

TARIFF REVISION PROPOSAL
JULY 2019 TO JUNE 2022



BHUTAN POWER CORPORATION LIMITED

February 2019

Table of Contents

1. Background.....	4
2. Rationale for Tariff Revision.....	4
3. Methodology.....	5
4. Salient features of the tariff proposal.....	5
4.1 Revision of the Miscellaneous Charge.....	5
5. Weighted Average Cost of Capital.....	6
5.1 Cost of Equity.....	6
5.2 Cost of Debt.....	6
5.3 Gearing.....	7
5.4 Tax rate.....	8
5.5 WACC.....	8
6. Operation and Maintenance Costs.....	8
6.1 Historical O&M cost.....	8
6.2 Benchmark O&M Current Replacement Cost.....	9
6.3 Inflation.....	9
6.4 O&M efficiency gains.....	10
7. Regulatory Fees.....	10
8. Asset Values and Depreciation.....	10
9. Investment Plan.....	10
9.2 Additional investment.....	11
10. Cost of working capital.....	12
11.1 Arrears.....	12
11.2 Inventory.....	12
11. Allocation Factor.....	13
12. Power Purchase.....	15
12.1 From GenCos.....	15
12.2 Import.....	15
12.3 Embedded Generation.....	15
13. Energy Sales Forecast.....	16
14. Losses.....	16
15. Non-tariff revenue.....	17
16. Cost of Supply.....	17
16.1 Unsubsidized Cost of Supply.....	18

The year-wise average tariffs is given below:.....	18
16.2 Tariff Structure.....	18
17. Miscellaneous Charges	20
18. Conclusion	20

List of Tables

Table 1: Existing Approved Tariff
Table 2: Lending rates of Banks
Table 3: NPPF Loan allocation to works
Table 4: Actual and Proposed Gearing ratio
Table 5: Proposed WACC for customer categories
Table 6: Benchmark O&M and CRC
Table 7: Inflation
Table 8: MHPA ATS Costs
Table 9: MHPA apportioned transmission network costs
Table 10: Singhegaon and 400 kV Jigmeling GIS allocation
Table 11: Revised Allocation for Transmission Substation
Table 12: Revised allocation for Average Transmission
Table 13: LV and MV allocation calculation
Table 14: Revised allocation for 33 kV and 11 kV lines
Table 15: Revised allocation for average distribution
Table 16: Energy Sales Forecast
Table 17: Wheeling energy forecast
Table 18: Major Tariff Input Parameters summary
Table 19: Unsubsidized Cost of Supply
Table 20: Year-wise average tariff

List of Annexures

- Annexure 1: Loan Balance Allocation, CoD and Gearing Calculations.
- Annexure 2: Loan Agreements and Schedules
- Annexure 3: O&M cost details
- Annexure 4: Letter from DITT
- Annexure 5: Current Replacement Costs
- Annexure 6: Inflation
- Annexure 7: Asset Value 2018
- Annexure 8: Investment Plan 2018-2022
- Annexure 9: Capitalization
- Annexure 10: Proposed Allocation factor calculations
- Annexure 11: Energy Sales Forecast
- Annexure 12: Wheeling Energy Forecast
- Annexure 13: Historical Energy Sales and Wheeled Energy
- Annexure 14: Loss statements for past tariff period
- Annexure 15: Non- Tariff Revenue
- Annexure 16: Miscellaneous Charges Proposal

Additional Information

1. Annual Accounts of 2016, 2017 and 2018 consisting of
 - a. Auditors' report
 - b. P&L statements
 - c. Balance Sheets
 - d. Cash flow statements

1. Background

The prevailing tariff of Bhutan Power Corporation Limited (BPC) as shown in Table 1 below was approved by Bhutan Electricity Authority (BEA) for the period 1st January 2017 to 30th June 2019.

