



**ARUNACHAL PRADESH STATE ELECTRICITY
REGULATORY COMMISSION (APSERC)**

Determination of Aggregate Revenue Requirement for

FY 2017-18

&

Tariff Order for FY 2017-18

For

Deptt. of Hydro Power Development

Government of Arunachal Pradesh

Issued on 08-09-2017

**Arunachal Pradesh State Electricity Regulatory Commission
अरुणाचल प्रदेश राज्य विद्युत नियामक आयोग**

O. T. BUILDING, T. T. MARG, NITI VIHAR MARKET

ITANAGAR-79111

Telephone No: 0360-2291642, Fax No: 0360-2291643, Website: www.apserc.in

टेलीफोन न: 0360-2291642, फैक्स न: 0360-229163

1 TABLE OF CONTENTS

List of Tables -----	3
Abbreviations -----	4
1. Introduction -----	7
1.1. Arunachal Pradesh State Electricity Regulatory Commission.-----	7
1.2. Arunachal Pradesh - Geographical Reality-----	10
1.3. Arunachal Pradesh Department of Hydro Power Development-----	10
1.4. Installed Capacity of APDHPD Hydro Electric Power Stations.-----	11
1.5. Tariff Petition for FY 2017-18: Filing-----	11
1.6. Admission of Petition and public Hearing Process-----	11
2. Petition's Summary for ARR & Tariff Determination -----	13
2.1. Gross Fixed Assets (GFA) And Depreciation- Petitioner's Submission-----	13
2.2. Return on Equity (ROE) - Petitioner's Submission-----	13
2.3. Employees' Expenses- Petitioner's Submission-----	14
2.4. Productivity / Comparative Parameters- Petitioner's Submission-----	15
2.5. Repair & Maintenance Expenses- Petitioner's Submission-----	15
2.6. Administrative & General Expenses - Petitioner's Submission-----	17
2.7. O&M Expenses – Petitioner's Submission-----	17
2.8. Interest on Working Capital- Petitioner's Submission.-----	18
2.9. Work in Progress - Petitioner's Submission-----	18
2.10. Interest Capitalized - Petitioner's Submission-----	19
2.11. Annual Fixed Costs FY 2017-18 Petitioner's Submission-----	19
2.12. Indicative Tariff - Petitioner's Submission-----	20
2.13. Petitioner's Prayer-----	21
3. Analysis: DETERMINATION OF ARR & TARIFF FOR FY 2017-18 -----	22
3.1. Installed Capacity, Design Energy, and Generation Projection-----	22
3.2. Assumptions for Tariff Petition Analysis-----	23
3.3. Fixed Costs-----	24
3.4. Assets and Depreciation-----	24
3.5. O&M Expenses-----	26

3.6.	<i>Return on Equity</i>	30
3.7.	<i>Interest on Loan Capital</i>	34
3.8.	<i>Interest on Working Capital</i>	34
3.9.	<i>Commission's Analysis & Approval of ARR</i>	36
3.10.	<i>Hydro Power Generation Tariff for FY 2017-18- Commission's Analysis</i>	36
4.	Compliance of Directives	39
4.1.	Directives	39
5.	ANNEXURES	45
5.1.	Annexure – I :Details of Hydro Electric Power Station of APDHPD	45
5.2.	Annexure – II: Details of Estimated Original Cost for Power Plants	51



LIST OF TABLES

Table 1 : Gross Fixed Asset - Petitioner's Submission	13
Table 2 : Return on Equity- Petitioner's Submission.....	13
Table 3 : Employees' Expenses- Petitioner's Submission	14
Table 4 : Employees Details	15
Table 5 : Repair & Maintenance Expenses – Petitioner's submission	16
Table 6 : Administrative & General Expenses - Petitioner's Submission	17
Table 7 : O & M Expenses-Petitioner's Submission.....	18
Table 8 : Interest on Working Capital- Petitioner's Submission	18
Table 9 : Work in Progress - Petitioner's Submission	19
Table 10 : Interest Capitalized - Petitioner's Submission	19
Table 11 : Annual Fixed Costs and Net Power Generation.....	20
Table 12 : Indicative Tariff - Petitioner's Submission.....	21
Table 13 : Power Scenario in Arunachal Pradesh	22
Table 14 : The assumptions considered for Tariff Petition Analysis	23
Table 15 : Gross Fixed Assets-Commission's Analysis	24
Table 16 : Plants commissioned till FY 2011-12	25
Table 17 : Plants commissioned after FY 2011-12	25
Table 18 : Employee's Cost - Commission's Analysis and Comparison	26
Table 19 : R&M Expenses - Commission's Analysis and Comparison	27
Table 20 : A & G Expenses - Commission's Analysis and Comparison	27
Table 21 : Total O&M Expenses – Commission's Analysis and Comparison	28
Table 22 : O&M Expenses – Commission's Analysis	29
Table 23 : Return on Equity – Commission's Analysis	30
Table 24 : Return on Equity- Commission's Analysis and Comparison	33
Table 25 : Interest on Working Capital - Commission's Analysis	35
Table 26 : Annual Fixed Charges- Commission's Analysis	36
Table 27 : Hydro Power considered for sale - Commission's Summary	37
Table 28 : Hydro Power Generation Tariff - Commission's Approval.....	38
Table 29 : Details of Hydro Electric Power Station of APDHP	45

ABBREVIATIONS

Abbreviation	Description
A&G	Administration & General
ACT	Electricity Act, 2003
APSERC	Arunachal Pradesh State Electricity Regulatory Commission
ARR	Aggregate Revenue Requirement
APTEL	Appellate Tribunal For Electricity
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CGS	Central Generating Stations
CPSU	Central Power Sector Undertakings
Cr./ Crs	Crore/ Crores
D/E	Debt Equity
DOP, AP	Department of Power, Govt. of Arunachal Pradesh
FY	Financial Year
GFA	Gross Fixed Assets
KhSTPS	Kahalgaon Super Thermal Power Station
kV	Kilovolt
kVA	Kilo Volt Amps
kWH	Kilo Watt Hour
LTC	Leave Travel Concession
MU	Million Units
MVA	Million Volt Amps
MW	Mega Watt
O&M	Operation & Maintenance
ROE	Return on Equity
RoR	Rate of Return
Rs.	Rupees
SS	Sub Station
SBI	State Bank of India
SBI-PLR	State Bank of India- Prime Lending Rate (Short Term)
SBI-MCLR	State Bank of India- Marginal Cost Lending Rate
SERC	State Electricity Regulatory Commission
R&M	Repairs and Maintenance
YoY	Year on Year

Before

The Arunachal Pradesh State Electricity Regulatory Commission (APSERC)

Itanagar, Arunachal Pradesh

Petition No. TP – 2 of 2017

In the matter of:

Determination of Aggregate Revenue Requirement (ARR) and Tariff for generation and supply of electricity by Department of Hydro Power Development, Arunachal Pradesh for the FY 2017-18

AND

Department of Hydro Power Development,

Govt. of Arunachal Pradesh, Itanagar ----- Petitioner

Present:

R. P. Singh, Chairman

ORDER

(Passed on 08-09-2017)

The Commission in exercise of the powers vested in it under section 62 (1) (a) read with Section 62(3) and Section 64 (3)(a) of the Electricity Act, 2003 and Arunachal Pradesh State Electricity Regulatory Commission (APSERC) (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012 including update amendments and other enabling provisions in this behalf, hereby issues this order, determining the Aggregate Revenue Requirement (ARR) and generation Tariff for the Financial Year 2017-18 for supply of electricity by the Department of Hydro Power Development, Govt. of Arunachal Pradesh (APDHPD) to the Department of Power for distribution in the State of Arunachal Pradesh. The relevant Regulation of the commission requires that the generating company shall file tariff with the Commission for fixation of tariff and Aggregate Revenue Requirement (ARR), complete in all respects, along with requisite fee as prescribed in the Commission's Fee, Regulations, 2011 on or before 30th November of the preceding year. Accordingly, the tariff petition for the financial year 2017-18 should have been filed by the APDHPD (the deemed generating company) on or before 30th November ,2016. However, it filed the said petition before the Commission on 17th

March 2017 without the mandatory petition filing fee along with a lot of data gaps which was tantamount to submission of incomplete Petition. Notwithstanding the data gaps therein, the Commission however admitted the same on 18th April, 2017 on receipt of the necessary tariff petition filing on 17th April 2017.

This order consists of four chapters which include detailed analysis of the Aggregate Revenue Requirement (ARR) and approved Generation Tariff for the Financial Year 2017-18. The Commission hereby directs the APDHPD to take all necessary steps for implementation of this order from the date specified below.

The directives contained in Chapter-4 shall be strictly adhered to and compliance thereof, as desired by the Commission must be placed before the commission within the stipulated time.

This order shall be effective from 1st April 2017 and shall remain in force till the next tariff order is issued by the Commission.

Date:
Place: Itanagar

(R. P. SINGH)
Chairman



1. Introduction

1.1. Arunachal Pradesh State Electricity Regulatory Commission.

In exercise of the powers conferred by the Electricity Act, 2003, (hereinafter referred to as Act) the Government of Arunachal Pradesh constituted the Electricity Regulatory Commission for the State of Arunachal Pradesh to be known as “**Arunachal Pradesh State Electricity Regulatory Commission**” (**APSERC**) as notified on 07.05.2010 (hereinafter referred to as Commission). The Commission so constituted is a one-member body to function as an autonomous authority responsible for regulation of the power sector in the State of Arunachal Pradesh. The powers and functions of the Commission are such as prescribed in the Act. The office of the Commission is presently located at Itanagar, Arunachal Pradesh. The Commission started functioning with effect from 02.03.2011 with the objectives and purposes for which it has been established.

