 The guidelines on "Tariff based Competitive Bidding for Transmission Service" (as amended up to 10th October, 2008) issued by Ministry of Power, Government of India under section 63 of the Electricity Act 2003, provide that the transmission tariff structure shall have two components – one escalable and the other non-escalable (See para 7 of the guidelines). Following these guidelines, the explanation for applicable escalation rates has been provided in the Standard Request for Proposal (RFP) and Standard Transmission Service Agreement (TSA) documents. While Standard RFP contains explanation about the applicable escalation rate for the evaluation purpose, Standard TSA contains explanation about the applicable inflation rate for payment purpose.

1.2 Clause 3.3.1.3 (a) in the Standard RFP document states the following:

"For the purpose of comparison of the Financial Bids, the Quoted Escalable Transmission Charges of each bidder shall be uniformly escalated as per the escalation rate mentioned below. However, for the purpose of actual payment of Transmission Charges, such escalation rate shall be applied as per the provisions of the TSA.

S.No.	Head	Value
1	Annual Escalation rate applicable to Quoted Escalable Transmission Charges	This shall be as per the rate notified by the CERC, applicable on the seventh day prior to the Bid Deadline
2	Discount rate for computation of Levelized Transmission Charges	This shall be as per the rate notified by the CERC as applicable for generation projects, applicable on the seventh day prior to the Bid Deadline"

1.3 Schedule 7 of the Standard TSA states the following:

".....the value of the Escalation Index shall be computed by applying the per annum inflation rate specified by CERC for payment of Escalable Transmission Charges,"

1.4 In view of the above provisions, the Central Electricity Regulatory Commission (CERC) had proposed to notify escalation rate and the inflation rate exclusively in the context of procurement of transmission services under competitive bidding. A draft methodology for computing annual escalation rate for escalable transmission charges for evaluation and per annum inflation rate for payment of escalable transmission charges was developed by the staff of the Commission.

1.5 The draft "Methodology for computing the Annual Escalation Rate for Escalable Transmission Charges for evaluation and Per Annum Inflation rate for payment of Escalable Transmission Charges" was posted on the website of the Commission on 30.11.2011 for inviting comments/suggestions/objections. With a view to ensure transparency and participation of stakeholders in the process, the Commission held a public hearing on 19.1.2012.

2. In response to the public notice and public hearing, comments from the following were received.

(i) Central Electricity Authority (CEA)

- (ii) REC Transmission Projects Company Ltd (RECTPCL)
- (iii) U.P. Power Corporation Ltd (UPPCL)
- (iv) Marquis Energy Exchange Ltd (MEX)

2.1 Comments in response to the public notice dated 30.11.2011

(i) *Central Electricity Authority (CEA):*

- The weight of 60% to WPI and 40% to CPI as given by the Commission while computing the escalation rate for generation projects may be used for transmission projects also.
- Explanation to the Notification on escalation rates for generation projects (General-Revised in November 2006) was provided by the Commission. A similar general explanation should have been furnished in this case also for clarity on how the escalation rate is to be applied for payment.

(ii) *REC Transmission Projects Company Ltd (RECTPCL):*

- The methodology used for calculation of rates is in line with the current practice. While notifying the methodology and rate, date of announcement of such rates along with corresponding data points to be considered for calculation of rates may be included.
- An illustration detailing the applicability of the per annum inflation rate for payment of escalable transmission charges may also be included.

(iii) *U.P. Power Corporation Ltd (UPPCL):*

- The WPI for the commodities in transmission system or for power sector should have been considered in place of WPI for all commodities. If the WPI for transmission system is not possible to compute, the weight for WPI in the composite series should be reduced.
- After computing the annual escalation rate using different combinations of WPI and CPI percentages, UPPCL suggested use of weights as 30% to WPI and 70% to CPI in view of phenomenal rise in pay of the employees.
- There should be only one escalation for evaluation and payment i.e. the escalation rate computed for evaluation purpose (5.09%) by them using 30% weight to WPI and 70% to CPI.

2.2 Comments during public hearing dated 19.01.2012

- (i) **Marquis Energy Exchange Ltd (MEX):** The representative from MEX suggested that the WPI for metals should be used in place of WPI for all commodities. Metals are used in transmission system and therefore, WPI for metals is more appropriate to use instead of WPI for all commodities.

3. Analysis of the comments and decision of the Commission

3.1 For computing the escalation rate for escalable transmission charges, CEA has suggested weightage to WPI and CPI in the ratio of 60:40 i.e. the ratio followed by the Commission while computing the escalation rate for escalable capacity charge component for generation projects. UPPCL has suggested the ratio of 30:70 for WPI and CPI respectively i.e. more weightage to CPI than WPI in view of the phenomenal rise in pay of the employees.

