

**HYDRO POWER DEVELOPMENT  
CORPORATION OF ARUNACHAL  
PRADESH LIMITED (HPDCAPL)**

**(A Govt. of Arunachal Pradesh Enterprise)**

**APPLICATION**

**FOR**

**APPROVAL OF CAPITAL COST**

**&**

**TARIFF**

**SUMBACHU SMALL HYDRO POWER  
PROJECT (SHP)**

**3MW (2 X 1.5 MW)**

**JEMEITHANG, TAWANG**

**(AP)**

# GENERAL HEADINGS OF PROCEEDINGS

BEFORE THE ARUNACHAL PRADESH STATE ELECTRICITY REGULATORY  
COMMISSION (APSERC), ITANAGAR

Filing No.....

Case No.....

IN THE MATTER OF:

APPLICATION FOR APPROVAL OF CAPITAL COST  
& TARIFF OF SUMBACHU SHP IN ACCORDANCE  
WITH THE APSERC (TERMS & CONDITIONS FOR  
TARIFF DETERMINATION FROM RENEWABLE  
ENERGY SOURCES) REGULATIONS, 2018

AND

IN THE MATTER OF:

HYDRO POWER DEVELOPMENT CORPORATION  
OF ARUNACHAL PRADESH LIMITED (A GOVT. OF  
ARUNACHAL PRADESH ENTERPRISE)  
(HEREINAFTER REFERRED TO AS HPDCAPL),  
PARKVIEW APARTMENT, LOWER NITI VIHAR,  
ITANAGAR -791111, ARUNACHAL PRADESH.

..... PETITIONER



सत्यमेव जयते



INDIA NON JUDICIAL

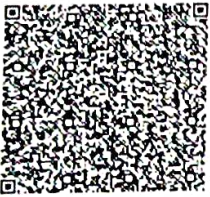
Government of Arunachal Pradesh

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 Account Reference : CSCACC (GV)/ arcscog07/ AR-PPMSHA0001/ AR-PPM  
 Unique Doc. Reference : SUBIN-ARARCSCEG0700071485355684W  
 Purchased by : Er TOKO ONUJ  
 Description of Document : Article 4 Affidavit  
 Property Description : UNDERTAKING  
 Consideration Price (Rs.) : 0  
 (Zero)  
 First Party : Er TOKO ONUJ  
 Second Party : Not Applicable  
 Stamp Duty Paid By : Er TOKO ONUJ  
 Stamp Duty Amount(Rs.) : 100  
 (One Hundred only)

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Chairman cum Managing Director  
Hydro Power Development Corporation of  
Arunachal Pradesh Ltd., Itanagar

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**AFFIDAVIT**

**BEFORE HON'BLE ELECTRICITY REGULATORY COMMISSION**

**FOR THE STATE OF ARUNACHAL PRADESH**

**FILE No:** \_\_\_\_\_

**CASE No:** \_\_\_\_\_

**IN THE MATTER OF : Petition for Approval of Capital Cost & Tariff of Sumbachu  
SHP under Sections 61, 62 and 64 of The Electricity Act  
2003**

**AND**

**IN THE MATTER OF:**

**Hydro Power Development Corporation of  
Arunachal Pradesh Limited (A Govt. Of Arunachal Pradesh  
Enterprise) (hereinafter referred to as HPDCAPL),  
Parkview Apartment, Lower Niti Vihar, Itanagar-  
791111, Arunachal Pradesh**

**.....Petitioner**

I Shri Toko Onuj son of late Toko Togur aged 51 years residing at Mob-II, Itanagar and District Papum Pare Arunachal Pradesh-791111 serving as Chairman cum Managing Director of Hydro Power Development Corporation of Arunachal Pradesh Limited under Government of Arunachal Pradesh, the deponent named above do hereby solemnly affirm and state on oath as under: -

1. That the deponent is the of the Hydro Power Development Corporation of Arunachal Pradesh Limited, and is acquainted with the facts deposed to below.
2. I, the deponent named above do hereby verify that the contents of the accompanying petition are based on the records of Hydro Power Development Corporation of Arunachal Pradesh Limited maintained in the ordinary course of business and believed by them to be true and I believe that no part of it is false and no material has been concealed there from.

Details of enclosures:

a) Proposal for Determination of Tariff of 3 MW Sumbachu SHP

b) Petition Fee – Rs. 5,00,000 ...../(Rupees FIVE LAKH ..... only), vide DD No. 780904 ..... dated 04/12/2020



Hydro Power Development Corporation of  
Arunachal Pradesh Limited.

Chairman cum Managing Director  
Hydro Power Development Corporation of  
Arunachal Pradesh Ltd., Itanagar

Petitioner

Place : Itanagar

Dated : 24<sup>th</sup> June, 2024

I, Adv. Tadu Bayor....., Itanagar, do hereby declare that the person making this affidavit is known to me through the perusal of records and I am satisfied that he is the same person alleging to be deponent himself.

