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No.CE/MEPCO/DG(MIRAD)/ $\frac{499-415}{1}$

Dated: 10 - 03 - 202 5

The Registrar, National Electric Power Regulatory Authority (NEPRA), NEPRA Tower, Attaturk Avenue (East), G5/1, Islamabad.

Sub: PETITION FOR DETERMINATION OF USE OF SYSTEM CHARGES (UoSC).

In pursuance of Regulation 7 of NEPRA Open Access (Interconnection and wheeling of Electric Power) Regulations, 2022 whereby, a distribution company shall prepare and submit a separate petition to the honorable Authority for its use of system charges (Annex-1), we are pleased to submit attached herewith Use of System Charges Petition for kind consideration and approval of Authority. It may kindly be noted that the instant petition includes Cost of Service Charges Study of MEPCO (FY 2022-23) as Annex-2, thereto forming fundamental basis for the instant petition.

For any clarification or additional information or any other matter relating to the said petition Engr. Muhammad Arshad Dharala (Director General MIRAD) MEPCO (03028266424, email: <u>dgmiradmepco@gmail.com</u>) is designated as focal person.

DA/as above

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Chief Executive Officer MEPCO H/Q Multan

Copy to:-

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For kind information p Chairman &. M (Lic.) 5. M (Law)	olease: ~2: M (Tech.) 4: Mi (Trf. & Fin)	



MEPCO USE OF SYSTEM CHARGES PETITION FOR THE FY 2022-23

SUBMITTED BY

MULTAN ELECTRIC POWER COMPANY (MEPCO) AS SUPPLIER OF LAST RESORT

IN COMPLIANCE OF NATIONAL ELECTRICITY POLICY (NE POLICY) READ WITH REGULATION 7 OF NEPRA OPEN ACCESS (INTERCONNECTION AND WHEELING OF ELECTRIC POWER) REGULATIONS, 2022 ("OPEN ACCESS REGULATIONS")



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1. BACKGROUND

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1.1 ABOUT THE PETITIONER MEPCO:

Multan Electric Power Company (MEPCO) was incorporated on 14th May1998 in line with Government policy of unbundling and corporatization of Pakistan power sector. MEPCO is responsible for the electricity delivery to over 7.6 million consumers of **13 administrative districts of southern Punjab** i.e. Multan, Muzaffargarh, Layyah, D.G. Khan, Rajanpur, Lodhran, Bahawalpur, R.Y. Khan, Khanewal, Sahiwal, Pakpattan, Vehari and Bahawalnagar, Pakistan as set out in MEPCO's Distribution License no. 06/DL/2002, granted by NEPRA under the NEPRA Act on April 25, 2002 as a result of the restructuring of WAPDA's Power Wing, MEPCO assumed its official operations and since then being headed by a Chief Executive Officer (CEO) and MEPCO Board of Directors.

1.2 PETITIONER MEPCO LICENSE DETAILS:

Under the provisions of Regulation of Generation, Transmission & Distribution of Electric Power (Amendment) Act, 2018, MEPCO is deemed to hold a "Power Supply" License to perform the function of sale of electric power in addition to existing licensee as Distribution Company. The Distribution function now shall, under Section 20, be limited to ownership, operation, management or control of distribution facilities for the movement or delivery to consumers of electric power. After the approval of Competitive Trading and Bilateral Contracts Market (CTBCM) by the honorable Authority on November 12, 2020 (No. NEPRA RJDL/LAM-01/40691-98) several implementation actions were taken. This included issuance of License for the Market Operator (MO) promulgation of several Regulations to ensure smooth implementation of CTBCM and create balance in roles, rights and obligations of the stakeholders in the CTBCM.

2. OBLIGATION & RATIONALE FOR PETITION:

Pursuant to the relevant directions of National Electricity Policy (NE Policy) read with regulation 7 of NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022 ("Open Access Regulations"), following are the grounds for petition for determination of use of system charges:

- a) In compliance with the Clause 4.4, Clause 5.5.2(f), Clause 5.5.2(g), Clause 5.5.4 and Clause 5.6.5 of NE Policy and
- b) In compliance with the regulation 7 Open Access Regulations, each distribution licensee, in consultation with the respective supplier of last resort shall, within ninety days following the date of notification of Open Access Regulation, submit separate petition to the Authority for determination of use of system charges.

2.1 DIRECTIONS IN NATIONAL ELECTRICITY POLICY:

- 1. The National Electricity Policy, 2021 issued under Section 14A of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (The Act) was prepared by the the Government of Pakistan for the development, reform, improvement and sustainability of the power market and power sector.
- 2. The National Electricity Policy identifies the major goals sought to be achieved for the power sector, and in this respect, provides policy directions. It also provides the key

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in the power sector to achieve identified goals.

- 3. Various sections of the said National Electricity Policy, 2021, as relevant to the instant case, are provided in the below lines.
- 4. **Clause 4.4 (Financial Viability)** of the National Electricity Policy provides that sustainability of the entire power sector pivots around the financial and commercial viability of its individual sub-sectors. This will be done by:
- 5. promoting investments on least cost basis balanced with development in the underserved areas;
- 6. having cost-reflective tariffs in transmission and distribution, to the extent feasible;
- 7. timely passing of costs to the consumers, while netting off any subsidies funded by the Government; and
- 8. recovery of costs arising on account of open access, distributed generation, etc.
- 9. Clause 5.5.2(f) of National Electricity Policy also provides:
 - a. "providing a level playing field to all market participants through uniform application of cross-subsidization and other grid charges to consumers of all suppliers:
- 10. Clause 5.5.2(g) of National Electricity Policy also provides:
 - a. <u>"the Government shall take a decision on the recovery of costs that arise due to</u> advent of the open access and market liberalization;"
- 11. Clause 5.5.4 of National Electricity Policy further directs:
 - a. "In order to ensure implementation of wholesale market design and its further evolution, the Regulator shall in a timely manner frame, modify and evolve regulatory framework for, inter alia, supply, procurement, open access / wheeling, competitive bidding, import of power, and ensure effective market monitoring and enforcement. Provided that after implementation of CTBCM, every transmission licensee and distribution licensee shall offer, to all market participants, nondiscriminatory open access / wheeling to its respective transmission or distribution system and interconnection services in accordance with CTBCM on the terms determined under the policy and legal framework."

12. As per Clause 5.6.5 of National Electricity Policy stipulates:

a. "The Regulator, in order to ensure liquidity of the power sector, provides a level playing field for the development of wholesale market and to facilitate prudent projects of the Government, may impose additional charge(s) which shall be deemed to be costs incurred by the distribution companies / electric power supplier(s). Such additional charge may take into account the sustainability, socio-economic objectives and commercial viability of the sector, affordability for the consumers and the policy of uniform tariff. Similarly, the Government may also incorporate, in the consumer-end tariff, any surcharge imposed by it, which shall also be deemed to be cost incurred by the distribution companies / electric power supplier(s) and shall be collected by them in discharge of their public service obligations."

2.2 LEGAL AND REGULATORY FRAMEWORK:

The approved design of Competitive Trading and Bilateral Contracting Market (CTBCM) provides the right of choice to the eligible Bulk Power Consumers (BPCs) to opt for any Supplier of Electric Power. The design, within the framework of the Act, also provides the concept of Competitive Supplier of Electric Power besides the Supplier of Last Resort, for the purposes of said right of choice to the BPCs within the said wholesale market design.

As directed in Clause 5.5.4 of the said National Electricity Policy, 2021, the honorable Authority promulgated / specified several Regulations to ensure effective implementation of the market regime in Pakistan. This included promulgation of National Electric Power Regulatory Authority,





Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022 ("Open Access Regulations").

For the purpose of this petition for determination of Use of System Charges in terms of mentioned Open Access Regulations, following terms as defined in the legal and regulatory framework are reproduced as below:

As per Section 2(ii) of the Act 1997 amended to date:

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"bulk-power consumer" means a consumer who purchases or receives electric power, at one premises, in an amount of one megawatt or more or in such other amount and voltage level and with such other characteristics as the Authority may specify and the Authority may specify different amounts and voltage levels and with such other characteristics for different areas"

Important definitions provided in Regulation 2 of Open Access Regulations are provided below:

2(1)(m) "open access" means the access to a network licensee's system or its associated facilities for movement and delivery of electric power, subject to the terms and conditions as provided in the Act, these regulations and use of system agreement, on non-discriminatory basis to:

- a) an electric power supplier for supply of electric power to its consumer(s); or
- b) a captive generating plant for delivery of the electric power from generation facility to the destination of its use; or
- c) any other person, including a licensee for delivery of electric power from a designated place to another designated place;

2(1)(n) "open access user" means any person who is availing open access under these regulations; and

2(1)(r) "use of system charges" shall include all charges related to use of distribution system, use of transmission system, system operator services, market operator services, metering service provider services and any other charges as determined by the Authority that may arise due to advent of the open access and market liberalization.

Part-III (OPEN ACCESS) Regulation 5 (Obligation to provide open access) of Open Access Regulations is reproduced hereunder:

- i. <u>A network licensee shall establish, operate and maintain its distribution system or</u> <u>transmission system, as the case may be, in a manner that ensure non-discriminatory open</u> <u>access in accordance with the Act, theses regulations, Market Commercial Code, Grid</u> <u>Code, Distribution Code and other applicable documents.</u>
- ii. A network licensee shall, on an annual basis, prepare an open access report demonstrating compliance with these regulations and licence terms and conditions, with the detail of its open access users, available and planned capacity, any issues identified in provision of open access, and any instances where open access was denied along with justification thereof. The said report shall also be made available on the website of the network licensee.
- iii. The report required under sub-regulation (2) shall be prepared and submitted to the Authority within a period of one month from the date of end of respective financial year and shall also be made available on the website of the network licensee.
- iv. The distribution company shall develop the use of system agreement in accordance with the minimum provisions provided in Schedule I within ninety days of the notification of these regulations and shall obtain the approval of the Authority and publish the same in its website.

Regulation 7 (rung of perition and determination of use of system charges) of Open Access Regulations provides as under:

Within ninety days following the date of notification of these regulations, each distribution licensee, in consultation with the respective supplier of last resort, shall prepare and submit separate petition to the Authority for determination of its use of system charges. Such petition shall be accompanied with a statement which will set out the basis upon which the use of system charges shall be calculated in such manner and with such details as shall be necessary.

Regulation 8 (Wheeling of electric power) of Open Access Regulations states under:

An open access use shall be entitled to wheel electric power using system of network licensee subject to compliance with these regulations and the Market Commercial Code, upon coming into effect, and use of system agreement.

3. TECHNICAL AND FINANCIAL ATTRIBUTES:

Adjoining the purposes of CTBCM, directions of the National Electricity Policy, 2021 and stipulations of the legal and regulatory framework; following understandings are inferred:

- 1. The network licensee, the MEPCO for the purposes of instant petition, is obligated to provide open access to its network to the open access users on non-discriminatory basis.
- 2. For the said obligation, the MEPCO is entitled for recovery of use of system charges in line with use of system agreement, as determined by the honorable Authority.
- 3. The use of system charges shall include:
 - a. Transmission Use of System Charges (NTDC, PGC) irrespective of the placement of BPC and the respective generator.
 - b. System Operator Charges
 - c. Metering Service Provider Charges
 - d. Market Operator Charges
 - e. Distribution Margin Charges w.r.t to the voltage level (132kV, 11kV etc) and consumer category wise for all possible BPC
 - f. Cross-Subsidy Charges (consumer category wise for all possible BPCs)
 - g. Stranded Cost/Capacity (consumer category wise for all possible BPCs)
 - h. Technical Transmission and Distribution Losses
- 4. With reference to the above elements of use of system charges, following clarification shall apply for clarity of application:
 - a. Currently applicable Transmission Use of System (TUoS) Charges, as already determined by the honorable Authority, compositely represent the charges relating to Transmission Network Operator(s)/Licensee(s), System Operator and Metering Service Provider. Accordingly, the said TUoS Charges remain part of use of system charges till separate charges for each of the said service providers are separately determined by the honorable Authority.
 - b. Market Operator Fee / Charges (MOF) will be recovered by Market Operator as per the mechanism provided in the Market Commercial Code. Accordingly, without prejudice to being part of Cost of Service of MEPCO, these shall not form part of use of system charges to be recovered directly by MEPCO
 - c. Cross subsidy will be assessed based on Cost of Service analysis for the applicable consumer categories of all possible BPCs, which is according to the principles of uniformity as provided in the National Electricity Policy (referred above).
 - d. Subject to the decision of the Government on the recovery of costs that arise due to advent of the open access and market liberalization, the Stranded Capacity Costs will include the use of system charges.

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e. As the transmission and distribution losses will be charged to market participants of open access through the mechanism as explained in the Market Commercial Code, therefore, such charges shall not be levied under these use of system charges as requested under this instant petition.

Explanation

The use of system charges will be determined in terms of metered quantities (kWh or kW), in consideration of allowed %age of losses and also that arrangements under the Market Commercial Code the parties (the BPC, Competitive Supplier and/or Generator) shall be committing to the Capacity Obligation (including all losses and reserve margin up to bus-bar) through Firm Capacity, therefore, such transmission or distribution losses, as the case may be, will not be charged separately. However, for the purposes of transparency of charges, the impact of such losses may be separately disclosed.

- f. The use of system charges, including the Distribution Margin Charges, as requested by MEPCO and to the extent approved by Authority, will be applicable with reference to those eligible Bulk Power Consumers (BPCs) who opt for supply from a competitive supplier, other than supplier of last resort.
- g. The use of system charges shall be with reference to the voltage level (132/66 kV, 11/33 kV) for the applicable consumer categories of all possible BPCs. The component-wise Cost of Service as per outcome detailed Cost of Service Study (Annex-2) and consequent assessment, as detailed above, of component-wise Use of System Charges for the applicable BPCs is provided at Annex 1.
- h. Power Factor Penalty as provided in applicable documents shall remain applicable in addition to the Use of System Charges.
- i. Any taxes and surcharges as imposed by the Government shall be applicable.

Summarizing the above, following is the abstract of entitled entities for each element of the use of system charges:

Sr. No.	Use of System Charge Element	Entitled Entity
1.	Transmission Use of System Charge	NTDC and other TSPs through NTDC/NGC.
2.	System Operator Charge / Fee	System Operator through NTDC.
3.	MSP Charge / Fee	MSP through NTDC
4.	Distribution Use of System Charge	MEPCO as Distribution Licensee
5.	Cross Subsidy	MEPCO as SOLR (Supply Licensee)
6.	Stranded Capacity Costs	MEPCO as SOLR (Supply Licensee)

4. BASIS OF USE OF SYSTEM CHARGES:

The instant petition for determination of use of system charges is framed under guidelines provided in the NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022 considering Model year i.e. FY 2022-23 and Prior year i.e. FY 2021-22 as base year. The cost of service study was carried out by MEPCO for the eligible BPCs of different categories who want to opt for competitive supplier leaving SOLR and wanted to use wire business facilities of SOLR about the cost reflective tariff and cross subsidies as attached hereto Annex-1.

4.1 METHODOLOGY FOR RECOVERY OF USE OF SYSTEM CHARGES:

The instant petition is for determination of use of system charges for recovery of costs and charges relating to service providers (SO, TNO, TSP, DNO), stranded capacity costs and the cross-subsidy currently being contributed by the eligible BPCs. It is pertinent to mention that



fixed (in terms of Rs./kW/Month) charge. However, following options are available for consideration and determination:

- 1. Use of system charges recovery in term of Rs./kW/Month metered shall provide guaranteed stream of revenue to cover for costs which are fixed in nature. This may, however, over burden the relevant consumers thus undermining the very purpose of CTBCM and open access regime.
- 2. Use of system charges recovery in term of Rs./kWh will render the service providers and the SOLR to face the revenue loss arising from low load factor of the eligible BPCs. On the other hand the open access users shall be benefitted for any favorable Energy or Capacity Imbalance at the Market this option may not provide a balanced approach to promised sharing of risks and rewards under CTBCM regime.
- 3. Use of system charges recovery through a hybrid approach, i.e. partly through fixed charge in terms of Rs./kW/Month (subject to minimum MDI compared to the contracted load) and partly in terms of Rs./kWh may provide a balanced plausible approach for all the involved parties. It is submitted that, in order to ensure level playing field for consumers of SOLR and Competitive Supplier, the recovery of use of system charges may have same charging mechanism.

As already mentioned, **Annex-1** to this petition also include proposed rates to be charged under each of the Three (3) options narrated above.

It is, however, noted that the methodology and process as per FACOS model, for the purpose of allocation of demand (kW or MW) related costs, allocates single system peak demand (of MEPCO) to different categories to arrive at the allocation base. This allocation, irrespective of being rational, judicious and in line with international norms, results in less than actual (billable) MDIs of respective customers. Accordingly, taking the same MW demand as denominator for demand (MW) based rate making will result in higher per MW rates

4.2 MECHANISM FOR ADJUSTMENT/INDEXATION OF USE OF SYSTEM CHARGES:

Each component of use of system charges detailed in the instant petition shall be subject to periodic adjustment/indexations. Whenever these components are adjusted for regulated consumers of the suppliers of last resort, at the same time, the corresponding adjustment in the relevant component of the proposed Use of System Charges for eligible BPCs shall simultaneously be made.

Note: It is further added that as per MEPCO understanding, losses on 132kV and 11kV caused by transportation of energy / capacity by generator / competitive supplier for providing supply to its BPCs shall be adjusted (units shall be credited to MEPCO) as per approved technical losses of MEPCO Network by NEPRA as discussed in section 5.2 & 5.3 of approved Market Commercial Code.