1.1.1 In accordance with the provisions of the Act, the Commission discharges the following functions:

- (a) Determines the Tariff for generation, supply, transmission and wheeling of electricity, wholesale, bulk, or retail, as the case may be, within the State; provided that where open access has been permitted to a category of consumers under Section 42, the State Commission shall determine only the wheeling charges and surcharge thereon, if any, for the said category of consumers.
- (b) Regulates Electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through agreements for purchase of power for distribution and supply within the State.
- (c) Facilitates Intra-State transmission and wheeling of electricity.
- (d) Issues licenses to persons seeking to act as transmission licensees, distribution licensees and electricity traders with respect to their operations within the State.
- (e) Promotes co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and specify, for purchase of electricity from such

sources, a percentage of the total consumption of electricity in the area of a distribution licensee.

- (f) Adjudicates upon the disputes between the licensees and generating companies; and to refer any dispute for arbitration.
- (g) Levies fee for the purpose of the Act.
- (h) Specifies State Grid Code consistent with the Grid Code standards.
- (i) Specifies and enforce standards with respect to quality, continuity, and reliability of services by licensees.
- (j) Fixes the trading margin in the Intra-State trading of electricity, if considered, necessary.
- (k) Discharges such other functions as may be assigned to it under the Act.
- (l) Under takes promotion of energy efficiency.

1.1.2 Further, the Commission also advises the State Government on all or any of the following matters namely:

- a) Promotion of competition, efficiency, and economy in activities of the electricity industry.
- b) Promotion of investment in electricity industry.
- c) Reorganization and restructuring of electricity industry in the State.
- d) Matters concerning generation, transmission, distribution and trading of electricity or any other matter referred to the State Commission by the State Government.

1.1.3 The Commission ensures transparency while exercising its powers and discharging its functions.

1.1.4 In discharge of its functions, the Commission is guided by the National Tariff Policy (NTP) brought out by GOI in compliance with Section 3 of the Act. The objectives of the NTP are to:

- (a) Ensure availability of electricity to consumers at reasonable and competitive rates.
- (b) Ensure financial viability of the sector and attract investments.
- (c) Promote transparency, consistency, and predictability in regulatory approaches across jurisdictions and minimize perceptions of regulatory risks.

- (d) Promote competition, efficiency in operation and improvement in quality of supply.

1.1.5 The Commission has so far notified the following Regulations to facilitate its functioning.

- I. State Advisory Committee (SAC) Notification – 2011.
- II. Conduct of Business Regulations- 2011.
- III. Redressal of Grievances and Ombudsmen Regulations-2011.
- IV. Fee Regulations-2011.
- V. Grant of Intra State Trading License Regulations-2011.
- VI. Determination of ARR and retail tariffs Regulations-2011.
- VII. Terms and Conditions for Tariff Determination from Renewable Energy Sources Regulations-2012.
- VIII. Renewable Power Purchase Obligations and its Compliance Regulations 2012.
- IX. Redressal of Grievances and Ombudsman Regulation (1st Amendment) 2012.
- X. State Grid Code Regulations-2012.
- XI. Terms and Conditions of Intra-State Open Access Regulations-2012.
- XII. Electricity Supply Code Regulation-2013.
- XIII. Reconstitution of the State Advisory Committee-2013.
- XIV. Multi Year Tariff Regulation - 2013 superseding the Regulation of 2011 on Determination of ARR and Retail Tariff Regulation.
- XV. Service Conditions of Staff Regulations-2015.
- XVI. Consumer Grievances Redressal Forum and Ombudsman Regulation,2015.
- XVII. Standards of Performance for The Distribution Licensee Regulation-2016.

- XVIII. Renewable Power Purchase Obligation and its Compliance Regulation (1st Amendment) 2016.
- XIX. Renewable Power Purchase Obligation and its Compliance Regulation (2nd Amendment) 2016.
- XX. Rooftop Solar Grid Interactive Based on Net Metering Regulation -2016.
- XXI. Appointment of Consultants Regulations-2017.
- XXII. Terms and Conditions for Tariff Determination from Renewable Energy Sources Regulation (1st Amendments) 2017.
- XXIII. Payment of Fees Regulation (1st Amendment) 2017.

1.2. Arunachal Pradesh - Geographical Reality

The total area of the State of Arunachal Pradesh is 83573 sq.kms. The State is having a population of around 13.82 lakhs (2011 Census). The State of Arunachal Pradesh is bounded by Assam in South, Bhutan in West, China in North, and Nagaland and Myanmar in East. It's Capital, Itanagar is about 380 kms. from Guwahati.

1.3. Arunachal Pradesh Department of Hydro Power Development

In order to oversee, co-ordinate and monitor the development of hydro power in the State of Arunachal Pradesh, the State Government created a separate department namely "Department of Hydro Power Development" on 12.11.2003. It is a full-fledged department with four Chief Engineers. The Department is entrusted with the development of micro/mini/small hydro projects, improvement of existing hydro projects including renovation & modernization works, operation and maintenance of existing hydel station survey & investigation of new potential sites, and construction of residential and non-residential buildings for the Department. The Department is foremost concentrating on the urgent need of bridging the existing demand supply gap to make the State self-reliant, so far as power needs of the State are concerned and to help achieve the target of electrification of all villages and households.

The Department at present has 116 micro/mini/small hydel power stations with an installed capacity of 68.52 MW. Department is also undertaking construction of Hydel Stations in various districts of the State which are under different stages of development. Completion of these ongoing schemes shall lead to a further capacity

addition. In addition to above, Department is also carrying out Survey & Investigation of new schemes with the objective of identifying more potential sites for tapping the estimated 2000 MW small hydro power potential in the State for developing hydro power.

Department has work force of 2831 Nos. staff comprising of experienced engineers, technical staff and other supporting staff. The Department of Hydro Power Development has also been assigned the responsibility of acting as nodal agency for coordinating and overseeing the allotment and development of Mega Hydro Electric Projects in the State by IPPs and CPSUs as per the State's Mega & Small Hydro Power policy. The Department is looking forward to transforming the long-awaited dream of the people of the State into reality that Arunachal Pradesh shall be the "FUTURE POWER HOUSE OF THE COUNTRY".

1.4. Installed Capacity of APDHPD Hydro Electric Power Stations.

The Department has 116 micro/mini/small hydel power stations with a total installed capacity of 68.52 MW. The list of Hydro Power stations of DHPD are given in Annexure –1 at the end of this Tariff Order.

1.5. Tariff Petition for FY 2017-18: Filing

The Chief Engineer(EM) of the Department has filed the tariff Petition CE/WZ/HPD/W-V/24/2016-17/5255-57 for the FY 2017-18 on dated 17.03.2017

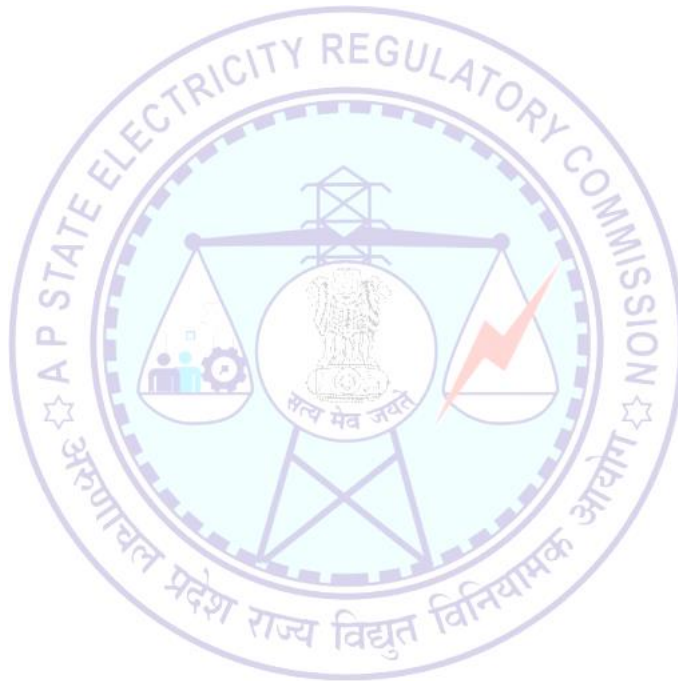
In the petition, APDHPD has proposed an indicative Tariff of Rs.5.13/ kWh based on Annual Fixed Charges of Rs. 165.25 Crs. with saleable Power as 322.38 MU at 56.54 % of Design Energy (National Average of PLF) of the Hydro plants for FY 2017-18.

1.6. Admission of Petition and public Hearing Process

The Commission observed that:

- I. The Petition was submitted in line with APSERC Conduct of Business Regulation No. APSERC/NOTIFICATION/2/2011 dated 8th November 2011.
- II. The Petitioner has deposited the requisite Petition fee in line with Schedule of the Fees prescribed under the Commission's Fee Regulations-2011, No. APSERC/NOTIFICATION/4/2011 dated 8th November 2011.

- III. The Petition filed by the Petitioner lacked in many requisite data. The Commission however admitted the Petition on 18th April, 2017 and numbered it as **Petition no TP 2 of 2017** in line with regulation 16(13) "Presentation, Scrutiny and Admission of the Petitions" of the Arunachal Pradesh State Electricity Regulatory Commission (Conduct of Business Regulations 2011).



2. Petition's Summary for ARR & Tariff Determination

The APDHPD in its petition for FY 2017-18 has submitted the details of various expenses that constitute the Annual Fixed Cost for determination of the tariff. The details are given in the following paras in this chapter and where ever, there is a data mismatch in previous year, the same has been updated as per present Petition for FY 2017-18.