Advocate

Solemnly affirmed before me on this 24..... day of June, 2024 at 11.48 a.m./p.m. by the deponent who has been identified by the aforesaid Advocate. I have satisfied myself by examining the deponent that he understood the contents of the affidavit which has been read over and explained to him. He has also been explained about section 193 of Indian Penal Code that whoever intentionally gives false evidence in any of the proceedings of the Commission or fabricates evidence for purpose of being used in any of the proceedings shall be liable for punishment as per law.

Tadu Bayor

Advocate

Tadu Bayor B.A./LL.B. A.I.C.  
Advocate  
Gauhati High Court  
Itanagar Permanent Bench  
Naharlagun (A.P.)

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## LIST OF ABBREVIATIONS

A&G	Administration & General
ARR	Annual Revenue Requirement
Crs	Crore
D/E	Debt Equity
FY	Financial Year
GFA	Gross Fixed Assets
APSERC	Arunachal Pradesh State Electricity Regulatory Commission
KWh	Kilo Watt hour
MU	Million Units
MW	Mega Watt
O&M	Operation & Maintenance
CUF	Capacity Utilisation Factor
MCLR	Marginal cost of fund based Lending Rate
R&M	Repairs and Maintenance
RoE	Return on Equity
Rs.	Rupees
SBI	State Bank of India
T&D	Transmission & Distribution

## **I. INTRODUCTION**

### **1.1. BACKGROUND**

Hydro Power Development Corporation of Arunachal Pradesh Limited (A Govt. of Arunachal Pradesh Enterprise) is entrusted with the design and construction of the power projects in the state of Arunachal Pradesh. Hydro Power Development Corporation of Arunachal Pradesh Limited has taken up the development of 3 MW Sumbachu SHP.

Sumbachu small hydroelectric project is located in Tawang District in the state of Arunachal Pradesh and envisages utilization of the flow of Sumbachu Nallah for generation of power. The project envisages a generation capacity of 3 MW of power by utilizing the available head between the Nallah elevations at EI 2678.5 m & EI 2389.5m. The project comprises a Trench weir which diverts the water into an intake placed on the right bank of the river. The diverted water passes through Desilting basin. Desilted water enters into water conductor system, forebay and the steel pressure shaft. A surface powerhouse is suitably located on a terrace at right bank of the river. Tail water from the powerhouse is discharged back into the nallah. The project utilises a net head of about 271.0 m.

#### **Location**

Sumbachu Small Hydel Project is located on the Sumbachu Nallah near Zemithang village in Tawang District of Arunachal Pradesh. The Project site is connected to Tawang by all-weather road which is 90 kms away from Zemithang. There is Pucca all-weather road between Tawang and Zemithang. The project site is located about 430 kms from Tezpur.

#### **Access**

The project area is accessible from Tawang and Zemithang, through all-weather pucca road and through Railway upto Bhalukpong which is 370 kms from Zemithang.

By Road	:	90 kms from Tawang District Headquarter 430 kms from Tezpur
Nearest Rail Head	:	Bhalukpong 370 km from site
Nearest Airport	:	Tejpur - 430 kms from Zemithang.

## **1.2 DETAILED PROJECT REPORT**

The detailed project report had been prepared by Alternate Hydro Energy Centre, Indian Institute of Technology, Roorkee (AHEC) in the year 2009. The detailed Engineering design and drawing works was also done by AHEC, Roorkee. The project construction work was awarded as a Turn – key EPC contract to M/s Nortech Power Projects (P) Ltd, Kolkata on 28<sup>th</sup> February 2009.

### **Recasting of DPR Cost Estimate**

M/s Concept Green Energy Pvt. Ltd., New Delhi was assigned to assess the works already executed and to further assess balance works, preparation of drawings for any revision required and prepare a revised cost estimate of project based on actual condition. M/s Concept Green Energy Pvt. Ltd., New Delhi submitted its report on Dec. 2013.

### **Techno-Economic Review Report**

M/s Alternate Hydro Energy Centre, Indian Institute of Technology, Roorkee (AHEC) was assigned to undertake the techno-economic review of the Detailed Project Report (DPR) of this project vide letter no. HPDC/MD/cont-13/2017-18/119-23 Dated 16.04.2018. M/s Alternate Hydro Energy Centre, Indian Institute of Technology, Roorkee (AHEC) submitted its report on the techno-economic review of the DPR in November, 2018.

The Detailed Project report, report on recasting of the DPR cost estimate & the report on the techno-economic review of the DPR is attached as Annexure to the petition. Further, details of actual capital cost is also attached as Annexure.