Tariff structures	Units	1st Jan 2017 to 30th June 2017	1st July 2017 to 30th June 2018	1st July 2018 to 30th June 2019
Low Voltage				
Block I (Rural) 0-100 kWh	Nu/kWh	0.00	0.00	0.00
Block I (Others) 0-100 kWh	Nu/kWh	1.28	1.28	1.28
Block II (All) 100-300 kWh	Nu/kWh	2.52	2.60	2.68
Block III (All) > 300 kWh	Nu/kWh	3.33	3.43	3.53
LV Bulk	Nu/kWh	3.79	3.90	4.02
Medium Voltage (MV)				
Energy Charge	Nu/kWh	2.00	2.07	2.16
Demand Charge	Nu/kVA/month	250.00	275.00	300.00
High Voltage (HV)				
Energy Charge	Nu/kWh	1.59	1.59	1.59
Demand Charge	Nu/kVA/month	262.00	262.00	262.00
Wheeling Charges	Nu/kWh	0.195	0.195	0.195

Table 1: Existing Approved Tariff

The Tariff Determination Regulation (TDR) 2016 requires the tariff to be filed four months before the expiry of the tariff.

2. Rationale for Tariff Revision

Bhutan Power Corporation Limited is implementing work programs for capital investments, which are in line with the BPC's Five Year Plans (FYP) and the major projects are in line with Royal Government of Bhutan (RGOB)'s FYP. These capital investments are aimed at strengthening the network, improving reliability through network expansion, improvement and up-gradation of existing transmission and distribution system to cater and replacement of old and obsolete assets.

In addition, BPC is expected to incur operation and maintenance expenditures considering the significant expansion of network size due to Rural Electrification and transmission asset

addition. Further, with the completion of Mangdechu Hydroelectric Power Plant, the associated transmission system will be transferred to BPC.

Hence, the tariff revision proposal to made to cover the allowed costs in the forthcoming tariff period and generate adequate returns.

3. Methodology

This tariff revision proposal is based on the Authority's Guidelines for Filing Tariff Applications 2019 and complies with all the requirements of the Regulation and the Domestic Electricity Tariff Policy (DETP). BPC has provided justifications for review and consideration by the Authority for the proposals.

Bhutan Electricity Authority's (BEA) Distribution Tariff model, which is based on the cost of supply methodology, has been used to determine the end user tariff. The following are the major assumptions made:

1. A power purchase cost of Nu 1.59/kWh (prevailing energy price) for energy from DGPC. Any revision in the power purchase price will change the proposed tariffs since the Regulation allows power purchase cost to be treated as pass-through cost. The Authority may consider making change in the power purchase price while determining the final domestic tariffs.

4. Salient features of the tariff proposal

The salient features of the tariff proposal are presented below:

4.1 Revision of the Miscellaneous Charge

The amount charged for services and deposits are currently low, hence there is a need to revise the rates in a manner that ensures the cost of services and necessary deposits are adequately covered.

4.2 Customer categories options

Presently, there are four major customer categories- Wheeling/Export, HV (High Voltage) customers, MV (Medium Voltage) customers and LV (Low Voltage) customers.

5. Weighted Average Cost of Capital

5.1 Cost of Equity

As per the Clause 7.2 of DETP, 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.

From the various loan offered by domestic financial institutions, the Industrial/Manufacturing loan is found to be relevant to BPC. The present lending rates is presented in table 2 below:

Financial Institution	Types of Loan	Interest Rate	Term (Years)
Bank of Bhutan	Manufacturing-Hydropower/Renewable energy	11.86%	20
Bhutan National Bank	Manufacturing & Industry Loan	11.50%	10
Druk Punjab National Bank	Services-Others	11.50%	15
T Bank	Manufacturing and Industry	11.00%	10
Bhutan Development Bank	Manufacturing/Industrial loan	12.33%	Above 5-10 years
Average Interest Rate	11.64%		

Table 2: Lending rates of Banks

BPC would like to propose CoE of 14.14% with the premium of 250 basis point on the average interest rates of all the financial institutions in Bhutan.