2.1. Gross Fixed Assets (GFA) And Depreciation- Petitioner's Submission

The Petitioner submitted the Gross Fixed Assets as shown in Table below. Depreciation on GFA @2.57% per Annum has been calculated by the Petitioner which also has been indicated here under:

Table 1 : Gross Fixed Asset - Petitioner's Submission (Rs.in Crs)

Sl.No.	Year	Opening Balance of GFA	Addition of Assets	Closing Balance of GFA	Rate of Depreciation %	Depreciation in absolute Amount.
1	2015-16	967.49	149.68	1117.17	2.57 %	28.72
2	2016-17	1117.17	45.87	1163.04	2.57 %	29.89
3	2017-18	1163.03	45.87	1208.90	2.57 %	31.07

2.2. Return on Equity (ROE) - Petitioner's Submission

The Petitioner has indicated an amount towards RoE @ 14% per annum on 30 % equity in the light of 70:30 as Debt Equity ratio on the amount of GFA.

Table 2 : Return on Equity- Petitioner's Submission (Rs. in Crs.)

Sl. No.	Particulars	2015-16	2016-17	2017-18
1	GFA	1117.17	1163.04	1208.90
2	Equity 30%	335.15	348.91	362.67
3	Loan 70%	782.02	814.12	846.23
4	ROE	46.92	48.85	50.77

2.3. Employees' Expenses- Petitioner's Submission

The Petitioner submitted that the accounts of the department are not being presently maintained on commercial basis. Accordingly, records of Operation & Maintenance expenses for individual HEPs for the period required by the regulations are not available and therefore actual O&M expenses for the department has been taken into consideration for determination of Annual Fixed Charges, and the amounts whereof for FY 2015-16 to FY 2017-18 are as under:

Table 3 : Employees' Expenses- Petitioner's Submission

(Rs. in Crs.)

Sl. No.	Particulars	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	Salaries & Allowances	59.83	62.97	66.28
2	Wages	0.00	0.00	0.00
3	OTA	0.00	0.00	0.00
4	Medical Treatment	0.00	0.00	0.00
5	Other allowances (O. E+ POL+	0.00	0.00	0.00
6	LTC	0.00	0.00	0.00
7	Sub-Total	59.83	62.97	66.28
8	Terminal Benefits			
9	Leave encashment	0.00	0.00	0.00
10	Gratuity	0.00	0.00	0.00
11	Commutation of Pension	0.00	0.00	0.00
12	Workman compensation	0.00	0.00	0.00
13	Ex – gratia	0.00	0.00	0.00
14	Sub – total	0.00	0.00	0.00
15	Pension Payment			
16	Basic Pension	0.00	0.00	0.00
17	Dearness Pension	0.00	0.00	0.00
18	Dearness allowance	0.00	0.00	0.00
19	Any other expenses	0.00	0.00	0.00
20	Sub – Total	0.00	0.00	0.00

21	Total (7+14+20)	59.83	62.97	66.28
22	Amount capitalized	0.00	0.00	0.00
23	Net Amount	59.83	62.97	66.28
24	Add prior period expenses *	0.00	0.00	0.00
	Grand Total	59.83	62.97	66.28

2.4. Productivity / Comparative Parameters- Petitioner's Submission

Productivity Parameters submitted by the petitioner are indicated on the table below:

Table 4 : Employees Details

Sl. No.	Particulars	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	Number of employees as on 1 st April 2017	2831	2831	2831
2	Number of employees recruited during the year	0	0	0
3	Number of employees on deputation / foreign service as on 1 st April 2017	0	0	0
4	Total Number of employees (1+2+3)	2831	2831	2831
5	Number of employees retired/ retiring during the year	0.	0	0
6	Number of employees at the end of the year (4-5)	2831	2831	2831

2.5. Repair & Maintenance Expenses- Petitioner's Submission

Expenses towards R&M for FY 2015-16 to FY 2017-18 as furnished by the petitioner are shown in the table below:

Table 5 : Repair & Maintenance Expenses – Petitioner's submission

(Rs. In Crs.)

Sl. No.	Particulars	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	Plant & Machinery	5.51	5.80	6.10
	- Plant and Apparatus	0.00	0.00	0.00
	- EHV Sub-Stations	0.00	0.00	0.00
	- 33 KV Sub-Stations	0.00	0.00	0.00
	- 11 kV Sub- Stations	0.00	0.00	0.00
	- Switch gear and cable connections	0.00	0.00	0.00
	- Others	0.00	0.00	0.00
	Total	5.51	5.80	6.10
2	Building	0.00	0.00	0.00
3	Hydraulic works & Civil Works	0.00	0.00	0.00
4	Line cable & Net work	0.00	0.00	0.00
	- EHV Lines	0.00	0.00	0.00
	- 33 kV Lines	0.00	0.00	0.00
	- 11 kV lines	0.00	0.00	0.00
	- LT Lines	0.00	0.00	0.00
	- Meters and metering equipment	0.00	0.00	0.00
	- Others	0.00	0.00	0.00
	Total	0.00	0.00	0.00
5	Vehicles	0.00	0.00	0.00
6	Furniture & Fixture	0.00	0.00	0.00
7	Office equipment's	0.00	0.00	0.00
8	Operating expenses	0.00	0.00	0.00
9	Maintenance (includes expenses under various heads)	0.00	0.00	0.00
10	Total	5.51	5.80	6.10
11	Add / Deduct share of other (To be Specified)	0.00	0.00	0.00
12	Total expenses	5.51	5.80	6.10
13	Less capitalised	0.00	0.00	0.00
14	Net expenses	5.51	5.80	6.10
15	Add prior period *	0.00	0.00	0.00
16	Total expenses charges to revenue as R&M expenses	5.51	5.80	6.10

2.6. Administrative & General Expenses - Petitioner's Submission

The expenses towards A&G for FY 2015-16 to FY 2017-18 submitted by the Petitioner are shown in table below:

Table 6 : Administrative & General Expenses - Petitioner's Submission (Rs. In Crs.)

Sl. No	Particulars	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	Rent, rates & taxes	4.18	4.40	4.63
2	Office Expenses			
3	Telephone, postage & Telegrams			
4	Consultancy fees			
5	Advertising & Publicity			
6	Other professional charges			
7	Conveyance & travel expenses			
8	Electricity & water charges			
9	Others			
10	Freight			
11	Other material related expenses			
12	Total expenses	4.18	4.40	4.63
13	Less Capitalised	0.00	0.00	0.00
14	Net expenses	4.18	4.40	4.63
15	Add Prior period *	0.00	0.00	0.00
16	Total expenses charged to revenue	4.18	4.40	4.63

2.7. O&M Expenses – Petitioner's Submission

Expenses projected by the Petitioner towards O&M for FY 2017-18 along with corresponding data for FY 2015-16 and FY 2016-17 is as mentioned below. The Petitioner also stated under the heading of "Assumptions" that an escalation at the rate of 5.25 % is applicable in respect of the expenses for FY 2017-18 under this head.

Table 7 : O & M Expenses-Petitioner's Submission

(Rs in Crs.)

Year	Employee Cost	R&M expenses	A & G Expenses	Total O & M Expenses
2015-16	59.83	5.51	4.18	69.52
2016-17	62.97	5.80	4.40	73.17
2017-18	66.28	6.10	4.63	77.01

2.8. Interest on Working Capital- Petitioner's Submission.

The Petitioner has considered an Interest @ 14.05 % per annum on working capital which is the Prime Lending Rate (PLR) of State Bank of India as on 05-10- 2015. The calculation of interest on working capital, as submitted by the Petitioner is summarized below:

Table 8 : Interest on Working Capital- Petitioner's Submission

(Rs. in Crs)

Sl. No.	Particulars	2015-16 Amount	2016-17 Amount	2017-18 Amount
1	Operation & Maintenance Expenses (1 month)	5.79	6.10	6.42
2	Maintenance of Spares (15% of O&M)	10.43	10.98	11.55
3	Receivables (2 months of fixed cost)	25.16	26.33	27.54
6	Total	41.38	43.41	45.51
7	Interest on Working Capital@14.05%	5.81	6.10	6.39

2.9. Work in Progress - Petitioner's Submission

Data / Details of work in progress as furnished by the Petitioner is given in the table below.

Table 9 : Work in Progress - Petitioner's Submission

(Rs in Crs.)

S. No.	Particulars	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	Opening balance	24.12	40.61	42.40
2	Add: New investments	31.46	63.82	19.69
3	Total	55.58	46.99	44.37
4	Less investment capitalised	14.97	45.87	45.87
5	Closing balance	40.61	42.40	39.79

2.10. Interest Capitalized - Petitioner's Submission

The Petitioner has not capitalized any Interest as shown in table below:

Table 10 : Interest Capitalized - Petitioner's Submission

(Rs. in Crs.)

Sl. No.	Interest capitalized	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	WIP	406.09	424.04	397.86
2	GFA at the end of the year	1117.17	1163.03	1208.90
3	WIP + GFA at the end of the year	1523.26	1587.08	1606.77
4	Interest (Excluding interest on WCL)- 14.05%	214.02	222.98	225.75
5	Interest Capitalised	0	0	0

2.11. Annual Fixed Costs FY 2017-18 Petitioner's Submission

The Petitioner submitted Annual Fixed Charges (AFC) in the format HG3 of the Petition based on various elements of costs contributing to AFC along with net Power Generation for FY 2017-18 after adjusting for Auxiliary Consumption. The format also includes similar data for FY 2015-16 and FY 2016-17:

Table 11 : Annual Fixed Costs and Net Power Generation

S.No	Particulars	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1.	Gross Generation (MU)	59.69	59.41	59.41
2.	Auxiliary Consumption (MU)	1.03	1.04	0.71
3.	Net Generation (MU)	58.66	58.37	58.70
4.	Free Energy to home state (MU)	0.00	0.00	0.00
5.	Royalty (Rs. in Crs.)	0.00	0.00	0.00
6.	Water Charges (Rs. in Crs.)	0.00	0.00	0.00
7.	Capacity Charges (Rs. in Crs.)			
(a)	Interest on Loan capitals (Rs. in Crs.)	0.00	0.00	0.00
(b)	Depreciation (Rs. in Crs)	28.71	29.89	31.07
(c)	Advance against depreciation (Rs. in Crs.)	0.00	0.00	0.00
(d)	O&M Expenses (Rs. in Crs.)	69.52	73.17	77.01
(e)	Interest on working capital (Rs. in Crs.)	5.81	6.10	6.39
(f)	Foreign exchange Rate (%)		Not Applicable	
(g)	Return on Equity (Rs. in Crs.)	46.92	48.85	50.77
(h)	Income Taxes (Rs. in Crs.)		Not Applicable	
	Total fixed expenses (Rs. in Crs.)	150.97	158.01	165.25

Petitioner has indicated that the projected Gross Generation for 2017-18 is as shown in above table.

