Electricity Regulatory Authority

18 MW Suchhu Hydropower Project

Tariff Review Report June 2025

Contents

Executive Summary

The Druk Green Power Corporation Limited (DGPC) submitted the domestic generation tariff proposal for the 18 MW Suchhu Hydropower Project (SHPP) located in Haa, Bhutan. The complete information from DGPC was received on 12th May 2025. The BPSO has declared the Commercial Operation Date (COD) of the project on 10th April 2025 vide letter no. 14/BPSO/Suchhu/2025/606. The DGPC has proposed three different tariffs for the project: i) Nu. 6.78/kWh considering 13% free power (three-year tariff period); ii) Nu. 5.90/kWh considering 0% free power (three-year tariff period); and iii) Nu. 5.24/kWh considering 0% free power with levelized tariff for 30 years. The project completion cost of Nu. 2586.29 million, Cost of Equity (CoE) of 13.74%, Cost of Debt (CoD) of 10.50%, Gearing ratio of 70% and mean annual energy generation of 76.57 GWh has been considered in the proposal.

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

The tariff application of SHPP has been reviewed, and the ERA has considered the weighted average cost of capital (WACC) as 12.19% based on CoE of 11.29%, CoD of 10.50% and gearing ratio of 70%.

Considering the reviewed regulatory parameters, cost allowances and energy generation from SHPP, the generation tariff works out to be Nu 5.49/kWh considering 0% free power as per the directives received from MoENR vide letter no. MoENR/SEC/ERA/01/2024-2025/912. The approved tariff is effective from the commercial operation date till the new tariff is determined by ERA based on the National Energy Policy 2025.

1 Background

DGPC submitted the proposal for the domestic generation tariff of 18 MW Suchhu HPP for the period of three years vide letter no. 08/DGPC/ERA/MD/2025/16 dated 11th February 2025 and the complete information was received on 12th May 2025. DGPC stated that the project completion cost is based on expected cost of Nu 2,556.76 million which may change slightly once the formal closure of contract of all contract packages are completed and finalized by end of June 2025.

The tariff application is reviewed based on the current Domestic Electricity Tariff Policy 2016 and the Tariff Determination Regulation 2022. The Secretariat has also received policy guidance from the Hon'ble Secretary, Ministry of Energy and Natural Resources on the applicable free power percentage for small hydro projects (capacities less than 100 MW) based on the new energy policy. The tariff has been proposed and reviewed considering the following principles for tariff determination:

1. Fairness to both service customers and service providers;
2. No unjust discrimination against service providers or those who wish to use the services;
3. Reflect the actual cost of efficient business operation;
4. Conducive to efficiency improvement in business operation;
5. Enhance efficient and adequate supply to satisfy, the domestic demand; and
6. Transparency in the determination and presentation of tariffs.

The ERA has sought clarifications from SHPP and DGPC on various information required to conduct the review. Based on the detailed review of the tariff application, the consideration of the ERA is submitted as outlined below.

2 Regulatory parameters

2.1 Tariff period

DGPC had proposed tariff period for three years and a levelized tariff for 30 years.

2.2 WACC Parameters

The pre-tax WACC is calculated in accordance with the Clause 69 of TDR, 2022 as follows:

$$WACC_g = \frac{CoE_g(1 - Gearing_g)}{1 - Tax} + (CoD_g \times Gearing_g)$$

Where:

1. WACCg is the weighted average cost of capital for the Generation Licensee "g", as a percentage;
2. CoEg is the cost of equity, as set out in Schedule C of the TDR, 2022, as a percentage for the Generation Licensee "g";
3. Gearingg is the ratio of debt to total net fixed assets, as set out in Schedule C of the TDR, 2022 for the Generation Licensee "g";
4. CoDg is the actual cost of debt for the tariff period for the Generation Licensee "g", 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 DGPC Proposal

DGPC had proposed a gearing ratio of 70%, CoE of 13.74%, CoD of 10.50% and a tax rate of 30%. The details of WACC parameters are discussed in the subsection below.

