



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

Determination of Aggregate Revenue Requirement for FY 2018-19

&

Tariff Order for FY 2018-19

For

Deptt. of Hydro Power Development

Government of Arunachal Pradesh

Issued on 02-11-2018

Arunachal Pradesh State Electricity Regulatory Commission

अरुणाचल प्रदेश राज्य विद्युत नियामक आयोग

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

ITANAGAR-791111

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

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

Table of Contents

LIST OF TABLES	4
ABBREVIATIONS	5
1. INTRODUCTION.....	8
1.1 ARUNACHAL PRADESH STATE ELECTRICITY REGULATORY COMMISSION	8
1.2 ARUNACHAL PRADESH - GEOGRAPHICAL REALITY	10
1.3 ARUNACHAL PRADESH DEPARTMENT OF HYDRO POWER DEVELOPMENT.....	10
1.4 INSTALLED CAPACITY OF DHPD HYDRO ELECTRIC POWER STATIONS.....	11
1.5 TARIFF PETITION FOR FY 2018-19: FILING	11
1.6 ADMISSION OF PETITION AND PUBLIC HEARING PROCESS	11
2. PETITION'S SUMMARY FOR ARR & TARIFF DETERMINATION	13
2.1 BACKGROUND.....	13
2.2 CAPITAL COST - PETITIONER'S SUBMISSION.....	13
2.3 INTEREST ON LOAN- PETITIONER'S SUBMISSION.....	13
2.4 DEPRECIATION	13
2.5 RETURN ON EQUITY (ROE) - PETITIONER'S SUBMISSION.....	13
2.6 O&M EXPENSES – PETITIONER'S SUBMISSION.....	13
2.7 INTEREST ON LOAN-PETITIONER'S SUBMISSION.....	14
2.8 SUMMARY SHEET - PETITIONER'S SUBMISSION.....	14
2.9 WORK IN PROGRESS - PETITIONER'S SUBMISSION	18
2.10 ANNUAL FIXED COSTS FY 2018-19 - PETITIONER'S SUBMISSION	19
2.11 INDICATIVE TARIFF - PETITIONER'S SUBMISSION	20
2.12 PETITIONER'S PRAYER.....	23
3. COMMISSION ANALYSIS: DETERMINATION OF ARR & TARIFF FOR FY 2018-19.....	24
3.1 GENERAL	24

3.2	POWER SCENARIO IN ARUNACHAL PRADESH.....	25
3.3	ASSUMPTIONS FOR TARIFF PETITION ANALYSIS.....	25
3.4	CAPITAL COST – COMMISSION ANALYSIS	26
3.5	DEPRECIATION- COMMISSION ANALYSIS.....	26
3.6	O&M EXPENSES – COMMISSION ANALYSIS	27
3.7	RETURN ON EQUITY – COMMISSION ANALYSIS.....	28
3.8	INTEREST ON LOAN CAPITAL – COMMISSION ANALYSIS.....	29
3.9	INTEREST ON WORKING CAPITAL – COMMISSION ANALYSIS.....	29
3.10	COMMISSION’S ANALYSIS & APPROVAL OF ARR.....	30
3.11	HYDRO POWER GENERATION TARIFF FOR FY 2018-19 COMMISSION'S ANALYSIS	30
4.	COMPLIANCE OF DIRECTIVES.....	32
4.1	General	32
4.2	DIRECTIVES	32
5.	ANNEXURES.....	38
5.1	Annexure 1- Details of Project under DHPD	38
5.2	Annexure 2. Capital Cost of Hydro Electric Power Station of DHPD.....	43
5.3	Annexure 3. Depreciation for plant Commissioned before FY 2012.....	45
5.4	Annexure 4. Depreciation for plant Commissioned after FY 2012	46
5.5	Annexure 5 - O&M Cost for FY 2018-19	48
5.6	Annexure 6 - ROE for FY 2018-19.....	51
5.7	Annexure 7. Interest on working capital for FY 2018-19.....	54

List of Tables

TABLE 1:ANNUAL REVENUE REQUIREMENT FOR FY 2018-19 - PETITIONER'S SUBMISSION.....	14
TABLE 2:WORK IN PROGRESS - PETITIONER'S SUBMISSION (RS IN LAKHS)	18
TABLE 3: ANNUAL FIXED COSTS AND NET POWER GENERATION.....	19
TABLE 4: INDICATIVE TARIFF - PETITIONER'S SUBMISSION.....	20
TABLE 5: POWER SCENARIO IN ARUNACHAL PRADESH	25
TABLE 6: THE ASSUMPTIONS CONSIDERED FOR TARIFF PETITION ANALYSIS	25
TABLE 7: DEPRECIATION FOR PLANTS COMMISSIONED TILL FY 2011-12	27
TABLE 8: DEPRECIATION FOR PLANTS COMMISSIONED AFTER FY 2011-12 -COMMISSION ANALYSIS.....	27
TABLE 9: O&M EXPENSES-COMMISSION ANALYSIS (RS. IN CR.)	28
TABLE 10: RETURN ON EQUITY-COMMISSION ANALYSIS.....	28
TABLE 11: INTEREST ON WORKING CAPITAL - COMMISSION'S ANALYSIS (RS. IN CRS.).....	29
TABLE 12: ANNUAL FIXED CHARGES- COMMISSION'S ANALYSIS (RS. IN CRORES).....	30
TABLE 13: ANNUAL FIXED CHARGES- COMMISSION'S ANALYSIS	31

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
kV	Kilovolt
kVA	Kilo Volt Amps
kWH	Kilo Watt Hour
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 – 3 of 2018

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 2018-19

AND

Department of Hydro Power Development,

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

Present:

R. P. Singh, Chairman

ORDER

(Passed on 02-11-2018)

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) RE Regulations, 2018 and other enabling provisions in this behalf, hereby issues this order, determining the Aggregate Revenue Requirement (ARR) for FY 2018-19 and generation Tariff for the Financial Year 2018-19 for supply of electricity by the Department of Hydro Power Development, Govt. of Arunachal Pradesh (DHPD) 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, (1st amendments) 2017 on or before 30th November of the preceding year. Accordingly, the tariff petition for the financial year 2018-19 should have been filed by the DHPD (the deemed generating company)

on or before 30th November, 2017. However, it filed the said petition before the Commission on 4th June, 2018.

This order consists of four chapters, which include detailed analysis of the Aggregate Revenue Requirement (ARR) for FY 2018-19 and approved Generation Tariff for the Financial Year 2018-19. The Commission hereby directs the DHPD 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 2018 and shall remain in force till the next tariff order is issued by the Commission.

Date: 02/11/2018

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) 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 Indian Electricity Grid Code (IEGC) standards specified under clause (h) of sub-section (1) section 79 of EA-2003.
 - 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 EA-2003.
 - l) Under takes promotion of energy efficiency.
- (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.
- (3) **The Commission ensures transparency while exercising its powers and discharging its functions.**
- (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.
- (5) **The Commission has so far notified the following Regulations to facilitate its functioning.**
- 1. State Advisory Committee (SAC) Notification – 2011.
 - 2. Conduct of Business Regulations- 2011.
 - 3. Fee Regulations-2011.
 - 4. Grant of Intra State Trading License Regulations-2011.
 - 5. Determination of ARR and retail tariffs Regulations-2011.
 - 6. Renewable Power Purchase Obligations and its Compliance Regulations 2012.
 - 7. Terms and Conditions of Intra-State Open Access Regulations-2012.

8. Electricity Supply Code Regulation-2013.
9. Reconstitution of the State Advisory Committee-2013.
10. Multi Year Tariff Regulation - 2013 superseding the Regulation of 2011 on Determination of ARR and Retail Tariff Regulation.
11. Service Conditions of Staff Regulations-2015.
12. Consumer Grievances Redressal Forum and Ombudsman Regulation,2015.
13. Standards of Performance for the Distribution Licensee Regulation-2016.
14. Renewable Power Purchase Obligation and its Compliance Regulation (1st Amendment) 2016.
15. Renewable Power Purchase Obligation and its Compliance Regulation (2nd Amendment) 2016.
16. Rooftop Solar Grid Interactive Based on Net Metering Regulation -2016.
17. Terms and Conditions for Tariff Determination from Renewable Energy Sources Regulation (1st Amendments) 2017.
18. Payment of Fees Regulation (1st Amendment) 2017.
19. Terms and Conditions for Tariff Determination from Renewable Energy Sources Regulations-2018.
20. Appointment of Consultants Regulations, 2018.
21. Service Conditions of Staff Regulations, 2018.

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 124 micro/mini/small hydel power stations with an installed capacity of 70.36 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 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 DHPD HYDRO ELECTRIC POWER STATIONS.

The Department has 117 micro/mini/small hydel power stations with a total installed capacity of 69.58 MW considering 5 no. defunct plant and 2 nos under trial run. The list of Hydro Power stations of DHPD given in Annexure –1 at the end of this Tariff Order.

1.5 TARIFF PETITION FOR FY 2018-19: FILING

The Chief Engineer (WZ) of the Department has filed the tariff Petition CE/WZ/HPD/W-VIII/01/2018-19/856-58 for the FY 2018-19 on dated 04/06/2018.

In the petition, APDHPD has proposed an indicative Tariff of Rs.3.29/ kWh based on Annual Fixed Charges of Rs. 9051.37 Lakhs and net generation 274.501 MUs of the Hydro plants for FY 2018-19.

1.6 ADMISSION OF PETITION AND PUBLIC HEARING PROCESS

The Commission observed that:

- (1) The Petition was submitted in line with APSERC Conduct of Business Regulation No. APSERC/NOTIFICATION/2/2011 dated 8th November 2011.
- (2) The Petitioner has deposited the requisite Petition fee in line with Schedule of the Fees prescribed under the Commission's Fee Regulations 1st amendment 2017, No. APSERC/NOTIFICATION/24/2017 dated 31st March 2017.
- (3) The Petition filed by the Petitioner lacked in many requisite data. The Commission however admitted the Petition on and numbered it as Petition no TP 3 of 2018 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

2.1 BACKGROUND

The DHPD has filed the tariff petition of 124 power plants along with it 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 2018-19.

2.2 CAPITAL COST - PETITIONER'S SUBMISSION

The Petitioner submitted the Capital cost of all the 124 power plants as per RE Regulation, 2012 .Details is shown in Table 1.

