



# **Domestic Electricity Tariff Policy**

**Ministry of Economic Affairs  
Royal Government of Bhutan  
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**MINISTER**

**FORWARD**

## ABBREVIATIONS

BEA	Bhutan Electricity Authority
BPC	Bhutan Power Corporation Ltd.
CoE	Cost of Equity
CoD	Cost of Debt
DGPC	Druk Green Power Corporation Ltd.
DHPS	Department of Hydropower and Power Systems
DRE	Department of Renewable Energy
EAB	Electricity Act of Bhutan 2001
HV	High Voltage
LV	Low Voltage
MoEA	Ministry of Economic Affairs
MV	Medium Voltage
MW	Mega Watt
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
RGoB	Royal Government of Bhutan
SHDP	Bhutan Sustainable Hydropower Development Policy, 2008.
TDR	Tariff Determination Regulation
WACC	Weighted Average Cost of Capital

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## **1. Introduction**

Bhutan's electricity supply is based on mainly hydropower. Hydropower is a strategic national resource and the main driver of the economic growth. It forms the foundation of Bhutanese economy and its benefits must accrue to the people of Bhutan. The two principle roles of the sector are i) It shall drive the economy of Bhutan by providing safe, reliable, affordable electricity in an equitable manner to improve the lives of all Bhutanese and , ii) Surplus power shall be exported to enhance national revenue and achieve positive balance of payment. While the second objective is being addressed through Bhutan Sustainable Hydropower Policy, in order to achieve the first objective, a proper domestic tariff Policy is essential.

The Electricity Act 2001 contains the broad principles of tariff setting and the Minister is empowered to provide policy guidelines and approvals associated with the tariff formulation. On one hand, Tariff formulation entails ensuring delivery of reliable, efficient and adequate supply of electricity, utility viability and adequate revenue for expansion and investment in the sector. On the other hand, for the general populace, electricity has to be affordable and adequate so as to enhance living standard of the people and to protect and preserve the environment to ensure sustainability of the hydropower resource. Considering the intertwined and conflicting objectives, a clear policy is required for determining the domestic tariff that ensures a balance in the interests of the public, customers and utilities in the electricity sector. As provided in the Act, this policy shall outline the tariff setting parameters to reflect the actual cost of efficient business operation of utilities and a Government subsidy mechanism to address the affordability aspect while at the same time incentivizes conservation and efficient utilization.

## **2. Scope**

This policy shall provide guidelines for domestic tariff determination which will be applicable for all the customers. However, the industrial customers may opt to have separate arrangement through a Power Purchase Agreement (PPA) with the service provider to ensure long term predictability upon approval by Bhutan Electric Authority (BEA). In case of the injection of electricity from non-conventional renewable energy sources into the grid, the price of such electricity shall be governed by a separate feed-in tariff regulation mentioned in the Alternate Renewable Energy Policy. The existing TDR shall be amended as per this Policy.

## **3. Objectives**

This tariff policy shall provide guidelines for domestic tariff formulation to achieve the following objectives in consonance with realization of GNH goals:

- (a) Ensure fairness to both service customers and service providers;

- (b) Ensure recovery of the actual cost of efficient business operation of electric utilities and enable investments in expansions and up-gradations;
- (c) Provide affordable tariff to improve the quality of life of the people through rationalized and targeted subsidy mechanism.
- (d) Promote transparency and predictability in tariff setting.
- (e) Promote conservation of environment to ensure sustainability of the hydropower resource.
- (f) Promote sustainable economic and Industrial growth.

#### **4. Legal Basis**

Section 17.1 Powers and functions of the Minister under the Electricity Act of Bhutan 2001 provides for the Minister:

- i) to determine general policies, targets and strategies of the electricity industry operations;
- ii) to set general policies on tariff determination and service provision on Licensee;
- iii) to set policy encouraging energy service extensions and providing electricity services for the underprivileged;

#### **5. Title and Operative period**

This Policy shall be known as “Domestic Electricity Tariff Policy, 2016”.