4.3 APPLICABLE CATEGORIES OF ELIGIBLE BPCS UNDER EXISTING TARIFF REGIME:

While, in terms of existing stipulation of the Act, a consumer who purchases or receives electric power, <u>at one premises</u>, in an amount of <u>one megawatt or more</u> is considered as Bulk Power Consumer, following position, with regard to consumer with one megawatt or more load at connection voltage 11 kV and above, is brought out for consideration:

Sr. No.	Consumption Category	Tariff Category	Voltage Level	Remarks
1.	General	A-2 & A- 3	N/A	As per the existing tariffs, no kW sanctioned load quantification or connection voltage is applicable to A-
		÷ .		2 and A-3 tariff categories.

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MEPCO USE OF SYSTEM CHARGES PETITION 2022-23

				Accordingly, these are not considered BPC for the purposes of this petition, However, these customers, based on the sanctioned load, may be connected at 11 KV level, as required. Any such customer falling within the definition of BPC, and subject to the approval of the Authority, will be considered in the analogy of C2.	
2.	Industrial Consumer ranging from 500 kW to 5 MW. [extendable to 7.5 MW under conditions]	B-3	11/33 kV	B 3 consumer ranges from 500 kW to 5 MW.[Extendable to 7.5 MW under conditions] It is clarified here that the consumers of this category below 1MW shall not be treated as eligible BPCs for CTBCM. The use of system charges indicated for B-3 category will apply in case of eligible BPC.	
3.	Industrial	B-4	66/132 kV and above	The use of system charges for B-4 category of consumers are assessed in the analogy of B-3 adjusted with differential of allowed losses at 11/33 kV (B-3) and 66/132 kV (B-4)	
4.	Bulk Supply Ranging from 500 kW to 5 MW. [extendable to 7.5	C-2(b)	11/33 kV	Bulk Supply consumer ranges from 500 kW to 5 MW. [Extendable to 7.5 MW under conditions] Although the Bulk Supply C-2	
	conditions]			customers are at 11/33 KV connection level. It is clarified here that the consumers of this category below 1MW shall not be treated as eligible BPCs for CTBCM. The use of system charges indicated for C-2 category will apply in case of BPC at one premises. Further, the consumers falling under the resale shall not be considered as eligible BPC	
5.	Bulk Supply	C-3(b)	66 kV and above	The use of system charges for C-3(b) category of consumers are assessed in the analogy of C-2(b) adjusted with differential of allowed losses at 11/33 kV (C-2) and $66/132$ kV (C-3). The consumers falling under the resale shall not be considered as eligible BPC.	
6.	Housing Colonies attached to Industries	Н	N/A	As per the existing tariffs, no kW sanctioned load quantification or connection voltage is applicable to H tariff category. Further, these connections are resale in nature. Accordingly these are not considered BPC for the purposes of this petition.	
7.	Azad Jammu & Kashmir	K	N/A	The supply feed for AJK customer category is more than 1 MW at 11 kV level. However, the same is primarily for resale purpose, therefore, not considered as BPC.	pr
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5. UTHER HYLPORTAINT CONSIDERATIONS IN INSTANT FETTION.

Following paragraphs of the petition highlights other important aspects which shall be taken into account while determining the said charges.

Government Subsidies

Any subsidy provided by the Government to the industrial or any other eligible BPC, as applicable, will be dealt with according to the directions and terms and conditions thereof as decided by the Government. However, for the purposes of this petition, such subsidies are not considered.

5.1 CAPTIVE POWER PRODUCERS AND USERS:

- 1. A captive power producer / user using the MEPCO network for wheeling of power to user destination will be considered "Market Participant" in terms of Market Commercial Code and will be dealt with accordingly. The use of system charges, except the Cross-Subsidy and Stranded Capacity cost, shall fully apply.
- 2. The cases of captive generation and consumption points at the same location taking additional supply from the local supplier of last resort (SOLR) shall be considered a regulated consumer of the SOLR with applicable regulated tariff. The quantum of additional sanctioned / contracted load (in terms of MW) shall be considered to determine its status as BPC in terms of the Act.
- 3. In case, the BPC choose to opt for a competitive supplier leaving SOLR, the use of system charges shall apply in full.

5.2 APPLICABILITY OF STRANDED CAPACITY COSTS:

The costs arising on account of market liberalization and advent of open access shall be the capacity charges/stranded costs to be paid by all eligible BPCs of a competitive supplier as detailed in this instant petition and the amount of such capacity charges shall be the same as the total generation capacity charges recovered from the equally placed BPCs of the suppliers of last resort either in a volumetric form (kWh) and/or through fixed charges and such charges shall continue to be paid till such time as may be decided by the Federal Government as per the National Electricity Policy.

5.3 APPLICABILITY OF USE OF SYSTEM CHARGES FOR NEW ELIGIBLE BPCS:

The Use of System Charges provided in the instant petition shall be applicable to all such BPCs who will opt to avail supply of electric power from competitive supplier including the captive generator using the distribution or/and transmission network to wheel its power to the destination of its use. Such charges shall be fully applicable to any new eligible BPC or incremental consumption, obtaining supply of electric power from competitive supplier without any exception.

6. PRAYER OF MEPCO AS PETITIONER:

In view of the above submissions, it is humbly requested that the Authority may kindly consider and determine the Use of System Charges as calculated in the attached Annex-1, containing detailed analysis from eligible BPCs falling under different categories as stated above who want to avail supply of electric power from competitive suppliers leaving SOLR.





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Annex-1

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Cost of Service & Proposed Use of System Charges For Eligible BPCs (One MV & slove 4 One Preniss)

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Cost Assessment Level	Goet of	Service linclusive o	Energy Loss	(isae)
Consumption Category	ļ	industri	el	
Tariff Calegory		B-3	·	
Current and Cost Element	Variable	Fixed		Total
PUNCTIONAL COST ENAMERA	Rs./kWh	Rs./kW/ Month	Rs./kWh	RsJkWh
Generation Cost - Energy	9,970			9 970
Generation Cost - Capacity		4.801.84	5.517	5.517
Transmission Charges		428,11	0 492	0.492
Market Operator's Fee		3.00	0.003	0 003
Distribution Use of System		706.72	0.812	0.812
Total Applicable Costs	9.870	8.939.87	1,824	19.794
impact of allowed losses				
Total Cost of Service	9.970	<u>5,939,67</u>	6,824	16.794
Cross Subsidy				9.456
Average Applicable Tariff				26.250

	Industria	L	
	8-1		
Variable	Fixed		Total
Rs./kWh	Rs./kW/ Month	Rs./kWh	Rs./kWh
9,216			9,216
	4,438.55	5.100	5.100
	395.72	0.455	0.455
	2.77	0.003	0.003
	653 25	0,751	0.751
9,216	5,490,29	9,309	15.523
0.754	449,38	0 516	1.271
9.970	5,939,67	6,824	16,794
			9.450
			26.250

	Industrial B-3 (1	MW or More1	
MDI Based	Volumetric	Нувгіс	ł
Rs./kW/ Month	Rs./kWh	Rs./kW/ Month	Rs./k ¹ ./h
453 81	0.754		0.75
4,438 55	5.100	1,331,56	3 570
395 72	0 455	118.72	0.31
653,25	0.751	195 98	012
5,941,33	7,069	1,646.26	5.161
449.38	0.516	134.81	0.36
6,390.71	7.675	1,781.07	\$ 62
5,689 10	9.455		9.45
12.073.81	17.031	1,781.07	14.98

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Cost Assessment Level	Gost of	Service (Inclusive o	of Energy Loss	impacti	Cost of S	ervice (Separated I	Ineray Loss	mpact)	PROPOS	ED Use of System	Cherges (Proposi	#[- <u>1)</u>
Consumption Category		Bulk Sys	XDIA			Bulk Supp	<u> </u>		Y	ow adding called		
Tariff Calegory		ÇZ(b)				C2(b)			MDI Based	Volumatric	НуБл	lđ
Eurotional Cost Element	Variable	Fixed		Total	Variable	Fixed	·	Total				
Puncuonal Goat Liaman	Rs./kWh	Rs./kW/ Month	Rs./kWh	Rs,/kWh	Rs./kWh	Rs./kW/ Month	Rs./kWb	Rs./kWh	Rs./kW/ Month	Rs./kWh	Rs./kW/ Month	Rs./kWh
Generation Cost - Energy	9,970			9 970	9.216			9.216	450.99	0.754		0.75
Generation Cost - Capacity		4,801.84	8 031	8.031		4,438 55	7.424	7,424	4,438,55	7.424	1.331 56	<u>ورع</u>
Transmission Charges		428,11	0.716	0.716		395 72	0.662	0.662	395.72	0.662	11872	C.4
Markel Operator's Fee		2.17	0 005	0.005		2.77	0 005	0.005		<u> AN SARAR</u>	<u> 2017 (1914) (1</u>	
Distribution Use of System		642,37	1.074	1.074		593,77	0.993	0.993	593.77	0,993	178 13	0.69
Total Applicable Costs	8.970	5,876.09	9,827	18.797	9.216	6,430,81	9.083	18.299	5,879.03	9.833	1,628.41	7,10
Impact of allowed losses					0.754	444 51	0.743	1,498	444.51	0.743	133 35	05
Total Cost of Service	9.970	6,875.09	9.827	19,797	5,970	5,876.32	9.827	19.797	6,323.54	10.576	1,761,77	7.63
Cross Subsidy				6.453	·			6.453	3,858.48	6,453		6 45
Average Applicable Tariff				26.260				26.250	10,182.02	17.030	1,761.77	14.08

Cost Assessment Level	Cost of	Service (inclusive o	Energy Loss	Impaci)
Consumption Category		industri	al	·
Tariff Category		84		
Euoclional Cost Element	Variable	Fixed		Total
	Rs./kWh	Rs./kW/ Month	Rs,/kWh	Rs./kWh
Generation Cost - Energy	9341			9.341
Generation Cost - Capacity		4,498.83	7,478	7.478
Transmission Charges		401.10	0.667	0.667
Market Operator's Fee		2.61	0 005	0.005
Distribution Use of System		430.40	0.715	0,715
Total Applicable Costs	1	5,333,13	8.864	18.205
impect of allowed losses				
Total Cost of Service	9.341	6,333,13	8.864	
Croes Subsidy]	8.045
Average Applicable Taril!				26,260
Cost Assessment Level	Cost of	Service (Inclusive of	Energy Loss	mpaci)
Consumption Category		Bulk Sup	ply .	
Tariff Category		C3(b)		
Fundlineal Cost Element	Variable	Fixed		Total
Functional Cost Clanant	Rs./kWh	Rs./kW/ Month	Rs.AWh	Rs./kWh
Generation Cost - Energy	9.341			9.341
Generation Cost - Capacity		4,498.83	7.594	7,594
Transmission Charges		401.10	0.677	0 677
Market Operator's Fee		2.81	0.005	0 005
Distribution Use of System		428.44	0.723	0.723
Total Applicable Costs	9,341	6.331.18	8.109	18,338
Impact of allowed losses				
Total Cost of Service	9.341	6,331,18	8.999	18.339
Cress Subsidy				7.911
Average Applicable Teriff				74 760

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	industria	L	
	B4		
Variable	Fixed		Total
Rs./kWh	Rs./kW/ Month	Rs./kWh	Rs./kWh
9.218		~~~~	9.216
	4,438,55	7.424	7.424
	395 72	0 662	0.662
	2 77	0.005	0.005
	424 63	0.993	0 993
9,216	5,261.87	9.083	18.299
0.125	71.46	(0 219)	(0.094)
9.341	6,333.13	8.864	18.205
			0.045
			26.250
Cost of S	ervice (Separated B	hergy Loss	26.250 26.250
Cost of S	ervice (Separated B Bulk Supp	inergy Loss I	26.250 26.250 mpact)
Cost of S	ervice (Separated B Bulk Supp C3(b)	Inergy Loss y	26.250 26.250
Cost of S	ervice (Seperated B Buik Supp C3(b) Fixed	Inergy Loss I	26.250 26.250 mpacti
Cost of S Variable Rs./kWh	ervice (Seperated E Bulk Supp) C3(b) Fixed Rs./kW/ Month	heray Loss y Rs./kWh	Total Rs./kWh
Cost of S Variable Rs/kWh 9.216	ervice (Seperated E Buik Suppi C3(b) Fixed Rs./kW/ Month	heray Loss y Rs./kWh	8,045 26,260 mpact) Total Rs./kWh 9 216
Cost of S Variable Rs/kWh 9.216	ervice (Seperated E Bulk Suppi C3(b) Fixed Rs./kW/ Month 4.438.55	Rs./sWh 7.424	8,043 28,269 mpacti Total Rs./kWh 9,216 7,424
Cost of S Variable Rs/kWh 9.216	ervice (Separated E Buik Supp) G3(b) Fixed Rs./kW/ Month 4.439.55 396.72	Rs.AWh 7.424 0.562	8,045 28,260 mpact) Total Rs./kWh 9,216 7,424 0,662
Cost of S Variable Rs/kWh 9.216	strvics (Soparisted E Buik Supp) C3(b) Fixed Rs./kW/ Month 4.438.55 395.72 2.77	Rs.AWh 7.424 0.562 0.905	8,045 28,260 mpact) Total Rs./kWh 9,216 7,424 0,562 0,005
Cost of S	ervice (Separated E Buik Suppl C316) Flaed Rs_AW/ Month 4.438 55 396 72 2.77 422 70	R#AWh 7.424 0.562 0.993	8,045 26,260 mp4cl) Total Rs./kWh 9,216 7,424 0,662 0,005 0,993
Cost of S Variable Rs./kWh 9.216 9.216	ervice (Sepérated E Buik Suppi C3(b) Fixed Rs./AW/ Month 4,439,55 395,72 2,77 422,70 5,289,74	Reray Loss I y Rerawin 7.424 0.567 0.005 0.993 3.083	26280 Total Rs.AWh 9216 7424 0662 0005 0993 18,299
Cost of S Variable Rs./kWh 9 216 \$216 \$216 \$216 0.125	ervice (3904rested E Buik Suppl C3(b) Fixed Rs_AW/ Month 4,438,55 396,72 2,77 422,70 5,269,74 71,43	Rs.AWh 7.424 0.567 0.005 0.993 3.083 (0.085)	26.260 Total Rs.AWh 9.216 7.424 0.662 0.905 0.993 16.289 0.041
Cost of S Variable Rs_hWh 9 216 9,216 9,216 0,125 9,341	ervice (3994r454 E Buik Supp) C3(b) Fixed Rs.AW/ Month 4 438.55 365 72 2 77 4 22.70 5 289.74 71.43 5 331.11	R=AWh R=AWh 7,424 0,662 0,005 0,993 9,083 (0,065) 8,899	26.280 Total Rs.AWh 9.216 7.424 0.662 0.993 18.289 0.041 18.339
Cost of S Variable Rs.Awh 9 216 9.216 9.216 0.125 9.311	ervice (3994/448 E Buik Suppi C3(b) Elast Rs.AW/ Month 4,438,55 396,72 277 422,70 5269,74 71,43 5,331,18	R=AWh R=AWh 7.424 0.562 0.005 9.083 (0.065) 8.995	8425 24.260 mpacti Total Rs.AWh 9.216 7.424 0.662 0.005 0.993 18.289 0.041 18.339, 7.911

	Industria	IB-4	
MDI Based	Volumatric	Hybri	d
Rs./kW/ Month	Rs./kWh	Rs./kW/ MonUs	Rs./k.Wh
75 30	0,125		0 12
4,438 55	7.424	1,331 56	5,193
395 72	0 662	118.72	0.493
424.63	0 993	127,39	0,695
6,334.20	9,204	1,577,67	6,43
71.46	(0.219)	1 21,44	(0.15)
5,405.66	8.985	1,599,11	6.32
4 840.17	8 045		8.04
10,246.83	17.930	1,699,11	14.37
10,246.83 PROPOS	17.030 ED Use of System	1,699,11 Charges (Propose	14.37;
10,248.83 PROPOS	17.030 ED Use of System Bulk Supply	1,699.11 Charges (Proposa (C-3(b)	14.37; -1)
10,246.83 PROPOSI MDI Based	17.030 ED Use of Bystem Bulk Supply Volumatric	1,699,11 Charges (Probosa (C-3(b) Hybric	14.37; -1)
10,248.83 PROPOS MDI Based Rs JAW/ Month	17.030 ED Use of System Bulk Supply Volumatric Rs./kWh	1,699.11 Charges (Proposal C.3(b) Hybris Rs./kW/ Month	14.37; -1) J RsJkWli
10,246.83 PROPOS MDI Based Rs./kW/ Month 74.83	17.030 EQ Use of System Bulk Supply Volumatric Rs./kWh 0,125	1,699,11 Charges (Probose) (C-3(b) Hybria Rs./kW/ Month	14.37; [-1] RsJkWli 0.125
10,246.83 PROPOS MDI Based Rs./kW/ Month 74.83 4.439.55	17.039 ED Use of Bystem Bolk Supply Volumatric Rs./kWh 0.125 7.424	1,539,11 Charaes (Probas) C-3(b) Hybrik Rs./kW/ Month 1,331,55	14.37; -1) RsJkWli
19,246.83 PROPOS MDt Based Rs /XW/ Month 74,03 4,439,55 395,72	17.030 ED Use of System Bulk Suppl Volumatric Rs./kWh 0.125 7.424 0.662	5,599,11 Charloss (Proboau C-3(b) Hybrik Rs./kW/ Month 1.331 55 116 72	14.37; -1) RsJkWli
10,245,83 PROPOSI MDI Based Rs.J.W/ Month 74.83 4.439.55 395.72	17.438 ED Use of System Bulk Supply Volumatric Rs./kWh 0.125 7.424 0.662		14.377 -1 -1
10,246,83 PROPOS: MDI Based Rs.J.W/ Month 74,83 4,439,55 395,72 395,72 422,70	17.438 ED Use of System Bulk Supph Volumatric Rs./kWh 0.125 7.424 0.662 5.424 0.993		14.37; .(1) .(2) .(2) .(2) .(2) .(2) .(2) .(2) .(2
10,346,83 PROPOSI MDI Based Rs./kW/ Month 74,83 4,439,55 395,72 422,70 5,331,81	17.030 ED Use of Exclem Bulk Supph Volumatric Rs./AWh 0.125 7.424 0.662 5.224 0.993 9.204		14.37; 14.37; 19 85,7kWit 0,725 5,19] 0,463 0,665 6,480
10,246,33 PROPOS MDI Based R3,XW/ Month 74,83 4,439,55 395,72 422,70 5,331,81 71,43	17.939 ED Use of System Bulk Supply Volumatric Rs./kWh 0.125 7.424 0.652 9.0593 9.204 (0.055)		14.37; 1 Rs./kWi 0.*22 5.19 0.463 0.695 6.485 (0.655
10,246,83 PROPOS MDI Based Rs/XW/ Month 74.83 4.439,55 	17.838 ED Use of Evelem Bulk Supply Volumatric Rs./kWh 0.125 7.424 0.662 9.294 0.993 9.294 (0.085) 9.113		14.37; 1 Rs./kWi 0.*22 5.19 0.463 0.665 6.485 (0.655 7,876
10,246,83 PROPOS MDT Based Rs./XW/ Month Z483 4,439,55 395,72 422,70 8,331,81 7,143 8,403,24 4,729,75	17.498 27.498 of Bystem Bulk Supply Volumatric R.s.AWN 0.125 7.434 0.662 9.294 9.204 0.0255 9.119 7.911		14.37; 14.37; 1 8 s./kWi 0, *21 5, 19] 0, 463 0, 695 6.485 (0, 555 7, \$79 7, 91]

