

Part - VI

Tariff Petition for the FY 2026-27

for

Voltage-wise cost of supply

Submitted by:

**Power & Electricity Department
Government of Mizoram**

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Contents

1.	Preamble	1
2.	Background	1
3.	Methodology adopted for Computation of Voltage wise Cost of Supply	1
4.	Determination of Voltage wise Losses	2
5.	Information required for arriving Voltage Wise Cost of Supply	3
6.	Methodology adopted for determination of Cost of Supply	4

List of Tables

<u>Table No.</u>	<u>Description</u>	<u>Page No.</u>
Table 1.1	Voltage wise Technical losses considered for FY 2026-27	3
Table 1.2	Classification of Categories on the basis of Voltage of power supply	4
Table 1.3	Voltage wise technical loss considered for FY 2026-27	4
Table 1.4	Apportionment of technical losses to voltage wise sale for FY 2026-27	5
Table 1.5	Apportionment of Commercial losses to voltage wise sale for FY 2026-27	5
Table 1.6	Allocation of power purchase cost for FY 2026-27	6
Table 1.7	Allocation of power purchase cost to the energy sales for FY 2026-27	6
Table 1.8	Allocation of Network Cost for FY 2026-27	7
Table 1.9	Voltage-wise Allocation of Network Cost	7
Table 1.10	Cost of Supply at different Voltage Levels for FY 2026-27	8

1. Preamble

P&ED is computing the voltage-wise cost of supply keeping in view the guidelines indicated by the Hon'ble APTEL its order dated 10.05.2012 in Appeal No.14 of 2011, appeal no. 26 of 2011 and appeal no. 27 of 2011. This section deals with the voltage wise cost of supply by the Petitioner for the FY 2026-27.

2. Background

The Petitioner is submitting to the Hon'ble Commission for determination of ARR for the upcoming FY 2026-27 as notified under Joint Electricity Regulatory Commission for Manipur and Mizoram (Multi Year Tariff) Regulations, 2014 read with First Amendment Regulations, 2019. The Petitioner has proposed the distribution losses @ 24.50% for the FY 2026-27.

3. Methodology adopted for Computation of Voltage wise Cost of Supply

The Hon'ble APTEL has proposed a simple methodology to functionalize use of Cost of Supply model. The APTEL notes that identical consumers connected at different nodes of distribution system need not to be differentiated. In addition, it is adequate to determine voltage-wise cost of supply considering the major cost elements which would be applicable to all the categories of the consumers connected at the same voltage level at different locations in the distribution system.

In the method suggested by the Hon'ble APTEL, there are five major components to arrive at the voltage wise cost of supply. These elements are:

- **Technical losses at each voltage level of the network:** This value of the technical losses is found by the field studies. Sampling of the feeders which are representative of the consumers in the system will help in identifying the technical losses at each voltage levels. The APTEL recognizes the difficulty in collecting data for technical loss at 11 kV and LT level, hence the suggestion to compute losses using maximum possible representative feeders for various consumer categories at respective voltage levels.
- **Commercial losses at each voltage level of the network:** The commercial loss of the system is the difference between approved loss in the ARR and the total technical loss computed from system study. This difference is to be apportioned according to the sales in each voltage level to arrive at the commercial loss at each voltage level.

- **Voltage wise sales:** The energy sale at a particular voltage level is the sum of energy sold for all the categories of consumers connected at the said voltage level. Due to its share of sales in total sales, the consumers of the 132/220 kV network will be apportioned a share of the commercial losses. The Hon'ble APTEL recognizes that in reality, there may be minimal technical losses at that level and very low probability of commercial losses. However, the APTEL is of the opinion that the consumers at 132/220 kV, being a part of the distribution system will bear these apportioned losses.
- **Power Purchase Cost:** The power purchase cost is the cost of energy purchased for sustaining the energy sales at each voltage level. This power purchase units for each voltage level is arrived by finding the energy input at each voltage level and adding the losses (technical and commercial) for the same voltage level and upstream. The energy input at each voltage level is the sum of the sales at the voltage level and the losses for the corresponding voltage level.
- **Network Cost:** The network costs are the costs like O&M, interest and finance charges, depreciation, return on equity etc. These costs are a part of the ARR which in turn provides the average cost of supply. Thus, the network cost is essentially the difference between the ARR value and the power purchase cost. The APTEL has suggested apportioning these costs according to the sales volume in each of the voltage level.