This Policy shall come into effect from March 1, 2016 and will remain in force until superseded or modified by another Policy.

#### **6. Institutional Arrangements**

##### **6.1 Ministry of Economic Affairs (MoEA)**

The Ministry of Economic Affairs is the nodal Ministry and Tengye Lyonpo is, as per EAB 2001 empowered to provide all policy guidelines with respect to the electricity sector.

Under the MoEA, the concerned Departments responsible in implementation of this policy are:

- i) Department of Hydropower and Power Systems (DHPS) is responsible for granting approval to the utility companies for development of hydropower and associated transmission systems including expansion and up-gradation thereof. DHPS shall also be responsible for examining the BEA’s proposal for subsidies requirement and allocation for customers and recommending the same to the Minister for approval.

- ii) Department of Renewable Energy (DRE) is responsible for granting approval to the utility companies for development of rural electrification, small/mini/micro hydro (25 MW and below), non-conventional renewable energy resources including expansion and up-gradation thereof. DRE is also responsible for development of feed-in tariff framework/policy.

#### **6.2 Bhutan Electricity Authority (BEA)**

The BEA is an autonomous regulator for the electricity sector. BEA shall develop regulations for formulating domestic tariff including subsidies in accordance with the provisions in the EA Act 2001 and this Policy. BEA shall determine and approve the Cost of Supply and submit the tariff proposal including subsidy allocations to the Minister through DHPS for consideration. There shall be one representative from private sector as Commissioner in the BEA.

#### **6.3 Bhutan Power Corporation (BPC)**

The BPC is responsible for electricity transmission, distribution and supply functions including management and operations of embedded generation units consisting of micro/mini/small hydro and diesel generating units. The BPC provides transmission access for export of surplus power to India. It is also Bhutan's Power System Operator. BPC shall implement the national plans and programs as directed/approved by MoEA. BPC shall file tariff proposals and implement the approved tariff as per the regulations of BEA.

#### **6.4 Druk Green Power Corporation (DGPC)**

The DGPC is responsible for managing all hydropower plants fully owned by the Royal Government and develop projects on its own or through joint ventures on behalf of the Royal Government as may be directed. DGPC shall implement the national plans and programs as directed/approved by MoEA. DGPC shall be responsible for ensuring domestic electricity supply security and provision of the royalty energy obligations as per the SHDP and this policy. DGPC shall file domestic generation tariff proposals and implement the approved tariff as per the regulations of BEA.

#### **6.5 Other Generating Plants**

Hydropower plants developed under SHDP other than fully owned DGPC projects shall be responsible for providing the royalty energy obligations. These hydropower plants shall be obliged to give the "first right of refusal" to the RGoB for sale of electricity for domestic consumption at their export rate.

### **7. Guiding Principles for Tariff formulation**

In general, the tariff for generation, transmission and distribution shall be computed on a cost plus model. The cost shall comprise of O&M, depreciation,

return of Assets & working capital, regulatory fees & levies, losses and the power purchase. While the domestic electricity demand for the next tariff cycle shall be based on the forecasts, the mean annual energy generation for the past three years with 98% water utilization factor to the extent of generation capacity less royalty energy shall be used for computation of the generation tariff. Other relevant models of tariff determination shall be explored for application.

To achieve the policy objectives, it is necessary to come out with the true, fair and competitive costs of supplies to the various customer categories without any inherent subsidy beyond forms of economic regulation provided by this policy in formulating the costs of supplies. Based on such cost of supplies, the end customer tariffs shall be computed by providing subsidies to targeted customers in a transparent manner to ensure that the tariff is fair, equitable and affordable. Therefore, to rationalize the cost of supplies, the following guidelines for tariff parameters shall be adopted:

### **7.1 Gearing Ratio**

To ensure competitive and efficient pricing through an optimal capital structure, the gearing ratio for computation of WACC shall be higher than the actual gearing ratio and up to a maximum of 70:30.

