

MADHYA PRADESH ELECTRICITY REGULATORY COMMISSION

ORDER ON

WHEELING CHARGES AND CROSS SUBSIDY SURCHARGE

(SMP No. 65/08)

NOVEMBER 2008

A1. LEGISLATIVE PROVISIONS

1.1 Section 42(2) of the Electricity Act, 2003 provides;

“ The State Commission shall introduce open access in such phases and subject to such conditions,and in determining the charges for wheeling,: ”

Provided that such open access shall be allowed on payment of a surcharge in addition to the charges for wheeling as may be determined by the State Commission:.....”

1.2 The Commission vide clause 1.24 of the MPERC(Terms and conditions for determination of tariff for distribution and retail supply) Regulations, 2006 has specified the items of expenditure of distribution licensee, which are attributable to wheeling activity and those attributable to retail supply activity. Further, the Commission has also specified in clause 1.20 that the wheeling charges shall be determined for each voltage level separately.

1.3 The Commission vide MPERC (Terms and conditions on intra-state open access) Regulations, 2004 allows all consumers with a power requirement of more than 1 MW to source their power from a supplier other than the distribution licensee, through open access. Such open access, however, can only be allowed to user on payment of wheeling charges.

1.4 The para 2 of clause 8.5.1 of Tariff Policy provides “ A consumer who is permitted open access will have to make payment to the generator, the transmission licensee whose transmission systems are used, distribution utility for the wheeling charges and in addition, the cross subsidy surcharge. The computation of cross subsidy surcharge, therefore, needs to be done in a manner that while it compensates the distribution licensee, it does not constrain introduction of competition through open access.....”

A2. DETERMINATION OF “WHEELING COST”

1.5 All three Distribution Licensees have filed Wheeling and Retail Supply ARR separately. However, it is only the Western Discom which actually distributes all costs items of a distribution ARR into wheeling and retail supply activities. The Discom claims to have conducted a study across two distribution centers to determine the proportion of costs, such as O&M associated with wheeling activity and retail sale activity. For other cost items, the Discom has used allocation ratios to the extent the expenses could be identified as being associated predominantly with one activity or other.

However, the other two Discoms (East and Central) have only considered (i) normative interest on working capital, (ii) provision for bad debts and (iii) interest on consumer security deposits fully into retail sale activity. All other items of costs are considered as being fully allocated to the wheeling activity.

1.6 The Commission in absence of a representative data set, does not wish to use the allocation ratios as adopted by West Discom for segregation for expenses. The

Commission directs that in the medium term, the Licensee should carry out an extensive study across a representative sample of its distribution centers, RAOs, etc. to develop the allocation ratios for segregation of each expense item (excluding power purchase) into wheeling and retail sale activity. However, the Commission desires that the Licensee undertakes a full accounting segregation for booking expenses separately under wheeling activity and retail sale activity.

- 1.7 For the purpose of this Order, therefore, the Commission allocates the fixed costs of distribution (i.e. other than power purchase) in the following manner :

Wheeling activity shall include:

- (a) O&M expenses
- (b) Depreciation
- (c) Interest on project loans
- (d) Interest on working capital loans – on normative working capital for wheeling activity
- (e) Return on Equity
- (f) Other miscellaneous expenses
- (g) Less : Other Income as attributed to wheeling activity

Retail sale activity shall include :

- (a) Interest on working capital loans – on normative working capital for retail sale activity
- (b) Interest on Consumer Security Deposits
- (c) Bad and Doubtful debts
- (d) Less : Other Income as attributed to retail supply activity

- 1.8 On the basis of above, the approved ARR for FY 08 for wheeling and retail supply activity for the Discoms is segregated as under:

Table 1: Allowed ARR for FY 08-09 segregated among wheeling and retail sale activities

Particulars	East	West	Central	Total
(A) Power Purchase expenses Rs. crore	2118.52	2487.22	1971.52	6577.26
(B) Transmission charges (MP Transco)	220.70	282.67	242.44	745.81
Wheeling activity:				
O&M expenditure	403.45	466.44	372.75	1242.64
Depreciation	30.69	36.11	28.88	95.68
Interest and Finance Charges on Project Loans	18.24	27.92	11.53	57.69
Interest on Working Capital	5.08	5.86	4.69	15.63
Return on Equity	51.95	69.37	46.14	167.46
Other expenses	--	1.10	0	1.10
Less: Other Income	6.12	1.46	7.75	15.33
(C) Sub-Total Wheeling ARR for FY 2008-09 as approved	503.29	605.34	456.24	1564.87
Retail Sale activity:				
Interest on Working Capital	0	0	0	0
Bad and Doubtful Debts	27.80	35.28	26.94	90.02
Interest on Consumer Security Deposit	22.07	31.96	22.49	76.52
Less: Other Income	60.13	75.46	29.85	165.44
(D) Sub-Total Retail ARR for FY 2008-09 as Approved	-10.26	-8.22	19.58	1.10
Grand Total FY 2008-09 ARR as approved (A+B+C+D)	2832.23	3367.01	2689.79	8889.03