The above elements will help to establish the voltage wise Cost of Supply. Due to the methodology applied to apportion losses in the various voltage levels, all the consumer categories at a particular voltage level will have same cost of supply. In this regard, APTEL has noted that refinements in the methodology may be done when more data becomes available.

4. Determination of Voltage wise Losses

Transmission & Distribution losses in a system are comprised of two separate components – Technical losses and Commercial losses.

- Technical losses occur naturally and consist mainly of power dissipation in electricity system components such as transmission & distribution lines and transformers.
- Commercial losses are caused by actions external to the power system and consist primarily of non-payment by customers, electricity theft, and errors in accounting and record-keeping. Since the rationale behind these two components is quite distinct, quantifying them separately is imperative for arriving at meaningful conclusions.

At each voltage level, the technical losses consist of two major Components: Transmission losses which refer to the losses in the current carrying wires; and Transformation losses which refer the losses incurred during the voltage transformation in the system. Aggregating the losses in these two elements at each voltage level would give the technical loss at that level. The losses remaining would be the commercial losses.

5. Information required for arriving Voltage Wise Cost of Supply

Following is the list of details required in order to carry out voltage wise cost of supply:

- Voltage wise technical losses
- Overall T&D losses
- Voltage wise energy sales
- Power Purchase Cost
- Network Costs

It is submitted that the Petitioner has computed voltage wise losses based on certain assumptions after observing the sample feeder data available.

The Petitioner has computed voltage wise cost of supply in view of distribution loss percentage projected for the FY 2026-27.

Table 1.1: Voltage wise technical losses considered for FY 2026-27

Sl. No.	Voltage Level (kV)	Technical loss (%)	Cumulative loss (%)
1	220/132 kV	2.00%	2.00%
2	33 kV	4.25%	6.17%
3	11 kV	6.55%	12.31%
4	LT (0.4 kV)	13.90%	24.50%

The Petitioner has arrived at voltage wise sales considering the projected sale of power for the FY 2026-27, across various categories at the respective voltages mentioned in the table below:

Table 1.2: Classification of Categories on the basis of Voltage of power supply

Sl. No.	Voltage Level	Categories
1	220/132 kV	PHE
2	33 kV	Ispat, Power Grid, Assam Rifles, etc.
3	11 kV	Hospital, Hotel etc.
4	LT (0.4 kV)	Kutir Jyothi, Domestic, Non-Profit Public Purpose, Public Lighting etc.

The Petitioner further submits that the voltage wise cost of supply study is based on the sample data certain parameters such as total loss, energy input etc.

Voltage Wise Technical Loss: The Petitioner submits that it has taken suitable assumptions to arrive at the loss at 132 kV.

6. Methodology adopted for determination of Cost of Supply

Due to lack of data for segregation of technical and commercial losses, it is not feasible to fix the technical and commercial loss levels within proposed loss levels.

In order to understand component of technical losses in total T&D loss, technical loss at each voltage level needs to be grossed. Following is the total technical loss at each voltage level and cumulative losses at subsequent voltage levels.

Table 1.3: Voltage wise technical loss considered for FY 2026-27

Sl. No.	Voltage Level (kV)	Technical loss (%)	Cumulative loss (%)
1	220/132 kV	2.00%	2.00%
2	33 kV	4.25%	6.17%
3	11 kV	6.55%	12.31%
4	LT (0.4 kV)	13.90%	24.50%

Following is the apportionment of technical losses to the voltage wise sale.

Table 1.4: Apportionment of technical losses to voltage wise sale for FY 2026-27

Sl. No.	Voltage Level (KV)	Technical Losses (%)	Cumulative Loss (%)	Energy Sale (MU)	Energy input (MU)	Technical Loss (MU)
1	2	3	4	5	6	7=(6-5)
1	220/132 kV	2.00%	2.00%	1.68	1.72	0.03
2	33 kV	4.25%	6.17%	14.74	15.71	0.97
3	11 kV	6.55%	12.31%	83.20	94.88	11.68
4	LT (0.4 kV)	13.90%	24.50%	453.52	600.68	147.17
	Total			553.14	713.00	159.85

Commercial losses (difference of total losses and grossed up technical losses) shall be apportioned pro rata to energy sales at each voltage level.