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MEPCO COST OF SERVICE STUDY FOR FY 2022-23

PREPARED BY

MULTAN ELECTRIC POWER COMPANY (MEPCO)

UNDER GUIDELINES OF

USAID CONSULTANT, PSIA

THE COST OF SERVICE STUDY OF MEPCO IS CONDUCTED ON THE MS EXCEL BASED FULLY ALLOCATED COST OF SERVICE (FACOS) MODEL DEVELOPED BY USAID TO FACILITATE DISCOS FOR DEVELOPMENT OF COMPETITIVE ENERGY MARKET



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Multan Electric Power Company (MEPCO) Ltd.

1. COST OF SERVICE STUDY:

Cost of Service is the total cost incurred by a utility company/DISCO in providing services to its customers and the allocation of the cost to different customer classes and/or voltage levels.

1.1 Fully Allocated Cost of Service Study (FACOS) Model

FACOS is a model developed in MS Excel with the support of USAID for DISCOs to conduct Cost of Service Study. The methodology used to build the FACOS Model follows very closely the standards that are used internationally. The Model performs the standard three steps procedures encompassed in most of Cost related Studies, namely, functionalization, classification, and allocation.

1.2 Major Steps of Cost of Service Study

A class based cost of service study begins with a detailed documentation of the numerous budgetary elements that are part of total revenue requirements of an electric power utility. The detailed revenue requirements are in the form of different data inputs to the FACOS Model. At a high level, the FACOS process consists of 3 basic steps which are narrated below:

- 1. <u>Functionalization</u> The identification of each cost element as one of the basic utility service "Functions" (e.g. generation/Power Purchase Price, transmission, distribution and customer).
- <u>Classification</u> The classification of the functionalized costs based on the billing component/determinant that each is associated with (e.g. kWs of capacity, kWhs of energy or number of customers).
- 3. <u>Allocation</u> The allocation of the functionalized and classified costs to customer classes, based on respective service requirements / parameters (e.g. kWs of capacity, kWhs of energy and the number of customers) of each class.
- 1.3 Fundamentals of FACOS Model

Table 1 Major Assumptions of FACOS Model

Description	FY 2022-23
Allowed Rate of Return (WACC) (NEPRA Determination).	
	17.50%
Capital Work in Progress ("CWIP")	CWIP 100%
Working Capital Allowance to be included in Rate Base	NO
Prior Year Adjustment (Rs. in Million)	22,673
Demand Allocation Methodology	1 CP
	(Single Annual Peak)
Customer Growth %	5.76%
Model Year	FY 2022-23
Base Year	FY 2020-21

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2. PROJECTIONS FOR REVENUE REQUIREMENT OF MEPCO 2022-23:

The Revenue Requirement (RR) is the fundamental input to the Cost of Service Model of MEPCO for revenue allocation to different categories of customers based on Capacity (kW), Energy (kWh) and number of consumers. The Table 2 below explains in detail the projected cost to be incurred for arriving at Revenue Requirement (Overall Cost of Service) of MEPCO for Model Year 2022-23.

DESCRIPTION		MODEL YEAR
DESCRIPTION		FY 2022-23
Proj. Units Purchased (M kWh) incl export loss		23,860
Proj. Units Sold (M kWh) by MEPCO to consumers	S	20,379
Assessed T&D Losses		14.59%
Average Monthly MDI (MW)		4,566
Energy Purchase Price (Rs/kWh)-ETR		8.82
Capacity Purchase Price (Rs/kW/Month)-CTR		4,273
UoS Rate (Rs/kW/Month)		383.66
POWER PURCHASE PRICE		PKR
Energy Charge		210,345,112,640
Capacity Charge		234,150,000,000
Transmission Charge		21,022,000,000
TOTAL		465,517,112,640
DISTRIBUTION MARGIN		
Pay & Allowances		18,585,765,169
Provision for Retirement Benefits		10,836,590,720
Maintenance		1,537,000,000
Traveling allowance		1,219,000,000
Vehicle maintenance		684,000,000
Elec. Bills Collection Charges		0
Other expenses		6,393,644,110
TOTAL O&M COST		39,256,000,000
Other Income		9,088,000,000
Provision for bad debts		0
Depreciation		6,065,346,289
Return on Assets		12,078,624,222
Working Capital Allowance		0
TOTAL DISTRIBUTION MARGIN		46,716,296,347
Prior Year Adjustment		22,673,000,000
TOTAL REVENUE REQUIREMENT		534,906,408,987
AVERAGE TARIFF (Rs/kWh)		
Power Purchase Price-Unadj.		19.51
Power Purchase Price-Adjusted		22.84
Distribution Margin		2.29
Prior Year Adjustment		1.11
AVERAGE TARIFF (Rs/kWh)		26.25

Table 2 Component Wise Revenue Requirement of MEPCO

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3. SUMMARY OF REVENUE REQUIREMENT:

The summary of Revenue Requirement of MEPCO is provided in the Table 3 below:

	DESCRIPTION	MODEL YEAR
1	POWER PURCHASE COST	PKR 465,517,112,640
2	DISTRIBUTION MARGIN	PKR 46,716,296,347
А	Operation and Maintenance Expense	PKR 37,660,325,837
В	Depreciation of Distribution Plant	PKR 6,065,346,289
C*	Return on Rate Base	PKR 12,078,624,222
	GROSS DISTRIBUTION MARGIN	PKR 55,804,296,347
D	Less: Other Income	PKR 9,088,000,000
	NET DISTRIBUTION MARGINS	PKR 46,716,296,347
3	PRIOR YEAR ADJUSTMENTS	PKR 22,673,000,000
	TOTAL REVENUE REQUIRED	PKR 534,906,408,987

Table 3 Summary of MEPCO Revenue Requirement

4. LINE LOSSES ON NETWORK CHARGED TO DIFFERENT VOLTAGE LEVELS:

Line losses taken from as a percentage on purchased units is given in **Table 4**. Line losses as a percentage on received units at each voltage level are calculated on the basis of sales data of FY 2021-22. The network losses of Table 4 are based on the third party studies conducted for STG and Distribution losses and segregation of current losses as per last conducted studies on pro rata basis. However, any further study will have immediate effect on Cost of service studies as and when conducted through third party or submitted by MEPCO to NEPRA on some other rationalized basis.

Table 4 MEPCO Line Losses at Different Voltage levels as per Business plan

Voltage Level	0.2 kV 0.4 kV	11 kV	Total Distribution	132kV	Total
Losses %age	7.20%	6.05%	13.25%	1.34%	14.59%

However, the losses asked by MEPCO and approved by NEPRA in MYT are as under:

1.10

Voltage Level	0.2 kV	0.4 kV	11 kV	Total Distribution	132kV	Total
Asked by MEPCO				13.25%	1.34%	14.59%
Approved by NEPRA	2.7	9%	8.21%*	11%	1.34%	12.34%

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* MEPCO approved NEPRA MYT section 78.3 Page 76

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5. CUSTOMER CLASSIFICATION BY VOLTAGE LEVEL:

While the Cost of Service study is based on allocation of the Revenue Requirement on Classes (categories/tariff) of the consumers at different voltage levels; the **Table 5** below provides mapping of existing categories/tariff of consumers on the basis of applicable voltage levels.

	Classi	fication by Voltage	Level	
Voltage	132/66kV	11kV	0.4kV	0.2 kV
	B4	B3	A1b	Ala
	C3a	C2a	A2b	A2a
	C3b	C2b	A2c	Bla
		H1	A3a	C1a
0		H2	B1b	E1i
ust		K1a	B2a	E1ii
om		K1b	B2b	E2
ler			C1b	
Cla			C1c	-
SS			D1a	
			D1b	
			D2a	
			D2b	
			G1	
			G2	

Table 5 Classification of Different Consumer Categories/Tariff with respect to Voltage Levels.

6. MEPCO TARIFF DETERMINED BY NEPRA IN JULY-2022:

Tariffs for various categories of MEPCO consumers as determined by NEPRA vide it's determination No. NEPRA/RIADG(Tariff)/ TRF- 100/X WDISCOs/13540- 13542 dated 22-07-2022 are provided in **Table 6** below.

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	TARIFF CATAGORIES	Fixed Charges Rs./KW/M	Variable Charges Rs./kWh
i	Up to 50 Units Life line		5.00
11	51-100 units Life line		15.60
ili	01-100 Units		18.66
iv	101-200 Units		20.67
v	01-100 Units		21.26
vi	101-200 Units		24.45
vil	201-300 Units		24.96
viii	301-400Units .		26.20
ix	401-500Units		26.64
x	501-600Units		27.64
xi	601-700Units		28.64
xii	Above 700 Units		29.64
A1(b)	Time of Use (TOU) – Peak		28.64
	Time of Use (TOU) - Off-Peak		21.26
E-1(i)	Temporary F-1 (i)		29.64
	COMMERCIAL - A2		
A2 (a)	Commercial - For peak load up to 5 kW		25.62
A2 (b)	Sanctioned load 5 kw and above	500	23.64
A2 (c)	Time of Use (TOU) - Peak (A-2)	500	28.64
	Time of Use (TOU) - Off-Peak	500	22.54
E-1 (ii)			25.62
L** (II)			
B1(a)			24.62
B1(b)			29.52
D1(D)		<u> </u>	20.31
P2 (a)	B1-100 (Off-peak)		22.41
D2 (d)		500	24.51
62 (D)	B2 - 100 (Peak)	500	20.51
83		500	21.51
	B3 - TOU (Peak)	460	20.51
	ВЗ - ТОО (ОП-реак)	460	23.31
84	<u>84 - TOU (Peak)</u>	400	28.51
	B4 - TOU (Off-peak)	400	23.11
E-2	Temporary E-2		27.51
	BULK		
C1 (a)	C1(a) up to 5 kW		25.25
C1 (b)	C1(b) exceeding 5 kW	500	25.05
:1 (c)	Time of Use (TOU) – Peak	500	28.64
	Time of Use (TOU) - Off-Peak	500	22.04
C2 (a)	C2 Supply at 11 kV	460	24.95
2 (b)	Time of Use (TOU) – Peak	460	28.64
	Time of Use (TOU) - Off-Peak	460	23.44
C3 (a)	C3 Supply above 11 kV	440	24.84
:3 (b)	Time of Use (TOU) – Peak	440	28.64
]	Time of Use (TOU) - Off-Peak	440	23.24
7	AGRICULTURAL TUBE WELLS - Tariff D		
1 (a)	D1 Scarp		25.25
2 (a)	D2 Agricultural Tube-wells	200	25.25
1 (b)	Time of Use (TOU) – Peak	200	28.64
	Time of Use (TOU) - Off-Peak	200	22.04
2 (b)	Time of Use (TOU) – Peak	200	28.64
	Time of Use (TOU) - Off-Peak	200	20.04
G	Public Lighting G		22.04
H	Residential Colonies H		20.34
<u></u> K1	Special Contracts - Tariff K (AIK)	+	0.00
			0.00

Table 6 NEPRA Determined Tariff for Different Consumer Categories of MEPCO

29.24 0.00 0.00

7. **RESULTS FROM FACOS MODEL:**

Given below is the point wise assumption and output summary of FACOS Model.

7.1 Proposed Revenue Requirement Allocation (in Percentage)

While developing the Fully Allocated Cost of Service Model, the detailed study for allocation of cost of service and rate base (for each component) to cost drivers (energy, demand and customer) was developed. When the distribution business is functionally isolated from the supply business, the proposed cost allocation percentage may be considered as under proposed in Table 7 below. However, the actual costs of distribution and supply business will be depicted and consequently, incorporated when these businesses may operationalize in real on ground.

	Revenue Requirement Allocation %age				
Description		Energy	Demand	Customer	Total
Energy Charges	-	100%	-	-	100%
Capacity Charges		-	100%	-	100%
T.UoSC		-	100%	-	100%
MoF		-	100%	-	100%
0&M Cost		-	65%	35%	100%
Depreciation		-	80%	20%	100%
RORB	······································	-	82%	18%	100%
Other Income		-	82%	18%	100%
Prior Year Adjustr	ment	-	65%	35%	100%

Table 7 Proposed Allocation of COS & RB to Cost Drivers i.e. Energy, Demand and Customer percentages

7.2 Revenue Requirement Allocation to Energy, Demand and Customer

Based on the allocation percentages given in above table, the revenue requirement allocated to energy, demand and customer (cost triggers) is shown in Table 8 below.

Table 8 Summary of Revenue Requirement w.r.to Cost Drivers

Summary of Reven	ue Requirement
Description	FY 2022-23 Rs. (M)
Energy Charges	210,345
Capacity Charges	234,150
T.UoSC	20,870
MoF	152
Power Purchase Price	465,517
O&M Cost	37,660
Depreciation	6,065
RORB	12,079
Other Income	(9,088)
Distribution Margin	46,716
Prior Year Adjustment	22,673

7.3 Revenue as per NEPRA Tariff by Customer Category and Voltage Level

Table 9 below, provides detailed category-wise estimated revenue and average (Rs./kWh) thereof. Whereas, the Table 10 is summary of the said category-wise estimated revenue based on the supply Voltage level of relevant customer category, with average rate (Rs./kWh) thereof.

Variable Total Fixed MDI Sales Rs./KWh Revenue **Customer Category** Charge Charge (GWh) MW Rs. (M) Rs. (M) Rs.(M) 33,489 35,109 25.34 Industrial -- B3 133 1,385 1,620 14,565 24.83 Industrial --- B4 84 606 495 15,060 Single Point Supply -- C2(b) 30 218 233 5,317 5,550 25.40 Single Point Supply -- C3(b) 6 45 56 1,081 1,137 25.39

Table 9 Allocation of Sales and Demand to Categorywsie & Segregation of Fixed and Variable Costs

As already mentioned, the calculation of revenue is based on NEPRA Tariff wise rates determined vide No. NEPRA/RIADG(Tariff)/ TRF- 100/X WDISCOs/13540- 13542 dated 22-07-2022 already provided in (Table6).

Table 10 Allocation of Sales and Demand to Voltage Levels & Segregation of Fixed and Variable Costs

		Demand	NEPRA	Revenue
ARIFF CATAGORIES	Sales	1.CP	Fixed Charge	Variable Charge
Voltage Level	(kWh)	MW	Rs	Rs
0.2 kV	11,357,556,641	2,534.75	4,230	262,478,818,205
0.4 kV	6,757,372,909	1,116.22	8,365,656,506	157,006,419,119
11 kV	1,611,813,037	166,17	1,854,595,726	39,034,652,993
132/66 kV	652,257,412	90.30	551,819,637	5,671,788,461
SUB TOTAL	20,379,000,000	3,907	10,772,076,100	474,191,678,778

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8. COST OF SERVICE FUNCTIONALIZED RATES (TARIFF WISE)

Based on the allocation of overall Revenue Requirement of MEPCO to customers categories, the resultant functional amounts (Rs. in million) for each customer category are summarized in Table 11 below.

			Energy	Demand	S Generati	on Cost	Transmission	Distri	bution	
Classes	Level	No. of Consumers	GWh	MW	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	Cus.Cost (Rs.M)	Total Cost
In Justrial B3	HkV	390	1,385	133	13,812	7,643	686	798	327	23,266
Industrial B4	132/66kV	10	606	84	5,665	4,535	407	305	129	11,040
Single Point Supply C2(b)	11kV	60	218	30	2,178	1,755	158	183	52	4,325
Single Point Supply C3(b)	132/66kV	3	45	6	. 418	340	31	23	:10	821

Table 11 Determination of Functional Rates based on Cost Drivers to Different Customer Categories

Based on the cost drivers (energy, demand & customers) based allocation of overall RevenueRequirement of MEPCO to the customers categories, the resultant functional (generation, transmission, MO Fee & Distribution) rates (in terms of Rs./kWh, Rs./kW/Month and Rs./Customer / Month, as applicable) are summarized in Table 12 below.

