



Report on Review of DSP-SI Solar Projects

Electricity Regulatory Authority
Ministry of Energy and Natural Resources

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Executive Summary

The De-suung Skilling Programme Solar Initiative (DSP-SI) submitted a Feed in Tariff Revision proposal for DSP-SI solar project phase I, II & III for Tariff period of 25 years vide email dated 12th January 2026. The phase I of DSP-SI was commissioned on July 2023 with capacity of 765 kW. The tariff approved for the previous tariff cycle was Nu 4.48/unit. The subsidizing 2 phases were launched in 2024 and 2025 and were approved interim tariff of Nu 4.5 /unit.

ERAS has reviewed the tariff proposal based on the National Energy Policy 2025, Guideline for Determination of Domestic Electricity Tariff and Tariff Determination Regulation (TDR) 2025. The analysis and approvals on the tariff determination methodology, Weighted Average Cost of Capital, Cost of Equity, Cost of Debt, gearing ratio, return on assets, depreciation, operation and maintenance cost, return on working capital, Capacity Utilization Factor, auxiliary consumption, degradation factor and approved tariff has been reported in the report.

1. Background

The preceding interim rates of the generation and capacity overview of the three phases are provided in the Table below:

Table 1: Summary of DSP-SI Solar Projects

Phase	I	II	III
Capacity (MW)	0.765	3.85	5.016
Plants	1. 255 kW [Centenary Farmer's Market (CFM)] 2. 510 kW [Dechencholing Solar Farm]	1. 1.6 MW RTS at Pangbisa 2. 104 kW RTS at CFM 3. 2.137 MW GMS at Dechencholing	1. 1.5 MW RTS at Dungkar Estate 2. 1.5 MW RTS at Paro Airport 3. 1.8 MW GMS at Dechencholing 4. 200kW GMS at Tareythang

2. Regulatory Parameters

2.1 Tariff Period

2.1.1 DSP Proposal

DeSuung Skilling Programme Solar Initiative (DSP-SI) has proposed the tariff period as 25 years which is in line with the Tariff Determination Regulation 2025.

2.1.2 ERA Approved

As per the TDR 2025, “*The Tariff Period for all categories of solar power projects of this Regulation shall be 25 years from the date of commissioning.*” The useful life of the project is also 25 years. The approved Tariff Period is provided in the Table below:

Table 2: Approved Tariff Period

Phase	I	II	III
DSP Proposed (Years)	25	25	25
ERA Approved (Years)	23	24	25

2.2 WACC Parameters

The pre-tax weighted average cost of capital (WACC) is calculated in accordance with the Section 96 of TDR 2025 as follows:

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

Where:

1. $WACC_g$ is the weighted average cost of capital for the Generation Licensee “g”, as a percentage;
2. CoE_g is the cost of equity, as a percentage for the Generation Licensee “g”;
3. $Gearing_g$ is the ratio of debt to total net fixed assets,
4. CoD_g 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 Gearing Ratio

2.2.1.1 DSP Proposal

According to the proposal submitted, the debt-to-equity ratio proposed is 70%, which is planned to be achieved during the tariff cycle.

2.2.1.2 ERA Approved

The Clause 6.4 of Guideline for Determination of Domestic Electricity Tariff states, “*To ensure competitive and efficient pricing through an optimal capital structure, the gearing ratio for the computation of WACC shall be higher than actual gearing ratio and up to maximum of 70:30.*”

As per section 77 of TDR 2025, “*If the actual equity deployed is less than 30% of the Capital Cost, the actual equity shall be used for the purpose of tariff determination. Conversely, if the actual equity deployed exceeds 30% of the capital cost, the excess amount shall be considered as debt, and the maximum gearing ratio shall be maintained at 70:30.*” Therefore, the actual gearing was approved. The approved gearing ratio is provided in the table below:

Phase	I	II	III
proposed gearing ratio (%)	70%	70%	70%
Actual Debt (Nu. Mil)	33.5	150	163.235
Actual Equity (Nu. Mil)	12.38	32.1105	69.95
Approved gearing ratio (%)	73.02%	82.37%	70%

2.2.2 Cost of Equity

2.2.2.1 DSP Proposal

According to the proposal Cost of Equity proposed is 16% which is maximum according to the TDR 2025.

2.2.2.2 ERA Approved

In line with clause 6.2 of Guideline for Determination of Domestic Electricity Tariff, “*The Rate of Return on Equity should be comparable to that of regional power market and industrial benchmark to attract and sustain investments. The value of equity at the time of commissioning of the renewable project shall be maintained throughout the project concession period for the determination of the Return on Equity.*” According to section 79 of TDR 2025, “*The cost of equity shall be 13% to 16% for Solar Generation Licensee.*”

DSP-SI has proposed a COD of 16%. ERAS reviewed all project parameters and observed that the plant meets all benchmark requirements except for the capital cost of phase I, indicating that the plant is improving efficiently. Even with a CoE of 16%, the project achieves a realizable tariff. As per the regulations, the allowable CoE range is 13% to 16%. ERA also approved COE of 16% with respect to its efficiency and tariff which equates to the realizable tariff.