Segregation of costs among voltage levels

- 1.9 The costs of distribution identified as attributable to wheeling activity must further be distributed among the three voltage levels of distribution i.e. 33kV, 11kV and LT. Though the EHT consumers (i.e. at voltages above 33 KV) are customers of the distribution companies, they are not connected to the distribution system. Some costs are associated with EHT consumers (mainly costs associated with metering, billing and collection). However, the Commission, at this juncture, is not inclined to get into those details, primarily on account of data unavailability. Further, the Commission's Regulations on terms and conditions of tariff also state in clause 3.1 (c) that the EHT consumers shall not bear wheeling expenses as the distribution system is not involved in supplying power to them.
- 1.10 The Distribution Licensees in MP presently do not maintain account of their costs on a voltage-wise basis. Similar is the case with other Govt. owned distribution companies in most States in India. So, in order to distribute the wheeling expenses on the voltage levels, the Commissions in India have adopted different methods, elaborated below :
- The APERC required the Distribution Licensees to segregate their asset base (GFA) among the three voltage levels (33kV, 11kV and LT). The Licensees supplied this data to the Commission and the Commission used the respective asset value ratios (i.e. GFA at a voltage level / total GFA) to distribute the total costs of wheeling into the voltage levels;

- The Rajasthan ERC (RERC) could not obtain the break-up of distribution GFA among the voltage levels, due to non-availability of such data with the Licensees. The Commission, therefore, determined the present cost of the asset base at each voltage level using the physical size of the network (i.e. ckt-km length of lines and number of substations) and multiplying the same with the present per unit cost data as available from the latest cost data book. The “present value” of the GFA so obtained at each voltage level was used to segregate the total wheeling costs among such voltage levels.
- Approaches similar to the one adopted by APERC have been used by the Maharashtra ERC – i.e. segregation of the asset base into voltage levels (in case of REL, however, the segregation could only be done to the level of HT and LT, due to inadequacy of data.

1.11 The present accounting practices of MP Discoms do not permit the segregation of GFA among the voltage levels directly. The Commission, therefore, considers to appropriate to apply the method adopted by the RERC under the present circumstances with some modifications. This, however, is the dispensation permitted only for the year for which these charges are being determined. The Commission directs the Licensees to distribute their present GFA into the three voltage levels and report this data to the Commission in their next tariff filing.

1.12 The Commission, therefore, adopt the approach to use the transformation capacity in MVA at interfaces of 33/11kV and 11/0.4kV instead of utilizing the number of substations at each voltage level as was done by RERC.

1.13 The data used for this exercise for the value of the asset base is given below:

Table 2: Identification of Asset Value

Voltage level of Lines	Cumulative length of lines (ckt-kms)	Per unit cost (Rs./ckt-km)	Total Cost of lines (Rs. Crs.)
33kV (on rail pole)	32999	861000	2841.21
11kV (on rail pole)	167639	360000	6035.00
LT (on PCC pole)	337832	242000	8175.53
Total	538470		17051.75

Transformer Voltage level	Cumulative length of lines (MVA)	Per unit cost (Rs./MVA)	Total Cost (Rs. Crs.)
33/11kV Transformer	11586	830000	961.64

11/0.4kV Transformer	17031	940000	1600.91
Total	28617		2562.55

1.14 For the purpose of above, the data for length of lines and transformation capacity is as at the end of FY 07, supplied by the Licensees as part of their filings for FY 08-09.