2.3 INTEREST ON LOAN- PETITIONER'S SUBMISSION

The Petitioner submitted the Debt as per RE Regulation, 2012 at 70% on Capital cost and interest considered @11.70%.Details shown in Table 1.

2.4 DEPRECIATION

The Petitioner submitted the Depreciation on Capital cost @ 5.83% per Annum for the first 12 years and the remaining depreciation shall be spread over the remaining useful life of the projects from 11th year onwards for all the 124 Power plants as per RE Regulation, which are shown in Table 1

2.5 RETURN ON EQUITY (ROE) - PETITIONER'S SUBMISSION

The Petitioner has indicated an amount towards ROE on the base value of equity 20% for the first 10 years of operation & @ 24% per annum from 11th year onwards as per RE Regulation, 2012,the base value for equity has been considered at 30 % in the light of 70:30 as Debt Equity ratio on the amount of Capital cost. Details shown in Table 1.

2.6 O&M EXPENSES – PETITIONER'S SUBMISSION

The Petitioner submitted the normative O&M Expenses for the FY 2018-19 to FY 2020-21 as per RE Regulation, 2012 which state that –

Normative O&M expenses for the first year of the control period (i.e) 2012-13 shall be as follows :-

For projects below 5 MW – Rs.25 Lakh/MW

For projects 5 MW – 25 MW – Rs.18 Lakh/MW

Normative expenses allowed shall be escalated @ 5.72% year over year. Details shown in Table 1.

2.7 INTEREST ON LOAN-PETITIONER'S SUBMISSION

The Petitioner has considered an Interest @ 12.20 % per annum on working capital as per RE Regulation, 2012. The calculation of interest on working capital, as submitted by the Petitioner is shown in Table 1.

2.8 SUMMARY SHEET - PETITIONER'S SUBMISSION

Table 1: Annual Revenue Requirement for FY 2018-19 - Petitioner's Submission

Sl. No	Head of Expense	Capital Cost	Interest on Loan	Depreciation	Return on Equity	O&M Expense	Interest on Working Capital	Total (Rs. in Lakh)
1	Kitpi Ph-I	1120.98	0	0	80.71	52.36	4.28	137.35
2	Nuranang	4035.53	0	47.44	290.56	150.79	14.53	503.31
3	T. Gompa	37.37	0	0.44	2.69	1.75	0.15	5.03
4	Dudunghar (chellengk- PhI)	22.42	0	0.26	1.61	1.05	0.09	3.02
5	Bramdhongchung	74.73	6.12	3.92	5.38	3.49	0.49	19.41
6	Shakti Nallah	74.73	6.12	3.92	5.38	3.49	0.49	19.41
7	Kitpi MHS Ph-II	2241.96	183.62	117.64	161.42	104.71	14.82	582.21
8	Chellengkang Ph-II	22.42	1.84	1.18	1.61	1.05	0.15	5.82
9	Bongleng	74.73	6.12	3.92	4.48	3.49	0.48	18.49
10	Thimbu	74.73	6.12	3.92	4.48	3.49	0.48	18.49
11	Bramdhongchung Ph-II	74.73	6.12	3.92	4.48	3.49	0.48	18.49
12	Tsechu Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49
13	Rahung	560.49	45.9	29.41	33.63	26.18	3.57	138.69
14	Dirang	1494.64	0	0	107.61	69.81	5.71	183.13
15	Sessa	1120.98	0	13.18	80.71	52.36	4.56	150.8
16	Rupa	149.46	0	1.76	10.76	6.98	0.61	20.11
17	Dokumpani	22.42	0	0.26	1.61	1.05	0.09	3.02
18	Domkhong	1494.64	122.41	78.42	107.61	69.81	9.88	388.14


Secretary (I/C)

State Electricity Regulatory Commission
Arunachal Pradesh

19	Sinchung	37.37	3.06	1.96	2.69	1.75	0.25	9.7
20	Ankaling	22.42	1.84	1.18	1.35	1.05	0.14	5.55
21	Khet	74.73	6.12	3.92	4.48	3.49	0.48	18.49
22	Mago MHS	74.73	6.12	3.92	4.48	3.49	0.48	18.49
23	Dikshi	22.42	1.84	1.18	1.35	1.05	0.14	5.55
24	Khadiyabey	149.46	12.24	7.84	8.97	6.98	0.95	36.98
25	Saktangrong	224.2	18.36	11.76	13.45	10.47	1.43	55.47
26	Jigaon	74.73	6.12	3.92	4.48	3.49	0.48	18.49
27	Zhongdongrong	747.32	61.21	39.21	44.84	34.9	4.75	184.91
28	Seppa	224.2	0	0	16.14	10.47	0.86	27.47
29	Pakke Kessang	22.42	0	0.26	1.61	1.05	0.09	3.02
30	Pacha MHS	2241.96	183.62	117.64	161.42	104.71	14.82	582.21
31	Pakoti	74.73	6.12	3.92	4.48	3.49	0.48	18.49
32	Patta Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49
33	Watte Mame	37.37	3.06	1.96	2.24	1.75	0.24	9.25
34	Kade Nallah	37.37	3.06	1.96	2.24	1.75	0.24	9.25
35	Kidding MHS	373.66	30.6	19.61	22.42	17.45	2.38	92.46
36	Dumi Dutte	22.42	1.84	1.18	1.35	1.05	0.14	5.55
37	Pappey Nallah	7.47	0	0.09	0.54	0.35	0.03	1.01
38	Patte MHS at Tali	22.42	0	0.26	1.61	1.05	0.09	3.02
39	Koye	37.37	3.06	1.96	2.24	1.75	0.24	9.25
40	Chambang	22.42	1.84	1.18	1.35	1.05	0.14	5.55
41	Paya MHS at Hiya	74.73	6.12	3.92	4.48	3.49	0.48	18.49
42	Mai Ph-I	1494.64	0	0	107.61	69.81	5.71	183.13
43	Mai Ph-II	747.32	0	0	53.81	34.9	2.86	91.57
44	Tago	3362.94	0	39.53	242.13	157.07	13.67	452.4
45	Dulom (Daporijo)	298.93	0	0	21.52	13.96	1.14	36.63
46	Maro	22.42	0	0.26	1.61	1.05	0.09	3.02
47	Sippi	2989.28	244.82	156.85	215.23	139.62	19.76	776.27
48	Ayingmuri MHS	186.83	15.3	9.8	11.21	8.73	1.19	46.23
49	Limeking MHS	22.42	1.84	1.18	1.35	1.05	0.14	5.55
50	Pinto Karo MHS	18.68	1.53	0.98	1.12	0.87	0.12	4.62


Secretary (I/C)

51	Sikin Karo	149.46	12.24	7.84	8.97	6.98	0.95	36.98
52	Sinyum Koro	74.73	6.12	3.92	4.48	3.49	0.48	18.49
53	Kojin Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49
54	Siyum	22.42	0	0.26	1.61	1.05	0.09	3.02
55	Pagi (Basar)	74.73	0	0	5.38	3.49	0.29	9.16
56	Along	298.93	0	0	21.52	13.96	1.14	36.63
57	Ego-Echi (Dali)	298.93	0	3.51	21.52	13.96	1.22	40.21
58	Mechuka	112.1	9.18	5.88	6.73	5.24	0.71	27.74
59	Yomcha	37.37	0	0.44	2.69	1.75	0.15	5.03
60	Beye	22.42	0	0.26	1.61	1.05	0.09	3.02
61	Kambang	4035.53	330.51	211.74	290.56	150.79	24.8	1008.4
62	Liromoba	1494.64	122.41	78.42	107.61	69.81	9.88	388.14
63	Yingko Sikong at Rapum	37.37	3.06	1.96	2.24	1.75	0.24	9.25
64	Angu	37.37	3.06	1.96	2.24	1.75	0.24	9.25
65	Solegomang MHS	37.37	3.06	1.96	2.24	1.75	0.24	9.25
66	Borong MHS	37.37	3.06	1.96	2.24	1.75	0.24	9.25
67	Sirikorang MHS	373.66	30.6	19.61	22.42	17.45	2.38	92.46
68	Yingkiong Ph-I	112.1	0	0	8.07	5.24	0.43	13.74
69	Sikut/ Tuting	74.73	0	0.88	5.38	3.49	0.3	10.05
70	Yingkiong Ph-II	149.46	0	1.76	10.76	6.98	0.61	20.11
71	Selli at Geku	373.66	0	4.39	26.9	17.45	1.52	50.27
72	Sirnyuk	1494.64	0	17.57	107.61	69.81	6.08	201.07
73	Kopu at Tuting	186.83	15.3	9.8	13.45	8.73	1.23	48.52
74	Silingri	37.37	3.06	1.96	2.69	1.75	0.25	9.7
75	Singa	22.42	1.84	1.18	1.61	1.05	0.15	5.82
76	Ngaming	37.37	3.06	1.96	2.69	1.75	0.25	9.7
77	Sika	11.21	0.92	0.59	0.81	0.52	0.07	2.91
78	Mayung	3.74	0.31	0.2	0.22	0.17	0.02	0.92
79	Gosang	373.66	30.6	19.61	22.42	17.45	2.38	92.46
80	Kote MHS	37.37	3.06	1.96	2.24	1.75	0.24	9.25
81	Sijen MHS at Adi pasi	37.37	3.06	1.96	2.24	1.75	0.24	9.25

Secretary (I/C)