2.2.3 Cost of Debt

2.2.3.1 DSP Proposal

COD of 0% for first 2 phases and 7% for the phase III was submitted considering the actual cost of BOB debt servicing on loan outstanding.

2.2.3.2 ERA Approved

As per the TDR 2025, “*For Solar Generation Licensee, the actual cost of debt for the Tariff Period shall be considered provided that it shall not exceed 9.45%.*” Since the actual interest on debt for first 2 phases is 0%, the actual interest on debt of 0% was approved. Whereas for phase III actual interest rate of 7% was approved. The details are provided in the Table below:

Table 3: COD Approved

Phase	I	II	III
DSP Proposed (%)	0%	0%	7%
Actual Debt (Nu mill)	33.5	150	163.235
Debt from	BTSEC	MOF	BOB
ERA Approved (%)	0%	0%	7%

2.2.4 Tax

2.2.4.1 ERA Approved

As per the TDR 2025, “Tax is the prevailing rate of company taxation, as a percentage.” Moreover, as per the Section 8 of Fiscal Incentive Act of Bhutan 2021, “The qualifying income derived by an Approved Business (regardless of its date of commencement of commercial operation) from any qualifying activity in the following High Priority Sectors carried out in Bhutan shall, subject to any conditions prescribed in the Rules and any conditions specified in the certificate of approval of the Approved Business, be exempt from tax for a qualifying period not exceeding 10 years: (6) energy, excluding hydroelectric projects;”

Based on the review, payment of tax for a period of ten years from the date of commercial operation of the projects is considered to be exempted and for rest of the useful life, 22% corporate tax has been considered.

2.3 Inflation

As per Clause 6.5 of Guideline for Determination of Domestic Electricity Tariff, inflation for O&M expenses should be based on historical average inflation rates published by the National Statistics Bureau (NSB).

2.3.1 ERA Review Approved

In line with the Guideline, the average historical inflation rate works out to 3.46% for the years 2022 to 2024 is as shown below:

Table 4: Reviewed Inflation

Inflation	2022	2023	2024	Average
Overall inflation	7.01%	3.96%	-0.60%	3.46%

Based on the review, it was approved to consider an inflation rate of 3.46% for determining tariff for the solar projects.

2.4 Other Regulatory Parameters

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

3 Allowances, Cost of Supply and Energy Volumes

As per TDR 2025, The total cost of supply for a Solar Generation Licensee in any year shall be determined as:

$$TC_{sg} = OM_{sg} + DEP_{sg} + CoE_{sg} + CoD_{sg} + CoWC_{sg} + Fees_{sg} + SO_{sg}$$

Where;

- 1) TC_{sg} is the total cost of supply of the Solar Generation Licensee “sg”, in million Ngultrum;
- 2) OM_{sg} is the allowance for operating and maintenance costs of the solar Generation Licensee “sg”, in million Ngultrum;
- 3) DEP_{sg} is the allowance for depreciation of assets for the Solar Generation Licensee “sg”, in million Ngultrum;
- 4) CoE_{sg} is the cost of equity as set out in Section 79 (2) of this Regulation for the Solar Generation Licensee “sg” in million Ngultrum;
- 5) CoD_{sg} is the actual interest of the loan as set out in Section 82 of this Regulation for the Solar Generation Licensee “hg” in million Ngultrum;
- 6) SO_{sg} is the System Operator charges payable by the Solar Generation Licensee “hg”, in million Ngultrum;
- 7) $CoWC_{sg}$ is the Cost of Working Capital for the Solar Generation Licensee “sg”, in million Ngultrum

3.1 Allowances

As per section TDR 2025, “*The Capital Cost of solar projects shall be inclusive of land cost, pre-development expenses, all capital works including plant and machinery, civil works, erection and commissioning, financing cost, interest during construction, and evacuation infrastructure up to the interconnection point.*”

3.1.1 Assets

3.1.1.1 DSP Proposed

DSP proposed consideration of Actual Cost incurred by each plant for the Tariff computation.