5.2 Cost of Debt

The actual cost of debt (CoD) for the tariff period is considered in line with the DETP.

The CoD has been calculated as the weighted average interest rate of the interest rates on existing as well as loans that are envisaged to be taken during the tariff period using the loan balance at the end of each year. The CoD is also calculated for individual customer category using the proposed allocation factor in Appendix 10.

BPC had availed loan of Nu.1.5 billion and Nu.0.5 billion from NPPF in 2018. The loan amount of Nu. 2 billion is allocated to the following works.

	Name of work	Expenditure as on 31/12/18	Loan Amount
1	Upgradation of Singyegaon S/s, Pasakha	2,071,060,804.40	1,400,472,730.34
2	Supply & Construction of 132kV D/C line from Kanglung to Phuntshothang	347,894,162.38	235,249,629.77
3	Supply & Construction of 132kV D/C line from Motanga to Nganglam	251,987,161.18	170,396,323.90
4	Construction of 1x15MVA, 132/33 kV substation at Motanga and 132kV Bay extension at existing substations at Kanglung & Nganglam.	174,301,192.12	117,864,268.36
5	Construction of 2x10 MVA, 132/33 kV substation at Phuntshothang	112,416,275.17	76,017,047.63
	Total	2,957,659,595.26	2,000,000,000.00

Table 3: NPPF Loan allocation to works

The loan taken for Rural electrification (RE) are for distribution system for 33 kV and below system, therefore the CoD of MV and LV calculated using the loans for RE.

For the future loans that are expected to be financed through a mix of debt and equity in the forthcoming tariff period, a gearing ratio of 70% and an interest rate of 10 % is considered.

The detailed calculations of individual CoD are presented *Annexure 1 - Loan Balance Allocation, CoD and Gearing Calculations*. The existing Loan agreements and schedules are attached as *Annexure 2*.

5.3 Gearing

As per the Clause 72 of the TDR, Gearing is the ratio of debt to total net fixed assets, as determined by the Authority for the Customer Group.

BPC's actual overall gearing is 40.3% for 2018. As separate WACC is required to be calculated, the gearing of individual customer category is calculated based on the loan balance and the net asset of the particular customer category. The loan balance and net asset of a particular customer category is calculated by using the proposed allocation factor. Thereafter, the gearing for the customer category is calculated.

Gearing	Customer category			
	Export	HV	MV	LV
Actual	61%	39%	39%	43%
Proposed	61%	60%	60%	60%

Table 4: Actual and Proposed Gearing ratio

The detailed calculation is presented in the *Annexure 1*.

5.4 Tax rate

BPC proposes a statutory corporate tax rate of 30% as prescribed in Section 45, Chapter 49 of the Income Tax Act of the Kingdom of Bhutan, 2001.

5.5 WACC

The WACC for the four customer categories using the values of parameters as established in the preceding paragraphs are presented in the following table.

WACC parameters	Export wheeling	HV	MV	LV
Gearing:	61 %	60 %	60 %	60 %
CoE	14.14%	14.14%	14.14%	14.14%
CoD	9.94%	8.86%	2.28%	1.79%
Tax	30%	30%	30%	30%
WACC:	13.94%	13.39%	9.45%	9.15%

Table 5: Proposed WACC for customer categories

6. Operation and Maintenance Costs

6.1 Historical O&M cost

BPC has reported the historical O&M costs in the past tariff period in figures in the “Input Sheet” of the Application. In the application model, the O&M of the average 3 years is calculated for the allowances. The O&M costs are after deducting non-allowable costs such as Corporate Social Responsibility, License fee to BEA, Fines and Penalties, Management Holding fee.