2.12. Indicative Tariff - Petitioner's Submission

Considering the Annual Fixed Charges and Net Generation of Hydro Power, the Petitioner has worked out the indicative Tariff as shown in the table below:

Table 12: Indicative Tariff - Petitioner's Submission

Sl. No.	Particulars	For FY 2017-18
1	Annual Fixed Costs Rs. Crs.	165.25
2	Net Saleable Energy MU	322.38
3	Indicative Tariff Rs. / kWh	5.13

2.13. Petitioner's Prayer

The Petitioner requested the Commission to:

- (a) Approve the Annual Fixed Charges as mentioned in Para 3 of the Petition.
- (b) Pass necessary orders in the light of additional submissions made in Para 5 of the Petition.
- (c) Approve reimbursement of Tariff Petition filing fee of Rs. 5,00,000/-
- (d) Pass such other and further order(s) as deemed fit and proper in the facts and circumstances of the case.

3. Analysis: DETERMINATION OF ARR & TARIFF FOR FY 2017-18

3.1. Installed Capacity, Design Energy, and Generation Projection

Commission observes that there is a huge discrepancy in projecting the power plant data by the DHPD. It has furnished total design energy of all 116 power plants as 570.18 MU and the corresponding Generation data projected as 59.41 MU. This gives a picture that Generation is around 10% of the design energy which is too low value and can't be considered.

Further as per design energy (MU) data & total plant capacity (MW) submitted by the DHPD, the plant capacity factor (i.e. Design Annual Energy (kWh) / (365*24*installed capacity of the plant) comes to around 95% which appears to be an erroneous figure.

Therefore, the Commission is hereby directs the DHPD to review the design energy data with the realistic data vis-à-vis the data as per approved project report/power potential study of the said plants otherwise all the subsequent calculation / analysis would be dubbed as in-accurate and misleading.

Table 13 : Power Scenario in Arunachal Pradesh

Sl. No.	Particulars	Units	FY 2015-16	FY 2016-17	FY 2017-18
1.	Total no. of Power Plant	no's	114		116
2.	Total Installed Capacity	kW	62015	68565	68515
3.	Total Installed Capacity excluding Plant not in operation	kW	49170	55720	55670
4.	Annual Design Energy	MU	516.09	570.60	570.18
5.	Annual Design Energy excluding Plant not in operation	MU	462.12	516.63	516.57
6.	Annual Net Generation	MU	59.69	59.41	59.41

It is observed from the tariff petition data that 36 nos of plant totaling to a installed capacity of about 12 MW with design energy of 54 MW has been shown to be

generating nil energy over the past few years but presumably their operation cost has been added in the ARR.

Commission observes with a sense of urgency that DHPD should draw up a plan to take up the recovery of these plants and present it to the commission along with the commercial justification, sources of funding, annual targets, time lines of restoration of generation. This would augment the total generation and performance of DHPD. In this regard, the Commission has been appraising DHPD from time to time to examine and undertake recovery of such plants.

3.2. Assumptions for Tariff Petition Analysis

Table 14 : The assumptions considered for Tariff Petition Analysis

Sl. No.	Particulars	Unit	Value		Remarks
1	Auxiliary Consumption		With Rotating Exciter	With Static Excitation	
	Surface	%	0.7	1	
	Underground	%	0.9	1.2	
2	Transformation Losses	%	0.5		
3	O&M Expenses	Actual exp. for the relevant year			
	Escalation	%	WPI - 5.25%		
4	Depreciation				
	Plant Life	Years	As per Regulations		
	Residual	%	10		
5	Design Energy	MU	570.18		
6	Capacity Utilization Factor	%	45%		As per APSERC Reg
7	Saleable Energy	MU	256.58		
8	Project wise Capital cost	INR in Lakh	Not available with DHPD		
9	R&M works	INR in Lakh	Undertaken by DHPD as per Petition		Not available in Petition
10	Interest rate	%	10.40%		

3.3. Fixed Costs

The DHPD has provided O&M expenses, GFA, depreciation etc. for the FY 2015-16 and FY 2017-18. The details of FY 2010-11, FY 2011-12 FY 2012-13 have been added by the Commission from the previous Petition /records to have a comprehensive approach of the ARR. The DHPD has requested the Commission to consider the Tariff Petition for determination of ARR and Tariff for FY 17-18 compiled on the basis of various components of expenses. As per the furnished data the following details are arrived.

3.4. Assets and Depreciation

Considering the Petitioner's submission in respect of Gross Fixed Assets (GFA) the Commission has analysed the same as shown in the following table. While making analysis in this regard, the Commission has also taken into account the data of FY 2010-11 to FY 2017-18 submitted by the Petitioner in earlier Petition.

Table 15 : Gross Fixed Assets-Commission's Analysis (Rs in Crs.)

Sl. No.	Particulars / Years	Opening Balance of GFA	Addition of Assets	Closing Balance of GFA	Rate of depreciation (%)	Depreciation in absolute Amount.
1	2010-11	823.42	0	823.42	2.57	21.16
2	2011-12	823.42	2.75	826.17	2.57	21.23
3	2012-13	826.17	0	826.17	2.57	21.23
4	2013-14	826.17	0	826.17	2.57	21.23
5	2014-15	826.17	141.32	967.49	2.57	24.86
6	2015-16	967.49	149.68	1117.17	2.57	28.71
7	2016-17	1117.17	45.87	1163.03	2.57	29.89
8	2017-18	1163.03	45.87	1208.9	2.57	31.07

Commission's Analysis

Despite repeated requests made by the Commission, DHPD didn't furnish the breakup of Gross Fixed Asset values. As required by relevant Regulation, the Commission feels that the depreciation of the Plants and Equipment's has to be

recovered and hence have to be added to the cost. The Commission has estimated the depreciation based on data as extracted from the available records.

Commission could find out the project cost for 68 (sixty-eight) no of projects totalling to 39.15 MU and around total actual generation of 41.2 MU (previous year data) out 116 no of plants maintained by DHPD. Had DHPD provided the details sought by the Commission, a more realistic value of the depreciation cost could have been derived. Project Cost details are listed at Annexure – II.

Table 16 : Plants commissioned till FY 2011-12

Installed Capacity (KW)	Design Energy (MU)	Actual Generation (MU)	Original Project Cost (Rs.in Crs.)	Depreciated value FY 2017-18 (@2.57 PA) (Rs.in Crs.)
38505	319.99	40.39	387.39	9.96

Table 17 : Plants commissioned after FY 2011-12

Name of the Stations	Installed Capacity (KW)	Design Energy (MU)	Actual Generation (MU)	Original Project Cost (Rs in Lakhs)	For year up to 16-17 @5.83PA (Rs in Lakhs)	For year up to 17-18 @5.83PA (Rs in Lakhs)	Depreciation for FY 2017-18 (Rs in Crs.)
Mago MHS	100	0.83	0.03264	140.44	22.11	29.48	0.07
Sirikorang MHS	500	4.16	0.78777	646.11	135.61	169.51	0.34
Kachopani MHS	200	1.66	0.07090	393.33	61.91	82.55	0.21
Sub Total	800	6.65	0.8913	1179.88	219.63	281.53	0.62

Considering the above data, depreciation for the FY 2017-18 has been calculated which comes to 10.58Cr (approx.) and the Commission approves the same.

3.5. O&M Expenses

The DHPD has provided the Operation and Maintenance Expenses covering

- a) Employees' costs
- b) R & M expenses
- c) Administrative & General expenses

While analysing these costs, the Commission has also tracked the corresponding values for previous years (from earlier Petition) and examined the YoY change for any unusual distortion.

3.5.1. Employee's cost

Table 18 : **Employee's Cost - Commission's Analysis and Comparison**

Sl. No.	Particulars/Years	Units	2015-16 (Actual)	2016-17 (Estimated)	2017-18 (Projected)
1	Number of employees as on 1st April ant till at the end of the year	Nos	2831	2831	2831
2	Total Employees Cost includes (Salaries + Terminal benefits + Pension etc)	Cr	59.83	62.97	66.28
3	Employees Productive Parameters				
3a	Energy sold in MU	MU	58.66	58.00	58.70
3b	Employees per MU of energy sold		48.26	48.81	48.23
3c	Share of employees cost in total expenses	%	39.63%	39.85%	40.11%
3d	Power station installed capacity own generation (MW)	MW	62.02	68.52	68.52
3e	Employees per MW of capacity for generating company		45.65	41.32	41.32

Commission observe a slight improvement in the performance parameter but still they have to be improved a lot. Commission didn't find any reference plan by DHPD against Commission's directive to prepare a yardstick for deployment of O&M staff in its hydro stations of different capacities.