### **7.2 Cost of Equity**

In order to make domestic tariff predictable, promote sustainable economic growth and, attract investment in the power sector, the Cost of Equity shall be based on the average lending rates of the domestic financial institutions. BEA may allow a reasonable premium up to a maximum of 250 basis points on the average lending rates of the financial institutes depending on the domestic market situation and gearing ratio applied. With approval of the Government, the return on equity shall be first allocated for the up-gradation, modernization and expansion of power systems including national plan works.

### **7.3 Cost of Debt**

The actual cost of debt for the tariff period should be considered. The debt along with its tenure should be structured by the utilities so as to encourage reduction in tariff. Utilities should be incentivized by BEA to restructure their debt to yield cost savings.

### **7.4 Operation & Maintenance (O&M) Expenses**

The O&M expenses shall be based on the benchmarks set by BEA. The O&M benchmarks for the new investments shall be maintained lower than that of older assets. The O&M expenses norms should be efficient, relatable to historical performance, realistic in case of new investments and progressively reflecting improvement in efficiencies and service standards. BEA shall come out with allowable and non-allowable O&M expenses for the purpose of tariff

determination. The costs related to CSR and income from rental and hire charges, if any, shall be excluded from the tariff calculations. Inflation to be used for O&M expenses shall be based on historical average inflation rates published by the National Statistics Bureau.

## **7.5 Depreciation**

The allowance for depreciation shall be such that it allows recovery of investment over the economic life of the asset. BEA shall formulate the schedules of depreciation applicable for generation, transmission and distribution and other associated infrastructure, equipment, etc. Under circumstances when the utilities are in difficulty in meeting the debt service obligation, accelerated depreciation may be allowed during the initial debt servicing period. The net proceeds from accumulated depreciation fund shall be used by utilities for replacement of assets.

## **7.6 Weighted Average Cost of Capital (WACC)**

WACC is necessary for determining the cost of capital and for computation of the return on assets. In order to avoid cross subsidies, between the customer categories, separate WACC should be computed for each customer categories.

## **7.7. Interest on Working Capital**

The interest on Working Capital shall be determined based on the prevailing lowest short term lending rate of financial institution of Bhutan.

## **7.8 Regulatory Asset Base**

Regulatory Asset Base will be determined by BEA from the capital cost incurred for the assets of the utilities. Assets owned by the utilities but not in use and/or which are not utilized for generation, transmission and distribution of electricity shall not be considered for tariff determination.

## **7.9 Treatment of Granted Assets**

All Granted Assets shall be treated as equity by the utility companies in order to determine the actual cost of supply and to avoid injection of subsidy through the generation and network cost of supply.

## **7.10 Investment & Expansion Plans**

The national plans and programs prepared by the Government shall be directed for implementation by the Utilities. BEA shall allow cost recovery depending on the capitalization schedule of the investments in the tariff cycle. For the investments made as per national plans but not utilized on account of the reasons beyond the control of the utilities, the cost shall be spread out across all

categories of the customers as per the allocation factors mentioned under 7.11(iv).

#### **7.11 Allocation Factors of Transmission and Distribution Assets**

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.

#### **7.12 Accounting of Imported Energy**

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.

#### **7.13 Non-Tariff Revenues**

All non-tariff revenues from rentals, fund deposits, deposit works, etc. shall be deducted from the total costs for computation of costs of supplies.

#### **7.14 Tariff Structure**

The generation tariff structure shall comprise of a single weighted average energy charge from selected generating plants.

The Tariff structure for general LV customers 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 customers such as commercial, industrial, institutions, street lightings, temporary connections etc. shall consist of single tier energy charge.