82	Pyabung MHS	18.68	1.53	0.98	1.12	0.87	0.12	4.62
83	Pangkang MHS	93.42	0	1.1	6.73	4.36	0.38	12.57
84	Pasighat	149.46	0	0	10.76	6.98	0.57	18.31
85	Yembung	1494.64	0	17.57	107.61	69.81	6.08	201.07
86	Silli	22.42	0	0.26	1.61	1.05	0.09	3.02
87	Rina	1494.64	122.41	78.42	107.61	69.81	9.88	388.14
88	Deopani Ph-I	560.49	0	6.59	40.36	26.18	2.28	75.4
89	Abhapani	336.29	0	3.95	24.21	15.71	1.37	45.24
90	Deopani Ph-II	560.49	0	6.59	40.36	26.18	2.28	75.4
91	Anini/ Awapani Ph-I	112.1	0	1.32	8.07	5.24	0.46	15.08
92	Tah Ahfra Ph-I & Ph-II	74.73	6.12	3.92	4.48	3.49	0.48	18.49
93	Chini Afra	186.83	0	2.2	13.45	8.73	0.76	25.13
94	Echi Ahfra	298.93	0	3.51	21.52	13.96	1.22	40.21
95	Awapani Ph-II	373.66	0	4.39	26.9	17.45	1.52	50.27
96	Echito Nallah	29.89	2.45	1.57	1.79	1.4	0.19	7.4
97	Rupapani	29.89	2.45	1.57	1.79	1.4	0.19	7.4
98	Chu Nallah	22.42	1.84	1.18	1.35	1.05	0.14	5.55
99	Awapani at Gepuline	373.66	30.6	19.61	22.42	17.45	2.38	92.46
100	Mukto MHS	0	0	0	0	0	0	0
101	Theya Ahfra at Jambupani	22.42	0	0.26	1.61	1.05	0.09	3.02
102	Dura Nallah	373.66	30.6	19.61	22.42	17.45	2.38	92.46
103	Tafragram	186.83	0	2.2	13.45	8.73	0.76	25.13
104	Kaho	7.47	0	0.09	0.54	0.35	0.03	1.01
105	Kebitho	22.42	0	0.26	1.61	1.05	0.09	3.02
106	Mati Nallah	373.66	0	4.39	26.9	17.45	1.52	50.27
107	Yapak Nallah	149.46	0	1.76	10.76	6.98	0.61	20.11
108	Teepani	373.66	30.6	19.61	22.42	17.45	2.38	92.46
109	Krawti Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49
110	Hathipani	74.73	6.12	3.92	4.48	3.49	0.48	18.49
111	Tah Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49

Secretary (I/C)

112	Maipani	44.84	3.67	2.35	2.69	2.09	0.29	11.09
113	Ashapani	44.84	3.67	2.35	2.69	2.09	0.29	11.09
114	Langpani	298.93	24.48	15.68	17.94	13.96	1.9	73.97
115	Tissue	298.93	0	3.51	21.52	13.96	1.22	40.21
116	Jongkey Nallah	18.68	1.53	0.98	1.12	0.87	0.12	4.62
117	Ngonalo at Vijaynagar	74.73	6.12	3.92	4.48	3.49	0.48	18.49
118	Tinning	44.84	3.67	2.35	2.69	2.09	0.29	11.09
119	Chicklong	112.1	9.18	5.88	6.73	5.24	0.71	27.74
120	Thiratju	747.32	0	0	53.81	34.9	2.86	91.57
121	Charju	448.39	0	5.27	32.28	20.94	1.82	60.32
122	Sumhok Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49
123	Tahin Nallah	74.73	6.12	3.92	4.48	3.49	0.48	18.49
124	Kachopani MHS	149.46	12.24	7.84	8.97	6.98	0.95	36.98

2.9 WORK IN PROGRESS - 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 2018-19 after adjusting for Auxiliary Consumption. The format also includes similar data for FY 2016-17 and FY 2017-18.

Table 2: Work in Progress - Petitioner's Submission (Rs in Lakhs)

Sl. No.	Particulars	2016-17 (Actual)	2017-18 (Estimated)	2018-19 (Projected)
1	2	3	4	5
1	Opening balance	40609.45	42404.45	42404.45
2	Add : New investments	6381.83	5000	5000
3	Total	46991.28	47404.45	47404.45
4	Less investment capitalised	4586.83	5000	5000
5	Closing balance	42404.45	42404.45	42404.45

2.10 ANNUAL FIXED COSTS FY 2018-19 - 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 2018-19 after adjusting for Auxiliary Consumption. The format also includes similar data for FY 2016-17 and FY 2017-18:

Table 3: Annual Fixed Costs and Net Power Generation

S.No	Particulars	2016-17	2017-18	2018-19	2019-20	2020-21
		(Actual)	(Estimated)	(Projected)	(Projected)	(Projected)
1	Gross Generation (MU)	64.39	59.74	277.28	277.28	277.28
2	Auxiliary Consumption (MU)	2.22	1.36	2.77	2.77	2.77
3	Net Generation (MU)	62.17	58.38	274.51	274.51	274.51
4	Free Energy to home state (MU)	0	0	0	0	0
5	Royalty (Rs.)	0	0	0	0	0
6	Water Charges (Rs.)	0	0	0	0	0
7	Capacity Charges (Rs.)					
	a) Interest on Loan capitals (Rs.)	2157.14	2051.17	1930.73	1930.73	1915.43
	b) Depreciation (Rs.)	1457.37	1434.99	1434.99	1419.04	754.96
	c) Advance against depreciation (Rs.)	0	0	0	0	0
	d) O&M Expenses (Rs.)	8949.46	9964.37	2128.48	2250.23	2378.95
	e) Interest on working capital (Rs.)	244.93	245.28	244.63	250.64	243.11
	f) Foreign exchange Rate (%)	Not Applicable				
	g) Return on Equity	3090.72	3116.73	3312.45	3325.59	3333.48
	h) Income Taxes (Rs.)	Not Applicable				
	Total fixed expenses (5+6+7)	15899.6	16812.54	9051.28	9176.22	8625.93

2.11 INDICATIVE TARIFF - PETITIONER'S SUBMISSION

Table 4: Indicative Tariff - Petitioner's Submission

Sl.No	Name of Station	Net Generation (In MUs)	ARR (in Lakhs)	Tariff
1	Kitpi Ph-I	5.854	137.35	2.35
2	Nuranang	23.415	503.31	2.15
3	T. Gompa	0.195	5.03	2.58
4	Dudunghar (chellengk- Ph1)	0.117	3.02	2.58
5	Bramdhongchung	0.39	19.41	4.97
6	Shakti Nallah	0.39	19.41	4.97
7	Kitpi MHS Ph-II	11.708	582.21	4.97
8	Chellengkang Ph-II	0.117	5.82	4.97
9	Bongleng	0.39	18.49	4.74
10	Thimbu	0.39	18.49	4.74
11	Bramdhongchung Ph-II	0.39	18.49	4.74
12	Tsechu Nallah	0.39	18.49	4.74
13	Rahung	2.927	138.69	4.74
14	Dirang	7.805	183.13	2.35
15	Sessa	5.854	150.8	2.58
16	Rupa	0.781	20.11	2.58
17	Dokumpani	0.117	3.02	2.58
18	Domkhong	7.805	388.14	4.97
19	Sinchung	0.195	9.7	4.97
20	Ankaling	0.117	5.55	4.74
21	Khet	0.39	18.49	4.74
22	Mago MHS	0.39	18.49	4.74
23	Dikshi	0.117	5.55	4.74
24	Khadiyabey	0.781	36.98	4.74
25	Saktangrong	1.171	55.47	4.74
26	Jigaon	0.39	18.49	4.74
27	Zhongdongrong	3.903	184.91	4.74
28	Seppa	1.171	27.47	2.35
29	Pakke Kessang	0.117	3.02	2.58
30	Pacha MHS	11.708	582.21	4.97
31	Pakoti	0.39	18.49	4.74
32	Patta Nallah	0.39	18.49	4.74
33	Watte Mame	0.195	9.25	4.74
34	Kade Nallah	0.195	9.25	4.74
35	Kidding MHS	1.951	92.46	4.74

36	Dumi Dutte	0.117	5.55	4.74
37	Pappey Nallah	0.039	1.01	2.58
38	Patte MHS at Tali	0.117	3.02	2.58
39	Koye	0.195	9.25	4.74
40	Chambang	0.117	5.55	4.74
41	Paya MHS at Hiya	0.39	18.49	4.74
42	Mai Ph-I	7.805	183.13	2.35
43	Mai Ph-II	3.903	91.57	2.35
44	Tago	17.562	452.4	2.58
45	Dulom (Daporijo)	1.561	36.63	2.35
46	Maro	0.117	3.02	2.58
47	Sippi	15.61	776.27	4.97
48	Ayingmuri MHS	0.976	46.23	4.74
49	Limeking MHS	0.117	5.55	4.74
50	Pinto Karo MHS	0.098	4.62	4.74
51	Sikin Karo	0.781	36.98	4.74
52	Sinyum Koro	0.39	18.49	4.74
53	Kojin Nallah	0.39	18.49	4.74
54	Siyum	0.117	3.02	2.58
55	Pagi (Basar)	0.39	9.16	2.35
56	Along	1.561	36.63	2.35
57	Ego-Echi (Dali)	1.561	40.21	2.58
58	Mechuka	0.585	27.74	4.74
59	Yomcha	0.195	5.03	2.58
60	Beye	0.117	3.02	2.58
61	Kambang	23.415	1008.4	4.31
62	Liromoba	7.805	388.14	4.97
63	Yingko Sikong at Rapum	0.195	9.25	4.74
64	Angu	0.195	9.25	4.74
65	Solegomang MHS	0.195	9.25	4.74
66	Borong MHS	0.195	9.25	4.74
67	Sirikorang MHS	1.951	92.46	4.74
68	Yingkiong Ph-I	0.585	13.74	2.35
69	Sikut/ Tuting	0.39	10.05	2.58
70	Yingkiong Ph-II	0.781	20.11	2.58
71	Selli at Geku	1.951	50.27	2.58
72	Sirnyuk	7.805	201.07	2.58
73	Kopu at Tuting	0.976	48.52	4.97
74	Silingri	0.195	9.7	4.97
75	Singa	0.117	5.82	4.97
76	Ngaming	0.195	9.7	4.97
77	Sika	0.059	2.91	4.97
78	Mayung	0.02	0.92	4.74