3.5.2. R & M expenses

Table 19 : R&M Expenses - Commission's Analysis and Comparison

Sl. No.	Particulars/ Years	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	R&M Expenses (Rs. Crs.)	2.96	5.92	6.36	8.57	9.93	5.51	5.8	6.1
2	YoY Change (%)		200.0	107.4	134.7	105.9	-Ve	105.3	105.2

3.5.3. Administrative & General Expenses

Table 20 : A & G Expenses - Commission's Analysis and Comparison

Sl. No.	Particulars/Years	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1	A & G Expenses (Rs. in Crs.)	2	2.24	2.41	3.45	3.65	4.18	4.4	4.63
2	YoY Change (%)	-	112.0	107.6	143.1	105.8	114.5	105.3	105.2

3.5.4.Total O & M Expenses*Table 21 :Total O&M Expenses – Commission’s Analysis and Comparison*

Sl.No.	Particulars/Years	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Total O&M as per the Petitioner (Rs. Crs.)	40.5	50.19	53.95	60.43	64.02	69.52	73.17
2	YoY Change		23.93%	7.49%	12.01%	5.94%	8.59%	5.25%
3	Commission’s Approval (Rs. Crs.)				15.2		17.33	

Commission’s Analysis

DHPD have stated that they have work force of 2831 including all cadres of employees. However, the cadre-wise number of employees, project wise details of employees, employees going to retire, employees going to be recruited /engaged etc. are not provided. Maintaining strength of 2831 employees for 116 small/micro projects seems to be very expensive and un-economical. Moreover, it is also not clear as to how many of them are engaged in ongoing construction projects and other activities of the APDHPD and how many are involved for Operation & Maintenance works. In absence of appropriate data in respect of the Employee’s Cost and also since the Employee’s cost is the major component of the O&M cost, the Commission has accordingly not considered the data in the tables 18 to 21 above.

In this regard, requisite guidelines as mentioned in CERC Regulations for Terms & Conditions for tariff Determination from Renewable Energy Sources, 2012 (Regulation 32) to be taken into account for deciding the normative O&M cost. Moreover, to determine the O&M expenses, the Commission has also issued its Regulation No. 28 of the Regulations notified by it regarding Terms & Conditions for Tariff Determination from Renewable Energy Sources, 2012 which is in line with the above mentioned CERC Regulation. According to these Regulations, the norms for Operation & Maintenance (O&M) expenses for FY 2012-13 are fixed for the State of Arunachal Pradesh as follows:

For Projects below 5 MW	Rs. 25 Lakhs/MW
For Projects of 5 MW to 25 MW	Rs. 18 Lakhs/MW

The above charges shall be escalated at the rate of 5.72% per annum from FY 2012-13 to FY 2017-18. Accordingly, the O&M Expenses for FY 2017-18 shall be as mentioned in Table no.22 below:

Further, the Commission has also taken reference of latest CERC latest Regulation 30 (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017 which are as follows:

Region	Project Size	O&M expenses (Rs. lakhs/MW)
Himachal Pradesh, Uttarakhand, West Bengal, and North-Eastern States	Below 5 MW	36
	5 MW to 25 MW	27
Other States	Below 5 MW	29
	5 MW to 25 MW	21

O&M cost has been estimated considering both the regulation of APSERC and CERC respectively which is compiled at Table below.

Table 22 : O&M Expenses – Commission's Analysis

Sl.No.	Rating	Below 5 MW	5 MW & above	Total in Rs. In Crs.
1	Norms for O&M cost for 2012-13 Rs. Lakh/MW	25	18	
2	Rate of escalation per year	5.72%	5.72%	
3	Escalation Factor	1.32	1.32	
4	O&M Rate as per APSERC Reg Lacs/MW	33.02	23.77	
5	O&M Rate as per CERC Reg 2017 Lacs/MW	36.00	27.00	
6	Capacity in MW)	44.61	18.00	
7	O&M cost as per APSERC (Rs. in Crs.)	14.73	4.28	19.04
8	O&M cost as per CERC (Rs.in Crs.)	16.06	4.86	20.92

As such, Commission considers latest CERC's 2017 norms for calculating O&M expenses invoking Regulation 57 of APSERC terms & condition for tariff

determination from Renewable Energy Source Regulation-2012 and as amended from time to time thereby approving Rs.20.91 Crores as O&M expenses for FY 2017-18 in respect of DHPD.

3.6. Return on Equity

DHPD has considered total Gross Fixed Assets for calculation of ROE at 14%. The Department has not provided the details of assets and costs. The total GFA costs and ROE worked out by the Petitioner is depicted in the table below:

Table 23 : **Return on Equity – Commission’s Analysis** (Rs. in Crs.)

Sl. No.	Particulars/ Years	Gross Fixed Asset	Equity (30%)	Loan (70%)	Return on Equity (14%)
1.	2010-11	823.42	247.03	576.39	34.58
2.	2011-12	826.17	247.85	578.32	34.7
3.	2012-13	828.91	248.67	580.24	34.81
4.	2013-14	832.92	249.88	583.04	34.98
5.	Commission’s App FY 2013-14				34.98
6.	2015-16	1117.17	335.15	782.02	46.92
7.	Commission’s App FY 2015-16				28.33
8.	2016-17	1163.03	348.91	814.12	48.85
9.	2017-18	1208.90	362.67	846.23	50.77

Commission analysis:

The Commission cannot consider the GFA projected at Rs. 1208.90 Crs. in the

Petition for FY 2017-18 in respect of 116 Hydro power stations in the state. Since the details of project wise costs are also not provided by the Department for the hydro stations and related assets. So, the Commission considered the Regulation guidelines.

In this regard, the Regulations notified by APSERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012

States that:

1. The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination) as determined under Regulation 13; and
2. The normative Return on Equity shall be:
 - (a) 20% per annum for the first 10 years;
 - (b) 24% per annum 11th year onwards.

Regulation 25 of the same Regulations specifies the norms for determination of the Base Capital Cost for FY 2012-13 as follows; viz.

- (a) For SHP, less than 5 MW = Rs. 7.00 Crore per MW
- (b) For SHP 5 MW to 25 MW = Rs. 6.30 Crore per MW

For the purpose to derive a generic asset value, it has been considered that most of the projects of DHPD are commissioned before 2012-13. As such, to arrive at Base Capital Cost the normative value as per the CERC's and this Commission's relevant regulations have been considered.

Thus, in the present case to determine the Debt Equity Ratio of the capital cost to calculate the Return on Equity, the capital cost of the projects which are less than 10 years old and those which are more than 11 years old has been worked out in accordance to the above-mentioned norms as follows:

As per APSERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012

Capacity of the projects that have completed upto 10 years:				Capacity of the projects that have completed 11 years onward:			
Particulars	MW	Rs. in Crs./MW	Rs. in Crs.		MW	Rs. in Crs./MW	Rs. in Crs.
Projects Less than 5 MW	23.52	7.00	164.61	Projects Less than 5 MW	27.00	7.00	189.00
Projects of 5-25 MW	12.00	6.30	75.60	Projects of 5-25 MW	6.00	6.30	37.80
Total Cost (A)			240.21	Total Cost (B)			226.80
Debt-Equity Ratio for (A)				Debt-Equity Ratio for (B)			
		Rs. in Crs.	Rs. in Crs.			Rs. in Crs.	Rs. in Crs.
Debt	0.70	240.21	168.14	Debt	0.70	226.80	158.76
Equity	0.30	240.21	72.06	Equity	0.30	226.80	68.04
Return on Equity for projects up to 10 years old (C)	0.20		14.41	Return on Equity for projects 11 years onward (D)	0.24		16.33
Total Return on Equity(ROE) - C+D (Rs. In Crs)			30.74				

As per CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017

The Capital Cost/MW for Hydro Power Plant less than 5 MW	Rs. 1000.00 Lacs/MW.
The Capital Cost/MW for Hydro Power Plant from 5 MW to 25 MW	Rs. 900.00 Lacs/MW.
Return on equity per annum	17.56%

Table 24 : **Return on Equity- Commission's Analysis and Comparison**

Capacity of the projects that have completed upto 10 years:				Capacity of the projects that have completed 11 years onward:			
Particulars	MW	Rs Cr/MW	Rs Cr		MW	Rs Cr/MW	Rs Cr
Projects Less than 5 MW	23.52	10.00	235.15	Projects Less than 5 MW	27.00	10.00	270.00
Projects of 5-25 MW	12.00	9.00	108.00	Projects of 5-25 MW	6.00	9.00	54.00
Total Cost (A)			343.15	Total Cost (B)			324.00
Debt-Equity Ratio for (A)				Debt-Equity Ratio for (B)			
		Rs Cr	Rs Cr			Rs Cr	Rs Cr
Debt	0.70	343.15	240.21	Debt	0.70	324.00	226.80
Equity	0.30	343.15	102.95	Equity	0.30	324.00	97.20
Return on Equity for projects up to 10 years old (C)	0.1756		18.08	Return on Equity for projects up to 10 years old (D)	0.1756		17.07
Total Return on Equity(ROE) - C+D				35.15			

In view of the above Commission considers the norms used by the CERC's latest regulation and hence commission approves the amount of Rs.35.15 Crore as Return on Equity for the FY 2017-18.

3.7. Interest on Loan Capital

It is submitted by DHPD that project cost has been funded by the budgetary support of State/ Central Government. The Department has not availed any loan and in view of this interest has not been claimed.

Commission's view:

Commission accepts the views of DHPD and does not approve any interest on loan capital.

3.8. Interest on Working Capital

DHPD has computed working capital as under.

