



Bhutan Electricity Authority

BPC Tariff Review Report 2022 to 2025

December 2022

Table of Contents

Executive Summary	1
1 Background	3
2 Regulatory parameters	4
2.1 Tariff Period	4
2.2 WACC Parameters	4
2.3 Inflation	12
2.4 Other Regulatory Parameters	13
3 Cost of supply	14
3.1 Energy Purchase Cost	15
3.1.2 Sales Forecast	17
3.1.2.1 <u>BPC Proposal</u>	17
3.1.2.2 <u>Input from Stakeholders</u>	17
3.1.2.3 <u>BEA Review</u>	17
3.1.3 Export Wheeling	18
3.2 Network Cost	19
3.2.1 Allowance for Depreciations and Return on Fixed Assets	20
3.2.1.1 Asset Schedule at the end of 2021	20
3.2.1.1.1 <u>BPC Proposal</u>	20
3.2.1.1.2 <u>Input from Stakeholders</u>	21
3.2.1.1.3 <u>BEA Review</u>	21
3.2.1.2 Investment	22
3.2.1.2.1 <u>BPC Proposal</u>	22
3.2.1.2.2 <u>Input from the stakeholders</u>	22
3.2.1.2.3 <u>BEA Review</u>	23
4 Cost Allowances	25
4.1 O&M Allowance	25
4.2 Regulatory Fees Allowances	28
4.3 The Cost of Working Capital Allowance	29
4.4 Non-Tariff Revenues	32
5 System Operator Cost	33
5.1 <u>BPC Proposal</u>	33
5.2 <u>Inputs from stakeholders</u>	34
5.3 <u>BEA Approval</u>	34

6.	Cost Allocation and Subsidies	35
6.1	Cost Allocation	35
6.1.1	<u>BPC Proposal</u>	35
6.1.2	<u>Inputs from Stakeholders</u>	37
6.1.3	<u>BEA Review</u>	37
6.2	Cost of Supply per customer group	39
6.3	Accounting of import energy	40
7.	Average Price per Customer Groups	41
7.1	<u>BPC Proposal</u>	41
7.2	<u>Input from Stakeholders</u>	41
7.3	<u>BEA Review</u>	42
8.	Subsidies	42
9.	Tariff Structures	42

Executive Summary

The tariff application of the Bhutan Power Corporation Limited (BPC) for the period 1st July 2022 to 30th June 2025 was reviewed after considering the comments received from the electricity consumers/licensees during the public hearing held on 3rd May 2022 as well as written comments received thereafter. The Bhutan Electricity Authority (BEA) has determined an average cost of supply of Nu 0.23/kWh for Wheeling, Nu 2.50¹/kWh for High Voltage, Nu 3.71 /kWh for Medium Voltage and Nu 4.85/kWh for Low Voltage consumers for the period from 1st September 2022 to 30th June 2025.

The domestic generation tariffs of the Druk Green Power Corporation Limited (DGPC) and Mangdechhu Hydroelectric Project (MHP) were determined at Nu 1.34/kWh and Nu 3.64/kWh respectively for the period from 1st September 2022 to 30th June 2025. The weighted average domestic generation tariff of DGPC and MHP has been determined at Nu 1.60/kWh for the purpose of domestic energy cost for BPC.

The weighted average cost of capital (WACC) for Wheeling was determined as 12.80% based on cost of equity (CoE) of 13.59%, cost of debt (CoD) of 9.97% and gearing ratio of 70%. For High Voltage (HV) consumers, the WACC was determined as 13.48%, based on CoE of 13.59%, CoD of 9.53% and gearing ratio of 60%. For the Medium Voltage (MV) consumers, the WACC was determined as 8.69%, based on CoE of 13.59%, CoD of 4.09% and gearing ratio of 70% and for Low voltage (LV) consumers, the WACC was determined as 8.51%, based on CoE of 13.59%, CoD of 3.83% and gearing ratio of 70%.

The cost allowances such as return on assets, depreciations, operation and maintenance cost and cost of working capital have been determined according to the provisions of the Domestic Electricity Tariff Policy (DETP), 2016 and Tariff Determination Regulation (TDR), 2022.

In keeping with subsidy allocation principles of DETP 2016, the Royal Government of Bhutan (RGoB) has approved the subsidy allocation of Nu 365.67million per year to LV consumers with effect from 1st September 2022.

Considering the approved cost of supply for DGPC, MHP and BPC and based on the subsidy allocation and application of uniform tariff of Nu 2.66/kWh approved by the Royal Government vide letter no. 24/DHPS/HQ/Tariff/2022-23/75 dated 22nd August 2022, the BEA has approved the tariff structure for the tariff period 1st September 2022 to 30th June 2025 as follows.

Tariff Structure	Unit	1 st September 2022 to 30 th June 2023	1 st July 2023 to 30 th June 2024	1 st July 2024 to 30 th June 2025
<i>Low Voltage (LV)</i>				
LV Block I(Rural*) 0-100 kWh	Nu/kWh	0	0	0

¹ Domestic HV cost of supply considering energy purchase and sales to the extent available from the domestic generations.

LV Block I (High landers) 0-200 kWh	Nu/kWh	0	0	0
LV Block I(Others) 0-100 kWh	Nu/kWh	1.28	1.28	1.28
LV Block II(All) >100 kWh	Nu/kWh	2.66	2.66	2.66
<i>Medium Voltage (MV)</i>				
Energy Charge	Nu/kWh	1.60	1.60	1.60
Demand Charge	Nu/kVA/Month	170	170	170
<i>High Voltage (HV)</i>				
Energy Charge	Nu/kWh	1.60	1.60	1.60
Demand Charge	Nu/kVA/Month	496	496	496
Wheeling	Nu/kWh	0.23	0.23	0.23

1 Background

The Bhutan Power Corporation Limited (BPC) submitted the revision of electricity tariffs petition for the tariff period 1st July 2022 to 30th June 2025 vide letter no. 28/BPC/BEA/CEO/2022/37 dated 8th March 2022. The tariff application was delayed by one week since BPC requested for time extension for the filing of the tariff application vide letter no. 16/BPC/CEO/BEA/2022/37 dated 28th February 2022 due to unavoidable circumstances.

According to BPC, the rationale for the need to revise the tariff were mainly to allow them to implement capital investments of over Nu 14.659billion in line with their Five-Year Plan infrastructure expansion to meet the increasing demand and for old age replacement or technological upgradation so as to improve the reliability, reduce technical losses and investments to modernize the networks for automation and digitalization. Further, BPC submitted that they expect to incur additional operation and maintenance expenditures considering the significant expansion of the distribution and transmission network.

BPC stated that the tariff application was prepared in line with TDR 2016, DETP 2016 and Bhutan Electricity Authority's (BEA) Distribution Tariff Model with the following assumptions:

- 1) The current power purchase price of Nu 1.50/kWh was considered and any changes in the power purchase price impact the final domestic end-user tariffs of BPC;
- 2) There has been no import of power from the distribution line from West Bengal State Electricity Board (WBSEB) and Assam State Electricity Board (ASEB) since 2020;
- 3) The generation from Tangsibji Hydro Energy Limited (THyE) has been considered for computation of wheeling charges from mid-2023;
- 4) The wheeling charge calculation has considered both exported energy and imported energy since import energy has been substantial in the last winter months;
- 5) Since BPSO will be delinked from BPC, only 50% of its operation and maintenance and capital cost were considered as per the System Operator Charges Regulation, 2022; and
- 6) As embedded generation are being handed over to DGPC, their costs have been excluded in the tariff calculation.

As part of the review process of the tariff application, a public hearing was conducted on 3rd May 2022 through virtual mode, attended by representatives from the HV and MV consumers and officials from Department of Hydropower and Power Systems (DHPS), DGPC, BPC, THyE, Dagachu Hydro Power Corporation (DHPC), Punatsangchhu-I Hydroelectric Project Authority (PHPA-I), Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) and representatives from the Association of Bhutanese Industries (ABI). BEA provided three (3) weeks after the public hearing to submit their written comments to the BEA.

2 Regulatory parameters

2.1 Tariff Period

BPC has proposed a three-year tariff period from 1st July 2022 to 30th June 2025 and the year 2021 has been used as the reference year. Tariff revision cycle are normally three years as per the Clause 7.19 of the DETP 2016, unless there is substantial and significant difference in the business environment and generation scenario.

BEA has approved tariff period of 2 years and 10 months, from 1st September 2022 to 30th June 2025 in accordance with the subsidy allocation approval of the Royal Government vide letter no 24/DHPS/HQ/Tariff/2022-23/75 dated 22nd August 2022.

2.2 WACC Parameters

The pre-tax weighted average cost of capital (WACC) for each Customer Group has been calculated in accordance with Clause 75 of TDR 2022.

$$WACC_c = \frac{CoE(1 - Gearing_c)}{1 - Tax} + (CoD_c \times Gearing_c)$$

Where:

- 1) $WACC_c$ is the weighted average cost of capital for the Customer Group “C”, as a percentage;
- 2) CoE is the cost of equity, as set out in Schedule C of the TDR 2022, as a percentage for the Licensee;
- 3) $Gearing_c$ is the ratio of debt to total net fixed assets, as determined by the Authority for the Customer Group “C”;
- 4) CoD_c is the actual cost of debt related to assets utilized by the Customer Group “C”, as a percentage, being the weighted average interest rate of the Licensee’s loans with suitable allowance made for currency risk of any loans not made in local currency, provided that the cost of debt should not exceed reasonable benchmarks; and
- 5) Tax is the prevailing rate of company taxation, as a percentage.

2.2.1 BPC Proposal

BPC proposed WACC of 12.80% for Wheeling, 13.61% for HV consumers, 8.18% for MV consumers and 8.25% for LV consumers. The proposed WACC parameters are shown in Table 1 below.

Table 1: Proposed WACC for Customer Categories

WACC Parameters	Wheeling	HV	MV	LV
Gearing	70 %	60 %	70 %	70 %
CoE	13.63%	13.63%	13.63%	13.63%
CoD	9.94%	9.70%	3.33%	3.43%

Tax	30%	30%	30%	30%
WACC	12.80%	13.61%	8.18%	8.25%

The details of the WACC parameters are discussed in the subsection below.

2.2.1.1 Gearing Ratio

BPC stated that their actual gearing ratio is 42.92% for 2021. However, based on requirements of the DETP 2016, BPC proposed the following gearing ratio for individual consumer category as shown in the Table 2 below.

Table 2: Proposed Gearing Ratio of BPC

Gearing	Customer Category			
	Export	HV	MV	LV
Actual	96.97%	32.29%	38.68%	26.52%
Proposed	70%	60%	70%	70%

2.2.1.2 Cost of Equity

BPC has proposed CoE of 13.63% for Wheeling purpose, HV consumers, MV consumers and LV consumers and submitted that the proposed CoE is based on the average interest rate of 11.13% for Industrial/Manufacturing loan as shown in Table 3 below and a maximum premium of 250 basis point.

Table 3: Proposed Average Lending Rate

Sl. No.	Financial Institution	Type of Loan	Interest Rate	Term (Years)
1	Bank of Bhutan	Manufacturing-Hydropower/Renewable energy	9.87%	20
2	Bhutan Development Bank	Manufacturing/Industrial Loan	11.80%	10
3	Bhutan Insurance Ltd	Manufacturing/Industrial Loan	12.00%	10
4	Bhutan National Bank	Manufacturing/Industrial Loan	11.88%	10
5	National Pension & Provident Fund	Member Home Loan	9.00%	30
6	Druk Punjab National Bank	Manufacturing/Industrial loan	11.50%	15
7	Royal Insurance Corporation of Bhutan	Industrial term loan/Manufacturing Industry	12.00%	10
8	Tashi Bank	Manufacturing and Industry	11.00%	15
	Average interest rate	11.13%		

2.2.1.3 Cost of Debt

BPC has proposed the cost of debt of 9.94% for Wheeling export energy, 9.70% for HV consumers, 3.33 % for MV consumer and 3.43% for LV consumer. BPC stated that for the purpose of calculation of CoD, the weighted average interest rates of the existing as well as loans that are

envisaged to be availed during the tariff period has been considered accounting the loan balance at the end of each year as per the DETP 2016.

BPC submitted that Nu 7,720.682 million apportioned to MHP for Associated Transmission System (ATS) was capitalized and accounted in books of accounts of BPC in the previous tariff period and in similar way, the balance ATS cost of Nu 4,979.46 million will be taken over by BPC in 2022. Additionally, BPC also included the loan for the 132 kV transmission line of THyE pothead yard till MHP pothead yard, since BPC will take over the assets in the year 2023. The principal loan amount and interest during construction (IDC) has been included in the CoD calculation as of 30th June 2022 by BPC. Further, BPC has considered their investments to be financed through a mix of 50% debt and 50% equity to reduce the interest costs.