3.2 The composition of O&M expenses for generation projects and transmission projects are different. It is a fact that in the total O&M expenditure, salary component is more in transmission projects compared to generation projects. The weightage given to WPI and CPI in the draft methodology is in the ratio of 45:55, which is based on composition of O&M expenses for the transmission projects which was adopted while framing the 2001 tariff regulations and 2004 tariff regulations. Therefore, this ratio has been adopted in the final methodology for computing the escalation/inflation rate for escalable transmission charges.

3.3 CEA and RECTPCL have suggested that for the sake of clarity general explanation similar to that provided for the "Notification on escalation rates for tariff based competitive bidding for procurement of power" should be provided along with the proposed "Notification on escalation rates for tariff based competitive bidding for transmission service". This suggestion has been considered and a similar explanation has been provided as Annexure-I and II to the methodology.

3.4 The revised methodology along with the annexures is enclosed with this order.

4. We direct the Secretary to notify the methodology for the information of all concerned.

(SHRI.V.S.VERMA)
MEMBER

(SHRI S.JAYARAMAN)
MEMBER

(DR.PRAMOD DEO)
CHAIRPERSON

New Delhi, dated 31st, January 2012.

Methodology for computing Annual Escalation Rate for Escalable Transmission Charges for Evaluation and Per Annum Inflation Rate for Payment of Escalable Transmission Charges

1. Background

1.1 The guidelines on "Tariff based Competitive Bidding for Transmission Service" (as amended up to 10th October, 2008) issued by Ministry of Power, Government of India under section 63 of the Electricity Act 2003, provide that the transmission tariff structure shall have two components – one escalable and the other non-escalable (See para 7 of the guidelines). Following these guidelines, the explanation for applicable escalation rates has been provided in the Standard Request for Proposal (RFP) and Standard Transmission Service Agreement (TSA) documents. While Standard RFP contains explanation about the applicable escalation rate for the evaluation purpose, Standard TSA contains explanation about the applicable inflation rate for payment purpose.

1.2 Clause 3.3.1.3 (a) in the Standard RFP document states the following:

"For the purpose of comparison of the Financial Bids, the Quoted Escalable Transmission Charges of each bidder shall be uniformly escalated as per the escalation rate mentioned below. However, for the purpose of actual payment of Transmission Charges, such escalation rate shall be applied as per the provisions of the TSA."

S.No.	Head	Value
1	Annual Escalation rate applicable to Quoted Escalable Transmission Charges	<i>This shall be as per the rate notified by the CERC, applicable on the seventh day prior to the Bid Deadline</i>
2	Discount rate for computation of Levelized Transmission Charges	<i>This shall be as per the rate notified by the CERC as applicable for generation projects, applicable on the seventh day prior to the Bid Deadline"</i>

1.3 Schedule 7 of the Standard TSA states the following:

*".....the value of the Escalation Index shall be computed by applying the per annum **inflation rate specified by CERC** for payment of Escalable Transmission Charges,".*

2. Methodology

In line with the above provisions, the Central Electricity Regulatory Commission (CERC) has prepared the methodology for determination of the annual escalation rate for escalable transmission charges for the purpose of evaluation and annual inflation rate for escalable transmission charges for the purpose of payment, which is covered in this section.

2.1 Methodology for determining the escalation rate for evaluation purposes

2.1.1 The escalation rate to be applied to quoted escalable transmission charges has been computed based on the time series data on WPI and (CPI) for the period of past 12 years. Composite series, using 45% weight to WPI and 55% weight to CPI has first been developed, which then has been used for computing the escalation rate. The reason for combining WPI and CPI is that the escalation in costs that the bidders of transmission projects would face is mainly on account of Operation and Maintenance (O&M) expenditure which is represented by WPI (for commodities/consumables/etc.) and CPI for (wages/salaries of personnel).

2.1.2 The methodology that has been used for computing the escalation rate is the same as is being followed for computing the escalation factors that the CERC is notifying at present under MOP Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees, i.e. the method of minimum mean square error, the mathematical formulation of which is as given below:

e: annual escalation rate in percent = $g \times 100$, where:

g: escalation factor = $[\exp\{\{(6 \times \sum_{t=2}^n (t-1) \times \ln R_t\} / \{(n-1) \times n \times (2n-1)\}\}] - 1$

$$R_t = (Y_t / Y_1)$$

Y_t = 't' th observation

Y_1 = initial observation

n = number of observations

2.1.3 *Computation of the escalation rate for evaluation purposes:* The escalation rate to be applied to quoted escalable transmission charges has been computed based on the time series data on WPI and CPI for the past 12 years. The data on WPI and CPI has been taken from the website of Ministry of Commerce & Industry and Labour Bureau, respectively. In the example below, data from 1999 to 2010 has been used. Composite series, using 45%

weight to WPI and 55% weight to CPI has first been developed, which then has been used for computing the escalation rate as under:

Composite Series: Average Index for escalable transmission charges					
Year	WPI for All Commodities	CPI for Industrial Workers	Proportion of WPI Component in Total Cost	Proportion of CPI Component in Total Cost	Composite Series
1999	76.79	92	45%	55%	84.92
2000	81.59	95	45%	55%	89.10
2001	85.80	99	45%	55%	92.98
2002	87.92	103	45%	55%	96.27
2003	92.60	107	45%	55%	100.53
2004	98.72	111	45%	55%	105.50
2005	103.37	116	45%	55%	110.19
2006	109.59	123	45%	55%	116.92
2007	114.94	131	45%	55%	123.64
2008	124.92	142	45%	55%	134.13
2009	127.86	157	45%	55%	143.93
2010	140.08	176	45%	55%	159.79

ANNUAL ESCALATION RATE FOR ESCALABLE TRANSMISSION CHARGES FOR EVALUATION						
Year No. (t)	Year	Composite Series	Yt/Y1 = Rt	Ln Rt	Year -1 (t-1)	Product [(t-1) x (Ln Rt)]
1	1999	84.92				
2	2000	89.10	1.05	0.05	1	0.05
3	2001	92.98	1.09	0.09	2	0.18
4	2002	96.27	1.13	0.13	3	0.38
5	2003	100.53	1.18	0.17	4	0.67
6	2004	105.50	1.24	0.22	5	1.08
7	2005	110.19	1.30	0.26	6	1.56
8	2006	116.92	1.38	0.32	7	2.24
9	2007	123.64	1.46	0.38	8	3.00
10	2008	134.13	1.58	0.46	9	4.11
11	2009	143.93	1.69	0.53	10	5.28
12	2010	159.79	1.88	0.63	11	6.95
A = Sum of "product" column						25.51
B= 6 times (6 x A)						153.08
C= (n-1) x n x (2n-1); n = No. of Years of data = 12						3036.00
D = B/C						0.05
g (Exponential Factor) = Exponential (D) -1						0.05
e = Annual Escalation Rate (%) = g x 100						5.17

The annual escalation rate computed in the above table (5.17%) has been notified as escalation rate for escalable transmission charges for evaluation.

2.2 Methodology for determining the inflation rate for payment purposes

2.2.1 The per annum inflation to be applied to Escalable Transmission Charges for Payment purposes has been computed based on the data on WPI and CPI for the latest twelve months (weekly/monthly). Composite series, based on WPI with 45% weight and CPI with 55% weight has first been developed, which then has been used for computing the inflation rate. The steps followed while computing the inflation rate are as under.

Step 1: Average index values for the appropriate six months period computed.

Step 2: A half-yearly inflation rate computed based on the average six months index.

Step 3: Annual inflation rate computed by multiplying half-yearly inflation rate by two.

Step 4: The annual inflation rate for parameters that require combining of two or more series in pre-determined proportion has been determined by combining each data point of two or more series in the pre-determined proportion to arrive at a composite new single series and then the annual inflation rate has been determined based on this composite new single series.

2.2.2 *Computation of the per annum inflation rate for escalable transmission charges for payment purposes:* The per annum inflation rate for Escalable Transmission Charges for Payment has been computed based on the data on WPI and CPI for industrial workers by taking the data for the period from July 2010 to June 2011. The data on WPI and CPI has been taken from the website of Ministry of Commerce & Industry and Labour Bureau, respectively. Composite series, based on WPI with 45% weight and CPI with 55% weight has first been developed, which then has been used for computing the inflation rate. The inflation rate has been computed as under:

ANNUAL INFLATION RATE FOR ESCALABLE TRANSMISSION CHARGES FOR PAYMENT			
Period	WPI	CPI	Composite Series
Jul-10	141	178	161.35
Aug-10	141.1	178	161.40
Sep-10	142	179	162.35
Oct-10	142.9	181	163.86
Nov-10	143.8	182	164.81
Dec-10	146	185	167.45
Jan-11	148	188	170.00
Feb-11	148.1	185	168.40
Mar-11	149.5	185	169.03
Apr-11	152.1	186	170.75
May-11	152.4	187	171.43
Jun-11	153.1	189	172.85
Average Index (July 10-Dec 10)			981.21
Average Index (Jan 11-Jun 11)			1022.44
Half-Yearly Inflation			4.20%
Annual Inflation			8.40%

The annual inflation rate computed in the above table (8.40%) is notified as per annum inflation rate for Escalable Transmission Charges for Payment.