			Energy	Dema nd	Gener	ation Cost .	Transm	MOF	Distri	butlon	
Classes	Volt. Level	No. of Customers	GWh	мw	Energy (<u>Řs/</u> kWh	Demand (Rs/kW/ Month) 🖓	(Rs/kW /Month)	(Rs/kW/ Month)	(Rs/kW/ Month)	(Rs./ Cust/KW Y/ Month)	Total Rs./ kWh
ir dustrial 83	11kV	390	1,385	133	9.97	4,801.84	428.11	3.00	501.18	205.54	16.79
Industrial B4	132kV	10	606	84	9.34	4,498.83	401.10	2.81	302.61	127.79	18.21
Single P. Supply C2(b)	11kV	60	218	30	9.97	4,801.84	428.11	3.00	501.18	141.19	19.79
Single P. Supply C3(b)	132kV	3	45	6	9.34	4,498.83	401.10	2.81	302.61	125.83	18.35

Table 12 Functional Rates of Different Customer Categories Encapsulated in Rs/kW/Month

The above detailed functional rates recapitulated, in terms of Rs./kW/Month, for each function are given in table 13 below.

Table 13 Tariff-wise Functional Rate Allocation of RR

•			Energy	Demand	Genera	tion Cost	Transm	MOF	Distrib	ution	
Classes	Volt. Lovel	No. of Customers	GWh	MW	Energy (Rs/kWh)	Demand (Rs/kW/ Month)	(Rs/kW /Month)	(Rs/kW/Month)	(Rs/kW/Month)	(Rs./ Cust/KW/ Month)	(Total Rs./KW/Month
Industrial B3	11kV	390	1,385	133	8654.08	4,801.84	428.11	3.00	501.18	205.54	14593.75
Industrial B4	132k V	10	606	84	5619.74	4,498.83	401.10	2.81	302.61	127.79	10952,88
Single P. Supply C2(b)	11kV	60	218	30	6050.78	4,801.84	428.11	3.00	501.18	141.19	11926.10
Single P. Supply C3(b)	132k V	3	45	6	5810.54	4,498.83	401.10	2.81	. 302.61	125.83	11141.72

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8.1 Unbundled Rates Rs./kWh (Tariff Wise)

The functional allocation of Revenue Requirement of MEPCO (Generation, Transmission, MO Fee and Distribution Cost) to customers categories, in Rs./kWh are shown in **Table 14** below.

Voltage Customer Sales Demand Generation T. UoSC MOF D. UoSC Total Rate Rs./kWh Rs./kWh Rs./kWh Category GWh MW Rs./kWh Rs./kWh level 0.49 Industrial -- B3 11kV 1,385 133 15.49 0.003 0.81 16.79 Industrial -- B4 132kV 606 84 16.82 0.67 0.005 0.72 18.21 Single Point Supply -- C2(b) 11kV 218 30 18.00 0.72 0.005 1.07 19.80 Single Point Supply -- C3(b) 132kV 45 6 16.93 0.68 0.005 0.72 18.34

Table 14 Tariff-wise Functional Rate Allocation of RR

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Cost of service study MEPCO	2023
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8.2 Volumetric Rates at Each Customer Category

The above functional rates combined in terms of the nature (Fixed or Variable) and resultant rates in terms of Rs./kW/Month and/or Rs./kWh are provided in **Table 15** below.

Customer Category	Voltage Level	Sales GWh	Allocated C Fixed Cost	Cost Rs. (M) Variable Cost	Fixed Charge Rs/kW/Month	Variable Charge Rs/kWh
Industrial B3	11kV	1,385	9,127	14,139	5,734	10.21
Industrial B4	132/66kV	606	5,247	5,794	5,205	9.55
Single P. Supply C2(b)	11kV	218	2,095	2,230	5,734	10.21
Single P. Supply C3(b)	132/66kV	45	394	428	5,205	9.55

(able 15 Tariff & Voltage level wise Sales Volume, Allocation of Fixed and Variable Cost in Terms of Rs./kW/Month and/or Rs./kWh

Note: Variable Cost in Table 15 includes energy cost and customer services cost.

9. REVENUE, COST OF SERVICE AND SUBSIDIES (TARIFF CATEGORY WISE)

Based on assessment of revenue and the cost of service for each category of consumer, as per the details provided herein before, the Subsidy or Cross Subsidy (the difference between revenue and cost) in terms of million rupees against each customer tariff category is provided in **Table 16** below. It may be noted that the negative figure means the customer is subsidized (revenue less than cost) Whereas, the positive figure shows that the customer is cross subsidizing (revenue more than cost). Average, in terms of Rs./kWh, assessment of subsidy or cross-subsidy, as the case may be, is also arrived in the last column of Table **16** below.

				Revenu	e as per NEP	RA Tariff		Cost of Service			
Customer Class5	Voltage	Sales GWh	Demand MW	Demand Charge (M.PKR)	Energy Charge M.PKR	Total M. PKR	Demand Cost (M.PKR)	Energy Cost M.PKR	Total M. PKR	Difference Subsidy M. PKR	subsidy Rs./kwh
Industrial B3	11kV	1,385	133	1,620	33,489	35,109	9,127	14,139	23,266	11,843	8.55
Industrial 84	132kV	606	84	495	14,565	15,060	5,247	5,794	11,040	4,020	6.63
Bulk Supply C2(b)	11kV	218	30	233	5,317	5,550	2,095	2,230	4,325	1,225	5.62
Bulk Supply C3(b)	132kV	45	6	56	1,081	1,137	394	428	821	316	7.02

Table 16 Tariff wise Cross Subsidy Determination based on sales and demand

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10. REVENUE, COST OF SERVICE, SUBSIDY AND REVENUE TO COST RATIOS

Revenue, Cost of Service and Subsidy in terms of million rupees for each category of the consumers is shown in **Table 17** below. The Table also provides the Revenue to Cost Ratio which shows that:

- If this ratio is less than one, the relevant customer class is subsidized, i.e. the tariff revenue is less than the allocated cost;
- If this ratio is greater than one, the relevant customer class is cross subsidizing, i.e. the tariff revenue is higher than the allocated cost; and
- If this ratio is equal to one, the customer class is at adequately priced vis-à-vis the allocated cost.

				FY	2022-23						
1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 /	an a	1.14	NEPRA Rever	iue (PKR)	Cost of	Service	Differ	ence	Revenu	e to Cost F	latio
Customer Class	Sales (GWh)"	MDI MW	Demand Charge (M.PKR)	Energy Charge S M,PKR F	Demand Cost (M.PKR)	Énergy Cost M.PKR	Demand (M.PKR)	Energy M.PKR	Demand Charge	Energy Charge	total
Industrial B3	1,385	133	1,620	33,489	9,127	14,139	(7,507)	19,350	0.18	2.37	1.51
Industrial B4	606	84	495	14,565	5,247	5,794	(4,752)	8,771	0.09	2.51	1.36
Bulk Supply C2(b)	218	30	233	5,317	2,095	2,230	(1,862)	3,087	0.11	2.38	1.28
Bulk Supply C3(b)	45	6	56	1,081	394	428	(338)	653	0.14	2.53	1.38

Table 17 Revenue to Cost Ratio i.e. Difference of NEPRA Allocated and Required Revenue

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11. REVENUE, COST OF SERVICE AND SUBSIDIES (RS./KWH)

Revenue, Cost of Service and Subsidy in terms of Rs./kWh for each category of the consumers is shown in **Table 18** below. The Table also provides the Revenue to Cost Ratio.

Customer Class	Voltage	Sales GWh	Revenue Rs./kwh	Cost of Service Rs./kwh	Subsidy Rs:/kwh	Revenue to Cost Ratio
Industrial B3	11kV	1,385	25.34	16.79	8.55	1.51
Industrial B4	132kV	606	24.83	18.21	6.63	1.36
Bulk Supply C2(b)	11kV	218	25.40	19.80	5.61	1.28
Bulk Supply C3(b)	132kV	45	25.39	18.34	7.05	1.38

Valide 12 Tariff wise Revenue, Cost of Service and Subsidy in terms of Rs./kWh

12. REVENUE, COST OF SERVICE AND SUBSIDIES (11 KV AND ABOVE)

The revenue cost of service and subsidies for customer categories that fall under 11kV are summarized in Table 19 below.

Fable 1.3 Cross Subsidy for Eligible BPCs 1MW and above

				Revenue	as per NEPRA	Tariff		ost of Service			
Customer Class	Voltage	Sales GWh	Demand MW	Demand Charge (M.PKR)	Energy Charge M.PKR	Total M. PKR	Demand Cost (M.PKR)	Energy Cost M.PKR	Total M. PKR	Difference Subsidy M. PKR	CoS Rs./kwh
Industrial B3	í.1kV	1,385	133	1,620	33,489	35,109	9,127	14,139	23,266	11,843	16.79
Industrial B4	66/132KV	606	84	495	14,565	15,060	5,247	5,794	11,040	4,020	18.21
Bulk Supply C2(b)	11kV	218	30	233	5,317	5,550	2,095	2,230	4,325	1,225	19.80
Bulk Supply C3(b)	132kV	45	6	56	1,081	1,137	394	428	821	316	18.34

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13.REVENUE/KWH, COST OF SERVICE/KWH AND SUBSIDIES/KWH (BPC ONLY)

With regard to the above analysis, the following points are emphasized and limited:

- 1. For the purpose of this study, the connections which do not come in the category of eligible BPCs i.e. Customers connections having load less than 1MW have not been intensively probed into details.
- 2. Currently, there are 132/66 KV customer within MEPCO, therefore, real data, thereof could be assessed for B4 and C3 consumers.
- 3. A broad assessment of the Cost of Service of such customers on analogy of other closest category of customers (e.g. B-3 for B-4 and C-2 for C-3) could be incorporated by adding or subtracting the loss levels.
- 4. Although the Industrial B-3 and Bulk Supply C2 customers are at 11 KV connection level, however, these customers may or may not fall within the definition of BPC as contained in NEPRA Act, 1997, if these are less than 1 MW load.
- 5. The customer categories A-2 and A-3, for purposes of cost of service assessment, have been considered at 0.4 KV level. However, these costumers, based on the sanctioned load, may be connected at 11 KV level, as required.
- Consumer category for tariff H, i.e. housing colonies attached to industries, despite being connected at 11 kV, cannot be considered as BPC for (i) principally being resale in nature and (ii) being less than 1 MW.
- 7. The supply feed for AJK customer category is primarily for resale purpose, therefore, not entitled for consideration as BPC.
- 8. Taking a single peak and analyzing it with total sales may have unrealistic load factors.
- 9. In case of B3 and C2 connections being on the 11kV distribution feeder, the figures of aggregative sales and load may have disrupting outputs in FACOS Model

Based on the above clarification, the abstract of Revenue (Rs./kWh), the Cost of Service (Rs./kWh) and resultant cross-subsidy (Rs./kWh) is appended at **Table 20** below.

Customer Class	Voltage	Sales GWh	Revenue Rs./kwh	Cost of Service Rs./kwh
Industrial B3	11kV	1,385	25.35	16.79
Industrial B4	66/132KV	606	24.85	18.21
Bulk Supply C2(b)	11kV	218	25.46	19.80
Bulk Supply C3(b)	132KV	45	25.27	18.34

Table 20 Sales, Revenue, Cost of Service and Cross Subsidy for Eligible BPCs 1MW and Above

14. MASTER DATA FOR RESULTS OF MEPCO'S COST OF SERVICE STUDY (FY 2022-23)

For interest of the readers to glance through overall master data for result of MEPCO's Cost of Service Study (FY 2022-23), following Tables (**Table 21** to **Table 27**) are added separately.

15.FINAL REMARKS:

- The above Cost of Service Study Report (FY 2022-23) is a sincere human effort to arrive at judicious assessment of functional (generation, transmission, market operator, distribution and customer services) costs for each category of consumers demonstrating the needs and parameters associated with relevant category.
- The results of the study are to be used for the purposes of rate making of Use of System Charges for possible eligible Bulk Power Consumers.
- The Fully Allocated Cost of Service (FACOS) model used for the purpose of this study is
 realistically elaborate, professionally structured in line with international practices and
 reasonably accurate to provide equitable results in terms of costs associated with
 demonstrated needs of the customers. Human errors and omissions are, however, expected.
- The underlying assumptions made and considerations relied upon in carrying out this Cost of Service Study were adopted with all possible care, without any prejudice and have been disclosed in details to the extent possible.
- Inherent and unforeseen limitations of the FACOS model, assumptions made and consideration relied upon may not be as exhaustive as expected; accordingly, for the purposes of rate making of Use of System Charges, certain out of the model iterations may be necessary.
- While the Cost of Service is substantially (99%) covered by the determined tariffs, inherent cross subsidization and possibility of stranded costs need considerate, careful, concerted and continuous attention for proactive mitigation thereof.
- While currently certain classes of consumers are enjoying benefit of inter and intra tariff subsidies, the other categories of consumers are paying huge (30~35%) cross-subsidies. For a robust, vibrant and successful wholesale, and later retail, power market, minimization, if not elimination, of intra and inter tariff subsidies shall remain fundamental requirement.

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Table 15 Master Data for Results of MEPCO's Cost of Service Study (FY 2022-23)

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						μ	2022-23						
		Energy	GWh	Deman	MW P	Generatio	n Cost	Transm	MOF	Distributi	u		Cort
Classes	Voltage Level	Sold	Purcha	at Meter	at CDP	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	cust. Cost (Rs.M	Total Cost (Rs. M)	Rs./kWh sold
	14121	1 385	1 499	133	143	13,812	7,643	681	5	798	327	23,266	16.79
co Ibrusuni	AUTT							101	6	305	129	11.040	18.21
Industrial – 84	132/66kV	606	615	84	85	5,665	4,535	404	0	500			
	1111	218	236	30	33	2,178	1,755	156	ц.	183	52	4,325	19.80
Single Point Supply - Lalut	AUTT								6	72	10	821	18.34
Single Point Supply C3(b)	132/66kV	45	45	9	9	418	340	92	> 	3	2	5	

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Table 16 COST OF SERVICE FY 2022-23 (per kW or kWn SOLD)

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		Cost Rs./kWh sold	6.82	8.86	9.83	9.00	
		Total Cost (Rs. M)	5,939.67	5,333.13	5,875.32	5,331.18	
	oution	cust. Cost (Rs.M)	205.54	127.79	141.19	125.83	
	Distril	Demand (Rs.M)	501.18	302.61	501.18	302.61	
	MOF	Cost (Rs.M)	3.00	2.81	3.00	2.81	
consumer)	Transm	Cost (Rs.M)	428.11	401.10	428.11	401.10	
kW or kWh at C	tion Cost	Demand (Rs.M)	4,801.84	4,498.83	4,801.84	4,498.83	
FY 2022-23	Genera	Energy (Rs.M)	9.97	9.34	9.97	9.34	
	WW PL	at CDP	143	85	33	9	
	Demar	at Meter	133	84	30	9	
	GWh	Purcha sed	1,499	615	236	45	
	Energy	Sold	1,385	606	218	45	
		Voltage Level	11kV	132/66kV	11kV	132/66kV	
		Classes	Industrial – B3	Industrial – B4	Single Point Supply – C2(b)	Single Point Supply C3(b)	

Table 17 COST OF SERVICE FY 2022-23 (per kW or kWh at Purchased)

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		S J					
		Cost Rs./kWh sold	6.31	8.75	9.08	8.88	
		Total Cost (Rs. M)	5,490.29	5,261.67	5,430.81	5,259.74	
	bution	cust. Cost (Rs.M)	189.99	126.07	130.51	124.15	
	Distr	Demand (Rs.M)	463.26	298.56	463.26	298.56	
	MOF	Cost (Rs.M)	2.77	2.77	2.77	2.77	
(CDP)	Transm	Cost (Rs.M)	395.72	395.72	395.72	395.72	
23 (kW or kWh	ion Cost	Demand (Rs.M)	4,438.55	4,438.55	4,438.55	4,438.55	
FY 2022-:	Generati	Energy (Rs.M)	9.22	9.22	9.22	9.22	
	id MW	at CDP	143	85	33	9	
	Demar	at Meter	133	84	30	9	
	/ GWh	Purcha	1,499	615	236	45	
	Energ	Sold	1,385	909	218	45	
		Voltage Level	11kV	132/66kV	11kV	132/66kV	
		Classes	Industrial – B3	Industriał – B4	Single Point Supply – C2(b)	Single Point Supply C3(b)	

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Table 18 COST OF SERVICE FY 2022-23 (per kWh SOLD)

	Coet	Rs./kWh Purchase	16.79	18.21	19.80	18.34
	Crist	Rs./kwh sold	6.82	8.86	9.83	00.6
		Total Cost (Rs. M)	6.82	8.86	9.83	00.6
	ion	cust. Cost (Rs.M)	0.24	0.21	0.24	0.21
	Distribut	Demand (Rs.M)	0.58	0:50	0.84	0.51
	MOF	Cost (Rs.M)	0.003	0.005	0.005	0.005
DP)	Transm	Cost (Rs.M)	0.49	0.67	0.72	0.68
2-23 (kWh at C	ion Cost	Demand (Rs.M)	5.52	7.48	8.03	7.59
FY 202	Generat	Energy (Rs.M)	9.97	9.34	9.97	9.34
	4 MW	at CDP	143	85	33	6
	Demano	at Meter	133	84	30	9
	/ GWh	Purcha sed	1,499	615	236	45
	Energy	Sold	1,385	909	218	45
		Voitage Level	11kV	132/66kV	11kV	132/66kV
		Classes	industrial – B3	Industriai – B4	Single Point Supply C2(b)	Single Point Supply – C3(b)