3.1.1.2 ERA Approved

The asset proposed for Phase 2 and 3 is within the benchmark set by the Authority, however the capital cost proposed for Phase 1 is exceeding the benchmark. Due to the aggregate nature of the project and the efficiency demonstrated by the developer, the actual capital cost has been approved. The approved capital cost (asset) is provided in the table below:

Table 5: Approved Asset Summary

Phase	I	II	III
Capacity (MWp)	0.765	3.85	5.016
Proposed Capital Cost (Nu mill)	45.88	182.1105	233.193
Proposed (Nu mill/ MW)	59.97	47.30	46.49
Benchmark Cost (Nu mill)	48.33	48.54	53.65
ERA Approved (Nu mill/ MW)	59.97	47.30	46.49

3.2 O&M Allowance

3.2.1 DSP Proposal

DSP submitted the O&M charge of 1.5% of asset value, which is maximum of allowed allowance according to the TDR 2025.

3.2.2 ERA Approved

DSP has proposed the maximum O&M cost of 1.5% of capital cost. As per the section 51 of the TDR 2025, *“The operation and maintenance allowances for Solar Generation Licensee shall be up to a maximum of 1.5% of the capital cost.”* According to the regulation, 1.5% of capital cost was approved.

3.3 Cost of Working Capital

3.3.1 ERA Approved

3.3.1.1 Inventories

As per the section 84 of TDR 2025, *“The allowance for inventories shall be as a percentage of operation and maintenance expenses or Capital Costs based on best industry practice or applicable benchmarks”*. As practiced in the regional markets, 15% of the O&M annual expense as an inventories was approved.

3.3.1.2 Arrears

Arrears of 40 days is approved at par with other solar plants and DGPC.

3.3.1.3 Interest on Working Capital

The Guideline for determination of domestic electricity tariff, *“The interest on working capital shall be determined based on the prevailing lowest short-term lending rate of financial institution of Bhutan”*.

The interest on working capital of 9.23 % which is currently the lowest short term lending rate was approved in line with the Guideline.

3.3.1.4 Regulatory Fees

For other projects the annual license fee was exempted except for the 1.8 MW ground mounted system at Dechenchholing. The Tariff application fee of Nu 2500 per MW has been included in the Tariff determination.

4 Energy Volumes

4.1 DSP Proposal

DSP proposed the consideration of Capacity Utilization Factor (CUF) of 16% for first 2 phases and 17% for phase III.

4.2 ERA Approved

DSP has proposed the CUF of 16% for the first 2 phases and 17% for phase III. The benchmark CUF has been published in TDR 2025. Due to the aggregate nature of the projected weighted average CUF has been taken into consideration and then compared with the proposed CUF. The reviewed CUF is provided in the table below:

Table 6: Approved CUF

Phase	I	II	III
DSP Proposed (%)	16%	16%	17%
Actual CUF (%)	15.38%	16.33%	-
Benchmark CUF (%)	16.33%	16.17%	15.8%
ERA Approved (%)	16.33%	16.33%	17%

5 Tariff Determination

As per TDR 2025, the average cost of supply is to be taken as the ratio of the annual costs of supply to the net energy volumes, with discounting applied over the Tariff Period.

The summary of parameter consideration for the tariff computation is provided in the Table below:

Table 7: Approved Parameter Summary

Parameters	Phase I	Phase II	Phase III
Capital cost (Nu mill/MW)	59.97	47.3	46.49
O&M Cost (% of asset)	1.5%	1.5%	1.5%
Depreciation	5.62% for first 11 years and 1.13% thereafter	8.24% for first 9 years and 0.51% thereafter	6.095 for first 11.5 years and 1.33% thereafter
Capacity Utilization Factor (%)	16.33%	16.17%	17%
Auxiliary consumption (%)	0.5%		
Degradation Factor (% p.a)	0.5%		
Inflation Rate (%)	3.46%		
Interest on Working Capital	9.23%		
Inventories (% of O&M)	15%		
Arrears (Days)	40		
Gearing	73.02%	82.37%	70%
Cost of Equity	16%		
Cost of Debt	0%	0%	7%
Tax	0% for first 10 years and 22% thereafter		
LCOE (Nu/kWh)	4.38	3.46	4.49

f6 Conclusion

In conclusion, the tariff review for the all three phases of the DSP-SI has been thoroughly evaluated using relevant frameworks, including the National Energy Policy 2025, Guideline for Determination of Domestic Electricity Tariff, and Tariff Determination Regulation 2025. The review considered the financial viability of the project, accounting for various economic, technical, and regulatory parameters to ensure an optimal balance between sustainability and cost efficiency. The project aligns with Bhutan's broader goal of promoting renewable energy sources, particularly solar, to diversify its energy mix and enhance energy security.

Considering the parameters approved, the weighted average Levelized Cost of Energy (LCOE) for all three project stands at **Nu 4.07/unit** over the 25-year tariff period with gross metering scheme. The tariff was approved during 136th commission meeting held on 23rd January 2026. These figures reflect a competitive pricing structure that balances the need for affordability, financial sustainability, and the promotion of renewable energy in Bhutan. The project is set to contribute significantly to Bhutan's renewable energy targets while promoting private-sector participation in the energy sector.