BPC would like to submit as O&M budget is provided by Department of Information Technology and Telecom (DITT), Ministry of Information and Communication (MOIC), the O&M cost of the Infocom Division in BPC has been excluded. DITT, however provides O&M for 18 fibers out of 24 fibers (75%) and the remaining 6 fibers (4 fibers by Bhutan Power System

Operator and 2 fibers by IT) is used by BPC. Hence, O&M costs for 6 fibers are accordingly included.

The O&M costs details for the past three years are attached as *Annexure 3*.

The letter from DITT for of O&M is attached. *Annexure 4*.

6.2 Benchmark O&M Current Replacement Cost

BPC has estimated the CRC of assets using capital expenditure inflated to current prices using the inflation rates published by National Statistical Bureau of Bhutan. The total CRC of assets as on 31st December 2018 works out to Nu 35,949 million. The CRC for each asset category viz., generation, transmission, distribution, and others is attached as *Annexure 5* and as required the CRC of each asset is presented in the “Input Sheet” of the Application Form. BPC would like to indicate that BPC’s CRC of assets is severely underestimated by using the net asset values for the pre-corporatization assets in the absence of gross asset values.

The benchmark O&M costs determined using the CRC are substantially lower than the actual O&M costs as shown in the table below.

Benchmark O&M			Replacement Cost (2018)		2018
Microhydel	2.50%	of capex	2,097	Mill Nu	52.4
Diesel generation	10.00%	of capex	0	Mill Nu	-
Transmission	1.00%	of capex	17,206	Mill Nu	172.1
Distribution	3.00%	of capex	10,356	Mill Nu	310.7
Other	2.00%	of capex	6,290	Mill Nu	125.8
			35,949	Mill Nu	660.96
<i>Benchmarks determined by BEA</i>			<i>Estimated by Licensee</i>		<i>Calculated</i>

Table 6: Benchmark O&M and CRC

BPC would like to request BEA to consider these actual costs while setting the benchmarks to ensure the O&M benchmark provide adequate O&M costs for BPC to provide the desired level of service delivery.

6.3 Inflation

As per DETP, inflation to be used for the O&M expenses shall be based on historical average inflation rates published by the National Statistics Bureau (NSB).

The inflation rates based on historical inflation rates as per National Statistical Bureau is considered which is attached as *Annexure 6*. Inflation for the next three years has been based on the historical inflation figures of past three years for the non-food items as presented below:

Year	2016	2017	2018
Inflation figures	2.8 %	3.6 %	1.2 %

Table 7: Inflation

6.4 O&M efficiency gains

The model for tariff allows the O&M costs to increase yearly by inflation less the target set for improvements in efficiency gains. With the wide coverage of electrical network across the country, it is difficult to set the efficiency gain.

With the ageing transmission and distributions assets and expanding network maintenance costs (increased customer base and geographical coverage and asset additions) , the O&M expenses are expected to increase. BPC, however, is taking various initiatives to reduce the O&M cost such as controllable costs target setting in performance targets. BPC would like to, therefore propose an efficiency gain of 0.5% for the forthcoming tariff period

7. Regulatory Fees

As per the Fees and Charges of the Regulatory Fees Regulation 2006, the license fee for transmission and distribution is calculated as 0.2 % of revenues from sale of electricity. The regulatory fee has been proposed based on the revenue from the proposed tariff.

8. Asset Values and Depreciation

BPC has submitted the gross and net asset value, lifetime, accumulated, and annual depreciation for the year 2018 in Schedule A (Assets) of the application form and is also attached as *Annexure 7*. The asset values and depreciation have been calculated using BPC's depreciation rates which is as same as that specified by the Tariff Determination Regulation 2016.

The figures are based on final accounts for the year 2018.

9. Investment Plan

9.1 Approved Investment Plan 2016-2019

The detailed Investment Plan 2016-2020 with write up is attached in *Annexure 8*.