- a) One month of O&M expenses
- b) Maintenance of spares (15% of O&M costs)
- c) Receivables (2 months of fixed costs)
- d) Interest on working capital is claimed as 14.05% PA

Commission analysis:

For working out the Interest on working capital, the Commission has taken into consideration its regulation no. 17 of the Regulations notified by it for determining the tariff from Renewable Energy Sources, 2012 according to which the working capital for SHPs would be sum total of:

- a) O&M expenses for one month.
- b) Maintenance spares @15% of O&M expenses.
- c) Receivables (2 months of fixed costs) : Receivables equivalent to two months of energy charges for sale of electricity on the normative CUF which has been fixed at 45% for the SHPs as per the regulation no. 26 of above mentioned Regulations of the Commission.
- d) Interest on working capital

As per **APSERC Regulation 17 (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012**

'Interest on Working Capital shall be at interest rate equivalent to the average State

Bank of India Base Rate prevalent during the first six months of the previous year plus 350 basis points.' whereas as per **CERC Regulation 26 (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017** 'Interest on Working Capital shall be computed at 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'.

In this respect, the Commission feels that since the Regulation of CERC provides for the latest banking regulation as regards to industrial borrowing. The lending rate indicated by the CERC should be followed. Accordingly the SBI interest rate of three hundred (300) basis points above the average State Bank of India MCLR (One Year Tenor) has been considered for this purpose.

The average SBI MCLR for last six months is 8.45%. After adding 300 basis points it comes as 11.45%.

Considering the above, interest on working capital has been calculated as shown at table below.

Table 25 : **Interest on Working Capital - Commission's Analysis** (Rs. In Crs.)

Sl.No	Particulars	2013-14	2015-16	2017-18
1	O&M expenses for one month	1.27	1.44	1.74
2	Maintenance spares (15% of O&M)	8.33	2.60	3.14
3	Receivables (2 months of energy charges calculated at 45% CUF)	8.73	8.01	10.52
4	Total Working Capital	18.33	12.05	15.40
5	Interest on Sl. 4 above (11.45% PA)	2.15	1.63	1.60

Commission approves Interest on Working Capital at Rs. 1.60 Crore for the FY 2017-18.

3.9. Commission's Analysis & Approval of ARR

With the above data, the Commission analyzed the AFC as under

Table 26 : Annual Fixed Charges- Commission's Analysis

(Rs in Crs)

Sl.No.	Particulars	Amount for FY 2013-14	Amount for FY 2015-16	Amount for FY 2017-18
1	Interest on Loan	0.00	0	0.00
2	Depreciation	0.00	0	10.58
3	Return on Equity	34.98	28.33	35.15
4	O&M Expenses	15.20	17.33	20.92
5	Interest on Working Capital	2.15	1.63	1.60
6	Total Annual Fixed Charges (AFC) Total Sl. 1 to Sl. 5 As analysed by the Commission	52.33	47.29	68.24
7	Fee for Tariff Petition Filing	0.00	0.05	0.05
8	Total amount Approved (Sl.6 to Sl.8)	52.33	47.34	68.29

Annual Fixed charges (AFC)- Commission's Approval Based on the above analysis, the Commission approves the annual fixed cost as Rs 68.29 Crs.

3.10. Hydro Power Generation Tariff for FY 2017-18- Commission's Analysis

Regulation 27 of the APSERC Regulation on "The Terms and Conditions for Determining of Tariff Determination from Renewable Energy Sources – 2012" dated 9th April'2012 specifies the Auxiliary Energy Consumptions Norms of Operation in respect of the Hydro Plants at 1% for SHPs.

The APDHPD has requested the Commission in its tariff petition to consider 56.54% of the presently projected designed energy of 570.18 MUs against the APSERC regulation 26 of CUF of 45%. In view of this factual information furnished by the APDHPD and the operational working conditions of the smaller capacities of number of hydel stations spread over the remote parts of the state, it is a reasonable request to consider 56.54% of designed energy as saleable energy. However, the norm for CUF is fixed at 45% for SHPs as per the Regulation no.26 of the Commission's Regulations on Terms & Conditions for Tariff Determination from Renewable Energy Sources, 2012 for working out the saleable energy from the SHPs. Having said that, the Commission has also noted that the actual generation versus design energy ratio of DHPD since many years has been around 10% only which is far below than the APSERC regulation 26 of CUF of 45% for SHPs. As a first step towards improvement of efficiency, DHPD is expected to increase the percentage of saleable energy at least as per the APSERC regulation guideline.

In view of the above ground realities, the Commission considers 45% CUF as per norms of above stated Regulations for tariff determination of the FY 2017-18.

The details of the Installed Capacity of DHPD (for which petition has been filed for Tariff determination), design energy and saleable energy are summarized as under:

Table 27 : Hydro Power considered for sale - Commission's Summary

Sl.	Particulars	FY 2013-14	FY 2015-16	FY 2017-18
1	Annual Fixed Charges (Rs. in Crs.)	52.33	47.34	68.29
2	Installed Capacity (MW)		62.015	68.52
3	Design Energy (MU)	506.44	516.09	570.18
4	CUF Considered (%)		37.64%	45%
5	Gross Energy (MU)	253.22	194.26	256.58
6	Auxiliary Power Consumption (%)	1.2%	1.00%	1.00%

7	Auxiliary Consumption (MU)	3.04	1.94	2.57
8	Saleable Energy (MU)	250.18	192.32	254.02
9	Tariff (Rs/kwh)	2.09	2.46	2.69

Table 28 : Hydro Power Generation Tariff - Commission's Approval

Sl. No.	Net Energy considered for fixing of tariff	Fixed Charges (Rs. Crs)	Approved Tariff (Rs./ kWh)
1	254.02	68.29	2.69



4. Compliance of Directives

General

The Commission has observed from the tariff petition submitted by DHPD that there are deficiencies, data gaps and there is need to improve efficiency in O&M of power stations, reducing O&M costs, to generate more power etc.

As per Commission's observations, several directives have been issued to DHPD in FY 2013-14 and FY 2015-16. It is a matter of great concern that none of the directives have been complied till date. DHPD is hereby again directed to furnish upto date compliance of all directives issued till date.

In this context Commission considers it necessary to reiterate the directives to the Department of Hydro Power Development once again for compliance.

4.1. Directives

4.1.1. Electricity Regulatory Cell

APDHPD shall create an Electricity Regulatory Cell (under a senior Officer) from the existing staff strength. The Cell so created shall be provided with necessary authority and resources so as to look after all the Tariff and Regulatory matters primarily to keep an vigil on the parameters approved and directives issued by the Commission and also to provide correct and timely information to the Commission. The said officer shall be the primary source of all data and submissions being filed before the Commission, so as to ensure consistency and timelines of the data submitted and proper co-ordination with the Commission in the tariff determination process.

Further to above, Commission observed that DHPD is not responding on Commission's queries hence it is very urgent to have this cell headed by some senior officials from DHPD for proper co-ordination and communication.

4.1.2. Generation

DHPD has generated and supplied only 58.65 MU during FY 2015-16 against saleable energy of 192.32 MU which is just 30%. It indicates that the Performance is poor. DHPD

shall take necessary steps to improve the performance of the stations and generate additional power. The DHPD shall make an all-out effort to increase the present generation at least by 10% (i.e. about 19.20 MU) of the saleable energy i.e. 192.32 MU. This will facilitate the additional generation with non-conventional source within the state. Further this low-cost energy shall not only reduce the burden of APDOP of buying energy at higher cost but shall also give relief to the consumers of the state. The DHPD shall submit a report to the Commission on the steps proposed to be taken in this regard with improvements carried out, within Six months.

4.1.3. Design Energy and the Generation by DHPD data discrepancy

Commission observed that there is a huge discrepancy in maintaining the power plant data. DHPD has furnished total design energy including all 116 power plants as 570.18 MU and the corresponding Generation data projected as 59.41 MUnits. This gives a picture that Generation is around 10% of the design energy which is a too low value and can't be considered. Further as per design energy (Mus) data & total plant capacity (MW) submitted by the DHPD, the plant capacity factor ($= \text{Design Annual Energy (kWh)} / (365 \times 24 \times \text{installed capacity of the plant})$) comes around 95%. Therefore, Commission is hereby directed to design energy data as per project report/power potential study of the said plants otherwise all the related data would be erroneous.

4.1.4. Preparation of yardstick of O&M Staff

The Deptt. is directed to prepare a yardstick for deployment of O&M staff in its hydro stations of different capacities and get it approved. The existing staff should be redeployed as per the yardstick enabling optimum utilization of the existing staff strength.

The Department is having 2831 nos employees of different cadres – Employees costs are shown at Rs. 59.83 crore for FY 2015-16.

Station wise man power working may be analyzed and the need based man power be assessed. Extra man power can be utilized at new stations after training them. Details of man power costs under different sub heads viz. pay, Dearness Allowance, Welfare expenses etc. are to be indicated in the tariff petition from next time onwards.

4.1.5. Accounting of O&M expenses

The Deptt. is directed to maintain project wise accounting of expenses in respect of the following:

- a) Expenses on salary and wages of the staff working in that generating station.

- b) Expenses incurred on repair & maintenance of that generating station.
- c) Any other general expenses incurred on the staff of that generating station.

These project wise details should be provided in the tariff Petition from next year onwards as these are regulatory requirements.

4.1.6. High O&M cost

DHPD has requested Commission to relax O&M cost as per actuals so as to enable them to recover its expenses. In this regard, the Commission had asked DHPD to furnish segregation of manpower cost details deputed for O&M and other works but the Commission has not received any details till date. DHPD is again requested to furnish the same.

Commission suggests that the O & M activities of major Power Station i.e. above 1 MW capacity may be carried out on PPP Model (Public Private Partnership Model). Initially one or two Power Plant of sizable capacity which is under performing may be taken up on experiment basis to carry out O&M activities and its performance shall be monitored. DHPD is requested to prepare a blue print of such PPP Model Project and furnish the same to APSERC for appraisal and comment.