2.2.1.1 Gearing Ratio

The gearing ratio for the SHPP has been considered 70% in line with the Tariff Policy against the actual gearing ratio of 57%.

2.2.1.2 Cost of Equity (CoE)

DGPC proposed Cost of Equity (CoE) of 13.74% based on the provisions of the Tariff Policy. The long-term average lending rates of the financial institutions of all sectors is 11.24% as given in Table 1. As per the DETP 2016, ERA could allow a reasonable premium up to a maximum of 250 basis points on the above rates depending on the domestic market situation and gearing ratio applied. We have included the premium of 250 point for tariff determination. Therefore, a post-tax cost of equity of 13.74 % is proposed.

Table 1: Proposed average lending rate

SL.No	Financial Institutions	Average Interest Rate
1	Bhutan Development Bank Limited	10.75%
2	Bank of Bhutan Limited	11.58%
3	Bhutan National Bank Limited	12.10%
4	Tashi Bank Limited	10.72%
5	Druk PNB Limited	10.88%
6	Royal Insurance Corporation Limited	11.83%

7	Bhutan Insurance Limited	12.23%
8	National Pension and Provident Fund (NPPF)	9.83%
	Average Interest Rate	**11.24%**

2.2.1.3 Cost of Debt (CoD)

The Cost of Debt (CoD) of 10.5% is proposed by DGPC for SHPP. This is as per the term loan with local Financial Institutions of Bhutan.

Table 2: Proposed Cost of Debt

Loan particulars	Principle amount (MNu.)	Interest rate	Repayment Period	Loan balance 31.12.2025 (MNu)	Loan balance 31.12.2026 (MNu)	Loan balance 31.12.2026 (MNu)
Financial Institutions of Bhutan	1466.5	10.50%	20 years	1442.31	1415.59	1386.05

2.2.2 ERA Review

The WACC parameters are determined as per the schedule C of TDR. The reviewed parameters are discussed in the subsections below.

2.2.2.1 Tax

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

2.2.2.2 Gearing

The Clause 7.1 of DETP 2016 states that the gearing ratio for the computation of WACC shall be higher than actual gearing ratio and up to maximum of 70%. As per Clause 69 of TDR 2022, Gearing is the ratio of debt to total net fixed assets, as determined by the Authority for the Generation Licensee.

The ERA approved gearing ratio of 70% for Mangdechu Hydropower Project (MHP) in 2019 and Tangsibji Hydro Energy limited (THyE) in 2024 when the project initially commissioned, The ERA also approved gearing ratio of 70% for MHP and 60% for existing DGPC plants for tariff period of 2022-2025. The actual gearing ratio of SHPP is 57.36%

Since SHPP being a new project, ERA approved ratio of 70% for SHPP at par with MHP and THyE.

2.2.2.3 Cost of Equity (CoE)

The ERA reviewed the average lending rates of the domestic financial and non-bank institutions for all sectors as shown in the Table 3 below.

Table 3: Average Long-Term Lending Rate of Financial Institutions in Bhutan

SL.No	Financial Institutions	Average Interest Rate (%)
1	Bhutan Development Bank Limited	11.79
2	Bank of Bhutan Limited	12.10
3	Bhutan National Bank Limited	10.75
4	Tashi Bank Limited	12.13
5	Druk PNB Limited	9.83
6	Royal Insurance Corporation Limited	11.17
7	Bhutan Insurance Limited	10.95
8	National Pension and Provident Fund (NPPF)	11.58
	Average Lending Rate	**11.29**

As per Clause 7.2 of DETP, it states, "ERA 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".

ERA approved CoE of **11.29%** for the purpose of tariff determination which is higher than the actual interest rate of 10.50% of actual CoD.