BPC has worked out the details calculation of the investment capitalization. For those projects that are to be financed through a mix of debt and equity, the IDC has been computed assuming an interest rate 10% and a gearing ratio of 70%. The capital drawdown for each year has been apportioned to debt and equity using the gearing ratio and interest is computed on the debt component of the capital drawdown amount.

The capitalization schedule of the Investment has been calculated based on the approved five year Investment Plan 2018-2022.

9.2 Additional investment

Apart from the investments in the five-year investment plan, there are additional investments that are required. The following additional investments are proposed.

1. BPC has received letter from DGPC to take over the KHP distribution system, which is estimated at Nu.4.9 million.
2. The SAP hardware up gradation was left out of investment as DHI was working on policy to centralize it. The SAP hardware investment is included in the proposal as it is required to upgrade the hardware and the investment is required during the upcoming tariff period.
3. Construction of colony at Transmission Maintenance Division, Phuentsholing. The Board approved the construction of the colony to be included after detailed study on the submission of the requirement. The capitalization of the colony is assumed to be in two phases.
4. BPSO investment was not included in BPC's investment plan as there were plans to be independent and it was assumed that BPSO will be independent by 2019. In the Bhutan Power System Coordination Committee, it was decided that till such time, the investments should be by BPC. Therefore, BPSO investments has been added in the proposal.

BPC has received letter from BEA vide BEA/CEO/BPC/2018-19/489 dated 28th September 2018 that the investment proposal of BPC do not have plans to improve the power reliability at Phobjikha, Jomotsangkha, Lhamaoizingkha and Dorokha and asked BPC to prioritize the activities and propose investments. BPC has decided to conduct techno-economic feasibility studies during the upcoming tariff period and has not included these investments.

9.3 Associated Transmission System (ATS) of Mangdechu Hydroelectric Project Authority (MHPA)

With the planned commissioning of MHPA, the transmission network will be taken over by BPC. The total cost of Associated Transmission System (ATS) of Mangdechu Hydroelectric Project Authority (MHPA) is given below. The cost to completion is as per the 13th MHPA Authority meeting. The IDC cost is as per the information from DHPS, MoEA.

Nu. in Million

Sl.#		Total Cost to completion	IDC	Total Asset Cost (Cost +IDC)
1	MHPA	6,407.03	1,016.68	7,423.71
2	CHEP	1,782.48	282.85	2,065.33
3	KHEL	1,263.21	200.45	1,463.66
4	THyEL	660.10	104.75	764.85
5	PHPA-II	461.58	73.24	534.82
	Total	10,574.40	1,677.97	12,252.37

Table 8: MHPA ATS Costs

It is envisaged that only the MHPA cost proportion (sl.1) in the Table 8 above will be capitalized in 2019. The detail costs (Nu.in Million) for the apportioned costs is given below.

	Cost	IDC	Total
400 kV line	4788.899	759.93	5548.826808
GIS S/S	1442.43	228.89	1671.322417
400 kV Quad moose	137.8	21.87	159.6668324
132 KV MHPA to yurmo	37.78	6.00	43.77513011
TOTAL	6,406.91	1,016.68	7,423.59

Table 9: MHPA apportioned transmission network costs

The investment plan for the upcoming tariff period as discussed in this section is submitted in the Schedule B- Investments in the tariff application form/model as required by the guideline.

The detailed working of investment capitalization schedule including the Interest During Construction (IDC) calculation for the tariff period attached in *Appendix 9*.

10. Cost of working capital

11.1 Arrears

For the forthcoming tariff period, BPC proposes arrears of 45 days for HV, MV, and LV category of customers and 50 days for the Wheeling and are presented in the “Input Sheet” of the Application Form. The proposed arrears figures are same as that approved by the Authority for the prevailing tariff period.

11.2 Inventory

For the forthcoming tariff period, BPC proposes an inventory of Nu 320 million, which is the value reported as per the provisional accounts of 31st December 2018.