Table 19 COST OF SERVICE FY 2022-23 (per kWh Purchased)

· .	Ah se	12	۱ø	0	٩ و	ł
+	Rs./kV Purcha	15.5	17.9	18.3	18.0	
tre tre	Rs./kWh sold	6.31	8.75	9.08	8.88	
	Total Cost (Rs. M)	6.31	8.75	9.08	8.88	
tion	cust. Cost (Rs.M)	0.22	0.21	0.22	0.21	
Distribut	Demand (Rs.M)	0.53	0.50	0.77	0.50	
MOF	Cost (Rs.M)	0.003	0.005	0.005	0.005	
Transm	Cost (Rs.M)	0.45	0.66	0.66	0.67	
on Cost	Demand (Rs.M)	5.10	7.38	7.42	7.49	
Generati	Energy (Rs.M)	9.22	9.22	9.22	9.22	
MW F	at CDP	143	85	33	9	
Demand	at Meter	133	84	30	9	
/ GWh	Purcha sed	1,499	615	236	45 -	
Energy	Sold	1,385	606	218	45	
	Voltage Level	11kV	132/66kV	11kV	132/66kV	
	Classes	industrial 83	Industrial B4	Single Point Supply C2(b)	Single Point Supply C3(b)	

Table 20 Impact of Losses on per kW or kWh basis (FY 2022-23)

at Meter at CDP Er 133 143 (R 84 85 (30 33 0	age ctretgy uwn eel Sold Purcha kv 1,385 1,499 66kV 606 615 vV 218 236	<u>s</u> eg <u></u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> <u></u> , <u>s</u> <u></u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> <u></u> , <u>s</u> <u></u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> <u></u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> , <u>s</u> <u></u> , <u>s</u> , <u>s</u> , <u>s</u> <u>s</u> <u>s</u> , <u>s</u> <u></u>
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Table 21 Impact of Losses on per kWh basis (FY 2022-23)

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		Cost Rs./kWh Purchase	1.27	0.24	1.50	0.25	
		Cost Rs./kWh sold	0.52	0.12	0.74	0.12	-
		Total Cost (Rs. M)	0.52	0.12	0.74	0.12	_
	uo	cust. Cost /Re M/	0.02	0:00	0.02	0.00	
	Distributi	Demand (Rs.M)	0.04	0.01	0.06	0.01	
	MOF	Cost (Rs.M)	0.0003	0.0001	0.0004	0.0001	-
er KWH basis)	Transm	Cost (Rs.M)	0.04	0.01	0.05	0.01	
t of Losses on p	on Cost	Demand (Rs.M)	0.42	0.10	0.61	0.10	
suzz-zs (Impac	Generati	Energy (Rs.M)	0.75	0.13	0.75	0.13	
È	MW P	at CDP	143	85	33	9	
	Deman	at Meter	133	84	30	9	
	, GWh	Purcha sed	1,499	615	236	45	
	Energ	Sold	1,385	606	218	45	
		Voltage Level	11kV	132/66kV	11kV	132/66kV	
		Classes	Industrial B3	Industrial B4	Single Point Supply – C2(b)	Single Point Supply C3(b)	

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Cross Subsidy Average Applicable Tariff	Total Cost of Service	Impact of allowed losses	Total Applicable Costs	Distribution Use of System	Market Onerator's Fee	Transmission Charnes	Generation Cost - Canacity	Generation Cost - Energy	Functional Cost Element	Lanif Category	Consumption Category	Cost Assessment Level	Average Applicable Lann	Cross Subsidy	Total Cost of Service	Impact of allowed losses	Total Applicable Costs	Distribution Use of System	Market Operator's Fee	Transmission Charges	Generation Cost - Capacity	Generation Cost - Energy		Functional Cost Element	Lantt Category	Consumption Category	Consumption Category		Average Applicable Lantr		Total Cost of Service	Impact of allowed losses	Total Applicable Costs	Distribution Use of System	Market Operator's Fee	Transmission Charges	Generation Cost - Capacity	Generation Cost - Energy		Functional Cost Element	Tallit Categoly	Tariff Category	Cost Assessment Level		Average Applicable Tariff	Crose Subsidy	Total Cost of Service	moact of allowed losses	Total Annicable Coste	Distribution Use of System	Market Operator's Fee	Transmission Charnes	Generation Cost - Canacity	Constain Cost - Econor	Functional Cost Element		Tariff Category	Consumption Category	Cost Assessment Level
	9.341		9.341				1.00	034	Rs./kWh	Variable		Cost of Se			9.341		9.341					9.341	Rs./kWh	Variable			01600	2			9.970		9.970					9.970	Rs./kWh	Antimatic	Variahle		Cost of Se				9 970		9 970				0.00	0 070	Rs./kWh	Variable			Cost of Se
	5,331.18		5,331.18	428.44	2.81	401 10	A AGR 93		Rs./kW/ Month	Fixe	DONNA DONNA	arvice (Inclusive			5,333.13		5,333.13	430.40	2.81	401.10	4,498.83		Rs./kWi Month		! 84	Inclusion	ation of the second s				5,875.09		5,875.09	642.37	2.77	428.11	4,801.84		Rs./kW/ Month		Fixe		Prvice (Inclusive			10.00,0	5 979 57	10.000	5 0 20 57	706 72	3 00	408 11	4 801 84		Rs./kW/ Month	Fixe	8-3	Industr	rvice (inclusive o
	8.999		8.999	0.723	0.065	0.677	7 504		Rs./kWh	ă)=	VIDE	of Energy Loss			8.864		8.864	0.715	0.005	0.667	7.478		Rs./kWh			stal	of Lieigy Luss				9.827		9.827	1.074	0.005	0.716	8.031		RsJkWh			1	of Energy Loss			470'0	E 874	0.027	E 934	0.812	204.0	0 492	5 517		Rs./kWh	4		ria)	or Energy Loss I
7.911 26.250	18.339		18.339	0.723	0.005	0.677	7 50/	1450	Rs./kWh	Total		Impact)	26.250	8.045	18.205		18.205	0.715	0.005	0.667	7.478	9.341	RsJkWh	lotal	•		Inipact		26,250	6,453	19.797		19.797	1.074	0.005	0.716	8.031	9.970	Rs./kWh	1.0001	Total		Impact)		26.250	0.452	46 704	10.794	46 704	0.812	201.0	10.0	0.070	0 070	RsJkWh	Total			Impact)
	9.341	0.125	9.216				017'6	270 0	Rs./kwh	Variable		Cost			9.341	0.125	9.216					9.216	RsJkWh	Vanable			1607	2			9.970	0.754	9.216					9.216	Rs./kWh	Validation	Variahla		Cost			3.370	0.70	0 754	0 742				017'6	210	Rs./kt/h	Variable			Cost
	5,331.18	71.43	5,259.74	422.70	2770	4,430.33	A ADD RE		Rs./kW/ Month	Fixe	Bulk Su	of Service (Separated			5,333.13	71.46	5,261.67	424.63	2.77	395.72	4,438.55		Rs./kW/ Month	Fixe	B4	Industr	of pervice (pervice to				5,875.32	444.51	5,430.81	593.77	2.77	395.72	4,438.55		Rs./kW/ Month	- 110		DC VIDE	of Service (Separated			3,333.07	5 010 CT	0, 00V	100 AD	20 233	71.000	205 77	1 1 2 5 5 5		Rs./kW/ Month	Fixe	B-3	Industr	of Service (Separated
	8.999	(0.085)	9.083	1 266 0	0.002	0.660	1 1 1		Rs_/kWh	α	ply	Energy Loss Impa			8.864	(0.219)	9.083	0,993	0.005	0.662	7.424		Rs./kWh				Energy Loss Impa				9.827	0.743	9.083	0.993	0.005	0.662	7.424		RsJkWh			YIE	Energy Loss Impa			b.824	0.010	0.300	0.1.01	0.003	0.400		E 400		Rs /kWh	a			Energy Loss Impa
7.911 26.250	18.339	0.041	18.299	0 993	0.005	1.424	9.210	222	Rs./kWh	Total		ct)	26.250	8.045	18.205	(0.094)	18.299	0.993	0.005	0.662	7.424	9.216	RsJkWh	Total			(CC)		26.250	6.453	19.797	1.498	18.299	0.993	0.005	0.662	7.424	9.216	Rs./kWh	Fotal	Tete		ict)		020 2C	16./94	1.2.1	15,523	10.10	0.003	0.455	5,100	912.6		Re /kWh	Total			Ct)
4,729,75	5,403.24	71.43	5,331.81	422 70	7/ CEC	4,438.55	/4.83		Rs./kW/ Month	MDI Based		PROPOS	10,245.83	4,840.17	5,405,66	71,46	5,334.20	424.63		395 72	4.438.55	75.30	Rs./kW/ Month		MDI Based		PROPOSITION PROPOS		10,182.02	3,858.48	6,323.54	444.51	5,879.03	593.77		395,72	4,438.55	450.99	Rs./kW/ Month		MDI Based		Sodoad	10.2.012.	13 079 81	6,300.71	449.00	5,941.33	C7.000	10 100 00 00 00 00 00 00 00 00 00 00 00	1 7 / CRF	4,438.55	453.81		De ILWI Month	MUL DASED	10 D		PROPOS
7.911	9.119	(0.085)	9.204	200 U	700.0	1.424	2125		Rs./kWh	Volumatric	Bulk Supply	ED Use of System	17.030	8.045	8.985	(0.219)	9.204	0.993	「「「「「「」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」	0.667	7.424	0.125	Rs./kWh		Volumatric	Industrial	ED Use of System		17.030	6.453	10.576	0.743	9.833	0.993	のないです。	0.662	7.424	0.754	RsJkWh		Volumatric	ulk Supply C-Z(b) (ED Use of System	1001	8,400	7.575	alc'n	650.7	10/.0	1.25 C	0.455	5,100	0,/54	I ANDREN	De ILWIH	VUUUUUUU	Volumental	Industrial B-3 (1 N	ED Use of System
1,844.05	1,844.05	21,430	1,577.09	176.81	110/2	1,331.56			Rs /kW/ Month	ну	C-3(b)	Charges (Proposa	1,599,11		1,599.11	21.44	1.577.67	127.39		118 72	1.331.56		Rs./kW/ Month		H	B-4	Charges (Proposa		1,761.77		1,761.77	133.35	1,628.41	178.13	The second second second	118.72	1,331.56		Rs./kW/ Month		Ну	1 MW or More)	Charges (Proposa	1,101,01	4 704 07	1,781.07	134.81	1,646.26	DR.CEL	1 402 Your Party Con-	118.72	1,331,56		Introduction (astronu	De feWi Month	Vr.		AW or More)	Charges (Proposa
7.911	7,579	(0 059)	6.480	D ROS	0.463	5.19/	21.0		RelkWh	brid		50	14,372	8.045	- 6.327	(0.153)	6,480	0.695	1. 「「「「「「「」」」」」	0.4F3	5.197	0.125	Rs./kWh		brid		「「おおおののないの」		14.083	6,453	7.630	0.52	7.109	0.695	「「「「ないない」」」	0.463	5,197	0.754	Rs./kWh		brid			14.200	44 005	5.529	0.301	5.168	c7C.0	ALL NO. IN PROPERTY OF	0.318	3,5/0	0.754	INANTEN		Disc			5

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MEPCO USE OF SYSTEM CHARGES PETITION FOR THE FY 2022-23

SUBMITTED BY

MULTAN ELECTRIC POWER COMPANY (MEPCO) AS SUPPLIER OF LAST RESORT

IN COMPLIANCE OF NATIONAL ELECTRICITY POLICY (NE POLICY) READ WITH REGULATION 7 OF NEPRA OPEN ACCESS (INTERCONNECTION AND WHEELING OF ELECTRIC POWER) REGULATIONS, 2022 ("OPEN ACCESS REGULATIONS")



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1. BACKGROUND

1.1 ABOUT THE PETITIONER MEPCO:

Multan Electric Power Company (MEPCO) was incorporated on 14th May1998 in line with Government policy of unbundling and corporatization of Pakistan power sector. MEPCO is responsible for the electricity delivery to over 7.6 million consumers of **13 administrative districts of southern Punjab** i.e. Multan, Muzaffargarh, Layyah, D.G. Khan, Rajanpur, Lodhran, Bahawalpur, R.Y. Khan, Khanewal, Sahiwal, Pakpattan, Vehari and Bahawalnagar, Pakistan as set out in MEPCO's Distribution License no. 06/DL/2002, granted by NEPRA under the NEPRA Act on April 25, 2002 as a result of the restructuring of WAPDA's Power Wing, MEPCO assumed its official operations and since then being headed by a Chief Executive Officer (CEO) and MEPCO Board of Directors.

1.2 PETITIONER MEPCO LICENSE DETAILS:

Under the provisions of Regulation of Generation, Transmission & Distribution of Electric Power (Amendment) Act, 2018, MEPCO is deemed to hold a "Power Supply" License to perform the function of sale of electric power in addition to existing licensee as Distribution Company. The Distribution function now shall, under Section 20, be limited to ownership, operation, management or control of distribution facilities for the movement or delivery to consumers of electric power. After the approval of Competitive Trading and Bilateral Contracts Market (CTBCM) by the honorable Authority on November 12, 2020 (No. NEPRA RJDL/LAM-01/40691-98) several implementation actions were taken. This included issuance of License for the Market Operator (MO) promulgation of several Regulations to ensure smooth implementation of CTBCM and create balance in roles, rights and obligations of the stakeholders in the CTBCM.

2. OBLIGATION & RATIONALE FOR PETITION:

Pursuant to the relevant directions of National Electricity Policy (NE Policy) read with regulation 7 of NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022 ("Open Access Regulations"), following are the grounds for petition for determination of use of system charges:

- a) In compliance with the Clause 4.4, Clause 5.5.2(f), Clause 5.5.2(g), Clause 5.5.4 and Clause 5.6.5 of NE Policy and
- b) In compliance with the regulation 7 Open Access Regulations, each distribution licensee, in consultation with the respective supplier of last resort shall, within ninety days following the date of notification of Open Access Regulation, submit separate petition to the Authority for determination of use of system charges.

2.1 DIRECTIONS IN NATIONAL ELECTRICITY POLICY:

- 1. The National Electricity Policy, 2021 issued under Section 14A of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (The Act) was prepared by the the Government of Pakistan for the development, reform, improvement and sustainability of the power market and power sector.
- 2. The National Electricity Policy identifies the major goals sought to be achieved for the power sector, and in this respect, provides policy directions. It also provides the key

in the power sector to achieve identified goals.

- 3. Various sections of the said National Electricity Policy, 2021, as relevant to the instant case, are provided in the below lines.
- 4. Clause 4.4 (Financial Viability) of the National Electricity Policy provides that sustainability of the entire power sector pivots around the financial and commercial viability of its individual sub-sectors. This will be done by:
- 5. <u>promoting investments on least cost basis balanced with development in the underserved</u> <u>areas:</u>
- 6. having cost-reflective tariffs in transmission and distribution, to the extent feasible;
- 7. timely passing of costs to the consumers, while netting off any subsidies funded by the Government; and
- 8. recovery of costs arising on account of open access, distributed generation, etc.
- 9. Clause 5.5.2(f) of National Electricity Policy also provides:
 - a. <u>"providing a level playing field to all market participants through uniform</u> <u>application of cross-subsidization and other grid charges to consumers of all</u> <u>suppliers:</u>
- 10. Clause 5.5.2(g) of National Electricity Policy also provides:
 - a. <u>"the Government shall take a decision on the recovery of costs that arise due to</u> advent of the open access and market liberalization;"
- 11. Clause 5.5.4 of National Electricity Policy further directs:
 - a. "In order to ensure implementation of wholesale market design and its further evolution, the Regulator shall in a timely manner frame, modify and evolve regulatory framework for, inter alia, supply, procurement, open access / wheeling, competitive bidding, import of power, and ensure effective market monitoring and enforcement. Provided that after implementation of CTBCM, every transmission licensee and distribution licensee shall offer, to all market participants, nondiscriminatory open access / wheeling to its respective transmission or distribution system and interconnection services in accordance with CTBCM on the terms determined under the policy and legal framework."

12. As per Clause 5.6.5 of National Electricity Policy stipulates:

a. "The Regulator, in order to ensure liquidity of the power sector, provides a level playing field for the development of wholesale market and to facilitate prudent projects of the Government, may impose additional charge(s) which shall be deemed to be costs incurred by the distribution companies / electric power supplier(s). Such additional charge may take into account the sustainability, socioeconomic objectives and commercial viability of the sector, affordability for the consumers and the policy of uniform tariff. Similarly, the Government may also incorporate, in the consumer-end tariff, any surcharge imposed by it, which shall also be deemed to be cost incurred by the distribution companies / electric power supplier(s) and shall be collected by them in discharge of their public service obligations."

2.2 LEGAL AND REGULATORY FRAMEWORK:

The approved design of Competitive Trading and Bilateral Contracting Market (CTBCM) provides the right of choice to the eligible Bulk Power Consumers (BPCs) to opt for any Supplier of Electric Power. The design, within the framework of the Act, also provides the concept of Competitive Supplier of Electric Power besides the Supplier of Last Resort, for the purposes of said right of choice to the BPCs within the said wholesale market design.