79	Gosang	1.951	92.46	4.74
80	Kote MHS	0.195	9.25	4.74
81	Sijen MHS at Adi pasi	0.195	9.25	4.74
82	Pyabung MHS	0.098	4.62	4.74
83	Pangkang MHS	0.488	12.57	2.58
84	Pasighat	0.781	18.31	2.35
85	Yembung	7.805	201.07	2.58
86	Silli	0.117	3.02	2.58
87	Rina	7.805	388.14	4.97
88	Deopani Ph-I	2.927	75.4	2.58
89	Abhapani	1.756	45.24	2.58
90	Deopani Ph-II	2.927	75.4	2.58
91	Anini/ Awapani Ph-I	0.585	15.08	2.58
92	Tah Ahfra Ph-I & Ph-II	0.39	18.49	4.74
93	Chini Afra	0.976	25.13	2.58
94	Echi Ahfra	1.561	40.21	2.58
95	Awapani Ph-II	1.951	50.27	2.58
96	Echito Nallah	0.156	7.4	4.74
97	Rupapani	0.156	7.4	4.74
98	Chu Nallah	0.117	5.55	4.74
99	Awapani at Gepuline	1.951	92.46	4.74
100	Mukto MHS	23.415	0	0
101	Theya Ahfra at Jambupani	0.117	3.02	2.58
102	Dura Nallah	1.951	92.46	4.74
103	Tafragram	0.976	25.13	2.58
104	Kaho	0.039	1.01	2.58
105	Kebitho	0.117	3.02	2.58
106	Mati Nallah	1.951	50.27	2.58
107	Yapak Nallah	0.781	20.11	2.58
108	Teepani	1.951	92.46	4.74
109	Krawti Nallah	0.39	18.49	4.74
110	Hathipani	0.39	18.49	4.74
111	Tah Nallah	0.39	18.49	4.74
112	Maipani	0.234	11.09	4.74
113	Ashapani	0.234	11.09	4.74
114	Langpani	1.561	73.97	4.74
115	Tissue	1.561	40.21	2.58
116	Jongkey Nallah	0.098	4.62	4.74
117	Ngonalo at Vijaynagar	0.39	18.49	4.74
118	Tinning	0.234	11.09	4.74
119	Chicklong	0.585	27.74	4.74
120	Thiratju	3.903	91.57	2.35
121	Charju	2.342	60.32	2.58

Secretary (I/C)

State Electricity Regulatory Commission
Arunachal Pradesh

Page 22

122	Sumhok Nallah	0.39	18.49	4.74
123	Tahin Nallah	0.39	18.49	4.74
124	Kachopani MHS	0.781	36.98	4.74

2.12 PETITIONER'S PRAYER

The Petitioner requested the Commission to:

- Approve the Annual Fixed Charges as mentioned in the Petition.
- Pass necessary orders in the light of additional submissions made in the Petition.
- Pass such other and further order(s) as deemed fit and proper in the facts and circumstances of the case.

3. COMMISSION ANALYSIS: DETERMINATION OF ARR & TARIFF FOR FY 2018-19

3.1 GENERAL

DHPD has filed the petition for Tariff & ARR (Aggregate Revenue Requirement) of all their Generating Stations as per Multi Year Tariff Regulation, 2013 and detail methodology/calculations as per APSERC (terms and condition for determination of Tariff from Renewable Energy Source), 2012. The petitioner determined the project specific ARR and tariff for all 124 Nos projects separately contrary to their earlier petitions submitted as consolidated ARR and average Tariff for DHPD. The Commission cannot allow such inconsistency.

The Commission hereby directs DHPD to file petition as per provisions of RE Regulation, 2018 and as amended time to time. The consolidated ARR and average tariff filing shall be done annually, for plant commission before 31st March 2017. However, for upcoming new plants or commissioned after March 2017, DHPD should either go for generic tariff order published by the Commission or for project specific tariff as per RE Regulation, 2018.

The Commission has been struggling for data inputs from DHPD since the very first petition but still no effort has been made till date. So, in order to determine ARR and tariff annually, DHPD should keep updating all the relevant cost data such as capital cost/ GFA, O&M Costs (Employees, R&M and AG), additional capitalization etc. project wise for said year as required for ARR and tariff calculation.

The Commission has evaluated and determined ARR and tariff as per clause (7) & (8) RE Regulation as amended time to time. Since no data input has been received despite several communications, the Commission has considered the realistic data input like actual Capital cost/ GFA and Depreciation of assets etc. submitted by the petitioner in their earlier petitions. O&M expenses has been calculated considering normative rate as per RE Regulation, 2018.

Above basis has been taken for determining ARR and tariff for FY 2018-19.

3.2 POWER SCENARIO IN ARUNACHAL PRADESH

Table 5: Power Scenario in Arunachal Pradesh

Sl. No.	Particulars	Units	FY2017 -18	FY2018-19
1	Total no. of Power Plant	No's	116	124
2	Total Installed Capacity	MW	68.52	69.58
3	Annual Design Energy	MU	570.18	587.55
5	Total Power Plant Nil Generation	No's	36	44
6	Total Installed Capacity Nil Generation	MW	12	14.42
7	CUF with plant in operation	%	10.19%	9.72%

The Commission observes as per above table a very poor performance of the plants which is generating far below the capacity. The CUF comes around 10% instead of 45% as per RE Regulation, 2018.

Further, it is observed that 44 numbers of plant totalling to an installed capacity of about 14.42 MW has been shown to be generating nil energy over the past few years but their operation cost has been added in the ARR.

Hence, the Commission feels a sense of urgency to recover those plants which has nil generation or operating below its rated capacity due to some minor repair/ replacement/refurbishment of components/parts/works etc. DHPD should draw up a plan to take up the recovery of those plants and present it to the Commission along with the commercial justification, sources of funding, annual targets, and 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 or take up as PPA model basis.

3.3 ASSUMPTIONS FOR TARIFF PETITION ANALYSIS.

The Commission considered the following assumption for tariff analysis.

Table 6: The Assumptions considered for Tariff Petition Analysis

Sl. No.	Particulars	Unit	Value	Remarks
1	Auxiliary Consumption	%	1%	
2	O&M Expenses	%	38.06 lacs/MW (Below 5MW), 28.54 lacs/MW (5MW-25MW) with Escalation @ 5.25% every year	As per RE Regulation, 2018

3	Depreciation	%	Project commission before March 2012, rate of depreciation taken @ 2.57%	Project commission after 2012 rate of depreciation @ 5.28% as per RE Regulation, 2018	
(a)	Plant Life	Years	For SHP 35 years		
(b)	Salvage value	%	10%		
5	Capacity Utilization Factor	%	36%		
6	Project wise Capital cost	INR in Lakh	Considered as per data available		
7	RoE	%	17.56%		
					As per RE Regulation, 2018
8	Interest on working capital	%	11.20%		
					As per RE Regulation, 2018

3.4 CAPITAL COST – COMMISSION ANALYSIS

The Petitioner has determined the Capital cost as per RE Regulation, 2012 of all the power plants individually (as shown in DHPD Tariff petitions – Table No. 4.3). The Commission considered 5 nos plants defunct out of 124 power plants as confirmed by the petitioner and one power plant under trial and one power plant have evacuation issue as submitted by the Petitioner.

So while analysing, the Commission considered only plants in operation. The Commission derived the capital cost from estimated cost submitted in previous petitions.

The Commission could able to find out the project cost for 80 number of projects totalling to 48.78 MW out of 117 Nos of plants as maintained by DHPD.

The Commission did not allowed any depreciation or return on equity for rest of the 37 nos of plants whose capital cost/GFA is not available.

The detail data is tabulated at Annexure-2

3.5 DEPRECIATION- COMMISSION ANALYSIS

The Petitioner has determined the Depreciation as per RE Regulation, 2012 of all the power plants individually (as shown in DHPD Tariff petitions – Table No. 5.2.1).

Despite repeated requests made by the Commission, DHPD did not furnish the detail 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 tariff.

The Commission has computed depreciation as for project commission before March 2012, rate of depreciation taken @ 2.57% on the project cost value considering the life of project to be 35 years and project commission after 2012, rate of depreciation taken @ 5.28% (as per RE Regulation, 2018).

The Commission has estimated the depreciation based on data as extracted from the available records for 80 nos of plants, which is as follows.

Table 7: Depreciation for Plants Commissioned till FY 2011-12

Installed Capacity (MW)	Project Cost (Rs.in Crores) for 69 nos. projects	Depreciated value FY 2018-19 (@ 2.57 PA) (Rs.in Crores)
39.45	389.46	10.01

Table 8: Depreciation for Plants Commissioned after FY 2011-12 -Commission Analysis

Installed Capacity (KW)	Project Cost (Rs in Crores)	Depreciation for FY 2018-19 @ 5.28PA (Rs in Crores)
9.86	40.86	1.94

(plant wise depreciation tabulated at Annexure 3 & 4)

Considering the above data, depreciation for the FY 2018-19 has been calculated which comes to **11.95 Cr (approx.)** and the Commission approves the same.

3.6 O&M EXPENSES – COMMISSION ANALYSIS

The Petitioner has submitted the Normative Operation and Maintenance Expenses separately for all the Power Plants as per the RE Regulation, 2012 (as shown in DHPD Tariff petitions –Table No. 5.5.1). The Petitioner did not submitted any detail actual data of O&M such as Employee expenses, A&G expenses and R&M expenses.

The Commission has already submitted through their earlier orders that the strength of 2831 employees for 116 small/micro projects seems to be very high and its cost thereof. It seems that 2831 nos of employees are in total with DHPD. Hence, the Commission maintained his observation to DHPD to clearly spell out to how many of them are engaged in ongoing construction projects and other activities of the DHPD and how many are actually involved for Operation & Maintenance works despite several communication.

However, the Commission allowed the operation and maintenance costs considering the normative rate as 38.06 Lakhs per MW (for Plant below 5 MW) and 28.54 Lakhs per MW (for plants above 5 MW upto 25 MW) as per APSERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources Regulations-2018

Table 9: O&M Expenses-Commission Analysis (Rs. in Cr.)

Sl.No.	Particulars/Years	2017-18	2018-19
1	Total O&M as per the Petitioner (Rs. Crs.)	77.01	21.29
2	YoY Change	5.72%	As per RE Regulation, 2018
3	Commission's Approval (Rs. Crs.)	20.92	25.34

(Detail calculation is attached at Annexure-5)

The Commission in a view to allow O&M costs in accordance with RE Regulation, 2018 and hence approved the O&M cost Rs. 25.34 Cr for FY 2018-19.

3.7 RETURN ON EQUITY – COMMISSION ANALYSIS

DHPD submitted the ROE considering normative capital cost and Debt:Equity ratio as 70:30 (as shown in DHPD Tariff petitions –Table No. 5.3.1). The Commission however allowed the ROE as per normative in the last order. Since the petitioner is not submitting any relevant actual data.