2.2.2.4 Cost of Debt (CoD)

As per DEPT 2016, Clause 7.3 states the actual cost of debt for the tariff period should be considered. ERA had verified the principal loan amount, interest rate, and repayment period as per the loan agreement. Therefore, the loan interest rate of 10.50% shall be considered for determination of SHPP domestic generation tariff.

2.2.2.5 The WACC

Based on the approved gearing ratio of 70%, CoE of 11.29%, CoD of 10.5 % and tax rate of 30%, the ERA approved a WACC of 12.19 % for the SHPP as shown in Table 4 below.

Table 4: Reviewed WACC

WACC Parameters	ERA review
Gearing	70%
CoE	11.29%
CoD	10.50%
Tax	30%
WACC	12.19%

2.3 Inflation

2.3.1 DGPC Proposal

DGPC had proposed an average annual inflation rate of 5.93% for SHPP to be used to calculate the historical O&M average cost and to escalate the yearly O&M allowance over the tariff period as shown in the Table 5 below.

Table 5: Proposed Year on Year historical Inflation on Non-Food Item

Year	2021	2022	2023	Average
Inflation Figures	6.82%	7.01%	3.96%	5.93%

2.3.2 ERA Review

As per Clause 7.4 of DETP, inflation for O&M expenses should be based on historical average inflation rates published by the National Statistics Bureau (NSB).

ERA verified that the proposed average historical inflation rates of 5.93% is reported correctly. However, the average inflation rate of 5.93% was for 2021, 2022, and 2023. ERA reviewed the latest available inflation rate of past three year as per DEPT 2016 which is for the year 2022, 2023, and 2024 as given below.

Table 6: Reviewed Year on Year historical Inflation on Non-Food Item

Year	2022	2023	2024	Average
Inflation Figures	7.01%	3.96%	-0.6%	3.46%

Therefore, ERA approved historical inflation rate of 3.46% for the tariff determination.

2.4 Other Regulatory Parameters

The O&M benchmark and O&M efficiency gain parameters are discussed in Section 3.2 in this review report.

3 Allowances, Cost of Supply and Energy Volumes

The total cost of supply for DGPC in any tariff year to be determined in accordance with Clause 70 TDR, 2022.

$$TCg = OMg + DEPg + RoAg + CoWCg + SOg + FEESg - NTRg$$

Where:

1. TCg is the total cost of supply of the Generation Licensee "g" in million Ngultrum;
2. OMg is the allowance for operating and maintenance costs of the Generation Licensee "g" in million Ngultrum;
3. DEPg is the allowance for depreciation of assets for the Generation Licensee "g" in million Ngultrum;
4. RoAg is the return on fixed assets of the Generation Licensee "g" in million Ngultrum, determined as,

   $$RoAg = WACCg \times NAg,$$

   Where:
   a. WACCg is the weighted average cost of capital for the Generation Licensee "g", and
   b. NAg is the net value of all fixed assets at the start of the year for the Generation Licensee "g", in million Ngultrum.

5. CoWCg is the Cost of Working Capital for the Generation Licensee "g" in million Ngultrum.

3.1 Allowances for Depreciations (DEP) and Return on Fixed Assets (RoA)

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

Further, the Clause 9 of the Guideline for Determination of Regulatory Asset Base, 2021, states "*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 these guidelines, all assets approved by the Royal Government of Bhutan shall be considered*."

The allowance for depreciation is based on the economic lifetime of the assets, in accordance with Schedule B of the TDR, which may be updated by the ERA from time to time. The allowance for depreciation allows taking assets 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 assets values.

3.1.1 DGPC Proposal

3.1.1.1 Fixed Assets

The DGPC has proposed a gross assets value of Nu 2586.29 million for SHPP as shown in the Table 7 below. It was stated that the gross value is including the IDC cost. The asset value is excluding transmission line cost of Nu 7.11 million.