Based on the above, the CoD proposed by BPC for different customer categories are as shown in Table 4, Table 5, Table 6, and Table 7 below.

Table 4: Proposed CoD for Wheeling

SL.No	Loan Particulars	Interest rate	Loan balance (Nu Mill)				Proposed CoD
			31.12.2021	31.12.2022	31.12.2023	31.12.2024	
1	MHPA ATS Loan	10%	2786.59	4294.09	4161.59	4015.52	9.94%
2	ThyE Loan	9%	-	802.70	775.80	746.41	
3	Future Loan	9%	-	206.51	175.81	72.22	
4	ADA Loan	0.7%	-	-	-	-	
5	ThyE 132 kV	11.55%	-	-	597.29	581.12	
Total			2786.59	5303.31	5,710.49	5,415.27	
Annual cost of debt			10%	9.81%	10%	10.02%	

Table 5: Proposed CoD for HV

SL.No	Loan Particulars	Interest rate	Loan balance (Nu Mill)				Proposed CoD
			31.12.2021	31.12.2022	31.12.2023	31.12.2024	
1	NPPF Loan	9%	941.10	860.54	773.11	678.48	9.70%
2	MHPA ATS Loan	10%	2617.88	4034.11	3909.64	3772.41	
3	Future Loan	9%	-	1239.11	1054.78	433.33	
Total			3,558.98	6,133.77	5737.63	4,884.22	
Annual cost of debt			9.74%	9.66%	9.68%	9.77%	

Table 6: Proposed CoD for MV

SL.No	Loan Particulars	Interest rate	Loan balance (Nu Mill)				Proposed CoD
			31.12.2021	31.12.2022	31.12.2023	31.12.2024	
1	ADA Loan	0.7%	106.75	93.40	80.06	66.71	
2	Future Loan	9%	-	206.51	175.81	72.22	
3	RE I	6%	29.05	26.97	24.90	22.82	
4	RE II	6%	45.79	41.21	36.63	32.05	

5	RE III	6%	63.76	59.21	54.65	50.10	3.33%
6	RE IV	6%	228.96	217.22	205.48	193.74	
7	RE V	6%	182.96	174.45	165.94	157.43	
8	RE JICA I	0.01%	431.96	415.02	398.08	381.14	
9	RE JICA II	0.01%	193.73	186.56	179.38	172.21	
Total			1,282.95	1,420.55	1,320.92	1,148.42	
Annual cost of debt			2.64%	3.55%	3.46%	2.99%	

Table 7 : Proposed CoD for LV

SL.No	Loan Particulars	Interest rate	Loan balance (Nu Mill)				Proposed CoD
			31.12.2021	31.12.2022	31.12.2023	31.12.2024	
1	RE I	6%	56.75	52.70	48.64	44.59	3.43%
2	RE II	6%	89.46	80.51	71.57	62.62	
3	RE III	6%	124.57	115.68	106.78	97.88	
4	RE IV	6%	447.32	424.38	401.44	378.50	
5	RE V	6%	357.45	340.83	324.20	307.58	
6	RE JICA I	0.01%	843.93	810.83	777.74	744.64	
7	RE JICA I	0.01%	378.49	364.48	350.46	336.44	
8	ADA Loan	0.70%	102.56	89.74	76.92	64.10	
9	Future Loan	9%	-	413.03	351.62	144.44	
Total			2,756.71	2,691.65	2,508.87	2,180.32	
Annual cost of debt			2.46%	3.67%	3.57%	3.07%	

2.2.2 Input from Stakeholders

2.2.2.1 Gearing Ratio

ABI in their written comments submitted that BPC has proposed different gearing ratios for the four customer categories – Wheeling, HV, MV and LV and ABI recommended 70% gearing ratio for all customer categories and wheeling.

DGPC in their written comments also stated that BPC has proposed the gearing ratio of 70% for export wheeling while the actual gearing is 96.97% for export wheeling. BPC stated that the proposed gearing is as per the DETP 2016. Further, DGPC submitted that the WACC, CoD and CoE might need to be considered accordingly for computation of export wheeling charges.

2.2.2.2 Cost of Equity

ABI submitted that BPC has proposed a cost of equity (CoE) of 13.63% based on an average lending rate of 11.13% from the Financial Institutions of Bhutan and a maximum premium of 250 basis points in line with Clause 7.2 of DETP. However, ABI recommended a CoE of 13.06% with only 200 basis points (11.06%+2%).

2.2.2.3 Cost of Debt

ABI submitted that the CoD proposed for various customer categories is a function of the planned quantum of capital investments, the debt ratio, scheduled drawl of loans over the tariff period, the interest rates for the various loans and the apportioning of the loans to the various customer categories. Since determining CoD is a complex exercise with several unknowns, ABI requested BEA to review in greater detail in close consultation with BPC.

2.2.2.4 *The WACC*

ABI submitted that as per the Clause 7.6 of the DETP 2016, which states that, “In order to avoid cross subsidies between the customers categories, separate WACC should be computed for each customer categories”. ABI recommended separate WACC for each customer category.

2.2.3 *BEA Review*

As per the Clause 75 of TDR 2022, WACC should be computed separately for each consumer category. The WACC parameters are provided in the Schedule C of TDR 2022 which may be updated by BEA from time to time. The parameters are discussed below for each customer category.

2.2.3.1 *Tax*

BEA has verified that the proposed tax rate is in accordance with the rate prescribed in Section 45, Chapter 9 of the Income Tax Act of the Kingdom of Bhutan, 2001. Therefore, BEA has used a tax rate of 30% for determination of pre-tax WACC.

2.2.3.2 *Gearing Ratio*

The DETP 2016 states that the gearing ratio for computation of WACC shall be higher than the actual gearing ratio and up to a maximum of 70%.

As per the Clause 75(3) of the TDR 2022, gearing ratio is the ratio of debt to total net fixed assets, as determined by the Authority for the Customer Group. Further, Schedule C of the TDR prescribes the gearing to be determined as prescribed as per the DETP 2016.

BPC submitted that as per the Clause 7.1 of DETP 2016, gearing ratio for computation of WACC shall be higher than actuals up to a maximum of 70:30. However, the average gearing ratio for wheeling is 96.97% which is higher than 70% and BPC proposed 70%. ABI recommended 70% gearing ratio for all consumers.

Since the policy requires the gearing ratio to be higher than the actual gearing with the maximum of 70%, the actual and the approved gearing ratio for the past tariff periods were as shown in Table 8 below.

Table 8: Actual and Approved Gearing Ratio

Tariff Period	Gearing Ratio	Customer Category			
		Export	HV	MV	LV
2013-2016	Actual	39.8%	39.8%	39.8%	39.8%
	Approved	40%	40%	40%	40%
2016-2019	Actual	9%	5%	64%	64%
	Approved	60%	60%	70%	70%
2019-2022	Actual	61%	39%	39%	43%
	Approved	65%	60%	70%	70%

From the above Table 8, during the tariff period 2013-2016, while the actual gearing was 39.8% BEA approved 40%. In 2016-2019, BEA increased the gearing ratio to 60% for export wheeling and for HV consumers since the actual gearing was 9 % and 5% respectively based on the

provisions of the DETP. Since the actual gearing of MV and LV was already 64%, BEA increased the gearing ratio to 70% for MV and LV in 2016-2019.

For tariff period 2019-2022, the actual gearing for export wheeling was 61%, HV consumers was 39%, MV consumers was 39% and LV consumers was 43%. However, BEA approved 65% for wheeling and maintained the gearing ratio of 60% for HV consumers and 70% for MV and LV consumers.

Based on the BPC proposal, BEA approved gearing ratio of 70% for wheeling and maintained the same gearing as previous tariff period for MV and LV consumers at 70% and 60% for HV consumers since the MV and LV consumers have reached the maximum gearing and the actual HV consumer gearing has decreased compared to 2019-2022.

2.2.3.3 *Cost of Debt*

BEA verified the proposed principal loan amount, interest rate, repayment period and the loan balance as of 31.12.2022, 31.12.2023 and 31.12.2024 and found that BPC has proposed interest rates and loan balances correctly except for RE-IV, RE-V, NPPF and ADA loans which were corrected as per the amortization schedule and loan agreements.

Since the RE JICA I, RE JICA II and ADA loans are in Japanese Yen (JYP) and Euro (EUR), BPC had taken the exchange rate of EUR and JYP as of 31st December 2018 for calculation of loan balance in Bhutanese Ngultrum (BTN). Therefore, BEA has corrected the loan balances in BTN using the exchange rates for JYP and EUR at the time of tariff review.

BPC also included loans for 720 MW Associated Transmission System (ATS) of MHP including interest during construction which was apportioned to MHPA as well as allocated to other upcoming projects since BPC will take over all MHP ATS. BPC submitted that for the ATS of MHP, only Nu 7,720.682 million apportioned to MHP was capitalized and accounted in BPC's books in the earlier tariff period. The balance ATS cost of Nu 4,979.46 million shall be taken over by BPC in 2022.

During the investment review, BEA Secretariat sought views from DHPS on the allocation of MHP ATS cost apportioned to PHPA-II, Chamkharchu Hydro Electric Project (CHEP), Kholongchhu Hydro Energy Limited (KHEL) and THyE since technical clearance for the investment has not been issued by DHPS, MoEA. DHPS recommended for capitalization of the additional ATS cost except for PHPA-II apportioned cost. Based on above, BEA Secretariat included loan for MHP ATS excluding IDC as per the agreement executed between Government of the Republic of India and RGoB considering 70:30 debt to equity ratio.

BPC has proposed new loan worth of Nu 2,065 million, Nu 1,758 million and Nu 722 million for the years 2022, 2023 and 2024 respectively for the new investment for the tariff period at 9% interest rate. BPC plans to finance these investments through 50% debt to reduce the interest costs. BEA has adjusted the loan balance based on the investment approved by BEA for the tariff period 2022-2025. Further, BEA considered loan interest rate of 9% as proposed by BPC.

The 132 kV transmission line of THyE pothead yard till MHP pothead yard will be taken over by BPC with loan in the year 2023. Considering the expected commissioning of THyE in end of year 2023 or beginning of year 2024, the loan is considered from the year 2024 onwards.

BPC has collected energy security deposit worth Nu 31.14 million from HV consumers, Nu 7.59 million from MV consumers and Nu 158.54 million from LV consumers. BEA has considered the security deposit collected from the consumers as loan with 0% interest rate while calculating the CoD for each consumer category.

The CoD for the tariff period is calculated as the weighted average of the interest rates of the loans and energy security deposits. BEA reviewed CoD and the loan details of Export Wheeling, HV consumers, MV consumers and LV consumers are as shown in Table 9, Table 10, Table 11 and Table 12 below respectively.

Table 9: Reviewed CoD for Export Wheeling

SL.	Loan Particulars	Interest rate	Loan balance (Nu Mill)			Approved CoD
			31.12.2022	31.12.2023	31.12.2024	
1	MHP ATS Loan	10%	4768.23	4611.40	4438.47	9.97%
2	Future loan	9%	44.02	186.43	557.71	
3	ThyE 132kV	11.55%			250.86	
Total			4,812.25	4,797.81	5,247.04	
Annual cost of debt			9.99%	9.96%	9.97%	

Table 10: Reviewed CoD for HV Consumers

Sl. No.	Loan Particulars	Interest rate	Loan balance (Nu Mill)			Approved CoD
			31.12.2022	31.12.2023	31.12.2024	
1	NPPF Loan	8.85%	760.22	676.22	585.29	9.53%
2	MHP loan	10.00%	2,514.35	2,431.65	2,340.46	
3	Future loan	9.00%	130.73	553.70	1,656.45	
4	Energy Security deposit	0.00%	31.14	31.14	31.14	
Total			3,436.45	3,692.71	4,613.34	
Annual cost of debt			9.62%	9.56%	9.43%	

Table 11 : Reviewed CoD for MV Consumers

Sl. No.	Loan Particulars	Interest rate	Loan balance (Nu Mill)			Approved CoD
			31.12.2022	31.12.2023	31.12.2024	
1	NPPF Loan	8.85%	42.50	37.81	32.72	4.09%
2	ADA LOAN	0.70%	34.97	30.60	26.23	
3	Future loan	9.00%	30.03	127.17	380.45	
4	RE I	6.00%	17.30	15.97	14.64	
5	RE II	6.00%	26.43	23.50	20.56	
6	RE III	6.00%	37.98	35.06	32.13	
7	RE IV	6.00%	135.56	128.03	120.50	
8	RE V	6.00%	109.17	103.71	98.25	
9	RE JICA I	0.01%	245.07	235.06	225.06	
10	RE JICA II	0.01%	119.66	115.06	110.45	

11	Energy Security deposit	0.00%	7.59	7.59	7.59
Total			806.25	859.55	1,068.59
Annual cost of debt			3.27%	3.89%	5.10%

Table 12: Reviewed CoD for LV Consumers

Sl. No.	Loan Particulars	Interest rate	Loan balance (Nu Mill)			Approved CoD
			31.12.2022	31.12.2023	31.12.2024	
1	NPPF Loan	8.85%	70.84	63.01	54.54	3.83%
2	RE I	6.00%	90.65	83.68	76.71	
3	RE II	6.00%	138.50	123.11	107.72	
4	RE III	6.00%	198.99	183.68	168.38	
5	RE IV	6.00%	710.31	670.85	631.38	
6	RE V	6.00%	572.00	543.40	514.80	
7	RE JICA I	0.01%	1,284.10	1,231.69	1,179.28	
8	RE JICA II	0.01%	626.99	602.87	578.76	
9	ADA LOAN	0.70%	183.26	160.35	137.44	
10	Future loan	9.00%	155.07	656.76	1,964.74	
11	Energy Security deposit	0.00%	158.54	158.54	158.54	
Total			4,189.24	4,477.94	5,572.29	
Annual cost of debt			2.97%	3.62%	4.89%	

The approved Cost of Debt is 9.97% for Export Wheeling, 9.53% for HV consumers, 4.09% for MV consumers and 3.83% for LV consumers for the purpose of determining the WACC.