So, the Commission now allows the ROE only on the realistic project cost as submitted by the petitioner in their earlier petitions.

Table 10: Return on Equity-Commission Analysis

Sl. No.	Particulars/ Years	Gross Fixed Asset	Equity (30%)	Loan (70%)	Return on Equity
3	2017-18	667.15	200.15	467.01	35.15
4	2018-19	508.31	152.49	355.81	26.78

(detail calculation is attached at Annexure-6)

The Commission has not considered any addition of equity for capitalized works, and therefore, approved the Return on Equity in accordance with RE Regulation, 2018 @ 17.56% allow **Rs 26.78 Crs** for RoE in the FY 2018-19.

3.8 INTEREST ON LOAN CAPITAL – COMMISSION ANALYSIS

DHPD submitted the Interest on Loan Capital considering normative capital cost and Debt: Equity ratio as 70:30 (as shown in DHPD Tariff petitions –Table No. 5.1.1).The Commission does not approved any interest on loan capital, since no loan component exist against the projects.

The project owned by DHPD 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 approved.

3.9 INTEREST ON WORKING CAPITAL – COMMISSION ANALYSIS

The Petitioner has submitted the Interest on working capital separately for all the Power Plants as per the RE Regulation, 2012 (as shown in DHPD Tariff petitions –Table No. 5.4.1) which should have been as per RE Regulation, 2018.

The Commission has computed Interest on working capital as per RE Regulations, 2018 according to which the working capital for SHPs would be sum total of:

- O&M expenses for one month.
- Maintenance spares @15% of O&M expenses.
- Receivables equivalent to two months of energy charges for sale of electricity calculated on the normative Capacity Utilization Factor
- Interest on working capital

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.

Table 11: Interest on Working Capital - Commission's Analysis (Rs. In Crs.)

Sl.No	Particulars	2017-18	2018-19
1	O&M expenses for one month	1.74	2.11
2	Maintenance spares (15% of O&M)	3.14	3.80
3	Receivables (2 months of energy charges calculated at 45% CUF)	10.52	11.03
4	Total Working Capital	15.4	16.94

5	Interest on Sl. 4 above	11.45%	11.20%
5	Interest on working capital	1.6	1.92

(detail calculation is attached at Annexure-7)

The Commission approved Interest on Working Capital as **Rs. 1.92 Crs** for the FY 2018-19.

3.10 COMMISSION'S ANALYSIS & APPROVAL OF ARR

The Petitioner has submitted the Annual Revenue Requirement separately for all the Power Plants as per the RE Regulation, 2012 *(as shown in DHPD Tariff petitions –Table No. 5.6.1).*

Based on the above analysis, the ARR Approved for DHPD for FY 2018-19 is summarized below:

Table 12: Annual Fixed Charges- Commission's Analysis (Rs. in Crores)

Sl.no	Particulars	Amount for FY 2017-18	Amount for FY 2018-19
1	Interest on Loan	0.00	0.00
2	Depreciation	10.58	11.95
3	Return on Equity	35.15	26.78
4	O & M Expenses	20.92	25.34
5	Interest on Working Capital	1.60	1.92
6	Total Annual Fixed Charges (AFC) Sl.no 1 to 5	68.25	65.93
7	Fee for Tariff Petition Filing	0.05	0.05
8	Total amount approved	68.30	65.98

The Commission approved based on the above analysis, the annual fixed cost as **Rs 65.98 Crs** for FY 2018-19.

3.11 HYDRO POWER GENERATION TARIFF FOR FY 2018-19 COMMISSION'S ANALYSIS

Regulation 28 of the APSERC Regulation on “The Terms and Conditions for Determining of Tariff Determination from Renewable Energy Sources – 2018” dated 21st May, 2018 specifies the Auxiliary Energy Consumptions Norms of Operation in respect of the Hydro Plants at 1% for SHPs.

The Commission in its tariff order has reasonable considered CUF of 36% for SHP because of the factual information furnished by the DHPD and the operational working conditions of the smaller capacities of number of hydel stations spread over the remote parts of the state of Arunachal Pradesh. 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 the CUF 45% as per the Regulation 27 of RE Regulation, 2018.

As a first step towards improvement of efficiency, DHPD shall make an all-out effort to increase the present generation at least by 21.73 MU (i.e. 10% of saleable energy 217.38 MU) more in the present generation energy.

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 13: Annual Fixed Charges- Commission's Analysis

Sl.no	Particulars	FY 2017-18	FY 2018-19
1	Annual Fixed Charges (Rs in Cr)	68.29	65.98
2	Installed Capacity (MW)	68.52	69.58
3	CUF considered (%)	0.45	0.36
4	Gross Energy (MU)	256.58	219.58
6	Auxiliary Power Consumption (1 %)	2.57	2.19
7	Saleable Energy (MU)	254.02	217.38
8	Tariff (Rs/kWh)	2.69	3.04

Hence, the Commission approved the generation tariff for DHPD Hydro Electric plants for FY 2018-19 at **3.04 (Rs/kWh)**.

4. COMPLIANCE OF DIRECTIVES

4.1 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, FY 2015-16 and FY 2017-18. It is a matter of great concern that many of the directives have not been complied till date. DHPD is hereby again directed to furnish upto date compliance report of all directives issued till date as soon as possible.

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

4.2 DIRECTIVES

(1) Electricity Regulatory Cell

DHPD 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, to ensure consistency and timelines of the data submitted and proper co-ordination with the Commission in the tariff determination process.

As per DHPD the Department have a nodal officer for Tariff and Regulatory matters. But due to lack of officers Electricity Regulatory Cell is still under process. However, the Commission direct DHPD it is very urgent to have this cell headed by some senior officials from DHPD and and furnish details of Concern officer, their phone nos. and email IDs for faster and efficient working.

(2) Generation

DHPD has generated and supplied only 58.36 MU during FY 2017-18 against saleable energy of 217.38 MU, which is just approx. 10%. 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 21.73 MU (i.e. 10% of saleable energy 217.38 MU) more in the present generation energy.. 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.

- (3) The Commission hereby also directs the Petitioner/ DHPD to keep project wise all data's for ongoing projects updated as estimated cost, revised Capital cost if any, progress physical & financial, O&M expenses (Employees, R&M and AG), Additional capitalization etc. that shall have to be submitted along with the petition along with the supporting documents.

(4) For newly Hydro Electric Plant to be commissioned

For newly Hydro Electric Plants the petitioner should get tariff fixed for entire useful life of plant on levelled basis by adopting the Generic tariff order published by the Commissioned or by filling separate for project specific tariff as per RE Regulation, 2018 and its amendment time to time.

For project specific Tariff filling petitioner is hereby directed to keep all data updated data like estimated & completed cost, Equity, Debt, O&M expenses (Employees, R&M and AG), Additional capitalization etc. and to be submitted along with the petition.

(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.

(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 one 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.

(7) 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.

(8) 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. The Commission received a status sheet from DHPD for plants so called in operation but shutdown due to several reasons indicated (Refer Annexure 1). It is observed that 44 numbers of plant totaling to an installed capacity of about 14.42 MW has been shown to be generating nil energy over the past few years.

Hence, the Commission observe an urgency to recover at least those plants which has nil generation or operating below its rated capacity due to some minor repair/ replacement/refurbishment of components/parts/works etc.

The Commission hereby directs DHPD to draw up a plan to take up the recovery of those plants and present it to the Commission along with the commercial justification, sources of funding, annual targets, and time lines of restoration of generation.

(9) 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.

(10) Depreciation for FY 2018-19

The 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 and accordingly approved the cost as calculated.

The Commission hereby directs the DHPD to get the project asset value re-evaluated through deploying the professional valuer and estimator for all the old plants whose capital is not available with the department so that a realistic depreciation can be calculated.

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

(11) Training and skill development of the employees of 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.

(12) 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. In this regard, the DHPD shall have to co-ordinate with SLDC which is being upgraded to have communication with the plants in Generation with SLDC. The DHPD need to update the Commission.

(13) 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.

(14) 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.

(15) Data Deficiencies and submission of Tariff Petition.

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.

(16) The Commission observed through the previous petitions filled that the various activities are being taken by the petitioner/DHPD and listed in their petition as Annexure 'Outlays And Expenditure Of On-Going Schemes and hydel Improvement, special repair (Hydel Improvement), R&M works etc. for different plants in operation. The petitioner did not furnish any proposal along with technical details, expenditure etc. for the said projects for information/ accounting to the Commission.


Secretary (I/C)

(17) 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: 02/11/2018

Place: Itanagar



(R.P.Singh)