1.15 In order to identify the asset values at different voltage levels, it is necessary to “assign” the interface transformers to either voltage levels. For this exercise, the Commission considers it appropriate to include the distribution transformers (11/0.4kV) to be part of the 11 kV network, while the power transformers at 33/11kV to be part of the 33 kV network. Based on this, the asset values in Rs. Crore at the three voltage levels works out to:

Table 3: Identification of value of network at each voltage level

Voltage level	Cost of Lines (Rs. Crs.)	Cost of transformation (Rs. Crs.)	Total Cost (Rs. Crs.)
33kV	2841.21	961.64	3802.85
11kV	6035.00	1600.91	7635.91
LT	8175.53	-----	8175.53
Total	17051.75	2562.55	19614.29

1.16 The expenses of wheeling activity, identified as incurred for the three voltage levels of distribution, shall now be worked out using the asset value ratios as obtained from above. This shall be as follows:

Table 4: Identification of network expenses (wheeling cost) at each voltage level)

Voltage level	Assets value (Rs.Crs.)	Assets value ratio	Total Cost (Rs Crs.)	Wheeling Cost (Rs Crs.)
33kV	3802.85	19.39%	1564.87	303.40
11kV	7635.91	38.93%		609.21
LT	8175.53	41.68%		652.26
	19614.29	100.00%		1564.87

Sharing of Wheeling costs

- 1.17 The cost of wheeling identified as above for the three voltage levels is again required to be allocated on the users at the three levels. It is necessary to do so since the 33kV network is used by the consumers at 33kV, 11kV and LT, while the 11kV network is used by the consumers of 11kV and LT. LT network is, however, used only by LT consumers.
- 1.18 This allocation of wheeling cost at each voltage level should be done based on the usage of the network at each voltage level by consumers. The Commission has chosen to adopt “Units Sold” at each voltage level as the measure of network usage to allocate the costs as detailed below:

Table 5: Allocation of wheeling cost over distribution system users

	Particulars	
A	Wheeling Cost at 33 kV- Rs Crore	303.40
B	Wheeling Cost at 11 kV- Rs Crore	609.21
C	Wheeling Cost at LT - Rs Crore	652.26
	Sales at 33 kV(MU)	4735.61
	Sales at 11 kV(MU)	6034.73
	Sales at LT (MU)	11194.40
	Total Sales (MU)	21964.75
D	Proportion of 33 kV sales to total sales	0.22
E	Proportion of 11 kV sales to total sales of 11kV and LT	0.35
F	Proportion of LT sales to total sales of 11kV and LT	0.65
	Cost allocation	
G	Wheeling cost of 33kV allocated to 33 kV users (A*D)	66.75
H	Balance wheeling cost of 33kV passed on to 11kV and LT users (A-G)	236.65
I	Wheeling cost of 33kV allocated to 11 kV users (H*E)	82.83
J	Balance wheeling cost of 33kV allocated to LT users (H-I)	153.82
k	Wheeling cost of 11kV allocated to 11 kV users (B*E)	213.22
L	Total Wheeling cost allocated to 11kV users (I+K)	296.05
M	Balance wheeling cost of 11kV allocated to LT users (B-K)	395.99
	Wheeling cost of LT network(fully allocated to LT users) (C)	652.26
N	Total Wheeling cost allocated to LT users (C+J+M)	1202.07
	Total wheeling cost (Rs. Crore) (G+L+N)	1564.87

- 1.19 The total wheeling costs allocated to the three voltage levels thus work out to: 33kV – Rs. 66.75 Crore, 11kV – Rs. 296.05 Crore and LT – Rs. 1202.07 Crore. Based on this allocation and considering the respective connected load / contract demand at each voltage, the wheeling charges in Rs. / kVA / month are determined as below :

Table 6: Wheeling Charges

Voltage	Wheeling Cost allocated (Rs. Crore)	Sales (MU)	Wheeling charges (in Rs./unit)
EHT	-----	-----	-----
33kV	66.75	4735.61	0.14
11kV	296.05	6034.73	0.49
LT	1202.07	11194.4	1.07

Applicability of wheeling charges under different scenarios

1.20 This section elaborates various scenarios of location of open access generators and their consumers and the consequent applicability of transmission and wheeling charges. The scenarios and the applicability of charges shall be as below:

- (a) Scenario 1: Generator is connected to Transmission network (EHT voltages), while the consumer is connected to the distribution network (33kV and below) of Distribution Licensee: The scenario shall attract both transmission and wheeling charges since power required by the open access consumer will flow downstream from the transmission network through distribution network up to the consumer's connection.
- (b) Scenario 2: Generator is connected to distribution network (33kV or below) of Distribution Licensee, while the consumer is connected to the transmission network (132kV or above): In this scenario, the consumer's requirement will be met by power flow over transmission network alone. The power generated by the open access generator will be locally consumed within the Discom and will not flow upstream to the open access consumer. Hence, such transactions shall attract only the transmission charges.
- (c) Scenario 3: Both Generator and consumer are connected to the transmission network (132kV or above): Only transmission charges shall apply, since there is no usage of distribution network.
- (d) Scenario 4: Both generator and consumer are connected to the distribution system of any of the Distribution Licensee: The power generated by the open access generator will be consumed within the Discoms under the conditions of uniform retail tariff throughout the M.P. and hence it will contribute to meeting the demand of the open access consumer. Therefore, there is no additional usage of transmission network in this transaction. Hence, such transactions shall attract only the wheeling charges.