2.2.3.4 Cost of Equity

As per the Clause 7.2 of DETP 2016, the CoE shall be based on the average lending rate of the domestic financial institutions and BEA may allow a reasonable premium up to a maximum of 250 basis points on the average lending rates of the financial institutions depending on the domestic market situation and gearing ratio applied.

Therefore, BEA considered the long-term average lending rates of five (5) financial institutions and three (3) non-banking Institutions for all sectors as of 3rd June 2022 as shown in Table 13 below.

Table 13: Average Long-term Lending Rate of Financial Institutions in Bhutan

Sl. No.	Financial Institutions	Interest Rate
1	Bank of Bhutan (BoB)	11.66%
2	Bhutan National Bank (BNB)	10.60%
3	Druk Punjab National Bank (Druk PNB)	11.17%
4	Bhutan Development Bank Limited (BDBL)	11.24%
5	Tashi Bank Limited (T Bank Ltd)	10.75%
Non-Banking Institutions		

1	Royal Insurance Corporation of Bhutan	12.08%
2	Bhutan Insurance Limited (BIL)	12.00%
3	National Pension & Provident Fund (NPPF)	9.27%
	Average Rate	11.09%

Based on the above, BEA approved CoE of 13.59% for all consumer categories by considering the long-term average lending rate of 11.09% and 2.5% premium at par with DGPC and MHP.

2.2.3.5 *The WACC*

Based on the approved CoD, CoE, tax rate and gearing ratio, BEA determined WACC of 12.80% for Wheeling, 13.48% for HV consumers, 8.69% for MV consumers and 8.51% for LV consumers as shown in the Table 14 below.

Table 14: Reviewed WACC

Parameters	Wheeling	HV	MV	LV
Gearing	70 %	60%	70 %	70 %
CoE	13.59%	13.59%	13.59%	13.59%
CoD	9.97%	9.53%	4.09%	3.83%
Tax	30%	30%	30%	30%
WACC	12.80%	13.48%	8.69%	8.51%

2.3 Inflation

The historical inflation rates are used for calculation of historical operation and maintenance (O&M) costs in 2021 price levels, which is the reference year for this tariff period. The forecasted inflation rate is used for the calculation of the forecasted O&M allowances in each of the years in the tariff period. As per Clause 7.4 of the DETP 2016, inflation to be used for the O&M expenses shall be based on historical average inflation rates published by the National Statistics Bureau (NSB).

2.3.1 *BPC Proposal*

BPC has proposed the inflation rate of 3.03% which was submitted based on average historical inflation rates from NSB for the period 2019–2021 for non-food items as shown in the Table 15 below.

Table 15: Proposed Historical Inflation Rate

Year	2019	2020	2021	Average
Inflation figures	2.24%	1.24%	5.62%	3.03%

2.3.2 *BEA Review*

BEA has verified the proposed historical inflation rates for the period 2019-2021 and found that the average historical inflation rate for the period 2019-2021 was 3.40% which is calculated as the average of the year-on-year inflation rates published by NSB as shown in the Table 16 below.

Table 16: Reviewed Historical Inflation Rate

Inflation	2019	2020	2021	Average
Year on year inflation	1.35%	2.02%	6.82%	3.40%

Therefore, BEA approved the average inflation rate of 3.40%.

2.4 Other Regulatory Parameters

The other regulatory parameters are determined in the Schedules of the TDR 2022 which may be updated by BEA from time to time. The technical loss allowances, commercial loss allowance and collection rates are discussed in the Clause 2.4.1 to 2.4.3 of this report. The O&M efficiency gain is discussed in Clause 4.1.2 and O&M benchmark is discussed in Clause 4.1.3 in this report.

2.4.1 Transmission and Distribution Technical Losses

The transmission and distribution technical losses are caused due to resistance in the network lines, cables and transformers and cannot be fully avoided requiring BPC to purchase more energy than they sell. The higher the technical losses, the more energy must be purchased per unit sold and hence the tariff will increase.

According to the Clause 61, 62 and 63 of the TDR 2022, the technical losses shall be taken into consideration when determining tariffs.

2.4.1.1 BPC Proposal

BPC has proposed technical losses as per the Schedule E of the TDR 2016 which are 2% for HV consumers, 2.5% for MV consumers and 9% for LV consumers.

2.4.1.2 BEA Review

BEA reviewed the loss figures for the past tariff period 2019-2021 and found that the average transmission losses including wheeling has been reported as 1.14%. Therefore, the HV technical loss allowances for BPC is approved as 1.14% based on average actual transmission losses including wheeling of past three years.

For MV, the technical losses is maintained at the existing allowance of 2.5% as per the TDR.

Considering the technical losses of 1.14% for HV and 2.5% for MV, the LV losses works out to 9% based on the LV sales in the period 2019-2021. BEA approved LV losses of 8.5% to encourage BPC to reduce their losses from the existing levels.

2.4.2 Commercial Losses

The commercial losses are mainly due to metering efficiency and electricity theft. According to the Clause 61, 62 and 63 of the TDR 2022, the commercial losses shall be taken into consideration when determining tariffs.

2.4.2.1 BPC Proposal

BPC has proposed commercial losses of 5% based on the LV sales to the total sales for all consumers.

2.4.2.2 BEA Review

The commercial losses mainly account for electricity theft and metering and billing errors. Since electricity theft is an offence under the Section 69(i) of the Electricity Act of Bhutan 2001 and to encourage BPC to reduce its metering and billing in-efficiencies, BEA approved commercial losses as 0%.

2.4.3 Collection Rates

The collection rate is the rate of billed energy sales that is actually paid by the consumers. In case of any non-recovery of the bills, the expected losses are borne by the other consumers, as determined in Clauses 64 and 87 of the TDR 2022.

2.4.3.1 BPC Proposal

BPC has proposed a collection rate of 100% for all customer categories.

2.4.3.2 BEA Review

As proposed, BEA has approved a collection rate of 100%.

3 Cost of supply

According to the Clause 86 of the TDR 2022, the cost of supply for a Customer Group in a particular year shall be determined as the sum of energy purchase costs, import price, network costs, the cost of Working Capital, System Operator cost less any Non-Tariff Revenue from that Customer Group, as follows:

$$COST_c = (1 + LOSS_c) \times PPP \times SALES_c + IP \times IMPORT \times IMALLOC_c + NETWORK_c + CoWC_c + SOC_c - NTR$$

Where;

- 1) $COST_c$ is the cost of supply for Customer Group “C”, in million Ngultrum;
- 2) $LOSS_c$ is the sum of technical and commercial losses allocated to Customer Group “C” as set out in Schedule E of TDR, as a percentage;
- 3) PPP is the domestic Power Purchase Price, determined under Clause 85 of TDR 2022, in Ngultrum per kWh;
- 4) $SALES_c$ is the sales for the year attributed to Customer Group “C”, in GWh ;
- 5) IP is the average import price in Ngultrum per KWh;
- 6) IMPORT is the volume of electricity imported by the Transmission and Distribution Utility, in GWh;
- 7) $IMALLOC_c$ is the allocation of import costs to Customer Groups, where $IMALLOC_c$ for the high voltage Customer Group equals one (1), and $IMALLOC_c$ for other Customer Groups equals zero;
- 8) $NETWORK_c$ is the network costs allocated to Customer Group “C”, determined under Clause 77 of TDR 2022, in million Ngultrum;

- 9) $CoWC_C$ is the Cost of Working Capital allocated to Customer Group “C”, determined under Clause 79 of TDR 2022, in million Ngultrum;
- 10) SOC_C is the cost of System Operator allocated to Customer Group “C”, determined in accordance with Clause 80 of TDR 2022, in million Ngultrum; and
- 11) NTR_C is the estimated Non-Tariff Revenue for the year arising from Customer Group “C”, in million Ngultrum.

3.1 Energy Purchase Cost

The energy cost is the cost incurred by BPC for purchasing the energy from DGPC, MHPA and India for supply to the consumers which is determined as per the following equation:

$$\text{Energy Purchase Cost}_c = (1 + \text{Loss}_c) \times \text{PPP} \times \text{SALES}_c + \text{IP} \times \text{IMPORT} \times \text{IMALLOC}_c$$

Where:

- 1) Energy Purchase Cost c is the cost for Customer Group “C”, in million Ngultrum;
- 2) $LOSS_C$ is the sum of technical and commercial losses allocated to Customer Group “C”, as a percentage;
- 3) PPP is the Power Purchase Price, which is the Additional Price determined for DGPC, in Ngultrum per kWh;
- 4) $SALES_c$ is the sales for the year attributed to Customer Group “C”, in GWh.
- 5) IP is the average import price in Ngultrum per kWh;
- 6) IMPORT is the volume of electricity imported by the Transmission and Distribution Utility, in GWh;
- 7) $IMALLOC_C$ is the allocation of import costs to Customer Groups, where $IMALLOC_C$ for the high voltage Customer Group equals one (1), and $IMALLOC_C$ for other Customer Groups equals zero;

3.1.1 Power Purchase from DGPC and MHP

The power purchase cost for a specific consumer group is the sales adjusted for the loss factor multiplied with the power purchase price.

3.1.1.1 BPC Proposal

For the purchase of power from DGPC’s various generating plants, BPC has proposed the existing power purchase price of Nu 1.5/kWh. However, BPC submitted that as generation tariff is reviewed separately by BEA, any revision in the generation tariff will change the proposed power purchase price and as permitted by Regulation, any revisions of the prevailing generation tariffs need to be factored in while determining the final domestic tariffs.

Further, BPC submitted that BEA need to address the issues on the weighted generation tariff as under the current differential generation tariff of MHP, when the domestic consumption exceeds the prescribed quantum, it adversely impacts the weighted generation tariff for BPC and similar circumstance would arise in the future.

3.1.1.2 Input from Stakeholders

ABI submitted that BPC has assumed a weighted average energy purchase price of Nu 1.50/kWh based on the prevailing approved generation tariff (Nu 1.42/kWh for DGPC and Nu 3.77/kWh for

MHP). The actual weighted average purchase price of BPC will depend on the veracity of the energy sales over the next three years, the level of energy generated by MHP and DGPC owned plants on a monthly basis and the actual drawl of energy from the various plants.

Furthermore, for the current tariff period (2019-2022), it was projected that about 96.6% of the total energy purchases to be made by BPC would be from DGPC and accordingly, the consolidated energy purchase price was determined to be Nu 1.5/kWh. However, based on observing the actual purchase of energy and adjusting for the shutdown of Tala this winter due to an exigency, the actual purchase of energy from DGPC was about 97.01% of the total resulting in a consolidated purchase price of only Nu 1.49/kWh. Accordingly, customers have been made to pay a higher tariff than actuals for the current tariff period.

Therefore, ABI proposed that DGPC's generation price of Nu 1.38/kWh be considered as BPC's energy purchase price and any purchase of energy from MHP during the lean season be accounted and billed separately to BPC. It was also submitted that BPC can pass on this additional cost to the various customer categories for the specific months when such instances happen.

Further, it was submitted that the energy purchase price of MHP be apportioned and levied across all customer categories during the winter months when generation from DGPC is not sufficient to meet the power demand. However, if the proposal to only account for DGPC's generation is not acceptable, then the same methodology of computing the weighted average power purchase price as has been done for the current tariff period be adopted.

