

**EXPLANATION FOR THE NOTIFICATION ON ESCALATION FACTORS AND OTHER PARAMETERS FOR TARIFF BASED COMPETITIVE BIDDING FOR TRANSMISSION SERVICE, DATED 31.03.2016**

1. In pursuance of the "Tariff based Competitive-bidding Guidelines for Transmission Service" (as amended up to 10th October, 2008) issued by Ministry of Power, Government of India, Clause 3.3.1.3 (a) of the Standard Request for Proposal (RFP), and Schedule 7 of the Standard Transmission Service Agreement (TSA) documents, the Central Electricity Regulatory Commission (CERC) notifies various escalation factors and other parameters, every six months, for the purpose of bid evaluation and payment. The relevant clauses of the above mentioned documents are as under:

(i) 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.*

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

(ii) 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. In line with the above provisions, the CERC is required to notify (i) Annual escalation rate for escalable transmission charges for the purpose of evaluation; (ii) Discount rate for computation of levelized transmission charges for evaluation; and (iii) Annual inflation rate for escalable transmission charges for the purpose of payment. While determining these rates for the present notification i.e. applicable for the period from 01.04.2016 to 30.09.2016, the methodology that was used for the notification dated

1.2.2012 has been used. The computation of the escalation factors and other parameters for evaluation and payment is provided in the following paras.

### 3 Escalation Factors and other parameters for the purpose of evaluation

#### 3.1 Escalation rate for escalable transmission charges for evaluation

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 i.e. for the period from 2004 to 2015. The data on WPI and CPI has been taken from the website of Ministry of Commerce & Industry and Labour Bureau, respectively. 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:

<b>Composite Series: Average Index for Escalable Transmission Charges</b>					
<b>Year</b>	<b>WPI for All Commodities</b>	<b>CPI for Industrial Workers</b>	<b>Proportion of WPI Component in Total Cost</b>	<b>Proportion of CPI Component in Total Cost</b>	<b>Composite Series</b>
2004	98.7	111.1	45%	55%	105.50
2005	103.4	115.8	45%	55%	110.19
2006	109.6	122.9	45%	55%	116.92
2007	114.9	130.8	45%	55%	123.64
2008	124.9	141.7	45%	55%	134.13
2009	127.9	157.1	45%	55%	143.93
2010	140.1	175.9	45%	55%	159.79
2011	153.4	191.5	45%	55%	174.33
2012	164.9	209.3	45%	55%	189.35
2013	175.4	232.2	45%	55%	206.60
2014	182.0	246.9	45%	55%	217.71
2015	177.03	261.42	45%	55%	223.44

<b>ANNUAL ESCALATION RATE FOR ESCALABLE TRANSMISSION CHARGES FOR EVALUATION</b>						
<b>Year No. (t)</b>	<b>Year</b>	<b>Composite Series</b>	<b>Yt/Y1 =Rt</b>	<b>Ln Rt</b>	<b>Year -1 (t-1)</b>	<b>Product [(t-1) x (Ln Rt)]</b>
1	2004	105.50				
2	2005	110.19	1.04	0.04	1	0.04
3	2006	116.92	1.11	0.10	2	0.21
4	2007	123.64	1.17	0.16	3	0.48
5	2008	134.13	1.27	0.24	4	0.96

6	2009	143.93	1.36	0.31	5	1.55
7	2010	159.79	1.51	0.42	6	2.49
8	2011	174.33	1.65	0.50	7	3.52
9	2012	189.35	1.79	0.58	8	4.68
10	2013	206.60	1.96	0.67	9	6.05
11	2014	217.71	2.06	0.72	10	7.24
12	2015	223.44	2.12	0.75	11	8.25
Annual Escalation Rate (%)						7.26
The basic formulation used for arriving at annual escalation rates is as under: <i>e</i> : annual escalation rate in percent = $g \times 100$ , where: <i>g</i> : escalation factor = $[exp\{\{(6 \sum_{t=2}^n (t-1) \ln R_t\} / \{(n-1)n(2n-1)\}\}] - 1$ $R_t = (Y_t / Y_1)$ $Y_t = "$ t" th observation $Y_1 =$ initial observation $n =$ number of observations						

The annual escalation rate computed in the above table (7.26%) has been notified as escalation rate for escalable transmission charges for evaluation.