## 2. DETERMINATION OF TARIFF FOR THE HEP

The Hon'ble Arunachal Pradesh State Electricity Regulatory Commission has issued the Arunachal Pradesh State Electricity Regulatory Commission (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2018 to determine the Tariff of Renewable Energy projects in the state of Arunachal Pradesh.

Regulation 7 of Renewable Regulations, 2018 provides that project specific tariff is to be determined for SHPs of installed capacity of 1MW to 25MW.

The COD of the Sumbachu HEP was declared on 23.01.2020. Accordingly, HPDCAPL is submitting this petition in respect of 3 MW Sumbachu SHP for approval of Capital cost & determination of Tariff in accordance with the parameters as defined in the APSERC (Terms & Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2018. The RE Regulations, 2018 provides that the tariff for sale of electricity from a hydro power station shall be aimed at recovering the Annual Fixed Charges and various components of AFC has been defined in Regulation 9. Accordingly, following has been considered for calculating Annual Fixed Charges for the SHP:

### **Annual Fixed Charges:**

The Annual Fixed Charges (AFC) is determined based on following factors:-

- a) Project Cost
- b) Design Energy
- c) Interest on Loan Capital.
- d) Depreciation.
- e) Return on Equity.
- f) Operation & Maintenance Expenses.
- g) Interest on Working Capital.

Summary of the assumptions & parameters considered for proposing the various components of AFC is detailed in the table below.

Sl. No.	Particulars	Unit	Value	
1	Auxiliary Consumption	%	1	
2	O&M Expenses	Below 5MW – 38.06 Lakh/MW (FY 2018-19)		
	Escalation	%	5.72% per annum	
3	Depreciation		5.28% for the 1 <sup>st</sup> 13 years and balance spread over useful life of the SHP as per RE Regulations,2018	
	Plant Life	years	35	
	Residual	%	10	
4	Working Capital			
	Receivable (2 months Fixed Cost)	Months	2	
	O & M Expenses	Months	1	
	Spares for Maintenance	%	15	O&M Expenses
	Rate of Interest	%	SBI MCLR ( One year Tenor) + 300 basis point	
5	Return on Equity	%	14, grossed up by applicable MAT	

Sl. No.	Particulars	Unit	Value	
6	Equity	%	30	Net Project Cost
	Loan	%	70	Net Project Cost
7	Interest	%	SBI MCLR ( One Year Tenor) + 200 basis point	
8	Moratorium		No moratorium after COD	

## 2.1 CAPITAL COST

Regulation 7 of Renewable Regulations, 2018 provides that project specific tariff is to be determined for SHPs of installed capacity of 1MW to 25MW. The Sumbachu SHP has installed capacity of 3 MW. Accordingly, actual project cost is submitted for consideration and approval of the Hon'ble Commission. The component wise details along with the technical & financial parameters and justifications are provided in the attached DPR/ revised DPR.

The details of the Capital cost are provided below for the consideration of the Hon'ble Commission.

Summary of Capital Cost		
Sl. No.	Particulars	Cost (Rs. Lakhs)
1	Civil works	1540.39
2	Design & Eng. Drawing etc	35.54
3	Survey & Investigation	15.50
4	ELECT. & MECH.	1351.79
5	Others	151.08
6	TOTAL	<b>3094.29</b>

## 2.2 DEBT-EQUITY RATIO

Clause 13 of the RE Regulations 2018, provides that the debt-equity ratio of 70:30 is to be considered for determination of tariff. However, the project has been funded by the Government of Arunachal Pradesh. Hence, the HPDC has considered the same as grant. Further, if the Government changes the nature of fund to Equity/Loan. HPDC shall submit before the Hon'ble Commission for reconsideration of the funding as per the Clause 13 of the RE Regulations 2018.

## 2.3 RETURN ON EQUITY

Sub-Regulation (1) of Regulation 16 of the RE Tariff Regulations, 2018 provides that the value base for the equity shall be 30% of the capital cost for tariff determination. Sub-Regulation (2) of the said Regulation stipulates the normative Return on Equity (ROE) as 14%, to be grossed up by prevailing Minimum Alternate Tax (MAT) as on 1<sup>st</sup> April of previous year for the entire useful life of the project.

However, the project has been funded by the Government of Arunachal Pradesh. Hence, the HPDC has considered the same as grant. Further, if the Government changes the nature of fund to Equity/Loan. HPDC shall submit before the Hon'ble Commission for reconsideration of the funding as per the Regulation 16 of the RE Tariff Regulations, 2018.

## 2.4 INTEREST ON LOAN CAPITAL

Regulation 14 of the RE Tariff Regulations, 2018 provides for the Interest on Loan. The provisions of the Regulation are provided below.