DGPC in written comments on BPC's proposal and ABI's review submitted that the power purchase price of Nu 1.50/kWh was determined as the weighted average price of energy supplied from DGPC power plants and MHP to domestic consumers and proposed that the Mangdechhu domestic proposed tariff be applicable for the domestic consumers only during the period when the energy from MHP is used for domestic consumption unlike in the last tariff period.

DGPC also suggested that this could be determined using a seasonal tariff for the lean season, or as pass through to specific consumers whose demand for power surpasses what is available from the existing hydropower plants. This would be in-line with the principles of tariff determination to, "enhance efficient and adequate supply to satisfy the domestic demand", without unnecessarily burdening the cost to LV consumers.

Further, DGPC proposed that domestic power allocation and supply during the lean season be considered as provided in Clause 15.5 of the Sustainable Hydropower Development Policy 2021 where the order of merit while prioritizing the supply of electricity be as essential Public Institutions and Services, Individual households, General Commercial establishments (including other Public Institutions and Services) and Industries including construction power.

DGPC also submitted that affordability of the tariffs to the general population is a key concern with the un-subsidized tariffs for the LV consumers being more than double the tariffs of the industrial consumers. The general trend elsewhere in the world is for the domestic consumer's tariffs to be much lower than commercial or industrial tariffs.

3.1.1.3 BEA Review

As per the Clause 7.16 of the DETP 2016, BEA Commission approved the weighted average generation tariff of DGPC and MHP as Nu 1.60 per unit for supply to BPC considering the domestic supply from DGPC and utilization of full generation from MHP during the lean season to meet domestic demand. Any shortfall of domestic supply from DGPC and MHP full generation during the lean season is expected to be met through import of power from India.

The cost of import from India shall be passed on to the HV consumers as per Clause 7.12 of the DETP 2016.

3.1.2 Sales Forecast

The sales forecast is used to estimate the power purchase costs of BPC and also for estimating the average cost of supply per unit sold. Therefore, the sales forecast has a large impact on the determined tariffs.

3.1.2.1 BPC Proposal

BPC has forecasted the domestic sales volumes for each customer category as shown in the Table 17 below.

Table 17: Proposed sales forecast per customer category (GWh)

Sales Forecast	2022/23	2023/24	2024/25
LV	665.61	701.65	739.72
MV	107.27	232.86	304.32
HV	3,950.58	5,356.86	5,740.47
Total	4,723.46	6,291.38	6,784.52

3.1.2.2 Input from Stakeholders

ABI in their written comments submitted that there is a substantial increase in the projected energy sales volume of BPC as compared to the current tariff period (2019-2022) and recommended BEA to review the energy sales forecast in close consultation with BPC and DHPS.

3.1.2.3 BEA Review

BEA reviewed the LV, MV and HV sales forecast submitted by BPC and found the following:

- a) BPC has projected the LV sales using the Compounded Annual Growth Rate (CAGR) method.
- b) For the existing MV consumers, BPC has projected the sales using the average load factor of the years 2019, 2020 and 2021 and power factor of 0.85 assuming that it would take some time for the industries to return to pre-COVID business levels. The energy sales forecast for the upcoming consumers was projected considering the Kholongchu HEP, Gyalsung project and the industrial parks. Although the capacity reserve charges agreements are not signed, BPC has considered the industries list as per lease agreement signed with the Department of Industries (DoI) for the land allotment.
- c) BPC sales forecast for existing HV consumers has been done using the load factor of the year 2020 and 2021 assuming that the production would take some time to return to pre-

COVID levels. The energy sales forecast of upcoming HV consumers was projected based on the contact demand signed with BPC and expected load factor according to type of industry.

BEA has used trend analysis for forecasting the LV sales for the tariff period 2019-2022 which is closer to the actual sales and if the CAGR method was used in the year 2019, the LV sales forecast would have been much higher compared to the actual LV sales as shown below.

Table 18: Sales forecast vs actual (GWh)

	2019	2020	2021	Total
Approved LV sales 2019-2022 using trend analysis	543.94	570.11	596.29	1,710.34
Projected sales using CAGR	555.50	604.72	658.92	1,819.14
Actual Sales 2019-2021	546.00	549.72	569.12	1,664.84

For the upcoming MV industries proposed by BPC, BEA has checked the likelihood of power draw by those upcoming industries in the upcoming tariff period, by consulting with DoI on the approval process and also contacting the individual industry promoters to update on the status of the proposed industries. Based on the updates, a realistic schedule for the date and quantum of power draw was estimated.

BEA also considered the additional list of upcoming MV industries from DoI who have signed lease agreement with respective Dzongkhags in consultation with BPC, DoI and the promoters.

For the upcoming HV industries proposed by BPC, BEA consulted with BPC, DoI, industry promoters on the current status. It was found that majority of industries proposed by BPC are under construction. On the additional list of industries from DoI, BEA consulted with the promoters and BPC, it was found that one industry has signed capacity reserve agreement and another is under construction. Therefore, based on the findings, BEA considered two additional HV industries in addition to what was proposed by BPC.

Considering the consumption pattern of the LV consumers and of the existing MV and HV industries, current status of the proposed industries and the realistic time schedule of these industries to come online, BEA approved sales forecast as shown in Table 19 below.

Table 19: Approved LV, MV and HV Sales Forecast (GWh)

Sales Forecast	2022/23	2023/24	2024/25
LV	635.64	664.01	692.38
MV	141.05	271.85	367.90
HV	4,079.74	5,642.58	6,139.09
Total	4,856.43	6,578.44	7,199.37

3.1.3 Export Wheeling

3.1.3.1 BPC Proposal

BPC has forecasted export wheeling energy by considering the energy generation from DGPC, DHPC, MHP and THyE as shown in Table 20 below.

Table 20: Proposed Export Wheeling (GWh)

Export Wheeling forecast	2022/23	2023/24	2024/25
DGPC	3,370.07	2,363.01	2,028.23
MHP	2,708.23	2,364.16	2,364.16
DHPC	436.96	445.08	445.08
THyE	30.53	444.26	481.66
Total	6,545.79	5,616.51	5,319.13

3.1.3.2 *BEA Review*

The energy to be export wheeled from DGPC and MHP is calculated based on the historical average generation of DGPC and MHP of the past three years adjusted for transmission losses after deducting auxiliary losses and BPC purchases. The energy to be export wheeled from Dagachhu Hydro Power Corporation Limited is calculated based on the historical average generation less auxiliary and transmission loss. The energy to be export wheeled from THyE is calculated based on the forecast energy generation less auxiliary and transmission loss.

Based on the above, BEA approved net export wheeling forecast as shown in Table 21 below.

Table 21: Approved Wheeling forecast (GWh)

Export Wheeling Forecast	2022/23	2023/24	2024/25
DGPC	3349.64	2449.85	2168.66
MHP	2727.97	2479.88	2429.69
ThyE		181.06	485.89
DHPC	459.76	462.62	462.62
Total	6537.37	5573.41	5546.86

3.2 Network Cost

The annual network costs allocated to each Customer Group shall comprise a share of each element of the total annual network costs, where the sum of allocations across all Customer Groups shall equal the total annual network costs referred to Clause 76 of the TDR 2022, in accordance with the following:

$$\begin{aligned}
 NETWORK_C = & WACC_C \times \sum_i [ASSET_i \times AALLOC_{i,c}] + \sum_i [DEP_i \times AALLOC_{i,c}] \\
 & + \sum_i [OM_i \times AALLOC_{i,c}] + FEES \times FALLOC_C
 \end{aligned}$$

Where:

- 1) NETWORK_C is the network cost allocated to Customer Group “C”, in million Ngultrum;
- 2) WACC_C is the Weighted Average Cost of Capital for Customer Group “C” for the Licensee, determined in accordance with Clause 75 of the TDR 2022, as a percentage;
- 3) ASSET_i is the net historical value of assets in asset category “i”, in million Ngultrum;

- 4) DEP_i is the depreciation allowance for assets in asset category “i”, in million Ngultrum;
- 5) OM_i is operating and maintenance allowance for cost category “i”, in million Ngultrum;
- 6) FEES is the allowance for regulatory fees and levies, in million Ngultrum;
- 7) $AALLOC_{i,C}$ is the allocation factor to Customer Category “C” for asset-related costs in asset category “i”, as a percentage, where $\sum_c AALLOC_{i,c}=1$;
- 8) $OMALLOC_{i,C}$ is the allocation factor to Customer Category “C” for operating and maintenance costs in cost category “i”, as a percentage, where $\sum_c OMALLOC_{i,c}=1$; and
- 9) $FALLOC_C$ is the allocation factor for fees, as a percentage, where $\sum_c FALLOC_{i,c}=1$

3.2.1 Allowance for Depreciations and Return on Fixed Assets

As per Clause 51 to 54 of TDR 2022, the allowance for depreciations shall be based on the economic lifetime of the assets, in accordance with Schedule B of the TDR, which may be updated by BEA from time to time. The allowance for depreciation allows consideration of asset additions and retirements over the tariff period.

As per Clause 55 of the TDR 2022, the return on assets shall be determined as the product of the WACC and the net asset values at the start of any year.

3.2.1.1 Asset Schedule at the end of 2021

As per Clause 42 to 50 of TDR 2022, asset values are to be based on historical asset values and licensees are allowed to include IDC and associated labour costs to be capitalized. The regulation also allows the allowance for asset additions, asset disposals and other asset value adjustments over the course of the tariff period.

The Clause 9 of the Guideline for Determination of Regulatory Asset Base, 2021, states that “The Authority shall establish the initial Regulatory Asset Base of each Licensee based on the following Criterion:

- a) For existing Licensees, the historical cost of assets based on audited accounts as of 31st December 2021 shall be considered; and
- b) For new Licensees, which come into existence after the commencement of this guidelines, all assets approved by the Royal Government of Bhutan shall be considered.”

The allowance for depreciation is based on the economic life of the assets, in accordance with Schedule B of the TDR 2022, which may be updated by BEA from time to time. The allowance for depreciation allows taking asset additions and removals over the tariff period into consideration. The return on assets is to be determined as the product of the WACC and the net asset values.

3.2.1.1.1 BPC Proposal

BPC has proposed asset values at the end of the year 2021 as shown in Table 22 below and also submitted that the depreciations rates has been considered as per the TDR.

BPC submitted that Druk Holding and Investments (DHI) has directed to transfer the embedded generation assets to DGPC vide letter no. DHI/BOARD/2022/15 dated 4th January, 2022. BPC

submitted that net asset worth Nu 258.738 million will be transferred to DGPC and those embedded generation assets not fully related to generation are retained and included in the assets of BPC. Similarly, with the delinking of BPSO, the BPSO net asset value of Nu 21.43 million is excluded from BPC assets. Further, BPC mentioned that they included distribution asset worth of Nu 27.83 million (net value) in the BPC's net asset value and gross asset value worth Nu 36.19 million based on the request of Dagachhu Hydropower Plant Corporation (DHPC) to take over their distribution system assets.

BPC also mentioned that the Guideline for determination of Regulatory Asset Base 2021 specifies that for existing Licensees, the historical cost of assets based on audited accounts as of 31st December 2021 shall be considered. Therefore, BPC submitted that the Asset Base as on 2021 taking into account the above-mentioned asset transfers as shown in Table 22 below.

Table 22: Proposed Asset Schedule at end of the year 2021 (Nu Mill)

Fixed Asset	Gross Value	Acc. Dep	Net Value	Dep
Building and Land	4,226	1,121	3,105	143
Generation	124	38	86	46
Transmission	22,057	5,217	16,840	717
Distribution	11,701	4,010	7,719	375
Others	2,182	1,296	762	151
Total	40,290	11,682	28,513	1,432

3.2.1.1.2 Input from Stakeholders

ABI, in their written comments submitted that for the tariff period (2019-2022), the approved gross value of assets for BPC was Nu 27,706 million at the beginning of the tariff period although the proposed value was Nu 28,846 million.

ABI also submitted that the gross value of assets at the end of the year 2021 has been reflected as Nu 40,290 million which was overestimated by Nu 1,054 million which as evident will mean that the return on assets as well as depreciation will be much higher than allowable values resulting in higher tariff than actually allowable. Considering above, ABI recommended the gross value of assets as of 2021 end be corrected and adjusted so that only allowable and admissible assets are included for the purpose of determining the cost.

3.2.1.1.3 BEA Review

The Sub Clause 9 (1) of the Guideline for Determination of Regulatory Asset Base, 2021 states that the Authority shall establish the initial Regulatory Asset Base of existing Licensees based on the audited account as of 31st December 2021 considering that the RAB is being established for the first time since the issuance of the guideline in the year 2021.