As directed in Clause 5.5.4 of the said National Electricity Policy, 2021, the honorable Authority promulgated / specified several Regulations to ensure effective implementation of the market regime in Pakistan. This included promulgation of National Electric Power Regulatory Authority



Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022 ("Open Access Regulations").

For the purpose of this petition for determination of Use of System Charges in terms of mentioned Open Access Regulations, following terms as defined in the legal and regulatory framework are reproduced as below:

As per Section 2(ii) of the Act 1997 amended to date:

"bulk-power consumer" means a consumer who purchases or receives electric power, at one premises, in an amount of one megawatt or more or in such other amount and voltage level and with such other characteristics as the Authority may specify and the Authority may specify different amounts and voltage levels and with such other characteristics for different areas"

Important definitions provided in Regulation 2 of Open Access Regulations are provided below:

2(1)(m) "open access" means the access to a network licensee's system or its associated facilities for movement and delivery of electric power, subject to the terms and conditions as provided in the Act, these regulations and use of system agreement, on non-discriminatory basis to:

- a) an electric power supplier for supply of electric power to its consumer(s); or
- b) a captive generating plant for delivery of the electric power from generation facility to the destination of its use; or
- c) any other person, including a licensee for delivery of electric power from a designated place to another designated place;

2(1)(n) "open access user" means any person who is availing open access under these regulations; and

2(1)(r) "use of system charges" shall include all charges related to use of distribution system, use of transmission system, system operator services, market operator services, metering service provider services and any other charges as determined by the Authority that may arise due to advent of the open access and market liberalization.

Part-III (OPEN ACCESS) Regulation 5 (Obligation to provide open access) of Open Access Regulations is reproduced hereunder:

- i. <u>A network licensee shall establish, operate and maintain its distribution system or transmission system, as the case may be, in a manner that ensure non-discriminatory open access in accordance with the Act, theses regulations, Market Commercial Code, Grid Code, Distribution Code and other applicable documents.</u>
- ii. A network licensee shall, on an annual basis, prepare an open access report demonstrating compliance with these regulations and licence terms and conditions, with the detail of its open access users, available and planned capacity, any issues identified in provision of open access, and any instances where open access was denied along with justification thereof. The said report shall also be made available on the website of the network licensee.
- iii. The report required under sub-regulation (2) shall be prepared and submitted to the Authority within a period of one month from the date of end of respective financial year and shall also be made available on the website of the network licensee.
- iv. <u>The distribution company shall develop the use of system agreement in accordance with</u> the minimum provisions provided in Schedule I within ninety days of the notification of these regulations and shall obtain the approval of the Authority and publish the same in its website.

Regulations provides as under:

Within ninety days following the date of notification of these regulations, each distribution licensee, in consultation with the respective supplier of last resort, shall prepare and submit separate petition to the Authority for determination of its use of system charges. Such petition shall be accompanied with a statement which will set out the basis upon which the use of system charges shall be calculated in such manner and with such details as shall be necessary.

Regulation 8 (Wheeling of electric power) of Open Access Regulations states under:

An open access use shall be entitled to wheel electric power using system of network licensee subject to compliance with these regulations and the Market Commercial Code, upon coming into effect, and use of system agreement.

3. TECHNICAL AND FINANCIAL ATTRIBUTES:

Adjoining the purposes of CTBCM, directions of the National Electricity Policy, 2021 and stipulations of the legal and regulatory framework; following understandings are inferred:

- 1. The network licensee, the MEPCO for the purposes of instant petition, is obligated to provide open access to its network to the open access users on non-discriminatory basis.
- 2. For the said obligation, the MEPCO is entitled for recovery of use of system charges in line with use of system agreement, as determined by the honorable Authority.
- 3. The use of system charges shall include:
 - a. Transmission Use of System Charges (NTDC, PGC) irrespective of the placement of BPC and the respective generator.
 - b. System Operator Charges
 - c. Metering Service Provider Charges
 - d. Market Operator Charges
 - e. Distribution Margin Charges w.r.t to the voltage level (132kV, 11kV etc) and consumer category wise for all possible BPC
 - f. Cross-Subsidy Charges (consumer category wise for all possible BPCs)
 - g. Stranded Cost/Capacity (consumer category wise for all possible BPCs)
 - h. Technical Transmission and Distribution Losses
- 4. With reference to the above elements of use of system charges, following clarification shall apply for clarity of application:
 - a. Currently applicable Transmission Use of System (TUoS) Charges, as already determined by the honorable Authority, compositely represent the charges relating to Transmission Network Operator(s)/Licensee(s), System Operator and Metering Service Provider. Accordingly, the said TUoS Charges remain part of use of system charges till separate charges for each of the said service providers are separately determined by the honorable Authority.
 - b. Market Operator Fee / Charges (MOF) will be recovered by Market Operator as per the mechanism provided in the Market Commercial Code. Accordingly, without prejudice to being part of Cost of Service of MEPCO, these shall not form part of use of system charges to be recovered directly by MEPCO
 - c. Cross subsidy will be assessed based on Cost of Service analysis for the applicable consumer categories of all possible BPCs, which is according to the principles of uniformity as provided in the National Electricity Policy (referred above).
 - d. Subject to the decision of the Government on the recovery of costs that arise due to advent of the open access and market liberalization, the Stranded Capacity Costs will include the use of system charges.



MEPCO USE OF SYSTEM CHARGES PETITION 2022-23

e. As the transmission and distribution losses will be charged to market participants of open access through the mechanism as explained in the Market Commercial Code, therefore, such charges shall not be levied under these use of system charges as requested under this instant petition.

Explanation

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The use of system charges will be determined in terms of metered quantities (kWh or kW), in consideration of allowed %age of losses and also that arrangements under the Market Commercial Code the parties (the BPC, Competitive Supplier and/or Generator) shall be committing to the Capacity Obligation (including all losses and reserve margin up to bus-bar) through Firm Capacity, therefore, such transmission or distribution losses, as the case may be, will not be charged separately. However, for the purposes of transparency of charges, the impact of such losses may be separately disclosed.

- f. The use of system charges, including the Distribution Margin Charges, as requested by MEPCO and to the extent approved by Authority, will be applicable with reference to those eligible Bulk Power Consumers (BPCs) who opt for supply from a competitive supplier, other than supplier of last resort.
- g. The use of system charges shall be with reference to the voltage level (132/66 kV, 11/33 kV) for the applicable consumer categories of all possible BPCs. The component-wise Cost of Service as per outcome detailed Cost of Service Study (Annex-2) and consequent assessment, as detailed above, of component-wise Use of System Charges for the applicable BPCs is provided at Annex 1.
- h. Power Factor Penalty as provided in applicable documents shall remain applicable in addition to the Use of System Charges.
- i. Any taxes and surcharges as imposed by the Government shall be applicable.

Sr. No. **Use of System Charge Element Entitled Entity** 1. Transmission Use of System Charge NTDC and other TSPs through NTDC/NGC. 2. System Operator Charge / Fee System Operator through NTDC. 3. MSP Charge / Fee MSP through NTDC 4. Distribution Use of System Charge MEPCO as Distribution Licensee 5. Cross Subsidy MEPCO as SOLR (Supply Licensee)

MEPCO as SOLR (Supply Licensee)

Summarizing the above, following is the abstract of entitled entities for each element of the use of system charges:

4. BASIS OF USE OF SYSTEM CHARGES:

Stranded Capacity Costs

6.

The instant petition for determination of use of system charges is framed under guidelines provided in the NEPRA Open Access (Interconnection and Wheeling of Electric Power) Regulations, 2022 considering Model year i.e. FY 2022-23 and Prior year i.e. FY 2021-22 as base year. The cost of service study was carried out by MEPCO for the eligible BPCs of different categories who want to opt for competitive supplier leaving SOLR and wanted to use wire business facilities of SOLR about the cost reflective tariff and cross subsidies as attached hereto Annex-1.

4.1 METHODOLOGY FOR RECOVERY OF USE OF SYSTEM CHARGES:

The instant petition is for determination of use of system charges for recovery of costs and charges relating to service providers (SO, TNO, TSP, DNO), stranded capacity costs and the cross-subsidy currently being contributed by the eligible BPCs. It is pertinent to mention that

- 1. Use of system charges recovery in term of Rs./kW/Month metered shall provide guaranteed stream of revenue to cover for costs which are fixed in nature. This may, however, over burden the relevant consumers thus undermining the very purpose of CTBCM and open access regime.
- 2. Use of system charges recovery in term of Rs./kWh will render the service providers and the SOLR to face the revenue loss arising from low load factor of the eligible BPCs. On the other hand the open access users shall be benefitted for any favorable Energy or Capacity Imbalance at the Market this option may not provide a balanced approach to promised sharing of risks and rewards under CTBCM regime.
- 3. Use of system charges recovery through a hybrid approach, i.e. partly through fixed charge in terms of Rs./kW/Month (subject to minimum MDI compared to the contracted load) and partly in terms of Rs./kWh may provide a balanced plausible approach for all the involved parties. It is submitted that, in order to ensure level playing field for consumers of SOLR and Competitive Supplier, the recovery of use of system charges may have same charging mechanism.

As already mentioned, **Annex-1** to this petition also include proposed rates to be charged under each of the Three (3) options narrated above.

It is, however, noted that the methodology and process as per FACOS model, for the purpose of allocation of demand (kW or MW) related costs, allocates single system peak demand (of MEPCO) to different categories to arrive at the allocation base. This allocation, irrespective of being rational, judicious and in line with international norms, results in less than actual (billable) MDIs of respective customers. Accordingly, taking the same MW demand as denominator for demand (MW) based rate making will result in higher per MW rates

4.2 MECHANISM FOR ADJUSTMENT/INDEXATION OF USE OF SYSTEM CHARGES:

Each component of use of system charges detailed in the instant petition shall be subject to periodic adjustment/indexations. Whenever these components are adjusted for regulated consumers of the suppliers of last resort, at the same time, the corresponding adjustment in the relevant component of the proposed Use of System Charges for eligible BPCs shall simultaneously be made.

4.3 APPLICABLE CATEGORIES OF ELIGIBLE BPCS UNDER EXISTING TARIFF REGIME:

While, in terms of existing stipulation of the Act, a consumer who purchases or receives electric power, <u>at one premises</u>, in an amount of <u>one megawatt or more</u> is considered as Bulk Power Consumer, following position, with regard to consumer with one megawatt or more load at connection voltage 11 kV and above, is brought out for consideration:

Sr.	Consumption	Tariff	Voltage	Remarks
No.	Category	Category	Level	
1.	General	A-2 & A- 3	N/A	As per the existing tariffs, no kW sanctioned load quantification or connection voltage is applicable to A-2 and A-3 tariff categories. Accordingly, these are not considered BPC for the purposes of this petition. However, these customers, based on the sanctioned load, may be connected at 11 KV level, as





MEPCO USE OF SYSTEM CHARGES PETITION 2022-23

2.	Industrial	B-3	11/33 kV	required. Any such customer falling within the definition of BPC, and subject to the approval of the Authority, will be considered in the analogy of C2. B 3 consumer ranges from 500 kW to
	Consumer ranging from 500 kW to 5 MW. [extendable to 7.5 MW under conditions]			5 MW.[Extendable to 7.5 MW under conditions] It is clarified here that the consumers of this category below 1MW shall not be treated as eligible BPCs for CTBCM. The use of system charges indicated for B-3 category will apply in case of eligible BPC.
3.	Industrial	В-4	66/132 kV and above	The use of system charges for B-4 category of consumers are assessed in the analogy of B-3 adjusted with differential of allowed losses at 11/33 kV (B-3) and 66/132 kV (B-4)
4.	Bulk Supply Ranging from 500 kW to 5 MW. [extendable to 7.5 MW under conditions]	C-2(b)	11/33 kV	Bulk Supply consumer ranges from 500 kW to 5 MW. [Extendable to 7.5 MW under conditions] Although the Bulk Supply C-2 customers are at 11/33 KV connection level. It is clarified here that the consumers of this category below 1MW shall not be treated as eligible BPCs for CTBCM. The use of system charges indicated for C-2 category will apply in case of BPC at one premises. Further, the consumers falling under the resale shall not be considered as eligible BPC.
5.	Bulk Supply	C-3(b)	66 kV and above	The use of system charges for C-3(b) category of consumers are assessed in the analogy of C-2(b) adjusted with differential of allowed losses at $11/33$ kV (C-2) and $66/132$ kV (C-3). The consumers falling under the resale shall not be considered as eligible BPC.
6.	Housing Colonies attached to Industries	Н	N/A	As per the existing tariffs, no kW sanctioned load quantification or connection voltage is applicable to H tariff category. Further, these connections are resale in nature. Accordingly these are not considered BPC for the purposes of this petition.
7.	Azad Jammu & Kashmir	K	N/A	The supply feed for AJK customer category is more than 1 MW at 11 kV level. However, the same is primarily for resale purpose, therefore, not considered as BPC.

5. OTHER IMPORTANT CONSIDERATIONS IN INSTANT PETITION:

Following paragraphs of the petition highlights other important aspects which shall be taken into account while determining the said charges.

Government Subsidies

applicable, will be dealt with according to the directions and terms and conditions thereof as decided by the Government. However, for the purposes of this petition, such subsidies are not considered.

5.1 CAPTIVE POWER PRODUCERS AND USERS:

- 1. A captive power producer / user using the MEPCO network for wheeling of power to user destination will be considered "Market Participant" in terms of Market Commercial Code and will be dealt with accordingly. The use of system charges, except the Cross-Subsidy and Stranded Capacity cost, shall fully apply.
- 2. The cases of captive generation and consumption points at the same location taking additional supply from the local supplier of last resort (SOLR) shall be considered a regulated consumer of the SOLR with applicable regulated tariff. The quantum of additional sanctioned / contracted load (in terms of MW) shall be considered to determine its status as BPC in terms of the Act.
- 3. In case, the BPC choose to opt for a competitive supplier leaving SOLR, the use of system charges shall apply in full.

5.2 APPLICABILITY OF STRANDED CAPACITY COSTS:

The costs arising on account of market liberalization and advent of open access shall be the capacity charges/stranded costs to be paid by all eligible BPCs of a competitive supplier as detailed in this instant petition and the amount of such capacity charges shall be the same as the total generation capacity charges recovered from the equally placed BPCs of the suppliers of last resort either in a volumetric form (kWh) and/or through fixed charges and such charges shall continue to be paid till such time as may be decided by the Federal Government as per the National Electricity Policy.

5.3 APPLICABILITY OF USE OF SYSTEM CHARGES FOR NEW ELIGIBLE BPCS:

The Use of System Charges provided in the instant petition shall be applicable to all such BPCs who will opt to avail supply of electric power from competitive supplier including the captive generator using the distribution or/and transmission network to wheel its power to the destination of its use. Such charges shall be fully applicable to any new eligible BPC or incremental consumption, obtaining supply of electric power from competitive supplier without any exception.

6. PRAYER OF MEPCO AS PETITIONER:

In view of the above submissions, it is humbly requested that the Authority may kindly consider and determine the Use of System Charges as calculated in the attached Annex-1, containing detailed analysis from eligible BPCs falling under different categories as stated above who want to avail supply of electric power from competitive suppliers leaving SOLR.





MEPCO USE OF SYSTEM CHARGES PETITION 2022-23

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MEPCO COST OF SERVICE STUDY FOR FY 2022-23

PREPARED BY

MULTAN ELECTRIC POWER COMPANY (MEPCO)

UNDER GUIDELINES OF

USAID CONSULTANT, PSIA

THE COST OF SERVICE STUDY OF MEPCO IS CONDUCTED ON THE MS EXCEL BASED FULLY ALLOCATED COST OF SERVICE (FACOS) MODEL DEVELOPED BY USAID TO FACILITATE DISCOS FOR DEVELOPMENT OF COMPETITIVE ENERGY MARKET



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Multan Electric Power Company (MEPCO) Ltd.

1. COST OF SERVICE STUDY:

Cost of Service is the total cost incurred by a utility company/DISCO in providing services to its customers and the allocation of the cost to different customer classes and/or voltage levels.

1.1 Fully Allocated Cost of Service Study (FACOS) Model

FACOS is a model developed in MS Excel with the support of USAID for DISCO's to conduct Cost of Service Study. The methodology used to build the FACOS Model follows very closely the standards that are used internationally. The Model performs the standard three steps encompassed in most of Cost related Studies, namely, functionalization, classification, and allocation.

1.2 Major Steps of Cost of Service Study

A class based cost of service study begins with a detailed documentation of the numerous budgetary elements of the total revenue requirements of a utility. The detailed revenue requirements are the data inputs to the FACOS Model. At a high level, the FACOS process consists of the following three (3) basic steps:

- 1. <u>Functionalization</u> The identification of each cost element as one of the basic utility service "Functions" (e.g. generation/Power Purchase Price, transmission, distribution and customer).
- <u>Classification</u> The classification of the functionalized costs based on the billing component/determinant that each is associated with (e.g. kWs of capacity, kWhs of energy or number of customers).
- 3. <u>Allocation</u> The allocation of the functionalized and classified costs to customer classes, based on respective service requirements / parameters (e.g. kWs of capacity, kWhs of energy and the number of customers) of each class.

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Table 1 Major Assumption of FACOS Model

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Description	FY 2022-23
Allowed Rate of Return (WACC) (NEPRA Determination)	
	17.50%
Capital Work in Progress ("CWIP")	CWIP 100%
Working Capital Allowance to be included in Rate Base	NO
Prior Year Adjustment (Rs. in Million)	22,673
Demand Allocation Methodology	1 CP
	(Single Annual Peak)
Customer Growth %	5.76%
Model Year	FY 2022-23
Base Year	FY 2020-21

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2. PROJECTIONS FOR REVENUE REQUIREMENT OF MEPCO 2022-23:

The Revenue Requirement (RR) is the fundamental input to the Cost of Service Model of MEPCO for revenue allocation to different categories of customers based on Capacity (kW), Energy (kWh) and number of consumers. The Table 2 below explains in detail the projected cost to be incurred for arriving at Revenue Requirement (Overall Cost of Service) of MEPCO for Model Year 2022-23.