Table 7: Asset schedule of SHPP (Nu Mill)

Fixed assets	Gross value	Acc. Dep.	Net Value	Depreciation
Land	0.98	-	0.98	-
Buildings	5.00	-	5.00	0.17
Civil Structures	190.39	-	190.39	6.35
Dam Complex	11.97	-	11.97	0.40
Water Conductor	1108.35	-	1233.38	36.95
Powerhouse	1233.38	-	36.21	41.11
Transmission Equipment	36.21	-	-	1.21
Equipment	-	-	-	-
Office equipment	-	-	-	-
Total	**2586.29**	**-**	**2586.29**	**86.18**

3.1.1.2 Investments

There is no new investment proposed for this tariff period.

3.1.2 ERA Review

3.1.2.1 Fixed Assets

The ERA finds that the cost of latest audited report is as of December 2024 which does not give the actual cost of the project to determine the tariff. The latest project cost of Nu 2556.76 million is estimated cost including IDC cost of Nu. 105.49 million. The project cost is likely to be changed slightly since the formal closure of contract of all contract packages are not completed and the provisions for price variation may also get changed. Moreover, the transmission cost has been excluded from the total cost of SHPP.

As per Clause 7.8 of DETP 2016, it states that the assets owned by utilities but not in use/or which are not utilized for generation, transmission, and distribution of electricity shall not be considered for tariff determination. Therefore, based on the detailed review of the assets schedule, the ERA has not included the asset values which fails in delivering the core business of electricity generation.

Based on the above, the reviewed assets schedule for SHPP is as shown in the Table 8 below.

Table 8: Reviewed Asset (Nu million)

Fixed assets	Gross value	Acc. Dep.	Net Value	Depreciation
Land	0.62	-	0.62	-
Buildings	5.00	-	5.00	0.17
Civil Structures	149.71	-	149.71	4.99
Dam Complex	15.20	-	15.20	0.51
Water Conductor	1062.23	-	1062.23	35.41
Powerhouse	1313.18	-	1313.18	43.77
Transmission Equipment	10.81	-	10.81	0.36
Equipment	-	-	-	-
Office equipment	-	-	-	-
Total	**2556.76**	**-**	**2556.76**	**85.20**

3.2 O&M Allowances

The determination of O&M costs is described in Clause 35 to 41 of TDR, 2022. The allowance for O&M costs is calculated each tariff year. O&M allowance is determined for the reference year 2023 which will be increased by inflation after deduction of 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 TDR. An annual regulatory fee and system operator charges are added to O&M costs.

3.2.1 DGPC Proposal

3.2.1.1 O&M Allowances

The DGPC had proposed O&M allowance of Nu 25.86 million for SHPP which is l% of the total project cost.

3.2.1.2 O&M Efficiency Gian

The DGPC had proposed 1% efficiency gains on O&M costs for SHPP as new power plant experiences teething problem at the start of operation.

3.2.1.3 Regulatory Fees

The DGPC had proposed annual regulatory fee of Nu. 0.18 million (Nu. 10,000 per MW) and annual system operator charges of Nu 0.46 million as per the System Operator Charges Regulation for the period of 2024-2025.

3.2.2 ERA Review

3.2.2.1 O&M Allowances

The Clause 38 of the TDR states that the determination of the operation and maintenance allowance shall take into consideration the historical costs for the power plants that are older than five years, as adjusted for inflation, while for the recently commissioned projects, it shall be determined based on the industry's best practices, as set out in Schedule A of TDR, opportunities for efficiency improvements and may include comparison with benchmarks from comparable utilities in the region.

The O&M cost of existing DGPC plants is 2.72% of the asset value and 0.42% of the asset value for MHP in the year 2023.

In accordance with the TDR and the O&M cost of existing plants, 1% of the capital cost (Nu 25.44 million) has been approved as O&M cost for SHPP since it is a new project and is expected to have higher efficiency than the existing operational plants.

3.2.2.2 O&M efficiency Gain

Considering the teething problems with electromechanical equipment failures during the initial stages, 1% efficiency gains on O&M costs shall be approved for SHPP.