*"1. Loan Tenure for the purpose of determination of tariff, loan tenure of 13 years shall be considered.*

## 2. Interest Rate

- (a) The loans arrived at in the manner indicated in Regulation 13 shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on April 1st of every year shall be worked out by deducting the cumulative repayment up to March 31<sup>st</sup> of previous year from the gross normative loan.
- (b) For the purpose of computation of tariff, normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate, (MCLR) (one-year tenor) prevalent during the last available six months shall be considered.
- (c) Notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed.”

However, the project has been funded by the Government of Arunachal Pradesh. Hence, the HPDC has considered the same as grant. Further, if the Government changes the nature of fund to Equity/Loan. HPDC shall submit before the Hon'ble Commission for reconsideration of the funding as per the Regulation 14 of the RE Tariff Regulations, 2018.

## 2.5 DEPRECIATION

The DHPD has proposed depreciation as per clause 15 of RE regulations, 2018. The Regulation provides as follows:

*“The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset.*

*Depreciation rate of 5.28% per annum for first 13 years and remaining depreciation to be spread during remaining useful life of the RE projects considering the salvage value of the project as 10% of project cost shall be considered. “*

The depreciation rate considered over the life of the SHP is provided in the Table below.

Particulars	Details
Useful life in years	35
Rate of Depreciation – 1st 13 Years (%)	5.28
Rate of Depreciation – after 13 Years (%)	0.97

Based on the above principle, year wise depreciation for the 35 years is provided below.

(Rs. Lakhs)

Calculation of Depreciation							
Sl. No.	Name of Station	Date of COD	Capital Cost	No. of Years since COD	Balance Useful Life	Depreciation /year upto 13th Year	Depreciation from 14th Year
1	Sumbachu SHP	23.01.2020	3094.29	0	35	163.38	30.04

It is submitted that the Hon'ble Commission may kindly consider and approve the Depreciation as proposed above.

## 2.6 O&M EXPENSES

As per clause 29 of RE Regulations, 2018, the normative O&M expenses for the first year of the control period (i.e. FY 2018-19) shall be as follows:-

Region	Project Size	O&M Expenses (Rs. Lakh/MW)
Arunachal Pradesh	Below 5 MW	38.06
	5 MW to 25 MW	28.54

The Regulation further provides that the normative O&M expenses allowed under these Regulations shall be escalated at the rate of 5.72% per annum for the Tariff Period for the purpose of determination of levellised tariff.

The Installed capacity of the Project being 3 MW, the applicable normative O&M expenses is Rs. 38.06 Lakhs/MW for the FY 2018-19 (base year). The normative O&M expenses for the FY 2018-19 has been escalated @ 5.72% year on year to arrive at the normative O&M expenses of Rs. 40.24 Lakhs/MW for the FY 2019-20 (The year of COD).

The O&M expenses for each subsequent year has been calculated based on the above principle. The O&M expenses for the 35 years is provided below.

Sl. No.	Name of Station	Capacity (MW)	Normative O&M Expense /MW)	Normative O&M Expense/MW	Escalation Rate / Annum
				At base FY 2019-20	
1	Sumbachu SHP	3.00	40.24	120.71	5.72%

*Petition for Approval of Capital Cost & Tariff of Sumbachu SHP*

(Rs. Lakhs)

FY 2019-20 (1st Year)	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year
120.71	127.62	134.92	142.63	150.79	159.42	168.54	178.18	188.37	199.14

(Rs. Lakhs)

11th Year	12th Year	13th Year	14th Year	15th Year	16th Year	17th Year	18th Year	19th Year	20th Year
210.53	222.57	235.31	248.77	262.99	278.04	293.94	310.76	328.53	347.32

(Rs. Lakhs)

21st Year	22nd Year	23rd Year	24th Year	25th Year	26th Year	27th Year	28th Year	29th Year	30th Year
367.19	388.19	410.40	433.87	458.69	484.93	512.66	541.99	572.99	605.77

(Rs. Lakhs)

31st Year	32nd Year	33rd Year	34th Year	35th Year
640.42	677.05	715.77	756.72	800.00

It is submitted that the Hon'ble Commission may kindly consider and approve the O&M expenses as proposed above.

## 2.7 INTEREST ON WORKING CAPITAL

The Working Capital requirement has been calculated in accordance with the clause 17(1) of the APERC RE Regulation, 2018, with the following:

- a) Operation & Maintenance expenses for one month;
- b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;

c) Maintenance and spare @ 15% of operation and maintenance expenses.

Further, clause 17(3) of the APSERC RE Regulation, 2018 provides as follows:  
*“Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred (300) basis points above the average State Bank of India MCLR (One Year Tenor) prevalent during the last available six months for the determination of tariff.”*

Interest rate has been considered as average of State Bank of India MCLR (One Year Tenor) prevalent during the last available six months of the previous year plus 300 basis points.

Accordingly, Interest @ 10.53 % per annum on working capital has been considered which is 300 basis points above the SBI MCLR (One year tenor) for last six months. The average SBI MCLR (One year tenor) for last six months is 7.53%.