Table 2 Component Wise Revenue Requirement of MEPCO

DECORPTION	MODEL YEAR		
DESCRIPTION	FY 2022-23		
Proj. Units Purchased (M kWh) incl export loss	23,860		
Proj. Units Sold (M kWh) by MEPCO to consumers	20,379		
Assessed T&D Losses	14.59%		
Average Monthly MDI (MW)	4,566		
Energy Purchase Price (Rs/kWh)-ETR	8.82		
Capacity Purchase Price (Rs/kW/Month)-CTR	4,273		
UoS Rate (Rs/kW/Month)	383.66		
POWER PURCHASE PRICE	PKR		
Energy Charge	210,345,112,640		
Capacity Charge	234,150,000,000		
Transmission Charge	21,022,000,000		
TOTAL	465,517,112,640		
DISTRIBUTION MARGIN			
Pay & Allowances	18,585,765,169		
Provision for Retirement Benefits	10,836,590,720		
Maintenance	1,537,000,000		
Traveling allowance	1,219,000,000		
Vehicle maintenance	684,000,000		
Elec. Bills Collection Charges	0		
Other expenses	6,393,644,110		
TOTAL O&M COST	39,256,000,000		
Other Income	9,088,000,000		
Provision for bad debts	0		
Depreciation	6,065,346,289		
Return on Assets	12,078,624,222		
Working Capital Allowance	0		
TOTAL DISTRIBUTION MARGIN	46,716,296,347		
Prior Year Adjustment	22,673,000,000		
TOTAL REVENUE REQUIREMENT	534,906,408,987		
AVERAGE TARIFF (Rs/kWh)			
Power Purchase Price-Unadj.	19.51		
Power Purchase Price-Adjusted	22.84		
Distribution Margin	2.29		
Prior Year Adjustment	1.11		
AVERAGE TARIFF (Rs/kWh)	26.25		

3. SUMMARY OF REVENUE REQUIREMENT:

The summary of Revenue Requirement of MEPCO is provided in the Table 3 below:

·	DESCRIPTION		MODEL YEAR
1	POWER PURCHASE COST	l.	PKR 465,517,112,640
2	DISTRIBUTION MARGIN	stear point	PKR 46,716,296,347
Α	Operation and Maintenance Expense		PKR 37,660,325,837
В	Depreciation of Distribution Plant		PKR 6,065,346,289
C*	Return on Rate Base	4	PKR 12,078,624,222
	GROSS DISTRIBUTION MARGIN		PKR 55,804,296,347
D	Less: Other Income		PKR 9,088,000,000
	NET DISTRIBUTION MARGINS		PKR 46,716,296,347
3	PRIOR YEAR ADJUSTMENTS	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	PKR 22,673,000,000
	TOTAL REVENUE REQUIRED		PKR 534,906,408,987

Table 3 Summary of MEPCO Revenue Requirement

4. LINE LOSSES ON NETWORK CHARGED TO DIFFERENT VOLTAGE LEVELS:

Line losses taken from as a percentage on purchased units is given in **Table 4**. Line losses as a percentage on received units at each voltage level are calculated on the basis of sales data of FY 2021-22. The network losses of Table 4 are based on the third party studies conducted for STG and Distribution losses and segregation of current losses as per last conducted studies on pro rata basis. However, any further study will have immediate effect on Cost of service studies as and when conducted through third party.

Table 4 MEPCO Line Losses at Different Voltage levels as per Business plan

Voltage Level	0.2 kV 0.4 kV	11 kV	Total Distribution	132kV	Total
Losses %age	7.20%	6.05%	13.25%	1.34%	14.59%

However, the losses asked by MEPCO and approved by NEPRA in MYT are as under:

Voltage Level	0.2 kV 0.4 kV	11 kV	Total Distribution	-132kV	Total
Asked by MEPCO			13.25%	1.34%	14.59%
Approved by NEPRA	2.79%	8.21%*	11%	1.34%	12.34%

* MEPCO approved NEPRA MYT section 78.3 Page 76

5. CUSTOMER CLASSIFICATION BY VOLTAGE LEVEL:

While the Cost of Service study is based on allocation of the Revenue Requirement on Classes (categories) of the consumers at different voltage levels; the **Table 5** below provides mapping of existing categories of consumers on the basis of applicable voltage levels.

Classification by Voltage Level						
Voltage	132/66kV	11kV	0.4kV	0.2 kV		
	B4	B3	A1b	A1a		
	C3a	C2a	A2b	A2a		
	C3b	C2b	A2c	B1a		
		H1	A3a	C1a		
0		H2	B1b	E1i		
ust		K1a	B2a	E1ii		
n n n		K1b	B2b	E2		
er (C1b			
Clas			C1c			
i ű			D1a			
			D1b			
			D2a			
			D2b			
			G1			
			G2			

Table 5 Classification of Different Consumer Categories with respect to Voltage Levels.

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6. MEPCO TARIFF DETERMINED BY NEPRA IN JULY-2022:

Tariffs for various categories of MEPCO consumers as determined by NEPRA vide their determination No. NEPRA/RIADG(Tariff)/ TRF- 100/X WDISCOs/13540- 13542 dated 22-07-2022 are provided in Table 6 below.

	TARIFF CATAGORIES	Fixed Charges Rs./KW/M	Variable Charges Rs./kWh
;- I	Up to 50 Units Life line		5.00
ii	51-100 units Life line		15.60
iii	01-100 Units		18.66
iv	101-200 Units		20.67
v	01-100 Units		21.26
vi	101-200 Units		24.45
vii	201-300 Units		24.96
vili	301-400Units		26.20
ix	401-500Units		26.64
x	501-600Units		27.64
xi	601-700Units	-	28.64
xii	Above 700 Units		29.64
A1(b)	Time of Use (TOU) – Peak		28.64
	Time of Use (TOU) - Off-Peak		21.26
E-1(i)	Temporary F-1 (i)		29.64
	COMMERCIAL - 42		
A2 (a)	Commercial - For neak load up to 5 kW		25.62
A2 (b)	Sanctioned load 5 kw and above	500	23.64
A2 (c)	Time of Use (TOU) - Peak (A-2)	500	28.64
	Time of Use (TOU) - Off-Peak	500	22.54
F-1 (ii)			25.67
			25,02
B1(a)	D1		24.62
B1(b)			29.51
01(0)			20.51
B2 (a)			22.41
B2 (b)	B2 - TOUL (Posk)	500	24.51
02 (0)	P') - TOU (Off pook)	500	20.51
83	P2 TOU (On-peak)	460	21.51
	B3 - TOU (PEak)	460	23.31
84	Pd TOU (Book)	400	23.51
	B4-100 (PEak)	400	20.51
F-2	Tomporany 5.2		23.11
			27.51
C1 (a)			25.25
C1 (b)	C1(b) expending E kik/		25.25
C1 (c)	Time of Lice (TOLI) - Peak	500	23:03
	Time of Use (TOU) - Off Book	500	22.04
(2 (a)	C2 Supply at 11 kV	460	24.95
C2 (h)	Time of Lice (TOLI) - Peak	460	28.64
(-)	Time of Use (TOU) - Off-Peak	460	23.44
C3 (a)	C3 Supply above 11 kV	440	24.84
C3 (b)	Time of Lise (TOLI) ~ Peak	440	28.64
()	Time of Use (TOU) - Off-Peak	440	23.24
D1 (a)	Di Scare		25.25
D2 (a)	D2 Agricultural Tube-wells	200	25.25
D1 (h)	Time of Lise (TOLI) - Peak	200	23.23
	Time of Use (TOU) - Off-Peak	200	22.04
D2 (h)	Time of Use (TOU) - Peak	200 200 '	28.64
	Time of Lise (TOU) - Off-Peak	200	20.04
G	Public Lighting G	200	28.04
<u>-</u>	Residential Colonies H		20.34
к1	Special Contracts - Tariff K (AIK)		0.00
K1 (i)	Time of Lise (TOLI) - Peak		0.00
	Time of Use (TOU) - 1 Can		0.00
Δ3	General Service		25 70
23-2			

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Table 6 NEPRA Determined Tariff for Different Consumer Categories of MEPCO

7. RESULTS FROM FACOS MODEL:

7.1 Proposed Revenue Requirement Allocation (in Percentage)

While developing the Fully Allocated Cost of Service Model, the detailed study for allocation of cost of service and rate base (for each component) to cost drivers (energy, demand and customer) was developed. When the distribution business is isolated from the supply business, the proposed cost allocation percentage may be considered as under proposed in Table 7 below. However, the real cost of distribution and supply business will be depicted when these may run in real business.

Table 7 Proposed Allocation of COS & RB to Cost Drivers i.e. Energy, Demand and Customer percentages

Revenue Requirement Allocation %age								
Description Energy Demand Customer Total								
Energy Charges	100%	-	-	100%				
Capacity Charges	-	100%	-	100%				
T.UoSC	-	100%	-	100%				
MOF	-	100%	-	100%				
O&M Cost	-	65%	35%	100%				
Depreciation	-	80%	20%	100%				
RORB	-	82%	18%	100%				
Other Income	-	82%	18%	100%				
Prior Year Adjustment	-	65%	35%	100%				

7.2 Revenue Requirement Allocation to Energy, Demand and Customer

Based on the allocation percentages given in above table, the revenue requirement allocated to energy, demand and customer (cost triggers) is shown in **Table 8** below.

Summary of Revenue Requirement					
Description	FY 2022-23 Rs. (M)				
Energy Charges	210,345				
Capacity Charges	234,150				
T.UoSC	20,870				
MOF	152				
Power Purchase Price	465,517				
O&M Cost	37,660				
Depreciation	6,065				
RORB	12,079				
Other Income	(9,088)				
Distribution Margin	46,716				
Prior Year Adjustment	22,673				
Revenue Requirement	534,906				

Table 8 Summary of Revenue Requirement w.r.to Cost Drivers

7.3 Revenue as per NEPRA Tariff by Customer Category and Voltage Level

The Table 9 below provides detailed category-wise estimated revenue and average (Rs./kWh) thereof. Whereas, the Table 10 is summary of the said category-wise estimated revenue based on the supply Voltage level of relevant customer category, with average rate (Rs./kWh) thereof. As already mentioned, the calculation of revenue is based on NEPRA Tariff determined vide No. NEPRA/RIADG(Tariff)/ TRF- 100/X WDISCOs/13540- 13542 dated 22-07-2022 already provided in (Table6).

Customer Category	MDI MW	Sales (GWh)	Fixed Charge Rs. (M)	Variable Charge Rs. (M)	Total Revenue Rs.(M)	Rs./KWh
Industrial B3	133	1,385	1,620	33,489	35,109	25.34
Industrial B4	84	606	495	14,565	15,060	24.83
Single Point Supply C2(b)	30	218	233	5,317	5,550	25.40
Single Point Supply C3(b)	6	45	56	1,081	1,137	25.39

Table 10 Allocation of Sales and Demand to Voltage Levels & Segregation of Fixed and Variable Costs

		Demand	NEPRA Revenue		
TARIFF CATAGORIES	Sales	1 ÇP	Fixed Charge	Nariable Charge	
Voltage Level	(kWh)	MW	, Rs 🔿	Rs · ·	
0.2 kV	11,357,556,641	2,534.75	4,230	262,478,818,205	
0.4 kV	6,757,372,909	1,116.22	8,365,656,506	157,006,419,119	
11 kV	1,611,813,037	166.17	1,854,595,726	39,034,652,993	
132/66 kV	652,257,412	90.30	551,819,637	5,671,788,461	
SUB TOTAL	20,379,000,000	3,907	10,772,076,100	474,191,678,778	

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8. COST OF SERVICE FUNCTIONALIZED RATES (TARIFF WISE)

Based on the allocation of overall Revenue Requirement of MEPCO to customers categories, the resultant functional amounts (Rs. in million) for each customer category are summarized at Table 11 below.

Table 10 Determination of Functional Rates based on Cost Drivers to Different Customer Categories

			Energy	Demand	Generatio	on Cost	Transmission	Distri	bution	[]
Classes	Voltage Level	No. of Consumers	GWh	MW	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	Cus.Cost (Rs.M)	Total Cost
Industrial B3	11kV	390	1,385	133	13,812	7,643	686	798	327	23,266
Industrial B4	132/66kV	10	606	84	5,665	4,535	407	305	129	11,040
Single Point Supply C2(b)	11kV	60	218	30	2,178	1,755	158	183	52	4,325
Single Point Supply C3(b)	132/66kV	3	45	6	418	340	31	23	10	821

Based on the cost drivers (energy, demand & customers) based allocation of overall RevenueRequirement of MEPCO to the customers categories, the resultant functional (generation, transmission, MO Fee & Distribution) rates (in terms of Rs./kWh, Rs./kW/Month and Rs./Customer /Month, as applicable) are summarized at **Table 12** below.

Table 1	IFunctional	Rates of D	ifferent	Customer	Categories	Encapsulated in	Rs/kW/Month
					**		

			Energy	Dema nd	Genera	ition Cost	Transm	MOF	Distri	oution	T . t . 1
Classes	Volt. Level	No. of Customers	GWh	MW	Energy (Rs/kWh)	Demand (Rs/kW/ Month)	(Rs/kW /Month)	(Rs/kW/ Month)	(Rs/kW/ Month)	(Rs./ Cust/KW / Month)	Rs./ kWh
Industrial B3	11kV	390	1,385	133	9.97	4,801.84	428.11	3.00	501.18	205.54	16.79
Industrial B4	132kV	10	ʻ 606	84	9.34	4,498.83	401.10	2.81	302.61	127.79	18.21
Single P. Supply C2(b)	11kV	60	218	30	9.97	4,801.84	428.11	3.00	501.18	141.19	19.79
Single P. Supply C3(b)	132kV	3	45	6	9.34	4,498.83	401.10	2.81	302.61	125.83	18.35

The above detailed functional rates recapitulated, in terms of Rs./kW/Month, for each function isgiven in table **Table 13** below.

Table 13 Tariff-wise Functional Rate Allocation of RR

			Energy	Demand	Genera	tion Cost	Transm	MOF	Distrib	ution	
Classes	Volt. Level	No, of Customers	GWh	MW	Energy (Rs/kWh)	Demand (Rs/kW/ Month)	(Rs/kW /Month)	(Rs/kW/Month)	(Rs/kW/Month)	(Rs./ Cust/KW/ Month)	Total Rs./KW/Month
Industrial B3	11kV	390	1,385	133	8654.08	4,801.84	428.11	3.00	501.18	205.54	14593.75
Industrial B4	132k V	10	606	. 84	5619.74	4,498.83	401.10	2.81	302.61	127.79	10952.88
Single P. Supply C2(b)	11kV	60	218	30	6050.78	4,801.84	428.11	3.00	501.18	141.19	11926.10
Single P. Supply C3(b)	132k V	3	45	6	5810.54	4,498.83	401.10	2.81	302.61	125.83	11141.72

8.1 Unbundled Rates Rs./kWh (Tariff Wise)

The functional allocation of Revenue Requirement of MEPCO (Generation, Transmission, MO Fee and Distribution Cost) to customers categories, in Rs./kWh are shown in **Table 14** below.

Customer Category	Voltage level	Sales GWh	Demand MW	Generation Rs./kWh	T. UoSC Rs./kWh	MOF Rs./kWh	D. UoSC Rs./kWh	Total Rate Rs./kWh
Industrial B3	11kV	1,385	133	15.49	0.49	0.003	0.81	16.79
industriai B4	132kV	606	84	16.82	0.67	0.005	0.72	18.21
Single Point Supply C2(b)	11kV	218	30	18.00	0.72	0.005	1.07	19.80
Sirgle Point Supply C3(b)	132kV	45	6	16.93	0.68	0.005	0.72	18.34
					1. A. A. S. A. S. M. S.			

Table 14 Tariff-wise Functional Rate Allocation of RR

8.2 Volumetric Rates at Each Customer Category

The above functional rates combined in terms of the nature (Fixed or Variable) and resultant rates interms of Rs./kW/Month and/or Rs./kWh are provided in **Table 15** below.

			Allocated C	Cost Rs. (M)		Variable
Customer Category	Voltage Level	Sales GWh	Fixed Cost	Variable Cost	Fixed Charge Rs/kW/Month	Charge Rs/kWh
Industrial B3	11kV	1,385	9,127	14,139	5,734	10.21
Industrial B4	132/66kV	606	5,247	5,794	5,205	9.55
Single P. Supply C2(b)	11kV	218	2,095	2,230	5,734	10.21
Single P. Supply C3(b)	132/66kV	45	394	428	5,205	9.55

Table 15 Tariff & Voltage level wise Sales Volume, Allocation of Fixed and Variable Cost in Terms of Rs./kW/Month and/or Rs./kUan

Note: Variable Cost in Table 15 includes energy cost and customer services cost.

9. REVENUE, COST OF SERVICE AND SUBSIDIES (TARIFF CATEGORY WISE)

Based on assessment of revenue and the cost of service for each category of consumer, as per the details provided herein before, the Subsidy or Cross Subsidy (the difference between revenue and cost) in terms of million rupees against each customer tariff category is provided in **Table 16** below. It may be noted that the negative figure means the customer is subsidized (revenue less than cost)

Whereas, the positive figure shows that the customer is cross subsidizing (revenue more than cost). Average, in terms of Rs./kWh, assessment of subsidy or cross-subsidy, as the case may be, is also arrived in the last column of Table 16 below.