As per the Clause 76 of TDR, the RoWC shall be calculated the RoWC as the product of interest on working capital based on the prevailing lowest short term lending rate of financial institution in Bhutan. BPC proposes the working capital of 9.98% which is the prevailing rate of Bank of Bhutan to calculate the return on working capital.

11. Allocation Factor

As per the DEPT, 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.

BPC would like to propose for the revision in allocation factors for some of the asset classes as the capitalization of these asset classes has impact on the allocation factors and thereby the a tariff of the customer categories.

With Singhegaon Substation and 400 kV GIS substation at Jigmeling, the allocation factor is proposed to be changed. For Singhegaon, the peak load of the substation was allocated to HV and MV. For 400 kV GIS at Jigmeling, the factor is calculated using the transmission capacity at voltage level. 500 kVA, 400/220 kV is allocated to Export and 160 kVA, 220/132 kV is allocated to HV.

Substation	Peak/Capacity	Export	HV	MV	LV
Singhegaon	94.40	0%	96%	4%	0%
400 kV GIS s/s Jigmeling	500.00	76%	24%	0%	0%

Table 10: Singhegaon and 400 kV Jigmeling GIS allocation

Using the weighted average of the costs of these new substations with the existing transmission substation, the allocation for overall transmission substation is calculated as shown in the table below:

Category	Export	HV	MV	LV	Total
Revised Allocation Transmission Substation	34%	56%	5%	5%	100%

Table 11: Revised Allocation for Transmission Substation

The weighted average of the revised allocation was used to revise the allocation of other category such as meters, civil structures and O&M allocation of transmission.

Category	Export	HV	MV	LV
Average Transmission	54%	34%	3%	9%

Table 12: Revised allocation for Average Transmission

For distribution assets, the MV and LV asset allocation is revised as per the contract demand of MV. Using the contract demand of MV at 54 MW and converting the 512 MU Sales in 2018, the MV% is 48%.

LV 2018	512	MU sales	
Calculation of MV and LV lines allocation			
Demand	2018		
MV	54	MW	
LV	58.4	converted to MW	
MV %	48%	Of Asset	

Table 13: LV and MV allocation calculation

The 33 and 11 kV lines allocation is proposed to be revised accordingly as shown in table below:

Category	Export	HV	MV	LV
33 kV lines			48.00%	52.00%
11 kV lines			48.00%	52.00%

Table 14: Revised allocation for 33 kV and 11 kV lines

The weighted average of the assets is used to find the average distribution average allocation factor, which is given in the table below:

Category	Export	HV	MV	LV
Average Distribution			19%	81%

Table 15: Revised allocation for average distribution

For rest of the asset classes, the existing allocation factors have been retained. Accordingly, the allocation factor for the O&M is revised.

The calculation of proposed allocation factors is attached in *Appendix 10*.

The changes in allocation factor for assets is proposed in Schedule A- Asset of the tariff application form/model and the changes to allocation factor for O&M is proposed in the “input” sheet in the tariff application model.

12. Power Purchase

12.1 From GenCos

BPC proposes Nu 1.59/kWh in “Input Sheet” of the Application Form. These energy(ies) will be purchased from Druk Green Power Corporation’s various generating plants.

However, as permitted by the regulation, any revisions of the prevailing generation tariffs will be incorporated in this proposal. The Authority may consider allowing these costs as determined by the Authority to factor in while determining the final tariffs.

12.2 Import

BPC proposes an energy import volume at MV of 1 MU for each year of the forthcoming tariff period from WBSEBL and ASEBL, India at the prevailing average import price of Nu 2.46/kWh, in the “Input Sheet” of the Application Form.

As per TDR, any net monthly import cost to meet the shortfall of domestic supply shall be allocated to HV customers on a monthly basis. BPC, therefore assumes that if there is net monthly import, the costs of import will be allocated to the HV customers as per prevailing practice. Hence, the import energy on net monthly import has not been considered in the tariff.