The Interest on Working Capital for 35 years of the life of the SHP is provided below.

(Rs. Lakhs)

Sl. No.	Particulars	Parameters	FY 2019-20 (1st Year)	2nd Year	3rd Year	4th Year	5th Year	6th Year
1	Operation & Maintenance Exp.	One month	10.06	10.63	11.24	11.89	12.57	13.28
2	Receivables	Two Months	48.70	49.90	51.17	52.51	53.92	55.42
3	Maintenance Spares -	15% of O&M Expenses	18.11	19.14	20.24	21.39	22.62	23.91
4	<b>Total</b>		76.86	79.67	82.65	85.79	89.11	92.62
5	<b>Interest</b>	10.53%	8.09	8.39	8.70	9.03	9.38	9.75

Petition for Approval of Capital Cost & Tariff of Sumbachu SHP

(Rs. Lakhs)

Sl. No.	Particulars	Parameters	7th Year	8th Year	9th Year	10th Year	11th Year	12th Year
1	Operation & Maintenance Exp.	One month	14.04	14.85	15.70	16.60	17.54	18.55
2	Receivables	Two Months	57.01	58.68	60.46	62.33	64.31	66.40
3	Maintenance Spares -	15% of O&M Expenses	25.28	26.73	28.26	29.87	31.58	33.39
4	<b>Total</b>		96.33	100.26	104.41	108.79	113.43	118.34
5	Interest	10.53%	10.14	10.55	10.99	11.45	11.94	12.45

(Rs. Lakhs)

Sl. No.	Particulars	Parameters	13th Year	14th Year	15th Year	16th Year	17th Year	18th Year
1	Operation & Maintenance Exp.	One month	19.61	20.73	21.92	23.17	24.50	25.90
2	Receivables	Two Months	68.61	48.33	50.81	53.42	56.19	59.11
3	Maintenance Spares -	15% of O&M Expenses	35.30	37.31	39.45	41.71	44.09	46.61
4	<b>Total</b>		123.52	106.38	112.17	118.30	124.77	131.62
5	Interest	10.53%	13.00	11.20	11.81	12.45	13.13	13.85

(Rs. Lakhs)

Sl. No.	Particulars	Parameters	19th Year	20th Year	21st Year	22nd Year	23rd Year	24th Year
1	Operation & Maintenance Exp.	One month	27.38	28.94	30.60	32.35	34.20	36.16
2	Receivables	Two Months	62.20	65.46	68.92	72.57	76.43	80.51
3	Maintenance Spares -	15% of O&M Expenses	49.28	52.10	55.08	58.23	61.56	65.08
4	<b>Total</b>		138.86	146.51	154.59	163.15	172.19	181.74
5	Interest	10.53%	14.61	15.42	16.27	17.17	18.12	19.13

Petition for Approval of Capital Cost & Tariff of Sumbachu SHP

(Rs. Lakhs)

Sl. No.	Particulars	Parameters	25th Year	26th Year	27th Year	28th Year	29th Year	30th Year
1	Operation & Maintenance Exp.	One month	38.22	40.41	42.72	45.17	47.75	50.48
2	Receivables	Two Months	84.82	89.38	94.20	99.30	104.69	110.38
3	Maintenance Spares -	15% of O&M Expenses	68.80	72.74	76.90	81.30	85.95	90.86
4	<b>Total</b>		191.85	202.53	213.82	225.76	238.39	251.73
5	<b>Interest</b>	10.53%	20.19	21.32	22.50	23.76	25.09	26.49

(Rs. Lakhs)

Sl. No.	Particulars	Parameters	31st Year	32nd Year	33rd Year	34th Year	35th Year
1	Operation & Maintenance Exp.	One month	53.37	56.42	59.65	63.06	66.67
2	Receivables	Two Months	116.41	122.77	129.50	136.62	144.14
3	Maintenance Spares -	15% of O&M Expenses	96.06	101.56	107.37	113.51	120.00
4	<b>Total</b>		265.84	280.75	296.52	313.19	330.81
5	<b>Interest</b>	10.53%	27.98	29.55	31.21	32.96	34.82

It is submitted that the Hon'ble Commission may kindly consider and approve the Interest on Working Capital as proposed above.

## 2.8 Annual Fixed Charges

The Annual Fixed Charges have been calculated based on the components of cost as detailed above. The year wise AFC of the SHP for 35 years is provided below.