3.2.2.3 Regulatory Fees

In line with the Regulatory Fees Regulation 2006, ERA shall consider annual regulatory fees of Nu. 0.18 million (Nu. 10,000 per MW).

The ERA approved total cost of Nu 179.04 million as system operator charges for the period 2024-2025 where 50% of the cost amounting to Nu 89.52 million has to be borne by Generation companies which was further allocated to each hydro plant based on the installed capacity as shown in the Table 9 below and 50% of the cost by Transmission and Distribution Licensee as per the Clause 39 of System Operator charges Regulation 2022.

Table 9: Reallocated System operator charges to Generation companies

Plants	Amount (Nu Mill)
DGPC	38.17
MHP	18.47
DHPC	3.23
THyE	3.03
PHPA-II	26.16
SHPP	0.46

Total	**89.52**

With SHPP coming online in this tariff period, as per Clause 17 of the System Operator Charges the allocation of System Operator cost to SHPP is estimated as Nu 0.46 million as shown in table above.

3.3 CoWC Allowances

CoWC is the cost of working capital for Generation Licensee "g", in million Ngultrum. The cost of working capital shall cover the allowance for arrears and inventories and shall be determined in accordance with Clause 70(5) of TDR, 2022 as follows.

$$CoWC_g = I \times \left[REV_g \times \frac{ARREARS_g}{365} + INVENTORIES_g\right]$$

Where:

1. I is the interest rate for working capital as determined in TDR 2022;
2. $REVg=OMg+DEPg+RoAg$ where OM is as described in Section 3.2 in this review.
3. ARREARSg is the allowed days receivables for the Generation Licensee "g", in days; and
4. INVENTORIESg is the allowance for inventories for the Generation Licensee "g", in million Ngultrum.

The purpose of CoWC allowances is to compensate for the loss of revenues caused by the lag between the time, the costs occurs and the time of receivables from the customers.

3.3.1 DGPC Proposal

3.3.1.1 Interest on Working Capital

DGPC had proposed 9.75% as interest on working capital.

3.3.1.2 Inventories

DGPC had proposed inventory level amounting to Nu 14.50 million which have been considered at Nu 55.55 million of BHP inventory level (in the ratio of MW = 18/64*51.55= 14.50).

3.3.1.3 Arrear

DGPC had proposed an arrear of 30 days for SHPP.

3.3.2 ERA Review

3.3.2.1 Interest on Working Capital

As per the Clause 7.7 of DETP, the interest on working capital shall be determined based on the prevailing lowest short-term lending rate of financial institution of Bhutan. In line with DETP, it was found that the lowest working capital interest rate is 9.23 % as offered by Bank of Bhutan. Therefore, ERA shall approve interest on working capital of 9.23% for determination of CoWC.

3.3.2.2 Arrear

DGPC clarified that arrears of 30 days is proposed based on past precedence used for other similar projects. Therefore, the ERA approved an arrear of 30 days as given below:

Table 10: ERA Review Arrear

Arrears	**No. of days**
Average energy consumption duration	15
Bill preparation and delivery duration	5
Bill payment due date	10
Total Arrears	**30**

3.3.2.3 Inventories

Clause 16 of Guidelines for Determination of Regulatory Asset Base 2021 states that "*The allowance for inventories shall be as a percentage (%) of the operation and maintenance expenses or capital cost based on industry practice or applicable benchmark".*

The inventories of BHP was Nu 50.11 million and Nu 53 million respectively for the year 2022 and 2023 which averages to Nu 51.55 million. ERA reviewed that the proposed inventories of Nu 14.50 million is 56.71% of SHPP proposed O&M cost of Nu 25.57 million.

The inventories of existing DGPC plants in the year 2023 are 0.78% of asset value and 28.52% of the O&M value. For MHP, the inventories are 0.05% of asset value and 11.47% of O&M value.