12.3 Embedded Generation

The historical energy volume and the forecasted energy volume from embedded generation for the forthcoming tariff period are indicated in the “Own Generation Sheet” of the Application Form. BPC has also included the generation by wind as internal generation.

As required, the expected energy volume from the embedded generation is deducted from the total power purchase forecast in “Input Sheet” of the Application Form.

13. Energy Sales Forecast

BPC has proposed energy sales forecast for each category of customers LV, MV, HV as presented table below.

SL#	Customer Category	2019	2020	2021	2022
1	High Voltage (HV)	1,688.46	2,460.38	2,809.68	2,809.68
2	Medium Voltage(MV)	117.98	162.27	162.27	162.27
3	Low Voltage (LV)	544.74	576.93	609.13	635.37
Grand Total		2,351.17	3,199.58	3,581.08	3,607.32

Table 16: Energy Sales Forecast

The calculations and assumption made and the basis of assumptions of the energy sales forecasts for each category of customer is reported separately in *Annexure 11*.

The energy to be wheeled was also forecasted. The energy generation from DGPC ,Dagachu and MHPA is considered. The details of the forecasted for generation, wheeling.

	2019	2020	2021
DGPC Plants	4,915.27	4,104.60	3,718.01
DHPC	439.09	439.09	439.09
MHPA	2,568.74	2,926.61	2,926.61
TOTAL	7,923.11	7,470.31	7,083.72

Table 17: Wheeling energy forecast

The calculations and assumption made for wheeling energy is given in *Annexure 12*.

As required is indicated in the “Input Sheet” of the Application Form.

The historical energy sales figures for LV, MV, HV and wheeling figures for past 10 years as required by the guideline is attached as *Annexure 13*.

14. Losses

BPC endeavors to reduce the technical losses. BPC’s proposes the technical loss of LV to be set at 10.5% as part of efficiency gains. The other losses allowances for Wheeling, HV and MV are proposed are as per Schedule E of the Regulation, which is as per the prevailing rates of the approved rates.

The historical losses for the last tariff period are attached as *Annexure 14*.

15. Non-tariff revenue

BPC has reported historical non-tariff revenue for the previous tariff period in the “Input Sheet” of the Application Form and the historical non-tariff revenue for the previous tariff period along with their sources and the proposed non-tariff revenue for the forthcoming tariff period for each customer category is indicated in *Appendix 15*.

The non-tariff revenue for the next three tariff years has been based on the consolidated historical non-tariff revenue as maintained by BPC. However, since the non-tariff revenue is not maintained on a category-wise basis, the total non-tariff revenue has been apportioned based on the no. of customers in the category. The calculation of the non-tariff revenue for the next is based on the average of past three years.

16. Cost of Supply

The following tariff input parameters are used in the distribution tariff model to calculate to cost of supply.

Customer category	Export	HV	MV	LV
Gearing	61%	60%	60%	60%
CoE	14.14%	14.14%	14.14%	14.14%
CoD	9.94%	8.86%	2.28%	1.79%
O&M	As per 2018 actual O&M (Mill Nu)			
Losses	LV technical loss reduced to 10.5% and other loss allowances as per existing regulation			
Inflation	As per past inflation published by NSB			
Asset Allocation and O&M allocation factor	As proposed			
DGPC energy price	Nu.1.59/kWh			
Import Energy Price (ASEB/WBSEB)	Nu.2.16/kWh			
Investments	As per the Investment Plan 2016-2020, Additional Investments and MHPA transmission costs			

Table 18: Major Tariff Input Parameters summary

16.1 Unsubsidized Cost of Supply

The Cost of supply for each customer category is calculated in the table below:

Customer Category	Unsubsidized Cost of Supply (Nu/kWh)
LV	5.89
MV	5.82
HV	2.24
Export (Wheeling)	0.316

Table 19: Unsubsidized Cost of Supply

The HV & MV combined as industries tariff is also worked out.