The Tariff structure for MV and HV customers shall consist of fixed and variable charges. The fixed charge shall be to recover the network cost and the variable charge shall be the generation cost. BEA shall work towards the recovery of the generation cost as the energy charge and fixed cost through the demand charge.

The wheeling charge shall consist of common single charge levied per unit of 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. BEA shall work towards wheeling charge structure that addresses congestion, scheduling, capacity / access issues, losses and fixed cost recovery etc.

In the long run, the tariff structure should be in such a way to encourage efficient use and conservation of electricity.

#### **7.15 Subsidy**

Tariff shall be made affordable to improve the living standards of the general populace through rationalized and targeted subsidy mechanism. The Government shall use the revenue from the sale of Royalty Energy from the generation utilities to subsidize the targeted customers as per section 11.1. i) c. of EAB 2001. To implement the subsidy allocation effectively and in a transparent manner, the following principles shall be adopted:

1. All LV Households and the Religious Institutions and Structures except Dzongs shall be provided subsidy in order to make electricity affordable. A progressive block tariff structure shall be adopted in order to apply regressive subsidy in proportion to consumption.
2. For LV customers such as street lightings, temporary connections for non-residential purpose, institutions and all other non-residential LV customers including commercial and industrial customers, the highest LV block tariff shall be charged. Beyond 2019, the Government shall adopt criteria to target subsidies amongst these various customer groups.
3. The rural domestic households shall be provided additional subsidy with objectives to enhance the living standards, curb rural to urban migration, conserve environment, reduce fossil fuel consumptions and promote income generating activities. This additional subsidy shall also apply to rural cooperatives, community Lhakhangs and micro trade activities.
4. Subsidy to the medium voltage (MV) industrial customers shall continue for the 2016-17 to 2018-19 tariff period. Beyond 2019, the Government shall

adopt criteria to target subsidies to MV industrial customers that need to be promoted.

5. HV industries shall not be eligible for subsidy.
6. In order to have a transparent mechanism for providing subsidy, the Ministry of Finance in consultation with the Ministry of Economic Affairs shall work out a modality for accounting of royalty energy revenue and payment of subsidy to the targeted customers.

#### **7.16 Allocation of Energy for Domestic Supply**

In order to meet the domestic demand, the existing plants fully owned by the Royal Government as of 2015 shall first be booked for domestic supply to the extent that they are able to meet the demand. In the event that they are not able to fully supply the demand, the plant(s) (out of the balance expensive plant) with the lowest cost of generation shall be selected to supplement the energy. The generation tariff for the bulk supply to the Transmission and Distribution utilities shall be the weighted average Costs of generation of the existing plants as of 2015 combined together and next least cost of generation of the additional plant(s) for meeting the domestic demand with energy to be supplied as weights. This would ensure that the domestic generation tariff is lower than the export tariff.

In the event of inadequate generation from all the fully RGoB owned plants to meet the domestic demand, the RGoB shall exercise its “first right of refusal” to source the energy from other plants not fully owned by RGoB that has the lowest off-take rate.

#### **7.17 Treatment of Unutilized Demand Capacity**

The MV and HV customers shall surrender any unutilized demand capacity to the BPC within one year of allocation. The BPC shall exercise its right to take over any unutilized demand capacity for reallocation to other customers.

#### **7.18 Royalty Energy**

All existing generation plants (Kurichhu, Chhukha, Tala and Basochhu) fully owned by the RGoB have to provide 15% of the annual generation as Royalty energy to RGoB free of charge. All other generation plants shall provide royalty energy as per the SHDP. RGoB shall have the option to avail the royalty energy either in energy or cash in lieu at the highest off-take rate or pro-rated thereof after adjusting for admissible losses and wheeling charges.

#### **7.19 Tariff Revision Cycle**

In order to ensure the predictability, the tariff revision cycle shall be normally be three years unless there is substantial and significant difference in the business environment and generation scenario in which case, an interim revision may be carried out.

All the parameters required for tariff formulation shall be notified in the regulation.