Considering 15% of O&M cost in comparison to other power plants inventory allowance and being a new plant, the inventory for SHPP works out to be Nu 3.84 million considering the allowed O&M cost of Nu 25.57 million. Since it is a new plant and would require much lower inventory than older plants, ERA shall approve inventory of Nu. 3.84 million.

3.4 Energy Volume

As per the Clause 71 of TDR 2022, the annual energy volumes to be determined as the mean annual energy generation of the past three years based on 98% water utilization factor to the extent of generation capacity after deduction of royalty energy adjusted for auxiliary consumption as:

$$ENERGY = \sum_i ENERGY_i \times (1 - AUX_i) \times (1 - ROYALTY_i)$$

Where:

1) ENERGY is the annual energy volume in any year, in GWh;
2) $ENERGY_i$ is the average historical mean annual energy generation of the past three years for plant "i", in GWh;
3) AUX_i is the allowance for auxiliary consumption at plant "i", as set out in Schedule D of TDR, 2016, as a percentage; and
4) $ROYALTY_i$ is the free energy which is made available to RGoB by plant "i", as a percentage.

3.4.1 DGPC Proposal

DGPC had proposed generation forecast of SHPP as 76.57 GWh and adjusted for auxiliary losses of 1.12%. DGPC has proposed two options for the free power consideration at 0% and 13% as given below:

Table 11: Energy volume

Year	Values (GWh)	Values (GWh)
Mean Annual Energy	76.57	76.57
Less: Auxiliary Losses (1.12%)	0.86	0.86
Less: Free power	0 (0% free power)	9.84 (13% free power)
Energy net off Aux. losses and royalty	75.71	65.87

3.4.2 ERA review

ERA reviewed that in the year 2023, the auxiliary loss is 0.04% for BHP, 0.42% for CHP, 0.17% for KHP, 0.84% for DHP, 1.05% for MHP, and 0.73% for THP. resulting an average auxiliary loss of 0.54% for these plants.

Based on the allowed auxiliary consumption for new plant which commenced in recent year such as MHP in 2019 and THyE in 2024, ERA approved 1% as auxiliary loss for Suchhu HPP.

In accordance with the directives received from the Ministry on the applicable free power percentage vide letter no. MOENR/SEC/ERA/01/2024-25/912 dated 18th June 2025, the free power percentage of 0% has been considered for Suchhu HPP.

Table 14: Energy Volumes for SHPP

Year	Value (GWh)
Mean Annual Energy	76.57
Less: Auxiliary Losses (1%)	0.77
Less: Free power	0
Energy Used for Tariff Determination	75.71

4 Tariff Determination

As per Clause 72 of the TDR, the average cost of supply shall be taken as the ratio of the discounted annual costs of supply to the discounted energy volumes, with discounting applied over the Tariff Period using the $WACC_g$, as follows:

$$AC_g = \frac{\sum_{n=1}^{TP} TC_{g,n} \Big/ (1+WACC_g)^n}{\sum_{n=1}^{TP} ENERGY_n \Big/ (1+WACC_g)^n}$$

Where:

- AC_g is the average cost of supply for the Generation Licensee “g”, in Ngultrum per kWh;
- TP is the number of years in the Tariff Period;
- $TC_{g,n}$ is the total cost of supply of Generation Licensee “g” in year “n” in million Ngultrum, as determined in accordance with clause 70 of TDR, 2016;

- $ENERGY_n$ is the energy volume in year "n" in GWh, as determined in accordance with Clause 71 of TDR, 2016; and
- $WACC_g$ is the weighted average cost of capital for the Generation Licensee "g", as determined in Clause 69of TDR, 2016.

Considering the reviewed regulatory parameters, cost allowances and energy generation from SHPP, the generation tariff works out to be **Nu 5.49 per unit** considering 0% free power for the tariff period effective from the Commercial Operation Date till the new tariff will be determined.