1.21 In the interest of avoiding pan-caking and encouraging open access, the Commission has proposed the above applicability of charges. The formulations above also conform to the principle that power flows on the network by displacement method.

A2. DETERMINATION OF CROSS-SUBSIDY SURCHARGE

- 2.1 The National Tariff Policy prescribes the following formulae for determination of cross-subsidy surcharge for various categories of consumers.

“8.5 Cross-subsidy surcharge and additional surcharge for open access

Surcharge formula :

$$S = T - [C(1+L/100) + D]$$

Where

S is the surcharge

T is the Tariff payable by the relevant category of consumers;

C is the Weighted average cost of power purchase of top 5% at the margin excluding liquid fuel based generation and renewable power.”

D is the Wheeling charge

L is the system Losses for the applicable voltage level, expressed as a percentage

“8.5.5 Wheeling charges should be determined on the basis of same principles as laid down for intra-state transmission charges and in addition would include average loss compensation of the relevant voltage level.

- 2.2 The first step in the determination of cross-subsidy surcharge is to work out the cost of marginal power purchase of top 5% power. As per the data of Tariff Order of FY 08-09, this works out as below :

Table 7: Cost of marginal power purchase of top 5% power

Stations	Units (MU)*	Cost (Ps./unit)**	Total cost (Rs. In Crs.)	5% margin power
Kawas	831.0	347.31	288.61	1922
Bansagar-4	75.4	319.17	24.07	
Tarapur	730.4	304.06	222.09	
DVC	285.0	270.40	77.06	
Total	1922.0		3.18	

*** Including CTU transmission losses and PGCIL transmission charges**

**** Including liquid fuel cost, if any.**

- 2.3 The Commission has determined the wheeling charges for voltage level of distribution separately. The Tariff Policy also specifies that the Loss level (term L) should be worked out for each voltage level separately. For this purpose, the loss level at each voltage level is taken as below because of non-availability of required reliable data by the Distribution Licensees:

Table8: Voltage-wise loss levels

Voltage Level	Loss level (L)
EHT (transmission system)	4.90%
33kV (only 33kV system)	6.0%
11kV (including 33kV system)	14.0%
LT (including 11kV and 33kV system)	42.8%
Overall*	33.17%

* The total targeted losses in the distribution system as of March'09 are matched to the target overall Discom losses as per GoMP loss reduction trajectory.

- 2.4 The cost of transmission shall be uniformly spread over all consumers at every voltage level, as the transmission network is utilized by all consumers. Therefore, similar to wheeling costs, the approved transmission ARR of FY 09 (pertaining to Discoms i.e. excluding that allocated to SEZ) of Rs. 745.82 Crore, when allocated to the total Distribution sales of 21449 MU, the transmission charge is Rs. 0.35/ unit. Further, the wheeling cost per unit is already worked out in Table 6 above for the three voltage levels of distribution.
- 2.5 Finally, the last term in the Tariff Policy formula – T – Average Tariff for each category is as obtained from the revenue model of FY 08-09 Tariff Order.
- 2.6 As per tariff order for FY08-09, the consumers having contract demand of 1MW or more shall be provided connections at 33 kV or above. Also, as per MPERC (Open Access) Regulations, 2005, the consumers with contract demand of 1 MW or above shall be allowed open access w.e.f. 1st October, 2007.
- 2.7 In accordance with the above, the Cross-subsidy surcharge for all categories of HT consumers having contract demand of 1MW or above at 132kV/33 kV under all scenario is approved as detailed in Annexure-I & II.

A3 APPLICABILITY OF THE ORDER

2.8 The order will be applicable for FY 08-09 with effect from the date of the tariff order to all open access consumers having contract demand of 1MW or above.

Ordered accordingly.

Sd/-
(C.S.Sharma)
Member (Eco.)

Sd/-
(K.K.Garg)
Member (Engg.)

Sd/-
(Dr. J.L.Bose)
Chairman

Place: Bhopal
Date: 7th November, 2008