As subsidy is the prerogative of the RGoB and the subsidy allocation to the targeted customers is done by the RGOB, only the unsubsidized cost has been calculated and shown.

The year-wise average tariffs is given below:

Average Tariff (Nu/kWh)	2019	2020	2021
LV	5.84	5.89	5.89
MV	5.94	5.80	5.82
HV	2.30	2.26	2.24
HV+MV (Industries)	2.57	2.50	2.47
Export	0.258	0.297	0.316

Table 20: Year-wise average tariff

16.2 Tariff Structure

In line with the guideline of the tariff structure in the DETP, BPC proposes the structure of LV and MV, HV and wheeling to be retained.

The HV and MV tariff is proposed to maintain the variable costs as pass through generation cost the fixed charge as demand charge based on Nu/kVA/month as in the existing tariff.

For the MV, as per the DETP, the subsidies were provided till 2018/2019. DETP mentions that beyond 2019, the government shall provide subsidies only to MV customers that need to be promoted. HV customers are not provided subsidy.

The billing assumptions for the upcoming tariff period is given in the table below:

Billing data		2019	2020	2021
	Cust nos.	201,580	209,883	218,177
LV	0-100	61	59	61
	100-300	87	90	94
	300+	238	256	272
	Total	386	404	428
	LV bulk	73	84	88
	LV total	459	488	515
MV	GWh	119	162	162
	MVA	74	78	78
HV	GWh	1,689	2,460	2,810
	MVA	314	463	463
Wheeling	GWh	7,923.17	7,718.21	7,387.83

Table 21: Billing assumptions

The tariff structure for LV is dependent on the subsidy available. BPC proposes the LV Block tariff structure to be maintained. The tariff structure for MV, HV is calculated using the billing assumptions.

Tariff structures		2018	2019	2020	2021
LV					
Block I	0-100	1.28	Depends on the subsidy		
Block II	100-300	2.68			
Block III	300+	3.53			
LV Bulk	Energy	4.02			
MV	Nu/kWh	2.16	2.48	2.86	2.95
	Nu/kVA/month	300	448.49	495.00	495.00
HV	Nu/kWh	1.59	1.59	1.59	1.59
	Nu/kVA/month	262	290	290	290
Wheeling	Nu/kWh	0.195	0.316	0.316	0.316

Table 22: Tariff structure

17. Miscellaneous Charges

BPC's current Miscellaneous Charges is quite less as it has not been revised since 2010. In 2017, only the energy charges were revised. Hence, further revision is felt necessary.

The need to revise the existing schedule of miscellaneous charges is based on the following grounds:

1. Increased rural electrification and number of customers has significantly increased the work load of BPC;
2. Introduction of 100 units free electricity and subsidy to many other categories has made electricity relatively affordable for the customers;
3. Change in electricity consumption patterns and increased customer expectation requires improvement in customer service;
4. Increase in cost of services owing to a general inflation since 2010;
5. Bad debts due to inadequate miscellaneous charges and their application methodology;
6. Affordability of the existing charges; and
7. Issues with the existing charges.

The amount charged for services provided by BPC are currently quite low as compared to the cost of such services. Also, the penalties are not adequate enough to deter customers from carrying out illegal activities such as stealing of electricity and connecting the lines disconnected by BPC. Hence, there is a need to revise the rates in a manner that shall bring in clarity and ensure proper implementation of tariff and collection of minimum cost for the services provided.

The detailed proposal is attached as *Annexure 16*.

18. Conclusion

BPC's tariff proposal made for the proposed rates to recover all prudent costs incurred to provide services to customer at the desired customer service level and ensure adequate investments in transmission and distribution network infrastructure to meet the increased reliability and quality of electricity supply in future. Therefore, BPC would like to submit that the Authority to consider and approve the proposal for the forthcoming tariff period.