Chairperson



Secretary (I/C)
State Electricity Regulatory Commission
Arunachal Pradesh

5. ANNEXURES

5.1 Annexure 1- Details of Project under DHPD

Sl. No.	Name of Existing Hydel	District/Zone	COD	Installed Capacity (in MW)	Actual Generation (in MU)	Remarks
1	2	4	3	5	6	7
1	Kitpi Ph-I	Tawang/WZ	1977 - 78	1.50	0.531	Unit-I Shutdown due to Turbine damage, Unit-II in Operation, Unit-III Shutdown due to TG coupling and generator bearing damage.
2	Nuranang	Tawang/WZ	1996 - 97	6.00	8.732	Unit-I shutdown due to low discharge, Unit-II in operation, Unit-III Shutdown w.e.f 07/10/12 due to runner bucket damage.
3	T.Gompa	Tawang/WZ	2001-02	0.05	0.086	Plant in Operation.
4	Chellengkang Ph-I	Tawang/WZ	2004-05	0.03	0.039	Plant in Operation.
5	Bramdhongchung Ph-I	Tawang/WZ	20-10-2008	0.10	0.000	Plant Shutdown since 16th july 2013 due to damage of turbine bearing.
6	Shakti Nallah	Tawang/WZ	15-03-2009	0.10	0.058	Unit-I In Operation, Unit-II Shutdown since 19/05/13 due to turbine bearing problem.
7	Kitpi MHS Ph-II	Tawang/WZ	16-12-2008	3.00	4.307	Unit-I in Operation, Unit-II Shutdown due to EM component defect.
8	Chellengkang Ph-II	Tawang/WZ	11-11-2009	0.03	0.071	Plant in Operation.
9	Bongleng	Tawang/WZ	15-10-2011	0.10	0.029	Unit-I Shutdown due to sluice valve problem, Unit-II Plant in Operation.
10	Thimbu	Tawang/WZ	09-07-2009	0.10	0.054	Unit-I in operation, Unit-II Shutdown due to sluice valve problem, runner shaft wear and tear.
11	Bramdhongchung Ph-II	Tawang/WZ	10-12-2009	0.10	0.044	Plant Shutdown due to low discharge w.e.f 18/12/17.
12	Tsechu Nallah	Tawang/WZ	09-07-2012	0.10	0.041	Unit-I Shutdown due to No Load, Unit- II in operation.
13	Khet	Tawang/WZ	20-06-2010	0.10	0.040	Plant Shutdown due to formation work on LMT road at Khet Village w.e.f 23/12/17.
14	Mago MHS	Tawang/WZ	2014-15	0.10	0.041	Unit - I - in Operation, Unit - II Shutdown due to no load.
15	Mukto MHS	Tawang/WZ	Under Trial Run	6.00	10.175	Plant in Operation
16	Rahung	West Kameng/WZ	1972 - 73	0.75	0.871	Unit-I & II in Operation, Unit-III Shutdown since sept 2004 due to turbine and alternator are out of order.
17	Dirang	West Kameng/WZ	1977 - 78	2.00	2.941	Unit-I Shutdown due to bursting of Turbine Casing, Unit-II & IV - In operation, Unit-III Shutdown due to failure of Alt & Electronic Governor.
18	Saktangrong MHS	West Kameng/WZ	2011-12	0.30	0.000	Unit-I & II Shutdown w.e.f 29-10-15 due to damage of runner blade due to silt, Unit-III Penstock, sluice valve clogged with silt.
19	Zhongdongrong	West Kameng/WZ	05-11-2016	1.00	1.019	Plant in Operation
20	Sessa	West Kameng/WZ	1992 - 93	1.50	0.556	Unit-I Shutdown due to stator wdg burn out, Unit-II in operation, Unit-III breakdown since long.
21	Rupa	West Kameng/WZ	1997 - 98	0.20	0.132	Unit - I Shutdown due to low discharge, Unit - II in Operation.
22	Dokumpani	West Kameng/WZ	2000-01	0.03	0.018	Plant shutdown due to power channel blockage w.e.f 12/06/17.
23	Domkhong	West Kameng/WZ	2008-09	2.00	0.000	Plant shutdown and dismantled for derating from 2 x 1000 kW to 2 x 500 kW. The work is in progress.

24	Sinchung	West Kameng/WZ	2008-09	0.05	0.000	Plant shut down since commissioning time due to low water discharge as discharge is used by villagers in irrigation and drinking water supply.
25	Ankaling	West Kameng/WZ	2009-10	0.03	0.000	Shutdown w.e.f 15-11-15 due to burn out of conductor.
26	Dikshi	West Kameng/WZ	2010-11	0.03	0.027	Plant shutdown w.e.f 12/06/17 due to power channel damage.
27	Khadiyabey	West Kameng/WZ	2011-12	0.20	0.000	All Electromechanical equipments of this project is totally sub merged under earth by heavy flood w.e.f 17-08-2014 due to continuous rain fall.
28	Jigaon	West Kameng/WZ	01-10-2016	0.10	0.154	Unit-I in Operation. Unit-II Shutdown due to low water discharge.
29	Seppa	East Kameng/WZ	1980 - 81	0.30	0.000	Machine shut down on July 2009 due to defect in Alternator, Governor, Turbine, Panel board & AVR.
30	Pakke Kessang	East Kameng/WZ	2001-02	0.03	0.008	Restored w.e.f 24/01/2018 but kept as standby due to grid supply availability.
31	Pacha MHS	East Kameng/WZ	2008-09	3.00	3.619	Unit-I in Operation. Unit-II Shutdown due to shaft and bearing damage.
32	Pakoti	East Kameng/WZ	2010-11	0.10	0.309	Unit-I in operation. Unit-II Shutdown due to lack of AVR card of 63 kVA Alt. 100 A MCCB required.
33	Patta Nallah	East Kameng/WZ	2010-11	0.10	0.280	Unit-I In operation. Unit-II Shutdown due to Alternator problem.
34	Watte Mame	East Kameng/WZ	2010-11	0.05	0.128	Plant in Operation
35	Kade Nallah	East Kameng/WZ	2010-11	0.05	0.000	Unit is shutdown since 13/07/12 due to wash out of power channel.
36	Koye	Kurung Kumey/WZ	2009-10	0.05	0.000	Hydel kept inoperative due to absence of step up transformer. Panel board components damaged due to dampness.
37	Paya MHS at Hiya	Kurung Kumey/WZ	2011-12	0.10	0.144	Plant shutdown due to earth fault in 11 kV line w.e.f 27/02/2018.
38	Kidding MHS	Kurung Kumey/WZ	22-05-2017	0.50	0.452	Plant under Trial Run.
39	Dumi Dutte	Kurung Kumey/WZ	18-12-2017	0.03	0.004	Put into Commercial Operation w.e.f 18/12/17 but due to defect T&D. Proper power could not be evacuated.
40	Pappey Nallah	Kurung Kumey/WZ	1995-96	0.01	0.000	Defunct
41	Patte MHS at Tali	Kra Dadi/WZ	2004-05	0.03	0.000	Power Channel and all EM equipments damaged.
42	Chambang	Kra Dadi/WZ	2009-10	0.03	0.000	Plant under Trial run.
43	Mai PH-I	Lower Subansiri/WZ	1977 - 78	2.00	0.006	Unit-I TG set foundation under repair. Unit-II & III shutdown as it requires overhauling. Unit-IV Shutdown as TG set foundation under reconstruction.
44	Mai PH-II	Lower Subansiri/WZ	1982 - 83	1.00	0.000	Unit-I taken for overhauling by M/s Ape Power. Unit-II requires overhauling. Work Would be done after unit-I
45	Tago	Lower Subansiri/WZ	1992 - 93	4.50	0.869	Unit-I in Operation. Unit-II Dismantled for overhauling by Ape Power Ltd. Unit-III Overhauling done. Awaiting commissioning.
46	Maro	Upper Subansiri/WZ	2002-03	0.03	0.000	Power to Maro village has been drawn from grid source machine kept as standby.
47	Sippi	Upper Subansiri/WZ	2008-09	4.00	4.677	Unit-I In Operation. Unit-II Shutdown due to maint of power channel w.e.f 27/12/17.
48	Siyum	Upper Subansiri/WZ	2005-06	0.03	0.000	Defunct
49	Pinto Karo	Upper Subansiri/WZ	2011-12	0.03	0.000	Commissioned w.e.f 15/12/16. Line charged upto 11 kV transformer and found good. Awaiting Drawal by DoP.
50	Sikin Koro	Upper Subansiri/WZ	2011-12	0.20	0.000	Commissioned on 25-04-17 but shutdown due to defect in transmission line of DoP.

Secretary (I/C)

51	Sinyum Koro	Upper Subansiri/WZ	2011-12	0.10	0.000	Commissioned on 2nd March 2017. Line charged upto 11 kV transformer and found good. Awaiting drawal by DoP.
52	Dulom (Daporijo)	Upper Subansiri/WZ	1981 - 82	0.40	0.000	Hydel Station shutdown since 2008 and presently R&M works on EM is progress.
53	Ayingmuri MHS	Upper Subansiri/WZ	2012-13	0.25	0.000	Plant Shutdown since 2014 due to E&M equipments damaged and problem.
54	Limeking MHS	Upper Subansiri/WZ	2012-13	0.03	0.000	Washed out by Flood during 2013.
55	Kojin Nallah	Upper Subansiri/WZ	2011-12	0.10	0.000	Intake weir washed away. Low discharge of water at tapping point and hence no generation since 2012.
56	Pagi (Basar)	West Siang/EZ		0.10	0.120	Due to breakdown of coupling assembly and burning of ELC driver card of unit-ii, only unit-I is operated.
57	Along	West Siang/EZ	1972 - 73	0.30	0.018	Frequent shutdown due to unstable grid voltage. Synchronisation with grid line is not possible due to unavailability of independent AVR.
58	Ego-Echi (Dali)	West Siang/EZ	Under Trial Run	0.40	0.615	Due to burning of stator winding, unit-IV is shutdown. Unit- I, II, III - in Operation.
59	Mechuka	West Siang/EZ	1987 - 88	0.15	0.000	Plant shutdown due to flood damage of water conductor system.
60	Yomcha	West Siang/EZ	2015-16	0.05	0.000	Machine shut down since 2008 due to T&D problem, low discharge and panel board break down.
61	Beye	West Siang/EZ	2001-02	0.03	0.000	W.e.f 08/12/15 DoP is supplying the load demand. Hence Shutdown.
62	Kambang	West Siang/EZ	2004-05	6.00	0.000	Plant shut down due to non-availability of grid line.
63	Liromoba	West Siang/EZ	2008-09	2.00	0.193	Due to heavy landslide, power channel has been damaged and choked. Hence shutdown for maintenance.
64	Yingko Sikong at Rapum	West Siang/EZ	2008-09	0.05	0.050	Plant operated from 4 PM to 8 AM daily as no load during daytime.
65	Angu	West Siang/EZ	2009-10	0.05	0.000	The maximum load the plant can generate during peak season is 25 KW whereas the demand of the nearest load center is above 25 Kw which is fed through grid.
66	Solegomang MHS	West Siang/EZ	2010-11	0.05	0.052	Plant operated from 4pm to 8am daily as no load during daytime.
67	Borung MHS	West Siang/EZ	2011-12	0.05	0.000	Hydel completely washed out due to flood on 30/06/14. Defunct
68	Sirikorang MHS	West Siang/EZ	2011-12	0.50	1.231	Plant in operation.
69	Yingkiong Ph-I	Upper Siang/EZ	2013-14	0.15	0.186	Plant in operation.
70	Yingkiong Ph-II	Upper Siang/EZ	1980 - 81	0.20	0.457	Plant in operation.
71	Siku/Tuting	Upper Siang/EZ	1992 - 93	0.10	0.185	Plant in operation.
72	Selli	Upper Siang/EZ	1984 - 85	0.50	0.835	Plant in operation.
73	Pangkang	Upper Siang/EZ	1994 - 95	0.13	0.000	Defunct
74	Sirnyuk	Upper Siang/EZ	1995-96	2.00	4.261	Plant in operation.
75	Kopu at Tuting	Upper Siang/EZ	1996 - 97	0.25	1.034	Plant in operation.
76	Silingri	Upper Siang/EZ	2007 - 08	0.05	0.164	Plant in operation.
77	Singa	Upper Siang/EZ	2008-09	0.03	0.049	Plant in operation.
78	Ngaming	Upper Siang/EZ	2008-09	0.05	0.169	Plant in operation.
79	Sika	Upper Siang/EZ	2008-09	0.02	0.000	On Auxiliary Load Only. Machine is run for 1 hour a day due to damage in T&D Line.
80	Mayung	Upper Siang/EZ	2008-09	0.01	0.000	Machine is restored on 28-03-18