				Revenu	e as per NEP	RA Tariff		Cost of Servic	e]	
Customer Class5	Voltage	Sales GWh	Demand MW	Demand Charge (M.PKR)	Energy Charge M.PKR	Total M. PKR	Demand Cost (M.PKR)	Energy Cost M.PKR	Total M. PKR	Difference Subsidy M. PKR	subsidy Rs./kwh
Industrial B3	11kV	1,385	133	1,620	33,489	35,109	9,127	14,139	23,266	11,843	8.55
Industrial B4	132kV	606	84	495	14,565	15,060	5,247	5,794	11,040	4,020	6.53
Bulk Supply C2(b)	11kV	218	30	233	5,317	5,550	2,095	2,230	4,325	1,225	5.62
Bulk Supply C3(b)	132kV	45	6	56	1,081	1,137	394	428	821	316	7.02

Table 16 Tariff wise Cross Subsidy Determination based on sales and demand

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10. REVENUE, COST OF SERVICE, SUBSIDY AND REVENUE TO COST RATIOS

Revenue, Cost of Service and Subsidy in terms of million rupees for each category of the consumers isshown in Table 17 below. The Table also provides the Revenue to Cost Ratio which shows that:

- If this ratio is less than one, the relevant customer class is subsidized, i.e. the tariff revenue isless than the allocated cost;
- If this ratio is greater than one, the relevant customer class is cross subsidizing, i.e. the tariff revenue is higher than the allocated cost; and
- If this ratio is equal to one, the customer class is at adequately priced vis-à-vis the allocated cost.

				F)	2022-23						
		an an c	NEPRÁ Reve	nue (PKR)	Cost of	Service	n Differe	nce 👘	Revenu	e to Cost j	Ratio
Custorner Class	Sales (GWh)	MDI MW	Demand Charge (M.PKR)	Energy Charge .M.PKR	Demand Coster (M.PRR)	Energy Cost M.PKR	Demand (M.PKR)	Energy M.PKR	Demand Charge	Energy Charge	total
Industrial B3	1,385	133	1,620	33,489	9,127	14,139	(7,507)	19,350	0.18	2.37	1.51
Industria) B4	606	84	495	14,565	5,247	5,794	(4,752)	8,771	0.09	2.51	1.36
Bulk Supp!y C2(b)	218	30	233	5,317	2,095	2,230	(1,862)	3,087	0.11	2.38	1.28
Bulk Supply C3(b)	45	6	56	1,081	394	428	(338)	653	0.14	2.53	1.38

Table 17 Revenue to Cost Ratio i.e. Difference of NEPRA Allocated and Required Revenue

11. REVENUE, COST OF SERVICE AND SUBSIDIES (RS./KWH)

Revenue, Cost of Service and Subsidy in terms of Rs./kWh for each category of the consumers isshown in **Table 18** below. The Table also provides the Revenue to Cost Ratio.

Customer Class	Voltage	Sales GWh	Revenue Rs./kwh	Cost of Service Rs./kwh	Subsidy Rs./kwh	Revenue to Cost Ratio
Industrial B3	11kV	1,385	25.34	16.79	8.55	1.51
Industrial B4	132kV	606	24.83	18.21	6.63	1.36
Bulk Supply C2(b)	11kV	218	25.40	19.80	5.61	1.28
Bulk Supply C3(b)	132kV	45	25.39	18.34	7.05	1.38

Table 18 Tariff wise Revenue, Cost of Service and Subsidy in terms of Rs./kWh

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12. REVENUE, COST OF SERVICE AND SUBSIDIES (11 KV AND ABOVE)

The revenue cost of service and subsidies for customer categories that fall under 11kv aresummarized at **Table 19** below.

Table 19 Cross Subsidy for Eligible BPCs 1MW and above

				Revenue	as per NEPRA	Tariff		Cost of Service			
Customer Class	Voltage	Sales GWh	Demand MW	Demand Charge (M.PKR)	Energy Charge M.PKR	Total M. PKR	Demand Cost (M.PKR)	Energy Cost M.PKR	Total M. PKR	Difference Subsidy M. PKR	CoS Rs./kwh
Industrial B3	11kV	1,385	133	1,620	33,489	35,109	9,127	14,139	23,266	11,843	16.79
Industrial B4	66/132KV	606	84	495	14,565	15,060	5,247	5,794	11,040	4,020	18.21
Bulk Supply C2(b)	11kV	218	30	233	5,317	5,550	2,095	2,230	4,325	1,225	19.80
Bulk Supply C3(b)	132kV	45	6	56	1,081	1,137	394	428	821	316	18.34

13.REVENUE/KWH, COST OF SERVICE/KWH AND SUBSIDIES/KWH (BPC ONLY)

With regard to the above analysis, the following points are emphasized and limited:

- 1. For the purpose of this study, the connections which do not come in the category of eligible BPCs i.e. Customers connections having load less than 1MW have not been intensively probed into details.
- 2. Currently, there are 132/66 KV customer within MEPCO, therefore, real data, thereof could be assessed for B4 and C3 consumers.
- 3. A broad assessment of the Cost of Service of such customers on analogy of other closest category of customers (e.g. B-3 for B-4 and C-2 for C-3) could be incorporated by adding or subtracting the loss levels.
- Although the Industrial B-3 and Bulk Supply C2 customers are at 11 KV connection level, however, these customers may or may not fall within the definition of BPC as contained in NEPRA Act, 1997, if these are less than 1 MW load.
- The customer categories A-2 and A-3, for purposes of cost of service assessment, have been considered at 0.4 KV level. However, these costumers, based on the sanctioned load, may be connected at 11 KV level, as required.
- Consumer category for tariff H, i.e. housing colonies attached to industries, despite being connected at 11 kV, cannot be considered as BPC for (i) principally being resale in nature and (ii) being less than 1 MW.
- 7. The supply feed for AJK customer category is primarily for resale purpose, therefore, not entitled for consideration as BPC.
- 8. Taking a single peak and analyzing it with total sales may have unrealistic load factors.
- 9. In case of B3 and C2 connections being on the 11kV distribution feeder, the figures of aggregative sales and load may have disrupting outputs in FACOS Model

Based on the above clarification, the abstract of Revenue (Rs./kWh), the Cost of Service (Rs./kWh) and resultant cross-subsidy (Rs./kWh) is appended at **Table 20** below.

Customer Class	Voltage	Sales GWh	Revenue Rs./kwh	Cost of Service Rs:/kwh
Industrial B3	11kV	1,385	25.35	16.79
Industrial B4	66/132KV	606	24.85	18.21
Bulk Supply C2(b)	11kV	218	25.46	19.80
Bulk Supply C3(b)	132KV	45	25.27	18.34

Table 20 Sales. Revenue, Cost of Service and Cross Subsidy for Eligible BPCs 1MW and Above

14. MASTER DATA FOR RESULTS OF MEPCO'S COST OF SERVICE STUDY (FY 2022-23)

For interest of the readers to glance through overall master data for result of MEPCO's Cost of Service Study (FY 2022-23), following Tables (**Table 21** to **Table 27**) are added separately.

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15.FINAL REMARKS:

- The above Cost of Service Study Report (FY 2022-23) is a sincere human effort to arrive at judicious assessment of functional (generation, transmission, market operator, distribution and customer services) costs for each category of consumers demonstrating the needs and parameters associated with relevant category.
- The results of the study are to be used for the purposes of rate making of Use of System Charges for possible eligible Bulk Power Consumers.
- The Fully Allocated Cost of Service (FACOS) model used for the purpose of this study is realistically elaborate, professionally structured in line with international practices and reasonably accurate to provide equitable results in terms of costs associated with demonstrated needs of the customers. Human errors and omissions are, however, expected.
- The underlying assumptions made and considerations relied upon in carrying out this Cost of Service Study were adopted with all possible care, without any prejudice and have been disclosed in details to the extent possible.
- Inherent and unforeseen limitations of the FACOS model, assumptions made and consideration relied upon may not be as exhaustive as expected; accordingly, for the purposes of rate making of Use of System Charges, certain out of the model iterations may be necessary.
- While the Cost of Service is substantially (99%) covered by the determined tariffs, inherent cross subsidization and possibility of stranded costs need considerate, careful, concerted and continuous attention for proactive mitigation thereof.
- While currently certain classes of consumers are enjoying benefit of inter and intra tariff subsidies, the other categories of consumers are paying huge (30~35%) cross-subsidies. For a robust, vibrant and successful wholesale, and later retail, power market, minimization, if not elimination, of intra and inter tariff subsidies shall remain fundamental requirement.

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Table 12 Master Data for Results of NiEFCO's Cost of Service Study (FY 2022-23)

						FΥ	2022-23							
		ı												
		Energ	y GWh	Deman	d MW	Generatio	on Cost	Transm	MOF	Distribut	-			
											5			
Classes	voitage Level	Sold	Purcha sed	at Meter	at CDP	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	cust. Cost (Rs.M	Total Cost (Rs. M)	Cost Rs./kWh sold	Cost Rs./kWh Purchased
Inductorial Do		1 201	1 100								-			
	ATT	C0C,1	T,459	£51	143	13,812	7,643	681	در	798	215	22.20		
Industrial R4	127/661	606	615	0	Lo				,	222	170	007'07	6/.0T	15.52
in the second	ANDU/AUL	222		40	6	5,005	4,535	404	m	305	179	11 040	18 21	17 00
Single Point Supply C2(b)	11kV	218	236	0č	33	2 170	1111					010/TT	77.07	06.11
				2	3	0/7'7	CC//T	156		183	52	4.325	19.80	1830
Single Point Supply C3(b)	132/66kV	45	45	9	9	418	OVC	4						22.24
						071	0+0	nc	5	53	10	821	18.34	18.09

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13 COST OF SERVICE FY 2022-23 (per kW or kWh SOLD)

	Cost		Rs./kwn	Purchased	16.79		18.21		19.80		18.34				
	t		Rs./kWh	cold	200	6.82	0 05	Q.00	000	ro.2	000	2011			
		Total	Cost		(RS. M)	5,939.67		5,333.13		5,875.32	00 00 1	5,331.10			
	tion			cust. Cost	(Rs.M)	205.54		127.79		141.19		125.83			
	Distribu			Demand	(Rs.M)	501.18		302.61		501.18		302.61			
		MOF		tey	(Rs.M)		00.5	10 0	T0.2	00 0	00.0	2 81	40.7		
nsumer)		Truncm	menall		Cost (Rs.M)		428.11		401.10		428.11		401.10		
M or kWh at Co			on Cost		Demand (Rs M)		4,801.84		4,498.83		4,801.84		4,498.83		
141 55 5500 100	LA 22-2202 14		Generatio		Energy	(IMI-SU)	9 97		934		9.97		9.34		
			MM	t	at CDP		CV 1	140	10	0	23	3	y	5	
			Demand		at Meter			133		84	0	20		D	
			-CMP		Purcha	sed		1,499		615		236		45	
				Energy		Plos		1.385		606		218		45	
					Voltage	TEVEL			TIKV	1433/ 004	AN00/75T	14166	ANTT	132/66kV	
					Classes				Industrial B3		Industrial B4		ngle Point Supply C2(b)	(4) CJ (4)	ngle Point Suppiy un

14 COST OF SERVICE FY 2022-23 (per kW or kWh at Purchased)

						FY 2022-2	3 (kW or kWh (CDP)						
										Distrib	stion		ţ	Cost
						Generatic	on Cost	Transm	MOF			Total		0- /LAMb
		Fnerøv	GWh	Demand	MM	Celleration						Cost	Rs./kWh	KS./KVVII
		10							+	Demand	cust. Cost	VD- MV	sold	Purchased
Classes	Voltage		Purcha	at Mater	at CDP	Energy	Demand (Bc M)	Cost (Rs.M)	(Rs.M)	(Rs.M)	(Rs.M)	(IN) -27)		
		Sold	sed			(MJ.SM)	(minut	-			1 20 00	5.490.29	6.31	24.4I
							A ADO EE	395.72	2.77	465.20	L CC-COT	1		
-				122	143	9.22	11:00+(+						0 75	17.96
	11kV	1,385	1,499		1					708 56	126.07	5,261.6/	0.1.0	
Industrial 63							A 428 55	395.72	2.11	00.007				
	100100	ENE	615	84	85	9.22	10:001'1				12011	5 430.81	9.08	18.30
Industrial 84	T32/DOKV	2						205 77	2.77	463.26	TCOCT			
				00	33	9.22	4,438.50	71.000					00 0	18.09
(4)	11kV	218	730	200						298 56	124.15	5,259.74	0.00	
ngle Point suppiy						0 2 2	4 438.55	395.72	7.11	20074				
(4) C3	132/66kV	45	45	9	D	1								
ngle Point Supply La(U)														

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Table 15 COST OF SERVICE FY 2022-23 (per kWh SOLD)

The bias of the were supplicited and another the supplicity of the

						FY 20	22-23 (kWh at C	DP)						
		Energ	y GWh	Demar	WWW P	Genera	tion Cost	Transm	MOF	Distribu	tion			
Classes	Voltage Level	Sold	Purcha sed	at Meter	at CDP	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	cust. Cost	Total Cost (Rs. M)	Cost Rs./kWh sold	Cost Rs./kWh Purchased
Industrial B3	111/1	1 205	1 400	122		100					(KS.M)			
	AUTT	C0C'T	T,433	- T33	143	9.97	5.52	0.49	0.003	0.58	0.24	6.82	6.82	16.79
Industrial B4	132/66kV	606	615	84	85	9.34	7.48	0.67	0.00	0.10				
Cincle Boint Currely, C1/b)	1111	010							c	00.0	17-N	8.86	8.86	18.21
augle court applie ctal	TTKV	817	735	0°	33	9.97	8.03	0.72	0.005	0.84	0.24	9.83	9.83	10 00
Single Point Supply (3/h)	122/6641	٩Ľ	15										2	00.01
	AND 1207	6	7	5	0	9.34	PC./	0.68	0.005	0.51	0.21	00.6	00.6	18 24
												2	22.2	+C.01

Table 16 COST OF SERVICE FY 2022-23 (per kWh Purchased)

						FY 202	2-23 (kWh at ((d)						
		Energy	/ GWh	Deman	d MW	Generati	on Cost	Transm	MOF	Distribul	tion	のないのないの		
	Voltage												Cost	145 C
Lasses	Level	Sold	Purcha	at Meter	at CDP	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	cust. Cost	Total Cost (Rs. M)	Rs./kWh sold	Rs./kWh Purchased
Industrial B3	11111	1 205	1 400								(INJ-SUL)			
	AVTT	COC'T	1,433	155 1	143	9.27	5.10	0.45	0.003	0.53	0.22	6.31	6.31	15.57
industrial 84	132/66kV	606	615	84	85	сс.6	7 38	0.66	0.005	010				70.07
Citada Attack								0000	cnn:n	00.0	17.0	8./5	8.75	17.96
Single Point Supply C2(b)	TIKV	218	236	30	33	9.22	7.42	0.66	0.005	0.77	0.22	9.08	0.08	10 20
Single Point Supply	132/001	1	1									222	0.0	UC.OL
	ANDO /7CT	£	}	0	٥	9.22	7.49	0.67	0.005	0.50	0.21	8.88	8 88	18.00
													2000	COIDT

Table 17 Impact of Losses on per kW or kWh basis (FY 2022-23)

			-			FY 2022-23 (Cc	ost of Losses or	kW or kWh)						
		Energy	GWh 📎	Deman	d MW	Strengt Senera	tion Cost	Transm	A MOF -	Distribut	ion	の設定ない事件		
Classes	Voltage Level	Sold	Purcha séd	at Meter	at CDP	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	cust. Cost	Total Cost (Rs. M)	Cost Rs./kWh sold	Cost Rs./kWh Purchased
Industriai B3	- 11kV	1,385	1,499	133	143	0.75	363.29	32.39	0.23	37.92	15.55	449.28	0 C2	
Industrial B4	132/66kV	606	615	84	85	0.13	60.28	5.37	0.04	4 05	1 71	21.15	20.0	/7-1
Single Point Supply – C2(b)	11kV	218	236	30	33	0.75	363 79	27.20		0.10		0	77-0	0.24
Cingle Doint Cumply, C3/h)	102/001	1.4	ļ					60.30	67.0	37.32	10.68	444.51	0.74	1.50
(a)co - Andressino - sigue	AND0/701	}	7	٥	٥	0.13	60.28	5.37	0.04	4.05	1.69	71.43	0.12	0.25
														1

Table 18 Impact of Losses on per kWh basis ((FY 2022-23)

FY 2022-23 (Impact of Losses on per KWH basis)

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Energy GWh De	De l	man	- MW p	Generati	ion Cost	Transm	MOF	Distribut	ion			
Į.											Cost	Cost
Sold	Purcha	at Meter	at CDP	Energy (Rs.M)	Demand (Rs.M)	Cost (Rs.M)	Cost (Rs.M)	Demand (Rs.M)	cust. Cost (Rs.M)	Total Cost (Rs. M)	Rs./kWh sold	Rs./kWh Purchased
1,385	1,499	133	143	0.75	0.42	0.04	0.0003	0.04	0.02	0.52	0.52	1.27
909	615	84	85	0.13	0.10	0.01	0.0001	0.01	0.00	0.12	0.12	0.24
218	236	30	33	0.75	0.61	0.05	0.0004	0.06	0.02	0.74	0.74	1.50
45	45	9	9	0.13	0.10	0.01	0.0001	0.01	0.00	0.12	0.12	0.25

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