BEA has found that the BPC asset schedule has been proposed as per the audited financial statements of 2021 and asset register maintained by BPC. The depreciation rates used by BPC are also as per the Schedule B of the TDR.

BEA verified the net asset of embedded generation to be transferred to DGPC, BPSO asset value and 33 kV DHPC distribution assets. It was found that BPC has accounted double net asset value

of DHPC distribution and accumulated depreciation of BPSO assets has been reported incorrectly. The observation was conveyed to BPC and accordingly, BPC submitted the corrected asset schedule on 19th April 2021, wherein the 33 kV DHPC distribution assets have not been taken over yet and will be taking over the asset in the year 2022, therefore, DHPC distribution assets has been added in BPC investment in 2022. Considering the above, BEA reviewed asset schedule of BPC is shown in the Table 23 below.

Table 23: Reviewed asset schedule at the end of 2021 (Nu Mill)

Fixed Asset	Gross Value	Acc. Dep	Net Value	Dep
Building	4,226	1,121	3,105	143
Generation	125	38	86	46
Transmission	22,057	5,217	16,840	717
Distribution	11,664	4,001	7,663	375
Others	2,182	1,419	762	151
Total	40,254	11,797	28,457	1,432

3.2.1.2 Investment

3.2.1.2.1 *BPC Proposal*

BPC has submitted investment worth Nu 14,136.85 million for the period 2021-2025 in October 2021. However, BPC submitted revised investment of Nu 18,397 million for the tariff period 2022-2025 at the time of submission of tariff application on 8th March 2022.

The increase in the proposed investment were mainly due to the addition of the cost of ATS of MHP and power infrastructure development. The summary of the updated Investment Plan is as shown in the Table 24 below.

Table 24: Proposed Capitalized Investment Schedule

Sl.No	Investments	Amount(Nu Mill)				Total
		2022	2023	2024	2025	
1	Buildings & land	263	166	97	29	555
2	Generation	26	1	3	5	35
3	Transmission	5941	3700	552	221	10414
4	Distribution	1701	673	642	326	3342
5	Vehicles	170	139	37	14	360
6	Office equipment	381	812	581	1682	3457
7	Tools	36	14	20	31	100
	TOTAL	8576	5553	1959	2308	18397

3.2.1.2.2 *Input from the stakeholders*

ABI, in their written comments submitted that BPC has proposed for a capital investment of about Nu 13,058 million for the fiscal year 2022/23 to 2024/25 (three years). However, based on historical trends, BPC has not been able to achieve its planned capital investments. During the tariff period 2019-2022, BPC had proposed a capital investment of Nu 16,467 million out of which only Nu 14,016 million (or about 85% of the proposal) was approved by BEA.

ABI also submitted that BPC had achieved only 84% of its proposed investment plan and 97% of the approved investment by BEA for the current tariff period and based on this empirical evidence, BPC will be able to capitalize only about 85% of the proposed investment amounting to about Nu 11,099 million.

3.2.1.2.3 BEA Review

Upon receipt of BPC Investment Plan Proposal for the period 2021-2025, BEA conducted a preliminary review of the proposal and requested BPC for additional information.

A consultation meeting was held with BPC on 21st December 2021 and during the meeting, the details on the proposed investments were discussed with the BPC management and the relevant officials.

BEA referred the Technical Clearance for Transmission System Expansion Plan (2021-2025) issued by DHPS to BPC vide letter no. 19/DHPS/PSD/BPC/2020-21/690 dated 1st March 2022.

BEA also referred to BPC Smart Grid Master Plan (SGMP) 2019, Distribution System Master Plan (DSMP) 2019-2020, BPC Budget 2022 as most of the investments were proposed in line with the plans and approved budget.

Considering the above, BEA approved investments worth Nu.13,924 million by scrutinizing the need for investments, source of funding, current status, risks associated with the completion of the investments, the capitalization schedule, reasonableness of the cost estimate, comments received during public hearing, capitalization schedule vis-à-vis achievement status during 2019 tariff review.

The approved BPC investment schedule for the tariff period 2022-2025 which is 72 % of the proposed BPC is as shown in Table 25 below.

Table 25: Reviewed Capitalized Investment Schedule

Sl.No	Investments	Amount (Nu Mill)				Total
		2022	2023	2024	2025	
1	Buildings & land	38	224	145	134	541
2	Generation	0	0	0	5	5
3	Transmission	4469	755	3031	681	8937
4	Distribution	383	734	1444	596	3158
5	Vehicles	69	57	37	93	256
6	Office equipment	67	81	565	208	921
7	Tools	38	14	22	31	106
	TOTAL	5064	1866	5245	1749	13924

3.2.1.3 Return on Assets (RoA) and Depreciation

3.2.1.3.1 BPC Proposal

The net asset value for each year has been calculated as gross asset value less the accumulated depreciation. The proposed return on assets allowance is calculated as the product of the proposed WACC (Wheeling of 13.94%, HV of 13.39%, MV of 9.45% and LV of 9.15%) and the expected

net asset values at the start of each tariff year. The depreciation allowances are proposed according to their expected depreciation during the next tariff period. BPC proposed figures are shown in Table 26, Table 27, Table 28 and Table 29 below.

Table 26: Proposed RoA and Depreciation for Wheeling (Nu Mill)

	2022/23	2023/24	2024/25
Gross asset values	9,125	10,249	10,633
Accumulated depreciation	2,093	2,434	2,805
Net asset value	7,032	7,815	7,828
Return on Asset	933	1,093	1,097
Depreciation	2,093	2,434	2,805

Table 27: Proposed RoA and Depreciation for HV (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	17920.14	21046.47	22678.99
Accumulated depreciation	4705.02	5393.05	6168.25
Net asset value	13215.12	15653.43	16510.74
Return on Asset	1798.69	2130.57	2247.25
Depreciation	688.02	775.21	812.61

Table 28: Proposed RoA and Depreciation for MV (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	5246.38	6038.86	6605.84
Accumulated depreciation	1710.57	1952.52	2235.81
Net asset value	3549.14	4125.64	4435.32
Return on Asset	483.07	561.53	603.69
Depreciation	241.95	283.30	325.57

Table 29: Proposed RoA and Depreciation for LV (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	12000.78	13467.64	14555.49
Accumulated depreciation	4078.94	4588.49	5194.46
Net asset value	7929.67	8902.23	9399.38
Return on Asset	1079.30	1211.67	1279.34
Depreciation	509.55	605.97	718.76

3.2.1.3.2 *BEA Review*

Based on the reviewed asset schedule of 2021, the investment plan for the tariff period 2022-2025 and the approved WACC, the approved return on assets and depreciation allowances for the next tariff period are as shown in Table 30, Table 31, Table 32 and Table 33 below.

Table 30: Reviewed RoA and Depreciation for Wheeling (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	6887.54	7716.67	8004.95

Accumulated depreciation	1593.78	1851.61	2131.10
Net asset value	5293.76	5865.06	5873.84
Return on Asset	677.78	750.92	752.05
Depreciation	257.84	279.50	291.72

Table 31: Reviewed RoA and Depreciation for HV (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	20040.72	21892.76	23512.49
Accumulated depreciation	5366.49	6098.83	6897.88
Net asset value	14674.2	15793.9	16614.6
Return on Asset	1978.63	2129.61	2240.27
Depreciation	732.36	799.07	860.43

Table 32: Reviewed RoA and Depreciation for MV (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	3094.13	3311.72	3600.32
Accumulated depreciation	1057.89	1185.34	1324.62
Net asset value	2036.24	2126.37	2275.70
Return on Asset	176.89	184.72	197.70
Depreciation	127.46	139.28	154.28

Table 33: Reviewed RoA and Depreciation for LV (Nu Mill)

	2022/23	2023/25	2024/25
Gross asset values	12755.63	13311.72	14670.90
Accumulated depreciation	4589.23	5065.27	5589.29
Net asset value	8166.40	8246.45	9081.61
Return on Asset	694.58	701.38	772.42
Depreciation	476.05	524.04	599.32

4 Cost Allowances

4.1 O&M Allowance

The determination of O&M cost is described in Clause 35 to 41 of the TDR 2022. The allowance for O&M costs is calculated each tariff year. The O&M allowance is determined for the reference year 2021 which will be increased by inflation less efficiency gain targets through the tariff period. For each year in the tariff period an additional O&M allowance is added for new assets as per the investment schedule using benchmarks as set out in the Schedule A of the TDR 2022.

4.1.1 Historical O&M Cost

4.1.1.1 BPC Proposal

The proposed historical O&M allowances figures for the period 2019-2021 are shown in Table 34 below.

Table 34: Proposed total O&M Allowances (Nu Mill)

	2019	2020	2021	Average
Transmission	373	441	462	432
Distribution	813	851	1065	923
Other	482	618	425	516
Total	1,669	1,910	1,951	1,871

BPC has proposed O&M allowances of Nu 1,871 million which is the average historical O&M cost of past three years adjusted for inflation. BPC submitted that the proposed historical O&M costs are after deducting non-allowable costs such as Corporate Social Responsibility (CSR), License fee to BEA, Fines and Penalties, Management fee for Holding Company and foreign exchange fluctuations (gain/losses). It was also submitted that the historical O&M costs exclude the following O&M received from other agencies to operate and maintain infrastructures:

- i. Historical O&M costs of Embedded Generation as the asset will be taken over by DGPC.
- ii. Historical O&M costs of BPSO as the O&M cost is allocated as per System Operator Charges Regulation.
- iii. O&M budget for Fiber Network Division (FND) provided by the Department of Information Technology and Telecom (DITT), Ministry of Information and Communication (MoIC) for the use of 18 fibers (75%) out of 24 fibers. The O&M cost of the remaining 6 fibers is only included in BPC.
- iv. O&M fund received from PHPA-I to maintain PHPA-I 400 kV transmission lines.
- v. O&M fund from PHPA-II to maintain PHPA-II kV lines.
- vi. O&M fund from KHEL for Korlung substation.

4.1.1.2 Input from Stakeholders

ABI submitted that BEA had approved O&M allowance of Nu 1,430 million for the tariff period 2019-2022. Accordingly, the actual inflation for the years 2019, 2020 and 2021 has been used to adjust the O&M allowance for the base year 2021 and Nu 1,683 million has been recommended for tariff computation.

4.1.1.3 BEA Review

BEA verified the historical O&M costs for the past years 2019 to 2021 from the audited annual accounts submitted by BPC and found that most of the costs has been reported correctly. Few minor corrections to the proposed historical O&M costs as per the audited annual accounts were made.

As per the provisions of TDR, non-allowable O&M expenses such as license and registration fees, CSR, management fee for holding company, loss on disposal of property, plant and equipment, provision/write-back of provision on obsolescence of material and contribution from DITT which do not relate directly to the licensed activities of BPC have been deducted from the total O&M costs.

BEA verified and deducted the historical O&M costs of Embedded Generation since DGPC will take over the asset soon. BEA also verified and deducted the historical O&M of BPSO since BPSO has filed the separate charges petition as per the System Operation Charges Regulation, 2022. Further, O&M funds received from DITT, KHEL, PHPA-I and PHPA II is verified and deducted from the historical O&M cost as proposed by BPC.

BEA has determined the O&M allowance based on the average historical O&M costs adjusted for inflation after above deductions. BEA approved O&M allowance of Nu 1,627 million as shown in Table 35 below.

Table 35: Reviewed Historical O&M Costs (Nu Mill)

	2019	2020	2021
Employee benefit Expenses	1,151	1,256	1,301
Operation and Maintenance	465	407	448
Other Expenses	207	410	216
Total	1,822	2,072	1,965
Deduction	261	486	317
Nominal O&M costs	1,561	1,586	1,648
O&M costs in 2021 values	1,614	1,619	1,648
O&M allowance		1,627	

4.1.2 O&M Efficiency Gain

4.1.2.1 BPC Proposal

BPC proposed an O&M efficiency gain target of 2%.

4.1.2.2 BEA Review

BPC proposed an O&M efficiency gain target of 2% in the tariff period. Since BPC has proposed investment of smart grid project worth Nu 3,593.57 million in the tariff period and submitted that smart grid investments should result in reduction of the O&M cost of BPC and enhanced reliability of the power system, BEA approved an O&M efficiency gain target of 2% as proposed by BPC.

4.1.3 Benchmark O&M Cost

4.1.3.1 BPC Proposal

BPC proposed total Current Replacement Cost (CRC) of assets as on 31st December 2021 of Nu 37,954.82 million based on capital expenditure adjusted for inflation and O&M benchmark as shown in Table 36 below.