Secretary (I/C)

81	Gosang	Upper Siang/EZ	2009 - 10	0.50	0.296	Plant in Operation
82	Kote MHS	Upper Siang/EZ	2011-12	0.05	0.000	On Auxiliary Load Only. Machine is run for 1 hour a day due to damage in T&D Line.
83	Sijen MHS at Adi Pasi	Upper Siang/EZ	2011-12	0.05	0.000	No provision for step up switchyard and T&D line.
84	Pyabung MHS	Upper Siang/EZ	2011-12	0.03	0.000	Power channel damage, evacuation line yet to be completed.
85	Pasighat	East Siang/EZ	2011-12	0.20	0.215	Unit-I Shutdown since long as machines is lying dismantled and now under R&M. Unit-II in operation.
86	Yembung	East Siang/EZ	1974 - 75	2.00	0.951	Unit-I and IV machine dismantled since long. Now under R&M. Unit-II Shutdown due to breakdown of AVR. Unit-III in operation.
87	Silli	East Siang/EZ	1994 - 95	0.03	0.055	Plant in Operation
88	Rina	East Siang/EZ	2001-02	2.00	1.610	Unit-I in operation. Unit-II shutdown due to breakdown in governor.
89	Deopani Ph-I	Lower Dibang Valley/EZ	2008-09	0.75	0.050	Unit-I shutdown due to defect in alternator, bearing, OPU, governor etc. Unit-II shutdown due to defect in panel board. Unit-III shutdown due to less discharge w.e.f 27-01-18.
90	Deopani Ph-II	Lower Dibang Valley/EZ	1986 - 87	0.75	0.054	Unit-I shutdown due to incoming breaker defect. Unit-II is in running condition w.e.f. 13.11.17 at 1230 Hrs. However, machine shutdown due to defective OPU w.e.f. 20.11.17 at 0900 Hrs. Unit-III shutdown due to defective OPU water connecting pipe.
91	Abhapani	Lower Dibang Valley/EZ	2004-05	0.45	0.000	Civil structure damaged (penstock pipe). one unit under R&M
92	Theya Ahfra at Jambupani	Lower Dibang Valley/EZ	1994 - 95	0.03	0.000	Defunct
93	Awapani Ph-I (Anini)	Lower Dibang Valley/EZ	2000-01	0.15	0.000	Unit I & III is completely damaged/dismantled. Bearing of unit II needs to be changed, re-aligned and control panels need to be re-calibrated. 24V battery is damaged.
94	Awapani Ph-II	Lower Dibang Valley/EZ	1994 - 95	0.50	1.354	Plant in Operation
95	Awapani at Gepuline	Dibang Valley/EZ	2005-06	0.50	0.094	Guide vane of Unit-I is not responding and AVR card of unit-II is malfunctioning. Trash Rack is yet to be fitted.
96	Tah Ahfra Ph-I & Ph-II	Dibang Valley/EZ	2014-15	0.10	0.000	Civil works have just started. Alternator, turbine and step-up transformer need overhauling. All the panels need to be re-calibrated, new battery bank and charger needed.
97	Chini Afra	Dibang Valley/EZ	2001-02 & 2009-10	0.25	0.000	Civil works of desilting tank and trash rack is fixed. CT of Y-phase is punctured due to lightning. DE thrust bearing and collar is fully damaged. Turnkey contractor assured to start the needful repair/replacement work with some conditions. Detailed report has been submitted.
98	Echi Ahfra	Dibang Valley/EZ	2001-02	0.40	0.127	Unit-I Shutdown w.e.f 27-02-18 due to mechanical defect. Unit-II is running temporarily.
99	Echito Nallah	Dibang Valley/EZ	2005-06	0.04	0.040	Alternator I is defective as no voltage is generated. Low water discharge and panel needs re-calibration. Unit-II in Operation.
100	Rupapani	Dibang Valley/EZ	2010-11	0.04	0.003	Plant shutdown due to runner shaft broken and blades need repair.
101	Chu Nallah	Dibang Valley/EZ	2010-11	0.03	0.015	Driver card of panel burnt. Panel metering needs recalibration. 24 Volts battery required. Runner lock of unit-I is damaged.

Secretary (I/C)

102	Doorah Nallah	Lohit/EZ	2011-12	0.50	0.289	Cascade machine shutdown w.e.f. 16.07.17 due to AVR of set no. I & II defective and alternator bearing and turbine bearing of set no. II also defective.
103	Tafragram	Lohit/EZ	1976 - 77 & 2013-14	0.25	0.126	Plant shutdown on 11.08.17 at 0730 hrs due to wash-out of penstock pipe in flash flood at Doorah nallah river point.
104	Tissue	Changlang/EZ	1984 - 85	0.40	0.684	Plant in operation.
105	Jongkey Nallah	Changlang/EZ	1986 - 87	0.03	0.012	Shutdown w.e.f 11.11.2017 due to low discharge.
106	Ngonalo at Vijaynagar	Changlang/EZ	2011-12	0.10	0.000	Not commissioned due to low discharge and penstock pipe leakage.
107	Tinning	Changlang/EZ	2010-11	0.06	0.092	Plant in operation.
108	Chicklong	Changlang/EZ	2010-11	0.15	0.054	Shutdown due to less discharge.
109	Thiratju	Tirap/EZ	2011-12	1.00	0.134	Plant shutdown due to repair of power channel.
110	Charju	Tirap/EZ	1978 - 89	0.60	1.121	Unit-I taken to kopu MHS and its replacement under repair at TSK. Unit II & III in operation.
111	Sumhok Nallah	Tirap/EZ	1984 - 85	0.10	0.000	Shutdown due to decrease in discharge of water.
112	Tahin Nallah	Tirap/EZ	2009-10	0.10	0.000	The Power Channel of this Hydel Station runs along paddy field and swampy area. Due to weight of RCC structure, the gradient of base of the channel has been disrupted by sinking and cracking of channel at several locations totalling to about 460.00 mtr of length. due to which water spills over and leaks out from the channel, thus reducing the design discharge required to run the turbines and also protection work at valley side of power channel has to be provided to avoid land slide/erosion of soil.
113	Kaho	Anjaw/EZ	2011-12	0.01	0.004	Plant in Operation.
114	Kebitho	Anjaw/EZ	2004-05	0.03	0.000	Plant is shutdown as new ELC is being installed.
115	Mati Nallah	Anjaw/EZ	2004-05	0.50	1.330	New Pelton turbine and electronic governor is under testing.
116	Yapak Nallah	Anjaw/EZ	2004-05	0.20	0.620	Plant in operation.
117	Teepani	Anjaw/EZ	2005-06	0.50	1.308	Unit-I Shutdown w.e.f 19/03/18 due to voltage problem. Unit-II in Operation
118	Krawti Nallah	Anjaw/EZ	2009-10	0.10	0.033	Unit-I & II is under shutdown due to damage of runner.
119	Hathipani	Anjaw/EZ	2009-10	0.10	0.000	Power transformer damaged and unstable frequency.
120	Tah Nallah	Anjaw/EZ	2009-10	0.10	0.000	Civil structure of water conducting system including penstock pipe completely damaged in flood during April 2010. also substation and transformer damaged.
121	Maipani	Anjaw/EZ	2009-10	0.06	0.000	The plant could not tested due to lack of power evacuation system.
122	Ashapani	Anjaw/EZ	2010-11	0.06	0.000	Plant shutdown due to low demand as the power required is fed from Kachapani MHS which has a common evacuation system.
123	Langpani	Anjaw/EZ	2011-12	0.40	0.162	Repairing job of Unit-I is under progress and Unit-II is in Operation.
124	Kachapani MHS	Anjaw/EZ	2011-12	0.20	0.106	Only Single unit is run at a time due to low demand.