(Rs. Lakhs)

Head of Expense	2019-20 (1st Year)	2nd Year	3rd Year	4th Year	5th Year	6th Year
O&M Expense	120.71	127.62	134.92	142.63	150.79	159.42
Return on Equity	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Loan	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	163.38	163.38	163.38	163.38	163.38	163.38
Interest on Working Capital	8.09	8.39	8.70	9.03	9.38	9.75
<b>Total</b>	<b>292.18</b>	<b>299.38</b>	<b>306.99</b>	<b>315.04</b>	<b>323.55</b>	<b>332.54</b>

(Rs. Lakhs)

Head of Expense	7th Year	8th Year	9th Year	10th Year	11th Year	12th Year
O&M Expense	168.54	178.18	188.37	199.14	210.53	222.57
Return on Equity	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Loan	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	163.38	163.38	163.38	163.38	163.38	163.38
Interest on Working Capital	10.14	10.55	10.99	11.45	11.94	12.45
<b>Total</b>	<b>342.05</b>	<b>352.11</b>	<b>362.73</b>	<b>373.97</b>	<b>385.85</b>	<b>398.41</b>

(Rs. Lakhs)

Head of Expense	13th Year	14th Year	15th Year	16th Year	17th Year	18th Year
O&M Expense	235.31	248.77	262.99	278.04	293.94	310.76
Return on Equity	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Loan	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	163.38	30.04	30.04	30.04	30.04	30.04
Interest on Working Capital	13.00	11.20	11.81	12.45	13.13	13.85
<b>Total</b>	<b>411.68</b>	<b>290.00</b>	<b>304.84</b>	<b>320.53</b>	<b>337.12</b>	<b>354.65</b>

(Rs. Lakhs)

Head of Expense	19th Year	20th Year	21 <sup>st</sup> Year	22nd Year	23rd Year	24th Year
O&M Expense	328.53	347.32	367.19	388.19	410.40	433.87
Return on Equity	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Loan	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	30.04	30.04	30.04	30.04	30.04	30.04
Interest on Working Capital	14.61	15.42	16.27	17.17	18.12	19.13
<b>Total</b>	<b>373.19</b>	<b>392.79</b>	<b>413.50</b>	<b>435.41</b>	<b>458.56</b>	<b>483.04</b>

(Rs. Lakhs)

Head of Expense	25th Year	26th Year	27th Year	28th Year	29th Year	30th Year
O&M Expense	458.69	484.93	512.66	541.99	572.99	605.77
Return on Equity	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Loan	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation	30.04	30.04	30.04	30.04	30.04	30.04
Interest on Working Capital	20.19	21.32	22.50	23.76	25.09	26.49
<b>Total</b>	<b>508.92</b>	<b>536.29</b>	<b>565.21</b>	<b>595.79</b>	<b>628.12</b>	<b>662.30</b>

(Rs. Lakhs)

Head of Expense	31 <sup>st</sup> Year	32nd Year	33rd Year	34th Year	35th Year
O&M Expense	640.42	677.05	715.77	756.72	800.00
Return on Equity	0.00	0.00	0.00	0.00	0.00
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Depreciation	30.04	30.04	30.04	30.04	30.04
Interest on Working Capital	27.98	29.55	31.21	32.96	34.82
<b>Total</b>	<b>698.44</b>	<b>736.64</b>	<b>777.03</b>	<b>819.72</b>	<b>864.86</b>

It is submitted that the Hon'ble Commission may kindly consider and approve the Annual Fixed Charges as proposed above.

## 2.9 Capacity Utilisation Factor (CUF)

Clause 27 of the RE Regulations 2018, provides that CUF for the small hydro projects shall be 45%. Further, clause 18 of the RE Regulations 2018 provides as follows:

*“The number of hours for calculation of CUF/PLF (wherever applicable) for various RE technologies shall be 8766.”*

In this regard it is submitted that the Sumbachu Small Hydel Project is located on the Sumbachu Nallah near Zemithang village in Tawang District of Arunachal Pradesh & is dependent on the water discharge for generation. The load factor achieved by the plant in past few years of its operation is in the range of 20% to 25%. The low generation is mainly on account of non-availability of discharge especially during the winter season. Hence, it may not be possible to achieve CUF 45% as prescribed for small hydro projects in Clause 27 of the RE Regulations 2018. Accordingly, HPDC has considered CUF of 27.50% for proposing the tariff.

In view of the above, it is requested that Hon'ble Commission may consider & relax the CUF norm of 45% and allow the recovery of tariff based on CUF of 27.50%

## 2.10 Auxiliary Power Consumption

Regulations 28 of the RE Regulations 2018 provides as follows:

*“Normative Auxiliary Consumption for the small hydro projects shall be 1 %”*

The above CUF & rate of auxiliary consumption has been considered for calculation of saleable energy for the project. The calculation of Gross Generation, Auxiliary consumption & Saleable energy based on the above Regulations is provided below.

Installed Capacity (MW)	Hours	CUF (%)	Gross Generation (MUs)	Auxiliary Consumption @1%	Net Generation (MUs)
3.00	8766	27.50	7.23	0.07	7.16

It is submitted that the Hon'ble Commission may kindly consider and approve the CUF, Gross Generation, Auxiliary Consumption & Saleable energy as proposed above.