Table 36: Proposed O&M Benchmark and CRC (Nu Mill)

Benchmark O&M	Percent of capex	Replacement Cost	Calculated O&M
Micro hydel	2.50%	2,110.85	52.77
Diesel generation	10.00%	0.00	-
Transmission	1.00%	17,937.82	179.38
Distribution	3.00%	11,263.08	337.89

Other	2.00%	6,643.07	132.86
Total		37,954.82	702.90

The O&M allowances figures for the tariff period 2022-2025 proposed by BPC are calculated based on the allowances for the reference year, adding annual allowances for the investment schedule in each year (2022-2025) using the proposed benchmarks in Table 36. The breakup of the proposed O&M allowances proposed by BPC is as shown in the Table 37 below.

Table 37: Breakup of O&M Allowances proposed by BPC (Nu Mill)

	2021 (Average)	2022	2023	2024	2025
O&M 2021 allowances	1871	1,927	1,986	2,046	2,108
O&M additions 2022 investments		15.39	15.54	15.70	15.85
O&M additions 2023 investments			85.76	86.62	87.49
O&M additions 2024 investments				55.53	56.08
O&M additions 2025 investments					195.91
Total O&M allowances	1,871	1,943	2,087	2,204	2,463

4.1.3.2 BEA Review

The O&M benchmarks for various asset categories are prescribed by the Schedule A of the TDR 2022 as shown in Table 38 below. BEA approved O&M benchmarks to be maintained as per the prevailing TDR.

Table 38: Reviewed O&M Benchmarks

O&M Benchmarks	
Diesel generation	10%
Transmission	1%
Distribution	3%
Others	2%

4.2 Regulatory Fees Allowances

As per the Fees and Charges, Schedule 1 of the Regulatory Fees Regulation, 2006, the license fee for transmission or system operation and distribution is calculated as 0.2 % of revenues from electricity tariff provided that the annual License fee shall be payable in advance, at the commencement of the financial year based on estimated revenue for the ensuing financial year as determined by the Authority.

4.2.1 BPC Proposal

BPC has proposed regulatory fees as shown in Table 39, according to the “Regulatory Fees Regulations of 2006”. BPC submitted that the regulatory fee has been proposed based on the revenue from the proposed tariff.

Table 39: Proposed Regulatory Fees (Nu Mill)

	2022/23	2022/24	2024/25
Regulatory fees	44.62	33.09	35.08

4.2.2 *Input from Stakeholders*

ABI have compared the annual license fee paid by the licensee to BEA and BEA expenditure in past three years indicating a surplus amount after meeting BEA expenditure and the surplus will increase further in the coming years. ABI also submitted that with the commissioning of new hydropower projects (Nikachu, Punatsangchu I and II) in the next three years the revenues for BEA from fees will increase further and therefore recommended that the current Regulatory Fees Regulation 2006 be reviewed and amended so that the statutory fees can be reduced for the Licensees while at the same time be adequate to meet BEA'S expenses. The reduction in fee will reduce the domestic tariffs.

4.2.3 *BEA Review*

In line with the concerns of ABI, BEA Secretariat during the 2021-2022 fiscal year recommended the amendment of current Regulatory Fee Regulation 2006 for reduction of annual license fee to be paid by Licensee. However, BEA Commission had directed the fees to be maintained at existing rates considering the delay in the commissioning of the upcoming projects.

Based on above, the Regulatory Fees is calculated as 0.2% of revenues from the electricity tariff as per Schedule 1 of Regulatory Fees Regulation, 2006 as shown in Table 40 below.

Table 40: Reviewed Regulatory Fees

Customer Category	2022/23	2022/24	2024/25	2022/23	2022/24	2024/25
Regulatory Fees (Nu Mill)	29.79		36.29		39.50	

4.3 The Cost of Working Capital Allowance

The allowance for Return on Working Capital is calculated as per the Clause 79 of the TDR 2022 as below.

$$CoWC_c = I * \left[REV_c \times \frac{ARREARS_c}{365} + INVENTORIES \times IALLOC_c \right]$$

Where:

- 1) $CoWC_c$ is the cost of working capital allocated to Customer Group "C" in million Ngultrum;
- 2) I is the interest rate for working capital as determined in Clause 59 of the TDR 2022;
- 3) $REV_c = OM_c + DEP_c + RoA_c$

Where:

- ✓ OM_c is the allowance for operating and maintenance costs for the Customer Group "C", in million Ngultrum;

- ✓ DEP_C is the allowance for depreciation of assets for the Customer Group “C”, in million Ngultrum and
- ✓ RoA_C is the return on fixed assets for the Customer Group “C”, in million Ngultrum, determined as:

$$RoA_C = WACC_C \times NA_C$$

Where:

- $WACC_C$ is the weighted average cost of capital for the Customer Group “C”, as determined in accordance with Clause 75 of the TDR 2022, as a percentage and
 - NA_C is the net value of all fixed assets at the start of the year for the Customer Group “C”, in million Ngultrum.
- 4) $ARREARS_C$ is the allowed days receivables for the Customer Group “C”, in days;
 - 5) $INVENTORIES_C$ is the allowance for the value of inventories, in million Ngultrum and
 - 6) $IALLOC_C$ is the allocation factor to Customer Group “C” for inventories, as a percentage, where $\sum_c IALLOC_{i,c} = 1$.

The purpose of the Working Capital allowances is to compensate for the loss of revenues caused by the lag between the time of costs incurred and the time of receivables from the consumers, and to allow a return on capital for inventories.

4.3.1 Interest Rate for Working Capital

4.3.1.1 BPC Proposal

BPC has proposed 9.97% as interest rate on working capital.

4.3.1.2 Inputs from Stakeholders

ABI submitted that BPC has proposed an interest on working capital of 9.97% per annum and recommended the interest on working capital of 8% be considered based on the current lowest short term lending rate of 8% per annum for Manufacturing-Hydropower term loan at a floating rate from Bank of Bhutan.

4.3.1.3 BEA Review

The Clause 7.7 of the DETP 2016 states that, “The interest on working capital shall be determined based on the prevailing lowest short-term lending rate of financial institution of Bhutan”.

BEA reviewed the working capital interest rates offered by the financial institutions in Bhutan and found that the lowest interest rate for working capital is offered at 9.23 % for Working Capital for Businesses loan offered by Bank of Bhutan Limited. Accordingly, BEA approved the interest on the working capital of 9.23 %. BEA found that the 8% recommended by ABI is interest rate for long term manufacturing – Hydro Power while the DETP 2016 prescribes use of lowest short term lending rate.

4.3.2 Arrears

4.3.2.1 BPC Proposal

BPC has proposed arrears of 35 days for HV, MV, and LV category of consumers and 40 days for the Wheeling, which are the same figures as approved by Authority for the Tariff period 2019-2022.

4.3.2.2 BEA Review

BPC had confirmed that there are no changes in MoU on bulk sale and purchase of electrical energy amongst Tala Hydropower Plant (THP), Chhukha Hydropower Plant (CHP), Basochhu Hydropower Plant (BHP) and BPC.

During tariff period 2019-2022, BEA Commission had reduced the number of days for calculation of arrears to reduce the billing and collection inefficiencies and as such the Commission decided to maintain arrears at the same levels as shown in Table 41 below.

Table 41: Approved Arrears

Arrears (No of Days)	Wheeling	HV	MV	LV
Average consumption duration	15	15	15	15
Bill delivery duration	5	0	0	0
Bill payment duration	20	20	20	20
Arrears	40	35	35	35

4.3.3 Inventories

4.3.3.1 BPC Proposal

BPC has proposed an inventory of Nu 568.76 million which is the value reported as per the audited account as of 31st December 2021.

4.3.3.2 BEA Review

As per the Clause 16 of Guideline for Determination of Regulatory Asset Base, 2021, the allowance for inventories shall be as a percentage (%) of operation and maintenance expenses or capital cost based on industry practice or applicable benchmark. Therefore, review of the inventories resulted in the following findings:

- a) BPC has proposed an inventory of Nu 568.76 million. However, as per the audited accounts of 31st December 2021, the total inventory reflected is Nu 560.66 million. Based on the figure reflected in the audited accounts, BEA deducted spare of infocomm worth Nu 5.96 million which was provided by DITT, MoIC. Therefore, the reviewed inventories allowance is Nu 554.70 million for the year 2021.
- b) CERC, India allows inventory of 15% of O&M cost. Based on CERC norms, allowance for inventories is Nu 244.03 million. BEA is of the view that CERC norms may be too low considering that required inventory is not readily available in Bhutan.

- c) BEA also checked the average inventory consumption for the period 2019 to 2021 and found that BPC has used average inventory of Nu 427.84 million per year. However, the unavailability of required spares which could have resulted in higher inventory consumption was also submitted by BPC.

Considering the above, BEA approved Nu 554.70 million based on audited figure of 31st December 2021 after deducting stock of Infocom spares and also requires BPC to come out with an efficient Inventory Management System.

Based on the proposed inventory, interest and arrears, BPC proposed the allowances for Cost of Working Capital as shown in Table 42 below.

Table 42: Proposed Allowances on CoWC (Nu Mill)

	2022/23	2023/24	2024/25
Wheeling	22	24	23
HV	62	68	70
MV	13	14	14
LV	35	38	40
Total	132	143	148

As per the Clause 79 of TDR 2022, the CoWC shall be calculated as the product of interest on working capital based on the prevailing lowest short term lending rate of financial institution in Bhutan at the time of tariff review.

BEA approved allowances for CoWC as shown in Table 43 considering short term lending rate of 9.23% and approved inventory and arrears.

Table 43: Approved Allowances for CoWC (Nu Mill)

	2022/23	2023/24	2024/25
Wheeling	20	21	22
HV	54	56	60
MV	8	8	9
LV	32	33	35
Total	114	118	126

4.4 Non-Tariff Revenues

The Non-Tariff Revenue is the revenue collected from consumers that does not arise from the sale of electricity, such as application fees, connection fees and meter test fees etc. According to the Clause 86(11) of the TDR 2022, the non-tariff revenues (NTR) shall be deducted from the cost of supply before calculating the tariffs.

4.4.1 *BPC Proposal*

BPC has proposed the non-tariff revenue such as rental income to be deducted from the historical O&M costs.

BPC has proposed the non-tariff revenue for the next three tariff years based on the consolidated average historical non-tariff revenue for past three years (2019-2021) which is allocated to each customer category based on the number of consumers in the category. The proposed Non-Tariff Revenues are as shown in the Table 44 below.

Table 44: Proposed Non-Tariff Revenue (Nu Mill)

Non-Tariff Revenue	2019	2020	2021	2022/23	2023/24	2024/25
LV	131.79	156.33	152.59	146.90	146.90	146.90
MV	0.05	0.05	0.05	0.05	0.04	0.05
HV	0.01	0.01	0.01	0.01	0.02	0.02

4.4.2 *BEA Review*

The Clause 7.13 of the DETP 2016 states that all non-tariff revenue from rentals, fund deposits, deposit works, etc. shall be deducted from the total cost for computation of costs of supplies.

BEA verified the consolidated historical non-tariff revenue and number of customers in each customer category submitted by BPC. Based on the consolidated historical non-tariff revenue and number of customers provided by BPC, BEA adjusted the average historical non-tariff revenue to 2021 figures. BEA then took the average of non-tariff revenue and apportioned it to the customer categories based on the number of consumers. Further, based on the provision of DETP, BEA added the revenue to be earned from deposit works/construction contracts as provided by BPC. The approved non-tariff revenues are proposed to be deducted from the LV, MV and HV cost of supply as shown in the Table 45 below.

Table 45: Approved Non-tariff Revenue (Nu Mill)

Non-Tariff Revenue	2022/23	2023/24	2024/25
Low Voltage	148.94	148.95	148.95
Medium Voltage	3.58	0.04	0.05
High Voltage	38.79	47.01	5.01
Total	191.31	196.01	154.01

5. System Operator Cost

5.1 BPC Proposal

BPC submitted that the Bhutan Power System Operator (BPSO) has proposed System Operator charges as per the System Operator Charges Regulation, 2022 and as per the regulation, the transmission and distribution licensee will be allocated 50% of the total cost of the System Operator. So, BPC has included only 50% of the total charges proposed by BPSO as per the regulation.

Table 46: Proposed SO Charges (Nu Mill)

Year	2022	2023	2024
System Operator cost	198.69	327.57	126.27
50% of the cost	99.35	163.79	63.14

BPC submitted that the system operator charges are proposed to be allocated equally between the Export wheeling and HV consumer category.

5.2 Inputs from stakeholders

ABI in their written comments submitted that as in DGPC's and MHPA's case, BPC has proposed regulatory fees in line with the new System Operator (SO) Charges Regulation as well as BEA Fee Regulations, 2006. A tariff application fee of 0.1% of revenue and an annual fee of 0.2% of revenue has been made by BPC in line with BEA's Fee Regulations. This has been considered after adjusting the projected revenues. However, similar to the justifications outlined in DGPC's and MHP's case, the following table shows the proposed and recommended SO fees for BPC for the tariff period 2022-2025.