Table 1.5: Apportionment of Commercial losses to voltage wise sale for FY 2026-27

Sl. No.	Voltage Level (KV)	Energy Sale (MU)	Technical Loss (MU)	Sales incl. Technical Loss (MU)	Commercial Loss (MU)	Energy Input at State Periphery (MU)
1	2	3	4	5	6	7
1	220/132 kV	1.68	0.03	1.72	0.07	1.79
2	33 kV	14.74	0.97	15.71	0.67	16.38
3	11 kV	83.20	11.68	94.88	4.02	98.91
4	LT (0.4 kV)	453.52	147.17	600.68	29.79	630.48
	Total	553.14	159.85	713.00	34.55	747.55

The Projected Power Purchase Cost (including PGCIL, POSOCO & ERLDC transmission costs) of the Petitioner for the FY 2026-27 is provided below:

Table 1.6: Allocation of power purchase cost for FY 2026-27

Particulars	FY 2026-27
Gross Power Purchase (MU)	1,049.97
Less: ER & NER Pool Loss (MU)	16.53
Less: Outside State Sale (MU)	285.90
Net Power Purchase (MU)	747.55
Power Purchase Cost (Rs. Crore)	507.73
Inter-State Transmission charges (Rs. Crore)	53.62
Cost of Generation (Rs. Crore)	13.09
Less: Revenue from Outside Sale (Rs. Crore)	131.86
Total Cost (Rs. Crore)	442.58
Average Power purchase Cost (inc. PGCIL charge) (Rs./kWh)	5.92

Following is the allocation of power purchase cost to the total energy sales.

Table 1.7: Allocation of power purchase cost to the energy sales for FY 2026-27

Sl. No.	Voltage Level (KV)	Energy Sale (MU)	Energy Sales + Technical loss + Comm. Loss (MU)	Projected Unit cost of power purchase (Rs./unit)	Power Purchase Cost (Rs. Crore)	Cost of Power per unit sale of Energy (Rs./unit)
1	2	3	4	5	6 = (4*5)	7= (6÷3)
1	220/132 kV	1.68	1.79	5.92	1.06	6.30
2	33 kV	14.74	16.38	5.92	9.70	6.58
3	11 kV	83.20	98.91	5.92	58.56	7.04
4	LT (0.4 kV)	453.52	630.48	5.92	373.27	8.23
	Total	553.14	747.55		442.58	8.00

The details of fixed distribution costs for the FY 2026-27 are provided below, which are excluding power purchase and PGCIL charges.

Table 1.8: Allocation of Network Cost for FY 2026-27

Sl. No.	Particulars	Amount (Rs. Cr)
1	Employee Cost	135.85
2	R&M costs	8.88
3	A&G expenses	5.71
4	Depreciation	0.19
5	Interest & Finance Charges	-
6	Interest on Working Capital	-
7	Return on Equity	-
8	Intra-state Transmission charges	45.89
9	Less: Non-Tariff Income	9.80
10	Total cost	186.71

Further, the Petitioner has worked out the voltage wise cost of per unit supply. Accordingly, the Petitioner has apportioned the network cost of Rs. 186.71 Crore arrived in the above table among the consumers of various voltage level i.e., 220/132 kV, 33 kV, 11 kV and LT levels, equitably on pro-rata basis as detailed below:

Table 1.9: Voltage-wise Allocation of Network Cost

Sl. No.	Voltage Level (KV)	Energy Sale (MU)	Energy Sales + Technical loss + Comm. Loss (MU)	Network Cost (Rs. Crore)	Cost of Power per unit sale of Energy (Rs./unit)
1	2	3	4	6 = (4*5)	7= (6÷3)
1	220/132 kV	1.68	1.79	0.45	2.66
2	33 kV	14.74	16.38	4.09	2.77
3	11 kV	83.20	98.91	24.70	2.97
4	LT (0.4 kV)	453.52	630.48	157.47	3.47
	Total	553.14	747.55	186.71	3.38

Table 1.10: Cost of Supply at different Voltage Levels for FY 2026-27

Sl. No.	Supply Voltage	Cost of power purchase (Rs./unit)	Network cost (Rs./unit)	Cost of supply (Rs./unit)
1	2	3	4	5
1	220/132 kV	6.30	2.66	8.95
2	33 kV	6.58	2.77	9.35
3	11 kV	7.04	2.97	10.01
4	LT (0.4 kV)	8.23	3.47	11.70

It is prayed that the Hon'ble Commission may kindly consider the above submission and approve the Voltage wise cost of supply as projected by the Petitioner for the FY 2026-27.