### 3. TARIFF DESIGN

Regulation 10 of the RE Regulations, 2018 provides for the tariff design & calculation of levellised tariff. The provisions of the Regulation are provided below.

"1. The generic tariff shall be determined considering the year of commissioning of the project, on levellised basis for the Tariff Period.

Provided that for renewable energy technologies having single part tariff with two components, tariff shall be determined on levellised basis considering the year of commissioning of the project for fixed cost component while the fuel cost component shall be specified on year of operation basis.

2. For the purpose of levellised tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered.

3. Levellisation shall be carried out for the 'useful life' of the Renewable Energy project.

4. The above principles shall also apply for project specific tariff."

In accordance with the above Regulations, levellised tariff has been calculated for the life of the project i.e 35 years. Discounting factor equivalent to Post Tax weighted average cost of capital has been considered.

Particulars	Amount/Rate	
Capital cost		3094.29
Debt	70%	2166.00
Equity	30%	928.29
Interest rate		9.53%
RoE		16.40%
Tax Rate		17.16%
Capital - Loan		5.52%
Capital Cost - Equity		4.92%
Weighted Average Cost of Capital ( WACC)/Discount Rate		<b>10.44%</b>

It is submitted that the Hon'ble Commission may kindly consider and approve the Discounting rate as proposed above.

### 3.1 LEVELLISED TARIFF PROPOSED FOR THE SUMBACHU SHP

The levelled tariff of the Sumbachu SHP has been calculated on the basis of the component wise cost, saleable energy, discounting factor as detailed in the previous sections. The calculation of the levelled tariff for the project life of 35 years is provided in the tables below.

Sl. No.	Particulars	Discount Rate	FY 2019-20 (1st Year)	2nd Year	3rd Year	4th Year	5th Year	6th Year
1	ARR (in Lakhs)		292.18	299.38	306.99	315.04	323.55	332.54
2	Net Generation (In Mus)		7.16	7.16	7.16	7.16	7.16	7.16
3	Tariff (Rs./unit)		4.08	4.18	4.29	4.40	4.52	4.64
4			1.00	2.00	3.00	4.00	5.00	6.00
5	Discounting Factor	10.44%	1.00	0.90	0.80	0.72	0.64	0.58
6	Discounted Tariff (Rs./unit)		4.08	3.74	3.44	3.16	2.91	2.68

Sl. No.	Particulars	Discount Rate	7th Year	8th Year	9th Year	10th Year	11th Year	12th Year
1	ARR (in Lakhs)		342.05	352.11	362.73	373.97	385.85	398.41
2	Net Generation (In Mus)		7.16	7.16	7.16	7.16	7.16	7.16
3	Tariff (Rs./unit)		4.78	4.92	5.07	5.22	5.39	5.56
4			7.00	8.00	9.00	10.00	11.00	12.00
5	Discounting Factor	10.44%	0.52	0.46	0.41	0.37	0.33	0.30
6	Discounted Tariff (Rs./unit)		2.46	2.27	2.10	1.94	1.79	1.65

Petition for Approval of Capital Cost & Tariff of Sumbachu SHP

Sl. No.	Particulars	Discount Rate	13th Year	14th Year	15th Year	16th Year	17th Year	18th Year
1	ARR (in Lakhs)		411.68	290.00	304.84	320.53	337.12	354.65
2	Net Generation (In Mus)		7.16	7.16	7.16	7.16	7.16	7.16
3	Tariff (Rs./unit)		5.75	4.05	4.26	4.48	4.71	4.95
4			13.00	14.00	15.00	16.00	17.00	18.00
5	Discounting Factor	10.44%	0.27	0.24	0.21	0.19	0.17	0.15
6	Discounted Tariff (Rs./unit)		1.53	0.97	0.91	0.86	0.81	0.76

Sl. No.	Particulars	Discount Rate	19th Year	20th Year	21st Year	22nd Year	23rd Year	24th Year
1	ARR (in Lakhs)		373.19	392.79	413.50	435.41	458.56	483.04
2	Net Generation (In Mus)		7.16	7.16	7.16	7.16	7.16	7.16
3	Tariff (Rs./unit)		5.21	5.49	5.78	6.08	6.40	6.75
4			19.00	20.00	21.00	22.00	23.00	24.00
5	Discounting Factor	10.44%	0.14	0.12	0.11	0.10	0.09	0.08
6	Discounted Tariff (Rs./unit)		0.72	0.67	0.64	0.60	0.57	0.53

Sl. No.	Particulars	Discount Rate	25th Year	26th Year	27th Year	28th Year	29th Year	30th Year
1	ARR (in Lakhs)		508.92	536.29	565.21	595.79	628.12	662.30
2	Net Generation (In Mus)		7.16	7.16	7.16	7.16	7.16	7.16
3	Tariff (Rs./unit)		7.11	7.49	7.89	8.32	8.77	9.25
4			25.00	26.00	27.00	28.00	29.00	30.00