## **8. Interpretation**

In the event of conflict of interpretation, the Ministry of Economic Affairs shall, on behalf of the RGoB, be the authority to interpret various provisions of this policy which shall be final and binding.

## **9. Amendments**

The RGoB may amend this policy and its provisions as and when required.

## **10. Definition**

The following words and expressions shall have the meaning ascribed to them:

Authority	means the authority of Bhutan Electricity Authority established by EAB 2001.
Affordable	means within one's financial means
Customers	means any person who is supplied with electricity for his own use by a Licensee or by any other person engaged in the business of supplying electricity to public under the Act or any other law for the time being in force and includes any person whose premises are for the time being connected for the purpose of receiving electricity with the works of a Licensee, or such other person, as case may be.
Domestic Supply	means the generation, transmission or distribution of electricity for domestic consumption by way of the generation, transmission or distribution system, respectively.
Export Energy	means electricity exported.
Electricity Act of Bhutan	Electricity Act enacted by the National Assembly in its 79 <sup>th</sup> Session held on 6 <sup>th</sup> day of the 6 <sup>th</sup> Month of the Female Iron Snake Year corresponding to 26 <sup>th</sup> July 2001 of Bhutan.
Embedded Generation	means a generator which is connected to a

Distribution System.

Fee-in Tariff	means a minimum guaranteed price per unit of electricity paid to the generator.
Firm Capacity	means the minimum guaranteed amount of generation of electricity throughout the year.
Fixed Charges	means the service charges of a utility that applies for supplying electricity to a customers.
Gearing Ratio	means the ratio of debt to assets.
Generation	means the conversion of another form of energy into electricity.
Generating Plants	means an electrical generating unit coupled to a turbine within a power station together with all plant and apparatus at that power station which relates exclusively to the operation of that units / plant.
Granted Assets	means assets (both monetary and non-monetary) funded through the Government.
Government	means the Royal Government of Bhutan.
Imported Energy	Means energy imported from India.
License	means a license issued by BEA.
Losses	means loss of energy due to resistance and other factors while transmitting energy.
Low Voltage	means voltage not exceeding 400 volts between phase to phase for three phase supply or 230 volts between phase to neutral in case of single phase supply.
Medium Voltage	means voltages of 6.6 kV or 11 kV or 33 kV.
Network costs	means cost of apparatus, equipment, plant and infrastructures used to convey and control the conveyance of electricity to customers.
Power Purchase Agreement	means a legal contract dealing with the sale and purchase of power and electrical energy.
Power Supply	means the supply of electricity by way of the power

	system in accordance with system security.
Regulatory Asset Base	Means assets which is regulated by BEA.
Royalty Energy	means the free energy that would be made available to the Government.
Rural domestic households	means households located outside the proclaimed Municipal or Thromde demarcated boundary.
Sale	means the sale of electricity to a customer or resale to third parties.
Subsidy	means a financial transfer from one entity to another in order to reduce the cost or price of services.
Supply	means the generation, transmission or distribution of electricity by way of the generation, transmission or distribution system, respectively.
Tariff	means price of electricity per unit or kilowatt hour (kWh)
Tariff parameters	means economic and financial parameters applied for determining tariff.
Tariff Revision Cycle	means the cycle, in a designated number of years, for which the tariff revision shall take place.
Utility (ies)	means company licensed by BEA to provide generation, transmission and distribution utility services.
Variable Charges	means usage or consumption charges of electricity listed in Ngultrum per units or kWh.
Weighted Average Cost of Capital (WACC)	means the Weighted Average Cost of Capital determined in accordance with Tariff Determination Regulation of BEA.
Wheeling Charges	means charges of transfer of power per unit of energy payable to owner of transmission network.
Working Capital	means the short term capital (i.e. difference between payables and receivables) required for meeting the day to day operating funds of the utilities determined in accordance with Tariff Determination Regulation of BEA.