4.1.7. The Business Plan:

DHPD is directed to submit its annual business plan consisting of the works i/c the renovation and life extension works planned to be taken up during the year along with the sources of funding, annual targets, time lines of completion, up to date physical achievements of ongoing works. Justification of the works planned be also incorporated in the business plan.

4.1.8. Reassessment of the value of the existing assets of DHPD.

The Deptt. hasn't provided the supporting details of the gross asset value projected in the tariff petition. Prima-facie the asset value seems to be on the higher side. The Deptt. is directed to reassess the value of its assets once again and provide the correct asset value to the Commission in the next petition. If the Deptt. feels proper and necessary, it is suggested that Deptt. may seek the services of professional valuers & estimators in this field for assessing the proper value of the assets of the Deptt. as it is a one-time exercise and it is in the benefit of the Deptt. that it should be done with fair amount of accuracy.

Project wise Asset registers, containing land details, civil structures, dams, spill ways, power house Buildings, Office Buildings, the Machinery, and Equipment together with

costs shall be prepared in standards format and shall be submitted the same to the Commission.

4.1.9. Hydro Power Stations with "Nil" Power Generation

It is noticed from the data provided that there are certain power stations with nil generation that are ranging from small rating to big rating units. Reasons are not indicated. The Department shall examine such stations and find out the reasons, carry out any improvements required and ensure the stations generate power. A report shall be submitted to the Commission on these stations about the plan of action to make them operational.

4.1.10. Reassessment of Installed Capacity of the existing stations

It is felt that the generation from the hydro stations does not commensurate with the installed capacity of the projects. As clarified by the DHPD on various occasions, one of the reasons stated for this was that many of the projects are very old and the capacity of the machinery has got de-rated due to ageing. Moreover, over a period of time the hydrology of the project has also changed leading to reduction in water discharge and hence reduction in the generating capacity. It was also stated that during earlier days one machine in the station used to be only as standby but whose capacity is added in the installed capacity. In view of the above the DHPD is directed to reassess the actual generating capacity of all such projects afresh and re-fix the installed capacity afresh and get it approved.

4.1.11. DHPD has asked for additional cost for the FY 2017-18 for RM works but didn't furnished any details. DHPD is hereby directed to furnish/include the details of such works along with cost in future in petition.

4.1.12. Depreciation for FY 2017-18

Commission has been requesting the details of GFA from DHPD but didn't receive any input till date. Further, Commission has worked out depreciation based on limited data available with the Commission (refer Annexure-II) and accordingly approved the cost as calculated. However, Commission feels, DHPD has to furnish the project cost details of the balance projects in operation.

In connection with the above, Commission also directs the DHPD to do re-valuation exercise of the old plants more than thirty five years and furnish the same to the Commission.

4.1.13. Training and skill development of the employees of the DHPD

The Deptt. is directed to give top most priority to training and skill development of O&M staff and the supervisory staff (JEs and AEs) of the generating stations so as to increase the longevity & efficiency of the machines. The Deptt. should work out a well thought plan of imparting training in phased manner and allocate necessary fund in its annual budget for the same.

Further to the above, Commission also observes that DHPD may undertake training/skill development for technicians/un-skilled worker to improve plant availability and performance.

4.1.14. Scheduling of generation from the Deptt.'s Hydro Stations

The Deptt. is directed to start scheduling the generation from its generating stations for proper and optimum utilization of the generation by the Deptt. of Power.

4.1.15. Fixing of project wise generation target

The Deptt. is also directed to fix monthly/quarterly target of generation project wise based on various factors like the seasonal availability of the water, condition of the machines etc. This will also help the Deptt. in self-assessment of its performance. Details of Project wise target and actual generation should be incorporated in the next tariff petition of the Deptt.

4.1.16. Raising of bills to Deptt. of Power

The AP DHPD directed to immediately confirm if it is raising monthly bills to AP DoP for the energy consumed by them at the tariff fixed by the Commission w.e.f 2013-14 onwards. On the basis of joint meter readings or as mutually decided by both the department for such station where meter are not installed. Persons authorized to sign the joint meter reading, format of the bill etc. should be worked out between the Chief-Engineer's of DHPD and Chief Engineer's DOP to avoid any kind of disputes.

4.1.17. Data Deficiencies and submission of Tariff Petition.

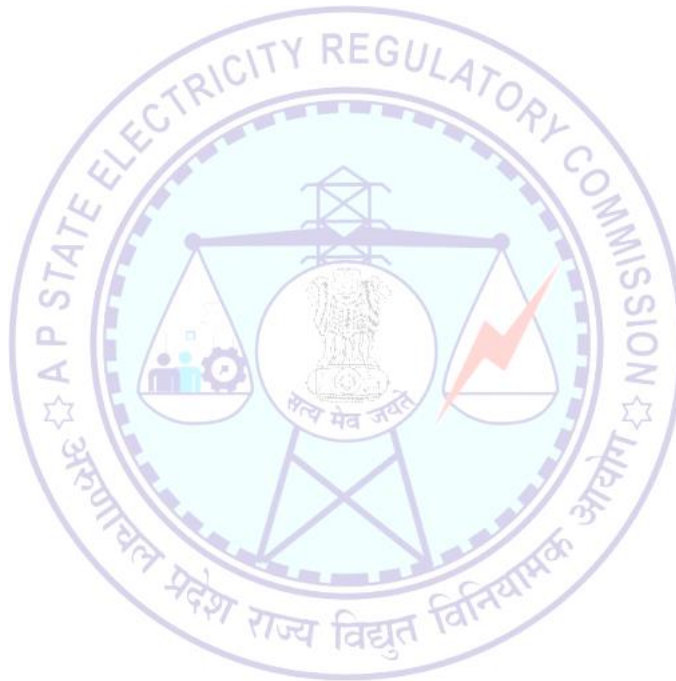
The formats provided by the Commission for submission of data along with Tariff Petition are not filled in complete shape. In HG1 format even Technical particulars of equipment are not filled up. Details of R&M costs, A&G expenses are to be furnished in the Tariff Petition.

4.1.18. Filing of the Petition in time

Tariff petition with all the required data in the formats shall be submitted by 30th November of every year.

Date:

Place: Itanagar



(R.P.Singh)
Chairman

5. ANNEXURES

5.1. Annexure – I :Details of Hydro Electric Power Station of APDHPD

Table 29 : **Details of Hydro Electric Power Station of APDHPD**

SL. No.	Name of the Stations	Units	Installed Capacity (KW)	Design Energy (MUs)	Actual Net Generation (MU)	Year of Commissioning
Tawang District						
1	Kitpi Ph-I	3 x 500	1500	12.48	1.15	1977-78
2	Nuranang	3 x 2000	6000	49.93	12.26	1996-97
3	T. Gompa	50	50	0.42	0.07	2001-02
4	Dudunghar	30	30	0.25	0.02	2004-05
5	Bramdhongchung	2 x 50	100	0.83	0.00	2008-09
6	Shakti Nallah	2 x 50	100	0.83	0.06	2008-09
7	Kitpi MHS Ph-II	2 x 1500	3000	24.97	3.95	2008-09
8	Chellengkang Ph-II	30	30	0.25	0.04	2008-09
9	Bongleng	2 x 50	100	0.83	0.01	2009-10
10	Thimbu	2 x 50	100	0.83	0.03	2009-10
11	Bramdhongchung Ph-II	2 x 50	100	0.83	0.04	2010-11
12	Tsechu Nallah	2 x 50	100	0.83	0.03	2010-11
West Kameng District						0.00
13	Rahung	3 x 250	750	6.24	1.12	1972-73
14	Dirang	4 x 500	2000	16.64	4.24	1977-78
15	Sessa	3 x 500	1500	12.48	0.45	1992-93

16	Rupa	2 x 100	200	1.66	0.00	1997-98
17	Dokumpani	30	30	0.25	0.15	2000-01
18	Domkhong	2 x 1000	2000	16.64	0.00	2008-09
19	Sinchung	50	50	0.42	0.00	2008-09
20	Ankaling	30	30	0.25	0.02	2009-10
21	Khet	2 x 50	100	0.83	0.11	2009-10
22	Mago MHS	2x50	100	0.83	0.03	2014-15
23	Dikshi	30	30	0.25	0.17	2010-11
24	Khadiyabey	2 x 100	200	1.66	0.00	2011-12
25	Saktangrong	3 x 100	300	2.5	0.06	2015-16
East Kameng District						0.00
26	Seppa	3 x 100	300	2.5	0.00	1980-81
27	Pakke Kessang	30	30	0.25	0.06	2001-02
28	Pacha MHS	2 x 1500	3000	24.97	2.25	2008-09
29	Pakoti	2 x 50	100	0.83	0.28	2010-11
30	Patta Nallah	2 x 50	100	0.83	0.28	2010-11
31	Watte Mame	50	50	0.42	0.14	2010-11
32	Kade Nallah	50	50	0.42	0.00	2010-11
Kurung Kumey District						0.00
33	Patte MHS at Tali	30	30	0.25	0.00	2004-05
34	Koye	1 x 50	50	0.42	0.00	2009-10
35	Chambang	30	30	0.25	0.01	2009-10
36	Paya MHS at Hiya	2 x 50	100	0.83	0.15	2011-12
Lower Subansiri District						0.00
37	Mai Ph-I	4 x 500	2000	16.64	0.25	1977-78