Table 47: Overview of SO Costs for BPC (proposed vs recommended)

	2022/23	2023/24	2024/25	Total
Proposed (Nu Mill)	99.345	163.785	63.135	326.26
Recommended (Nu Mill)	21.665	26.814	49.661	98.14

5.3 BEA Approval

As per the System Operator Charges Regulation 2022, the System Operator Charges approved by BEA Commission in its 103rd Commission Meeting is as shown in Table 48 is considered.

Table 48: Approved Total Cost (Nu Mill)

Particular	2022/23	2023/24	2024/25	Total
O&M cost				
Proposed	57.66	56.77	55.52	169.95
Reviewed	43.32	42.87	41.38	127.57
Capital expenditure				
Proposed	140.63	270.14	70.00	480.77
Reviewed	0.63	74.32	325.82	400.77
Regulatory Fees				
Proposed	0.40	0.65	0.75	1.80
Reviewed	0.09	0.23	0.83	1.16
Total Proposed cost	198.69	327.57	126.27	652.53
Total Approved cost	44.04	117.43	368.03	529.49

The total cost of the System Operator has to be allocated half to Generation Companies and half to Transmission and Distribution Licensees as per the Clause 37 of the System Operator Charges Regulation, 2022. Since BPSO is mainly involved in the dispatch of generation and to coordinate power flow at the transmission level including import of power, as proposed by BPC, SO Charge allocated to BPC is further allocated 50% to wheeling and 50% to HV consumers as shown in Table 49 below.

Table 49: Approved Allocation of System Operator Charges

Particular	Amount (Nu Mill)
------------	------------------

	2022/23	2023/24	2024/25
Total Reviewed Cost	44.04	117.43	368.03
Generation (50 %)	22.02	58.71	184.02
Transmission and Distribution (50%)	22.02	58.71	184.02
Wheeling and HV cost allocation			
Wheeling	11.01	29.36	92.01
HV	11.01	29.36	92.01

6. Cost Allocation and Subsidies

6.1 Cost Allocation

The costs of supply for each customer group have to be determined. The assets, O&M and import costs, as well as fees and inventories, must be allocated across consumer groups. According to the Clause 65 of TDR 2022, this shall be done using allocation factors. The allocation factors for assets and associated costs like O&M, inventories, fees and levies for the consumer categories are to be updated based on the following provisions of the TDR.

- i) Where assets and associated costs are exclusively used by a particular Customer Group, the same shall be allocated fully to this Customer Group.
- ii) Where assets and associated costs are for export purpose, the entire cost shall be allocated to that Customer Category.
- iii) Where generation, transmission and distribution assets and their associated costs are meant for joint usage by different Customer Groups, the allocation factors shall be based on capacity demand in MW.
- iv) From the above Clauses i), ii) and iii) of the TDR, weighted average allocation factors for all the Customer Groups shall be determined for allocating assets and associated costs that do not fall under the above three items including fees and levies of the Authority.

6.1.1 *BPC Proposal*

In keeping the provisions of the DETP 2016, BPC proposed revision of allocation factors to reflect the change in utilization of the system owing to significant demand growth since the power utilization scenario in Bhutan has undergone substantial changes especially with the industrial sector outpacing the capacity addition and experiencing net-import during the lean generation months. BPC submitted that the upcoming High Voltage industries in Industrial Parks are expected to propel unprecedented acceleration in the demand growth. Further, the Medium Voltage industries are projected to be established in the Industrial Parks which are in the advanced stages of construction.

For transmission assets, BPC submitted that the 400kV lines are allocated based on the generation capacity and the 400kV substations of Malbase and Jigmeling are allocated to HV as exports are done directly without requiring ICT. The allocation factors for 220kV & 132kV substations, and

66kV transmission lines has been worked out by taking the contract demands of the HV & MV customer category including the future loads during tariff cycle and computing it against the peak load (for transmission substations) and line loading (for transmission lines) adjusted with future demand. For the LV category usage, load factor has been used on the peak demand to derive the allocation factor of HV Transmission systems.

For distribution assets (33kV & 11kV), BPC proposed to allocate to MV consumers and LV consumers. The contract demand of MV consumers including the future load and the total average energy sales to LV consumers converted to MW are used to determine the allocation factors for the distribution lines.

For the 6.6 kV lines, the asset is fully allocated to the LV consumer's category. Similarly, the LV lines and distribution substations/transformers are allocated 100% to the LV consumer's category. The allocation factor for civil structures, meters and distribution O&M were determined from the weighted average allocation factors for MV & LV.

For the remaining assets (others) that do not fall under transmission and distribution, the allocation factor is determined from the weighted average allocation factors for all the customer categories. The proposed asset allocation factor is shown in Table 50 below.

Table 50: Proposed Asset Allocation Factor

Items	Category	Export	HV	MV	LV	
AALLOCI,c , Allocation of Asset Related Costs	Buildings & land	15%	48%	10%	27%	
	Generation	Mini/Micro Hydels	0%	0%	51%	49%
	Transmission	Civil structures	22%	70%	5%	3%
		400+ kV lines	52%	48%	0%	0%
		220 kV lines	45%	55%	0%	0%
		132 kV lines	0%	63%	29%	9%
		66 kV lines	0%	88%	8%	4%
		Substations	0%	90%	5%	5%
		Meters	22%	70%	5%	3%
	Distribution	Civil structures	0%	0%	21%	79%
		33 kV lines	0%	0%	51%	49%
		11 kV lines	0%	0%	51%	49%
		6.6 kV lines	0%	0%	0%	100%
		LV lines	0%	0%	0%	100%
		Substations & transformers	0%	0%	0%	100%
Meters	0%	0%	21%	79%		
Others		15%	48%	10%	27%	
OM ALLOCI,c Allocation of O&M Costs	Generation		0%	0%	0%	0%
	Transmission		22%	70%	5%	3%
	Distribution		0%	0%	21%	79%
	Other		15%	48%	10%	27%
IALLOCI,c, Allocation of Inventories		15%	48%	10%	27%	
FALLOCI,c, Allocation of fees & Levies		22%	70%	5%	3%	

6.1.2 Inputs from Stakeholders

ABI submitted that BPC has proposed a capital investment of Nu 3,278.46 million for 400 kV transmission lines for the tariff period 2022-2025. The gross value of 400 kV transmission lines in the year 2021 end has been reflected as Nu 7,621.9 million. This means that about 43% of the current gross value of 400 kV transmission line assets will be added to the 400 kV transmission system over the next three years. As evident, almost all of this 400 kV transmission assets will be added primarily for export of energy from the new hydropower plants and not to cater to the domestic HV industries. The existing 400 kV transmission assets (from THP, MHP, PHPA-I and PHPA-II) is also primarily catering to the export of power. Accordingly, the allocation of assets for the 400 kV transmission system that is 52% for export and 48% for HV as proposed by BPC is not tenable.

Further, ABI also submitted that BPC has also proposed for revision of the allocation factors among the customer categories across all infrastructure types. Upon analysis of the outcome of this proposal, it is evident that most of the assets are transferred from the export category to the domestic customers although most of the capital investments planned over the next three years predominantly pertain to building a robust transmission system to cater to export of energy from the upcoming hydropower plants. ABI recommends that the asset allocation factor proposed by BPC needs to be reviewed and adjusted accordingly.

DGPC in their written comments submitted the following response to ABI's submission:

- a) With the demand growth especially with the industrial sector demand outpacing the capacity addition, there are instances of net imports during the lean generation months and it is expected to increase hereafter. The upcoming high voltage industries are expected to propel unprecedented acceleration in the demand growth. Therefore, the cost allocation may need to consider the growth, load requirements and usage of the assets.
- b) 400kV substation capacity of Malbase and Jigmeling is used mainly by the industries. The substation capacity of Jigmeling and Malbase are allocated to HV as exports are done directly without requiring such ICT.

6.1.3 BEA Review

As per the Clause 7.11 of DETP 2016, the allocation factors for assets and associated costs like O&M costs, inventories, fees and levies shall be determined for the customer categories based on the following guidelines:

- i) Where assets and associated costs are exclusively used by a particular customer category, the same shall be allocated fully to this customer category.
- ii) Where assets and associated costs are for export purpose, the entire allocation shall be to the export category.
- iii) Where generation, transmission and distribution assets and their associated costs are meant for joint usage by different customers, the allocation factor shall be based on capacity demand.

- iv) From the above i), ii), and iii), weighted average allocation factors for all the customer categories shall be determined for allocating assets and associated costs that do not fall under the above three items including fees and levies of BEA. BEA shall work towards determining the allocation factor schedules based on the above guidelines.

BEA reviewed the load growth trend for the coming years based on the contracted demand of the HV industries, MV industries and the LV consumption and found that there is a substantial growth in the HV demand from 2021 onwards which is further expected to increase. Hence the assets which were initially used for export of power will have to be used for import by the industries since the domestic supply will surpass the domestic demand.

The assets and associated costs meant for export purpose, including the entire cost is allocated fully to the export category. Further, the assets and associated costs which are exclusively used by a particular Customer Group such as 6.6 kV lines, LV lines and distribution substations were allocated fully to LV consumers.

The transmission and distribution assets and their associated costs which are meant for joint usage by Export, HV consumers, MV consumers and LV consumers were allocated based on capacity demand in MW.

The assets such as civil structures and meters under ‘Transmission’ and ‘Distribution’ assets category are allocated based on the weighted average of the costs and allocation factors within each asset category respectively. The allocation of O&M costs for the transmission assets is also based on this approach.

The assets categorized as ‘Building and Land’ and ‘Others’ are allocated to various Customer Groups considering weighted average of generation, transmission and distribution assets allocation factors. The allocation of O&M costs for assets categorized as ‘Others’, allocation of inventories and allocation of fees and levies are also worked out using this approach.

Based on the above, BEA approved asset allocation factors for the tariff period 2022-2025 as shown in the Table 51 below.

Table 51: Approved Asset Allocation factors

Items	Category	Export	HV	MV	LV	
AALLOC _{i,c} Allocation of Asset related Costs	Building	16%	48%	7%	29%	
	Generation	Mini/micro hydels	0%	0%	40%	60%
	Transmission	Civil structures	24%	70%	3%	3%
		400+kV lines	46%	54%	0%	0%
		220kV lines	39%	56%	2%	3%
		132kV lines	0%	87%	5%	8%
		66kV lines	0%	87%	5%	8%
		Substations	10%	80%	5%	5%
	Distribution	Meters	24%	70%	3%	3%
		Civil structures	0%	0%	16%	84%
33kV lines		0%	0%	40%	60%	

	11kV lines	0%	0%	40%	60%
	6.6kV lines	0%	0%	0%	100%
	LV lines	0%	0%	0%	100%
	Substations/trans- formers	0%	0%	0%	100%
	Meters	0%	0%	16%	84%
	Others	16%	48%	7%	29%
OM AALLOC i,c Allocation of O&M Costs	Generation	0%	0%	40%	60%
	Transmission	24%	70%	3%	3%
	Distribution	0%	0%	16%	84%
	Others	16%	48%	7%	29%
IAALLOC i,c, Allocation of inventories		16%	48%	7%	29%
FAALLOC i,c, Allocation of Fees & Levies		16%	48%	7%	29%

6.2 Cost of Supply per customer group

The allocation factors in Table 51 allocate the asset related cost, O&M cost, working capital (fees and inventories) to Wheeling, HV, MV and LV consumers. The energy costs, including cost of losses are allocated according to the sales and loss factors for each consumer group. Non-Tariff Revenues are deducted from the relevant customer groups cost of supply. Based on the above, the reviewed cost of supply for Export Wheeling, HV Consumers, MV Consumers and LV Consumers are shown in Table 52, Table 53, Table 54 and Table 55 below.

Table 52: Reviewed Cost of Supply to Export Wheeling (Nu Mill)

	2022/23	2023/24	2024/25
Energy costs	119	102	101
Network costs	1,118	1,219	1,245
Working capital	20	21	22
Other revenue	0	0	0
SO Charges	11	29	92
Unsubsidized Cost of Supply	1,268	1,371	1,460

Table 53: Reviewed Domestic Cost of Supply to HV Consumers (Nu Mill)

	2022/23	2023/24	2024/25
Energy costs*	5,538	6,864	7,193
Network costs	3,241	3,478	3,687
Working capital	54	56	60
Other revenue	(39)	(47)	(5)
SO Charges	11	29	92
Unsubsidized Cost of Supply	8,805	10,381	11,027

*Energy costs include only the cost of energy purchased from DGPC and MHP at average generation tariff @ Nu 1.60 per Unit and the Cost of import is covered under the Section 6.3 of this report.