*Petition for Approval of Capital Cost & Tariff of Sumbachu SHP*

Sl. No.	Particulars	Discount Rate	25th Year	26th Year	27th Year	28th Year	29th Year	30th Year
5	Discounting Factor	10.44%	0.07	0.06	0.06	0.05	0.05	0.04
6	Discounted Tariff (Rs./unit)		0.50	0.48	0.45	0.42	0.40	0.38

Sl. No.	Particulars	Discount Rate	31st Year	32nd Year	33rd Year	34th Year	35th Year
1	ARR (in Lakhs)		698.44	736.64	777.03	819.72	864.86
2	Net Generation (In Mus)		7.16	7.16	7.16	7.16	7.16
3	Tariff (Rs./unit)		9.76	10.29	10.85	11.45	12.08
4			31.00	32.00	33.00	34.00	35.00
5	Discounting Factor	10.44%	0.04	0.03	0.03	0.03	0.02
6	Discounted Tariff (Rs./unit)		0.36	0.34	0.32	0.30	0.28

Particulars	Tariff
<b>Total of Tariff</b>	45.99
<b>Total of Discounting Factor</b>	9.37
<b>Levellised tariff - 35 years - Rs./unit</b>	4.91

It is submitted that the Hon'ble Commission may kindly consider and approve the Levellised Tariff of Rs. 4.91/unit for the Sambachu SHP as proposed above.

PAYER

It is respectfully prayed that the Hon'ble Commission may be pleased to:

- (a) Approve the Capital cost, Annual Fixed Charges & Tariff as submitted in Para 2 & 3
- (b) Relax the CUF as proposed
- (c) Pass such other and further order(s) as are deemed fit and proper in the facts and circumstances of the case.



**Authorised Signatory**

Chairman cum Managing Director  
Hydro Power Development Corporation of  
Arunachal Pradesh Ltd., Itanagar

Place: Itanagar

Date: 24<sup>th</sup> June, 2024

# ANNEXURES

## ANNEXURE

1. Registration of Company Act. 2013 – MOA (Memorandum of Association) & AOA (Articles of Association) & Registration Certificate to be furnished for our reference.
2. HPDCAPL to submit the audited annual accounts for last three years i.e. Balance Sheet, Statement of profit & Loss Account. Cash Flow Statement etc. Details in respect of Sumbachu SHP to be furnished separately
3. Original DPR was of Rs. 2037.23 (Lakhs) with configuration of 3× 1000 KW. Subsequently DPR of the project was revised by AHEC to amount of Rs. 2497.29 (Lakhs) in year 2009 as per mentioned in letter HPDC/MD/cont-13/pt-1/2011-12/096-98 dated 30<sup>th</sup> September 2011. HPDCAPL to submit the revised DPR of 01/2009
4. Original TEC Approval from competent authority (Approval letter report etc) and revised TEC with approval due to change in cost. Design etc. as relevant.
5. Tender process details including tender document. Tender evaluation process details and evaluation report.
6. Complete main Contract agreement along with any amendment executed between M/S Nortech Power Projects (P) Limited, Kolkata and HPDCAPL, shall be furnished containing technical specifications, drawings. Terms and details breakup costs along with BOQ.
7. Furnish Planned and actual construction schedule.
8. Details of CDM benefits Rebates. If availed
9. Submit the detailed break up cost of the projects along with the comparison between DPR. Contracted cost as (total 2596 lakhs) per M/S Nortech Power Projects (P) Ltd. And actual completed cost (3034.76 lakhs) as per CEA guidelines for preparation and vetting of revised cost estimates of hydro electric projects (copy attached). Can HPDCAPL justify/clarify the coincident of matching the recast estimate of Rs. 3034.76 by concept green in the 2013 where as AHEC has reviewed the TEC/revised recast by concept green in 2018 to the tune of cost 3059.66. As per books of accounts of HPDCAPL. The Petitioner has to submit all data's/ cost calculation in soft editable form/xls to enable checking in order to ease the review process.
10. In order to know the project accounting by HPDCAPL may furnish all the major important works of Civil /E&M duly signed by both employer and contractor.
11. Following details of the Completed Project to be Furnished
  - Final Plant layout/General Arrangement drawings of complete project area
  - Electro mechanical detail such as Turbine, Generator, unit auxiliaries, plant auxiliary's technical parameters along with scheme cum equipments GA drawing.
  - 33KV Switch yard equipment details/ Electrical single line diagram along with protection scheme from generator to power evacuation substation.
12. In order to expedite the review process by the Commission, the petitioner is asked to give a detail presentation of the project technical features along with different variation / change in the cost during execution from the original.