### 3.2 Discount rate for computation of levelized transmission charges for 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,

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

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

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

DISCOUNT RATE TO BE USED FOR BID EVALUATION		
	Cost of Debt/Equity	WACC (%)
<b>1. Cost of Debt</b>		
0.70(MR)x(1-CTR)	<b>6.54</b>	
<b>2. Cost of Equity</b>		
0.30((RF+b(RP))	<b>3.24</b>	
<b>Discount Rate (1+2)</b>		<b>9.78</b>

<b>Assumptions used for computing the Discount Rate</b>	
<b>Components of Debt/Equity</b>	<b>Rates (%)</b>
Debt	70.00
Equity	30.00
Corporate Tax Rate (CTR)	30.00
Risk Free rate (RF)	7.77
Beta Value (b)	1.01
Equity Market Risk Premium (RP)	2.99
Market Rate of Interest (MR)	13.35
Return on Equity (ROE)	10.76

The Debt and Equity of 70:30 has been assumed based on CERC norms on Debt and Equity in its Tariff Regulations 2014-19. The basic corporate tax rate proposed in the GOI Budget for the year 2016-17 (i.e. excluding surcharge and cess) has been assumed while computing the discount rate.

Hitherto, while calculating the cost of debt, the market rate of interest was being linked to the prime lending rate. The market rate of interest for the year 2015 shall be taken as the base rate (base rate of 9.85%, i.e average of base rates of five major banks) + 350 basis points. Accordingly, the market rate of interest has been taken as 13.35%.

As regards risk free rate, the 10 year GOI securities rate for the “current year” was being considered as the risk free rate (the “current year” being year immediately preceding the year of the Notification, i.e. for Notifications in the year 2016, the year 2015 was being taken as the “current year” and the data for that was being taken as the risk free rate).

In the calculation of cost of equity, the market risk premium is assumed as the difference between the expected market return and the risk free rate. Accordingly, the market risk premium in this Notification has been arrived at by subtracting the current year risk free rate of 7.77% from the rate of return on market portfolio over the past ten years (10.76%), i.e. from 2006 to 2015. Sensex values for the past eleven years have been used to arrive at rate of return (CAGR) on the market portfolio for the past ten years. The historical approach adopted here for arriving at the expected market return assumes the expected future return as an average to be the same as past returns. The market risk premium in this Notification thus has been taken as 2.99% (10.76% - 7.77%). The beta value has been computed based on the data on Bombay Stock Exchange (BSE) Indices for Power Sector and Sensex for the year 2015.

The WACC computed in the above table (9.78%) has been notified as discount rate for bid evaluation.

#### 4 *Inflation rate for escalable transmission charges for payment*

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 for the period from January 2015 to December 2015. 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:

<b>ANNUAL INFLATION RATE FOR ESCALABLE TRANSMISSION CHARGES FOR PAYMENT</b>			
<b>Period</b>	<b>WPI</b>	<b>CPI</b>	<b>Composite Series*</b>
Jan-15	177.3	254.0	219.5
Feb-15	175.6	253.0	218.2
Mar-15	176.1	254.0	218.9
Apr-15	176.4	256.0	220.2
May-15	178.0	258.0	222.0
Jun-15	179.1	261.0	224.1
Jul-15	177.6	263.0	224.6
Aug-15	176.5	264.0	224.6
Sep-15	176.5	266.0	225.7
Oct-15	176.9	269.0	227.6
Nov-15	177.5	270.0	228.4
Dec-15	176.8	269.0	227.5
Average Index (Jan 15-Jun 15)			220.49
Average Index (July 15-Dec 15)			226.39
Half-Yearly Inflation			2.68%
Annual Inflation			5.36%
*Composite series using weight of 45% to Wholesale Price Index (WPI) and 55% to Consumer Price Index (CPI).			

The annual inflation rate computed in the above table (5.36%) is notified as per annum inflation rate for Escalable Transmission Charges for Payment.

5. Explanation for the notification dated 1.2.2012 (See CERC website [www.cercind.gov.in](http://www.cercind.gov.in)) provides further details like date of announcement of the notification, sources of the data used for computing the escalation factors, application of inflation rate for the purpose of payment with an example, etc.

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