Table 54: Reviewed Domestic Cost of Supply to MV Consumers (Nu Mill)

	2022/23	2023/24	2024/25
Energy costs	234	451	610
Network costs	484	511	551
Working capital	8	8	9

Other revenue	(4)	(0)	(0)
Unsubsidized Cost of Supply	723	971	1,170

Table 55: Reviewed Domestic Cost of Supply to LV Consumers (Nu Mill)

	2022/23	2023/24	2024/25
Energy costs	1,144	1,195	1,246
Network costs	2,018	2,108	2,309
Working capital	32	33	35
Other revenue	(149)	(149)	(149)
Unsubsidized Cost of Supply	3,045	3,187	3,441

6.3 Accounting of import energy

The Clause 7.12 of DETP 2016 states that the import of energy shall continue especially during the lean season to meet the domestic energy deficits till adequate firm generation capacity is added. Since the bulk of domestic demand is for the industries, any net monthly import cost to meet the shortfall of domestic supply shall be allocated to industries (HV customers). For net monthly import, generation utility should have entered into an arrangement with the Indian counterparts regarding price and quantum of energy, which shall also be allocated to the HV customers on monthly basis

Considering the HV, MV and LV Sales forecast 2022-2025 provided in Table 56 below, the BEA estimated the power purchase requirement from DGPC, MHPA and import. The average power purchase price of Nu 1.6/unit has been determined considering the weighted average power purchase from DGPC at Nu 1.34/unit and MHP at Nu 3.64/unit. Any energy deficit is assumed to be met through import from India. Since the import price is not known, the average power purchase price of Nu. 1.6/unit has been used to estimate the import cost and any cost beyond Nu 1.6/unit while importing the energy from India shall be passed on to the HV customers to recover the energy charge for the imported energy.

Table 56: Sales Forecast

Sales Forecast	2022/23	2023/24	2024/25
LV	635.64	664.01	692.38
MV	141.05	271.85	367.90
HV	4,079.74	5,642.58	6,139.09
Total	4,856.43	6,578.44	7,199.37

The import energy charges shall also include charges such as India NLDC application fees, Central Transmission Utilities (CTU) transmission charges, NLDC scheduling & operating charges for buy and sale, State transmission utilities (STU) transmission charges, Distribution Charges and applicable Deviation Settlement Mechanism (DSM) charges.

As the energy imported from India need to be wheeled till the HV network and further supplied to HV customers using the BPC network, the wheeling charge at Nu 0.23/unit and network cost of Nu. 1.06/unit shall be payable by the HV customers in addition to the actual energy import price.

7. Average Price per Customer Groups

As per Clause 87 of the TDR 2022, the Average Price for a Customer Group shall be determined as the ratio of the discounted costs of supply for that Customer Group to the discounted electricity sales to that Customer Group, where sales are adjusted for an allowed collection rate, and where discounting occurs over the Tariff Period at the WACC applicable to the Customers.

$$AP_C = \frac{\sum_{n=1}^{TP} COST_{C,n} / (1 + WACC_C)^n}{\sum_{n=1}^{TP} (SALES_{C,n} \times COLL) / (1 + WACC_C)^n}$$

Where:

- 1) AP_C is the Average Price for Customer Group “C”, in Ngultrum per kWh;
- 2) TP is the number of years in the Tariff Period;
- 3) $COST_{C,n}$ is the cost of supply allocated to Customer Group “C” in year “n”, as determined in accordance with Clause 86 of the TDR 2022 in million Ngultrum;
- 4) $SALES_{C,n}$ is the volumes of electricity sales expected from Customer Group “C” in year “n”, in GWh;
- 5) COLL is the target collection rate set by the Authority for the Licensee, as a percentage; and
- 6) $WACC_C$ is the Weighted Average Cost of Capital for the Customer Group “C”, as determined in accordance with Clause 75 of the TDR 2022, as a percentage.

7.1 BPC Proposal

BPC has proposed the unsubsidized cost of supply as shown in Table 57 below.

Table 57: Proposed Unsubsidized Cost Supply

Consumer	Nu/kWh
Wheeling (DGPC+DHPC)	0.20
Wheeling (MHP+THyE)	0.36
High Voltage	2.62
Medium Voltage	5.48
Low Voltage	4.98

7.2 Input from Stakeholders

ABI calculated cost of supply based on the recommended for the various parameters as outlined in the preceding sections, the tariff for the various customer groups has been computed and is shown in the following Table 58 below.

Table 58: Tariff Rates for the various Customers categories

ABI	
Wheeling	0.45

HV	2.00
MV	4.89
LV	4.94

7.3 BEA Review

Considering the approved domestic generation cost of supply, WACC, sales forecast, cost allowances for each customer category and approval of uniform tariff as decided by the the Royal Government vide letter no. 24/DHPS/HQ/Tariff/2022-23/75 dated 22nd August 2022, the cost of supply for the period 2022/23 to 2024/25 for each customer group is as shown in Table 59 below.

Table 59: Reviewed & Approved Unsubsidized Cost of Supply – Nu/kWh

Consumer Category	Nu/kWh
Wheeling	0.23
High Voltage *	2.50
Medium Voltage	3.71
Low Voltage	4.85

*Domestic HV cost of supply considering energy purchase and sales to the extent available from the domestic generations.

8. Subsidies

In line with the DETP 2016, BEA upon determination of the Cost of Supply submitted the tariff subsidy allocation proposal to Minister through DHPS for consideration vide letter no. BEA/CEO/NOTE/2021-2022/589 dated 20th June 2022.

Based on annual subsidy allocation of Nu 365.67 million to the LV consumers and application of uniform tariff of Nu 2.66/kWh approved by the Royal Government vide letter no. 24/DHPS/HQ/Tariff/2022-23/75 dated 22nd August 2022 the per unit subsidy approved by the RGoB to LV consumers are as shown in the Table 60 below.

Table 60: Per Unit Subsidy to LV Consumers and MV consumers

Customer Category	RGoB subsidy per unit (Nu.)		
	1 st September 2022 to 30 th June 2023	1 st July 2023 to 30 th June 2024	1 st July 2024 to 30 th June 2025
Low Voltage			
LV Block I (Rural) 0-100 kWh	2.66	2.66	2.66
LV Block I (High landers) 0-200 kWh	2.66	2.66	2.66
LV Block I(Others) 0-100 kWh	1.38	1.38	1.38

9. Tariff Structures

The DETP 2016 provides the following guidelines on the tariff structure for the LV, MV and HV consumers:

- i. The tariff structure for general LV consumers shall comprise of only energy charges with progressive blocks and tariff starting with a lifeline block to ensure that the energy is provided at minimal rate for meeting the basic energy requirements. The tariff structure for other LV consumers such as commercial, industrial, institutes, street lightings, temporary connections etc. shall consist of single tier energy charge.
- ii. The tariff structure for MV and HV consumers shall consist of fixed and variable charges. The fixed charge shall be to recover the network cost and variable charge shall be the generation cost.
- iii. The wheeling charge shall consist of common single charge levied per unit energy wheeled through the network including export. In order to optimize the transmission infrastructure, common corridors are being constructed for exporting of electricity from several generating stations.

9.1 BPC Proposal

BPC submitted that the tariff structure of LV, MV, HV and wheeling to be retained as mentioned in the guidelines of the tariff structure in the DEPT. BPC also submitted that MV and HV tariff was proposed to maintain the variable costs as pass-through generation cost and the fixed charge as demand charges based on the Nu/kVA/month as in the existing tariff. BPC proposed block wise billing data for LV, MV and HV forecast are shown in Table 61 below.

Table 61: Proposed Billing Assumption

Customer Group	Unit	2022/23	2023/24	2024/25
Low Voltage				
0-100(rural)	GWh	103	108	114
0-200(Highlander)	GWh	1.19	1.34	1.15
0-100(Urban)	GWh	65	69	73
101-500	GWh	135	142	151
>500	GWh	273	285	299
Total		577.19	605.34	638.15
LV bulk	GWh	90	95	102
LV Total		667.19	700.34	740.15
Medium Voltage				
Energy	GWh	107	298	383
Demand	MVA	61	156	156
High Voltage				
Energy	GWh	3,278	3,877	4,060
Demand	MVA	780	1,012	1,012
Wheeling	GWh	6,546	5,584	5,277

9.1.1 *LV Tariff Structure and Customer Categorization*

BPC submitted that the provision of Subsidy is the prerogative of the Royal Government of Bhutan and the LV tariff trend depends on the subsidy application. There are many new customer categories that are introduced to target the subsidy benefits. It is important to have proper guidelines to categorize LV customers for correct application of subsidies.

BPC also submitted that BEA letter vide no. BEA/CEO/BPC/2021-22/137 dated 24th August 2021 has asked BPC to review the LV customer categorization and as per the letter BPC submitted a report on the current customer categorization for review as enclosed.

9.1.2 HV and MV Tariff Structure

For HV, BPC submitted that the energy charge would be the generation tariff and the losses. For MV tariff structure, to work towards reflecting energy cost as generation tariff, the energy charge is increased to 4% in the first year and kept constant whereas the demand charge is increased to 6% annually.

Based on above, BPC submitted that tariff structure for LV is dependent on the subsidy available and LV Block tariff structure to be maintained. The tariff structure for MV and HV are calculated using the billing assumptions as shown in Table 62 below.

Table 62: Proposed Tariff Structure

Customer Group	Unit	2021/22	2022/23	2023/24	2024/25
Low Voltage					
0-100	Nu/kWh	1.28	Depends on the subsidy		
101-500	Nu/kWh	2.68			
500+	Nu/kWh	3.64			
LV Bulk		4.14			
Medium Voltage					
Energy Charge	Nu/kWh	2.65	2.76	2.76	2.76
Demand Charge	Nu/kVA/month	325	345	365	387
High Voltage					
Energy Charge	Nu/kWh	1.50	1.50	1.50	1.50
Demand Charge	Nu/kVA/month	292	321	353	385

Regarding the demand charge, BPC requested the review of the current minimum level of demand (90% for HV and 60% for MV) and consider the full contracted demand so as to recover full network cost. The demand charges calculated are on the basis of recovery with the full contract demand.

9.2 The Approved Tariff Structures

Based on the reviewed sales forecast for LV, MV and HV consumers, BEA approved the billing assumption for the tariff period 2022/23 to 2024/25 as shown in Table 63 below.

Table 63: Reviewed Billing Assumptions

Consumer Group	Unit	2022/23	2023/24	2024/25
Low Voltage (LV)				
0 – 100 kWh (Rural)	GWh	98	102	107

0 – 200 kWh (Highlander)	GWh	1.13	1.27	1.41
0 – 100 kWh (Others)	GWh	62	65	68
>100 kWh	GWh	129	135	141
Medium Voltage (MV)				
Energy	GWh	141	272	368
Demand	MVA	88	134	166
High Voltage (HV)				
Energy	GWh	4080	5643	6139
Demand	MVA	820	964	994
Wheeling	GWh	6537	5573	5547

Considering the approved cost of supply for DGPC, MHP and BPC and based on the subsidy allocation and application of uniform tariff of Nu. 2.66/kWh approved by the Royal Government vide letter no. 24/DHPS/HQ/Tariff/2022-23/75 dated 22nd August 2022, BEA has endorsed the tariff structure for the tariff period 1st September 2022 to 30th June 2025 as shown in Table 64 below.

Table 64: The approved tariff structure for 1st September 2022 to 30th June 2025

Tariff Structure	Unit	1 st September 2022 to 30 th June 2023	1 st July 2023 to 30 th June 2024	1 st July 2024 to 30 th June 2025
<i>Low Voltage (LV)</i>				
LV Block I(Rural*) 0-100 kWh	Nu/kWh	0	0	0
LV Block I (High landers) 0-200 kWh	Nu/kWh	0	0	0
LV Block I(Others) 0-100 kWh	Nu/kWh	1.28	1.28	1.28
LV Block II(All) >100 kWh	Nu/kWh	2.66	2.66	2.66
<i>Medium Voltage (MV)</i>				
Energy Charge	Nu./kWh	1.60	1.60	1.60
Demand Charge	Nu./kVA/Month	170	170	170
<i>High Voltage (HV)</i>				
Energy Charge	Nu./kWh	1.60	1.60	1.60
Demand Charge	Nu./kVA/Month	496	496	496
Wheeling	Nu/kWh	0.23	0.23	0.23

While Nu 2.66/unit will be recovered from HV consumers through the domestic HV energy price and demand charge, the remaining cost will be recovered from BPC network charge for import of energy.