38	Mai Ph-II	2 x 500	1000	8.32	0.00	1982-83
39	Tago	3 x 1500	4500	37.45	2.69	1992-93
Upper Subansiri District						0.00
40	Dulom (Daporijo)	4 x 100	400	3.33	0.00	1981-82
41	Maro	30	30	0.25	0.00	2002-03
42	Sippi	2 x 2000	4000	33.29	8.02	2008-09
43	Ayingmuri MHS	2 x 125	250	2.08	0.00	2012-13
44	Limeking MHS	1 x 30	30	0.25	0.00	2012-13
45	Pinto Karo MHS	25	25	0.21	0.00	2011-12
46	Sikin Karo	2 x 100	200	1.66	0.00	2011-12
47	Sinyum Koro	2 x 50	100	0.83	0.00	2011-12
48	Kojin Nallah	2 x 50	100	0.83	0.00	2011-12
West Siang District						0.00
49	Pagi (Basar)	2 x 50	100	0.83	0.11	1972-73
50	Along	4 x 100	400	3.33	0.03	1975-76
51	Ego-Echi (Dali)	4 x 100	400	3.33	0.60	1987-88
52	Mechuka	6 x 25	150	1.25	0.07	2015-16
53	Yomcha	50	50	0.42	0.00	2001-02
	Tato			0.42	0.00	
54	Beye	30	30	0.25	0.05	2004-05
55	Kambang	3 x 2000	6000	49.93	0.00	2008-09
56	Liromoba	2 x 1000	2000	16.64	0.24	2008-09

57	Yingko Sikong at Rapum	50	50	0.42	0.05	2009-10
58	Angu	50	50	0.42	0.00	2010-11
59	Solegomang MHS	50	50	0.42	0.06	2011-12
60	Borung MHS	50	50	0.42	0.00	2011-12
61	Sirikorang MHS	2x250	500	4.16	0.79	2013-14
Upper Siang District						0.00
62	Yingkiong Ph-I	3 x 50	150	1.25	0.01	1980-81
63	Sikut/ Tuting	2 x 50	100	0.83	0.15	1984-85
64	Yingkiong Ph-II	2 x 100	200	1.66	0.37	1992-93
65	Selli at Geku	2 x 250	500	4.16	1.11	1994-95
66	Sirnyuk	2 x 1000	2000	16.64	4.65	1996-97
67	Kopu at Tuting	250	250	2.08	0.78	2007-08
68	Silingri	50	50	0.42	0.14	2008-09
69	Singa	30	30	0.25	0.05	2008-09
70	Ngaming	50	50	0.42	0.15	2008-09
71	Sika	15	15	0.12	0.00	2008-09
72	Mayung	5	5	0.04	0.00	2009-10
73	Gosang	2 x 250	500	4.16	0.30	2011-12
74	Kote MHS	50	50	0.42	0.00	2011-12
75	Sijen MHS at Adi pasi	50	50	0.42	0.00	2011-12
76	Pyabung MHS	25	25	0.21	0.00	2011-12
East Siang District						0.00
77	Pasighat	2 x 100	200	1.66	0.22	1974-75
78	Yembung	4 x 500	2000	16.64	0.00	1994-95
79	Silli	1 x 30	30	0.25	0.09	2001-02

80	Rina	2 x 1000	2000	16.64	1.48	2008-09
Lower Dibang Valley District						0.00
81	Deopani Ph-I	3 x 250	750	6.24	0.32	1986-87
82	Abhapani	250 + 2 x 100	450	3.74	0.00	1994-95
83	Deopani Ph-II	3 x 250	750	6.24	0.39	2004-05
Dibang Valley District						0.00
84	Anini/ Awapani Ph-I	3 x 50	150	1.25	0.00	1994-95
85	Tah Ahfra Ph-I & Ph-II	50 + 50	100	0.83	0.00	2001-02 2009-10
86	Chini Afra	250	250	2.08	0.00	2001-02
87	Echi Ahfra	2 x 200	400	3.33	0.21	2005-06
88	Awapani Ph-II	2 x 250	500	4.16	1.32	2005-06
89	Echito Nallah	2 x 20	40	0.33	0.02	2010-11
90	Rupapani	2 x 20	40	0.33	0.02	2010-11
91	Chu Nallah	2 x 15	30	0.25	0.02	2011-12
92	Awapani at Gepuline	2 x 250	500	4.16	0.26	2014-15
93	Mukto MHS	3 x 2000	6000	49.93	1.15	Under Trial Run
Lohit District						0.00
94	Dura Nallah	5 x 100	500	4.16	0.36	1976-77 2013-14
95	Tafragram	250	250	2.08	0.11	1984-85
Anjaw District						0.00
96	Kaho	10	10	0.08	0.01	2004-05

97	Kebitho	30	30	0.25	0.00	2004-05
98	Mati Nallah	2 x 250	500	4.16	1.18	2004-05
99	Yapak Nallah	2 x 100	200	1.66	0.47	2005-06
100	Teepani	2 x 250	500	4.16	1.13	2009-10
101	Krawti Nallah	2 x 50	100	0.83	0.04	2009-10
102	Hathipani	2 x 50	100	0.83	0.00	2009-10
103	Tah Nallah	2 x 50	100	0.83	0.00	2009-10
104	Maipani	2 x 30	60	0.5	0.00	2010-11
105	Ashapani	2 x 30	60	0.5	0.01	2011-12
106	Langpani	2 x 200	400	3.33	0.37	2011-12
Changlang District						0.00
107	Tissue	4 x 100	400	3.33	0.61	1986-87
108	Jongkey Nallah	25	25	0.21	0.01	2011-12
109	Ngonalo at Vijaynagar	2 x 50	100	0.83	0.00	2010-11
110	Tinning	2 x 30	60	0.5	0.04	2010-11
111	Chicklong	3 x 50	150	1.25	0.00	2011-12
Tirap District						0.00
112	Thiratju	4 x 250	1000	8.32	0.00	1978-79
113	Charju	3 x 200	600	4.99	0.91	1984-85
114	Sumhok Nallah	2 x 50	100	0.83	0.00	2009-10
115	Tahin Nallah	2 x 50	100	0.83	0.00	2011-12
116	Kachopani MHS	2x100	200	1.66	0.07	2014-15
	TOTAL		68515	570.18	59.41	

5.2. Annexure – II: Details of Estimated Original Cost for Power Plants

Sl. No.	Name of the Stations	Installed Capacity (KW)	Year of Commissioning	Estimated Original Cost (Rs in lakhs)
Tawang District				
1	Nuranang	6000	1996-97	985
2	Bramdhongchung	100	2008-09	134.71
3	Shakti Nallah	100	2008-09	109.32
4	Kitpi MHS Ph-II	3000	2008-09	3373.83
5	Chellengkang Ph-II	30	2008-09	54.94
6	Bongleng	100	2009-10	114.27
7	Thimbu	100	2009-10	126.91
8	Bramdhongchung Ph-II	100	2010-11	105.3
9	Tsechu Nallah	100	2010-11	157.75
West Kameng District				
10	Sessa	1500	1992-93	131
11	Domkhong	2000	2008-09	2845.77
12	Sinchung	50	2008-09	54.48
13	Ankaling	30	2009-10	66.35
14	Khet	100	2009-10	144.27
15	Mago MHS	100	2014-15	140.44
16	Dikshi	30	2010-11	56.86
17	Khadiyabey	200	2011-12	282.91
East Kameng District				
18	Pacha MHS	3000	2008-09	3992.8
19	Pakoti	100	2010-11	138.37
20	Patta Nallah	100	2010-11	140.8
21	Watte Mame	50	2010-11	145.5
22	Kade Nallah	50	2010-11	95.09
Kurung Kumey District				
23	Koye	50	2009-10	98

24	Chambang	30	2009-10	109.55
25	Paya MHS at Hiya	100	2011-12	237.93
Upper Subansiri District				
26	Sippi	4000	2008-09	3832.92
27	Pinto Karo MHS	25	2011-12	83.11
28	Sikin Karo	200	2011-12	387.61
29	Sinyum Koro	100	2011-12	197.06
30	Kojin Nallah	100	2011-12	184.35
West Siang District				
31	Kambang	6000	2008-09	3832.92
32	Liromoba	2000	2008-09	3073.73
33	Yingko Sikong at Rapum	50	2009-10	40.14
34	Angu	50	2010-11	39.46
35	Solegomang MHS	50	2011-12	88.83
36	Borong MHS	50	2011-12	175
37	Sirikorang MHS	500	2013-14	646.11
Upper Siang District				
38	Sirnyuk	2000	1996-97	2464.32
39	Ngaming	50	2008-09	103.04
40	Sika	15	2008-09	50
41	Mayung	5	2009-10	22.22
42	Gosang	500	2011-12	826
43	Kote MHS	50	2011-12	96.7
44	Sijen MHS at Adi pasi	50	2011-12	91.41
45	Pyabung MHS	25	2011-12	74.13
East Siang District				
46	Rina	2000	2008-09	3024.45
Dibang Valley District				
47	Tah Ahfra Ph-I & Ph-II	50	2009-10	49.63
48	Echi Ahfra	400	2005-06	484.79
49	Awapani Ph-II	500	2005-06	714.46
50	Echito Nallah	40	2010-11	74.04
51	Rupapani	40	2010-11	74.65
52	Chu Nallah	30	2011-12	73.84

53	Awapani at Gepuline	500	2014-15	714.46
Anjaw District				
54	Mati Nallah	500	2004-05	598.56
55	Yapak Nallah	200	2005-06	317.71
56	Teepani	500	2009-10	675.47
57	Krawti Nallah	100	2009-10	119.07
58	Hathipani	100	2009-10	120.44
59	Tah Nallah	100	2009-10	122.99
60	Maipani	60	2010-11	98.14
61	Ashapani	60	2011-12	99.98
62	Langpani	400	2011-12	543.91
Changlang District				
63	Jongkey Nallah	25	2011-12	144.5
64	Ngonalo at Vijaynagar	100	2010-11	408.45
65	Tinning	60	2010-11	99.98
Tirap District				
66	Sumhok Nallah	100	2009-10	198.9
67	Tahin Nallah	100	2011-12	222.98
68	Kachopani MHS	200	2014-15	393.33