2.3 The details on date of announcement for the notification of escalation rate/inflation rate for the purpose of evaluation/payment, sources of the data used (WPI and CPI) for computing the escalation rate/inflation rate and application of inflation rate for the purpose of payment (with an example) have been provided in Annexure-I. Sample calculation of inflation rate and resultant payment index through its application is provided in Annexure-II.

Date of Announcement, Data Source and Application of Inflation Rate for Payment

1. Date of announcements and corresponding data points

1.1 The date of publications for all escalation/inflation rates shall be as under:

Date of announcement	Application period
1st week of April	1st April to 30th September
1st week of October	1st October to 31st March

1.2 The data points for inflation rate for indexed transmission charge for payment shall be as under:

Data set for announcements to be made in 1st week of April	Data set for announcements to be made in 1st week of October
Average of relevant index for the preceding period of 1st Jan to 30th June and 1st July to 31st December	Average of relevant index for the preceding period of 1st July to 31st Dec and 1st Jan to 30th June

2. Data Source for WPI and CPI: The website of Ministry of Commerce and Industry (www.eaindustry.nic.in) is the source for data on WPI, and the website of Labour Bureau (www.labourbureau.nic.in) is the source for data on CPI.

3. Calculation of Inflation rate for payment: The calculation is provided in para 2.2.2 of the methodology

4. Application of inflation rate for payment: The annual inflation rate applicable for the six months period should be converted to a monthly rate by dividing by 12. It should then be applied on a simple basis (not compounding) for the following six months period on the base value for the financial year. This is illustrated in the example given below:

Example:

October Announcement (Financial Year 2010-11)

Annual Inflation rate: 2.93%

Monthly Rate = $2.93 / 12 = 0.2442\%$

Base Value for the month of September 2010 = 100 (say)

Starting Base Value for the six month period of the year = 100

Escalated Value for Month N (N=1 to 6) = Starting Base Value + N*(Base Value for the Financial year *Monthly Rate)

$$= 100 + N * (100 * 0.2442\%)$$

Thus, escalated values for the months of October 2010 to March 2011 will be 100.2442, 100.4883, 100.7325, 100.9767, 101.2208 and 101.4650 respectively. The last value i.e. 101.4650 shall become base value for the period of April-September 2011 and so on.

Annexure-II

Sample Calculations for Escalation Rates and Resultant Payment Index through its Application									
A	B	C	D	E	F	G	H	I	J
Year	Month	Sample Price Index	Average Price Index for six months	Half Yearly Escalation Rate (%)	Annual Escalation Rate (%) to be Announced (Applicable for the following six months)	Monthly Escalation to be applied for next six months	Escalation Applied respective months	Index Value for Payment (Assured Starting at 100)	Remarks
					E*2	F/12	B*G		
1	1	50							
	2	46							
	3	48							
	4	50							
	5	52							
	6	54							
			50.00						
	1	52.5							
	2	53.5							
	3	51.5							
	4	49.5							
	5	48.5							
	6	35						100.00	Starting Index Value
			48.42	-3.17%	-6.33%	-0.5278%			
2	1	40					-0.5278%	99.4722	
	2	42.5					-1.0556%	98.9444	
	3	44					-1.5833%	98.4167	
	4	48.5					-2.1111%	97.8889	
	5	50					-2.6389%	97.3611	
	6	62.5					-3.1667%	96.8333	Base for next semester
			47.92	-1.03%	-2.07%	-0.1721%			
	1	54					-0.1721%	96.6667	
	2	54					-0.3442%	96.5000	
	3	60					-0.5164%	96.3333	
	4	70					-0.6885%	96.1667	
	5	55					-0.8606%	96.0000	
	6	55					-1.0327%	95.8333	Base for next semester
			58.00	21.04%	42.09%	3.5072%			
3	1	52.5					3.5072%	99.1944	
	2	55.5					7.0145%	102.5556	
	3	56					10.5217%	105.9167	
	4	57.5					14.0290%	109.2778	
	5	56.5					17.5362%	112.6389	
	6	56.5					21.0435%	116.0000	Base for next semester
			55.75	-3.88%	-7.76%	-0.6466%			
	1	57					-0.6466%	115.2500	
	2	25					-1.2931%	114.5000	
	3	57.5					-1.9397%	113.7500	
	4	57.5					-2.5862%	113.0000	
	5	58					-3.2328%	112.2500	
	6	58					-3.8793%	111.5000	Base for next semester