Annexure 2. Capital Cost of Hydro Electric Power Station of DHPD

Sl. No.	Name of Station	Division/Zone	Installed Capacity (MW)	COD	Capital Cost (RS. In Lakh)
1	Nuranang	Western Zone	6.00	01-04-1996	985.00
2	Bramdhongchung	Western Zone	0.10	01-04-2008	105.30
3	Shakti Nallah	Western Zone	0.10	01-04-2008	109.32
4	Kitpi MHS Ph-II	Western Zone	3.00	01-04-2008	3373.83
5	Chellengkang Ph-II	Western Zone	0.03	01-04-2008	54.94
6	Bongleng	Western Zone	0.10	01-04-2009	114.27
7	Thimbu	Western Zone	0.10	01-04-2009	126.91
8	Bramdhongchung Ph-II	Western Zone	0.10	01-04-2010	134.71
9	Tsechu Nallah	Western Zone	0.10	01-04-2010	157.75
10	Sessa	Western Zone	1.50	01-04-1992	131.00
11	Domkhong	Western Zone	2.00	01-04-2008	2845.77
12	Sinchung	Western Zone	0.05	01-04-2008	54.48
13	Ankaling	Western Zone	0.03	01-05-2009	66.35
14	Khet	Western Zone	0.10	01-04-2009	144.27
15	Mago MHS	Western Zone	0.10	01-04-2014	140.44
16	Dikshi	Western Zone	0.03	01-04-2010	56.86
17	Khadiyabey	Western Zone	0.20	01-04-2011	282.91
18	Pacha MHS	Western Zone	3.00	01-04-2008	3992.80
19	Pakoti	Western Zone	0.10	01-04-2010	138.37
20	Patta Nallah	Western Zone	0.10	01-04-2010	140.80
21	Watte Mame	Western Zone	0.05	01-04-2010	145.50
22	Kade Nallah	Western Zone	0.05	01-04-2010	95.09
23	Koye	Western Zone	0.05	01-04-2009	98.00
24	Chambang	Western Zone	0.03	01-04-2009	109.55
25	Paya MHS at Hiya	Western Zone	0.10	01-04-2011	237.93
26	Sippi	Western Zone	4.00	01-04-2008	3832.92
27	Ayingmuri MHS	Western Zone	0.25	01-04-2012	175.00
28	Limeking MHS	Western Zone	0.03	01-04-2012	21.00
29	Pinto Karo MHS	Western Zone	0.03	01-04-2011	83.11
30	Sikin Karo	Western Zone	0.20	01-04-2011	387.61
31	Sinyum Koro	Western Zone	0.10	01-04-2011	197.06
32	Kojin Nallah	Western Zone	0.10	01-04-2011	184.35
33	Mechuka	Eastern Zone	0.15	04-01-2015	113.02
34	Kambang	Eastern Zone	6.00	01-04-2008	3832.92
35	Liromoba	Eastern Zone	2.00	01-04-2008	3073.73
36	Yingko Sikong at Rapum	Eastern Zone	0.05	01-04-2009	40.14
37	Angu	Eastern Zone	0.05	01-04-2010	39.46
38	Solegomang MHS	Eastern Zone	0.05	01-04-2011	88.83
39	Sirikorang MHS	Eastern Zone	0.50	01-04-2013	646.11
40	Sirnyuk	Eastern Zone	2.00	01-04-1996	2464.32
41	Kopu at Tuting	Eastern Zone	0.25	01-04-2007	259.60
42	Silingri	Eastern Zone	0.05	01-04-2008	101.68

Secretary (I/C)

43	Singa	Eastern Zone	0.03	01-04-2008	122.98
44	Ngaming	Eastern Zone	0.05	01-04-2008	103.04
45	Sika	Eastern Zone	0.02	01-04-2008	50.00
46	Mayung	Eastern Zone	0.01	01-04-2009	22.22
47	Gosang	Eastern Zone	0.50	01-04-2011	826.00
48	Kote MHS	Eastern Zone	0.05	01-04-2011	96.70
49	Sijen MHS at Adi pasi	Eastern Zone	0.05	01-04-2011	91.41
50	Pyabung MHS	Eastern Zone	0.03	01-04-2011	74.13
51	Rina	Eastern Zone	2.00	01-04-2008	3024.45
52	Deopani Ph-II	Eastern Zone	0.75	01-04-2004	290.10
53	Tah Ahfra Ph-I and Tah Ahfra Ph-II	Eastern Zone	0.10	04-01-2009	49.63
54	Echi Ahfra	Eastern Zone	0.40	01-04-2005	484.79
55	Awapani Ph-II	Eastern Zone	0.50	01-04-2005	714.46
56	Echito Nallah	Eastern Zone	0.04	01-04-2010	74.04
57	Rupapani	Eastern Zone	0.04	01-04-2010	74.65
58	Chu Nallah	Eastern Zone	0.03	01-04-2011	73.84
59	Awapani at Gepuline	Eastern Zone	0.50	01-04-2014	714.46
60	Mukto MHS	Western Zone	6.00	Under Trial Run	7798.70
61	Dura Nallah	Eastern Zone	0.50	01-04-2013	404.87
62	Mati Nallah	Eastern Zone	0.50	01-04-2004	598.56
63	Yapak Nallah	Eastern Zone	0.20	01-04-2005	317.71
64	Teeapani	Eastern Zone	0.50	01-04-2009	675.47
65	Krawti Nallah	Eastern Zone	0.10	01-04-2009	119.07
66	Hathipani	Eastern Zone	0.10	01-04-2009	120.44
67	Tah Nallah	Eastern Zone	0.10	01-04-2009	122.99
68	Maipani	Eastern Zone	0.06	01-04-2010	98.14
69	Ashapani	Eastern Zone	0.06	01-04-2011	99.98
70	Langpani	Eastern Zone	0.40	01-04-2011	543.91
71	Tissue	Eastern Zone	0.40	01-04-1986	617.00
72	Jongkey Nallah	Eastern Zone	0.03	01-04-2011	144.50
73	Ngonalo at Vijaynagar	Eastern Zone	0.10	01-04-2010	408.45
74	Tinning	Eastern Zone	0.06	01-04-2010	99.98
75	Chicklong	Eastern Zone	0.15	01-04-2011	98.14
76	Sumhok Nallah	Eastern Zone	0.10	01-04-2009	198.90
77	Tahin Nallah	Eastern Zone	0.10	01-04-2011	222.98
78	Kachopani MHS	Eastern Zone	0.20	01-04-2014	393.33
79	Jigaon	Western Zone	0.10	01-04-2016	71.85
80	Zhongdongrong	Western Zone	1.00	01-04-2016	1406.44
TOTAL			48.78		50831.32

5.3 Annexure 3. Depreciation for plant Commissioned before FY 2012

Sl. No.	Name of Station	Division/Zone	Installed Capacity (MW)	Capital Cost (Rs. In Lakh)	Depreciation Amount @ 2.57% P.A (Rs. In Lakh) for FY 2018-19
1	Nuranang	Western Zone	6.00	985	25.31
2	Bramdhongchung	Western Zone	0.10	105.3	2.71
3	Shakti Nallah	Western Zone	0.10	109.32	2.81
4	Kitpi MHS Ph-II	Western Zone	3.00	3373.83	86.71
5	Chellengkang Ph-II	Western Zone	0.03	54.94	1.41
6	Bongleng	Western Zone	0.10	114.27	2.94
7	Thimbu	Western Zone	0.10	126.91	3.26
8	Bramdhongchung Ph-II	Western Zone	0.10	134.71	3.46
9	Tsechu Nallah	Western Zone	0.10	157.75	4.05
10	Sessa	Western Zone	1.50	131	3.37
11	Domkhong	Western Zone	2.00	2845.77	73.14
12	Sinchung	Western Zone	0.05	54.48	1.40
13	Ankaling	Western Zone	0.03	66.35	1.71
14	Khet	Western Zone	0.10	144.27	3.71
15	Dikshi	Western Zone	0.03	56.86	1.46
16	Khadiyabey	Western Zone	0.20	282.91	7.27
17	Pacha MHS	Western Zone	3.00	3992.8	102.61
18	Pakoti	Western Zone	0.10	138.37	3.56
19	Patta Nallah	Western Zone	0.10	140.8	3.62
20	Watte Mame	Western Zone	0.05	145.5	3.74
21	Kade Nallah	Western Zone	0.05	95.09	2.44
22	Koye	Western Zone	0.05	98	2.52
23	Chambang	Western Zone	0.03	109.55	2.82
24	Paya MHS at Hiya	Western Zone	0.10	237.93	6.11
25	Sippi	Western Zone	4.00	3832.92	98.51
26	Pinto Karo MHS	Western Zone	0.03	83.11	2.14
27	Sikin Karo	Western Zone	0.20	387.61	9.96
28	Sinyum Koro	Western Zone	0.10	197.06	5.06
29	Kojin Nallah	Western Zone	0.10	184.35	4.74
30	Kambang	Eastern Zone	6.00	3832.92	98.51
31	Liromoba	Eastern Zone	2.00	3073.73	78.99
32	Yingko Sikong at Rapum	Eastern Zone	0.05	40.14	1.03
33	Angu	Eastern Zone	0.05	39.46	1.01
34	Solegomang MHS	Eastern Zone	0.05	88.83	2.28
35	Sirnyuk	Eastern Zone	2.00	2464.32	63.33
36	Kopu at Tuting	Eastern Zone	0.25	259.6	6.67
37	Silingri	Eastern Zone	0.05	101.68	2.61

38	Singa	Eastern Zone	0.03	122.98	3.16
39	Ngaming	Eastern Zone	0.05	103.04	2.65
40	Sika	Eastern Zone	0.02	50	1.29
41	Mayung	Eastern Zone	0.01	22.22	0.57
42	Gosang	Eastern Zone	0.50	826	21.23
43	Kote MHS	Eastern Zone	0.05	96.7	2.49
44	Sijen MHS at Adi pasi	Eastern Zone	0.05	91.41	2.35
45	Pyabung MHS	Eastern Zone	0.03	74.13	1.91
46	Rina	Eastern Zone	2.00	3024.45	77.73
47	Deopani Ph-II	Eastern Zone	0.75	290.1	7.46
48	Tah Ahfra Ph-I and Tah Ahfra Ph-II	Eastern Zone	0.10	49.63	1.28
49	Echi Ahfra	Eastern Zone	0.40	484.79	12.46
50	Awapani Ph-II	Eastern Zone	0.50	714.46	18.36
51	Echito Nallah	Eastern Zone	0.04	74.04	1.90
52	Rupapani	Eastern Zone	0.04	74.65	1.92
53	Chu Nallah	Eastern Zone	0.03	73.84	1.90
54	Mati Nallah	Eastern Zone	0.50	598.56	15.38
55	Yapak Nallah	Eastern Zone	0.20	317.71	8.17
56	Teepani	Eastern Zone	0.50	675.47	17.36
57	Krawti Nallah	Eastern Zone	0.10	119.07	3.06
58	Hathipani	Eastern Zone	0.10	120.44	3.10
59	Tah Nallah	Eastern Zone	0.10	122.99	3.16
60	Maipani	Eastern Zone	0.06	98.14	2.52
61	Ashapani	Eastern Zone	0.06	99.98	2.57
62	Langpani	Eastern Zone	0.40	543.91	13.98
63	Tissue	Eastern Zone	0.40	617	15.86
64	Jongkey Nallah	Eastern Zone	0.03	144.5	3.71
65	Ngonalo at Vijaynagar	Eastern Zone	0.10	408.45	10.50
66	Tinning	Eastern Zone	0.06	99.98	2.57
67	Chicklong	Eastern Zone	0.15	98.14	2.52
68	Sumhok Nallah	Eastern Zone	0.10	198.9	5.11
69	Tahin Nallah	Eastern Zone	0.10	222.98	5.73
Total			39.45	38946.1	1000.91

5.4 Annexure 4. Depreciation for plant Commissioned after FY 2012

Sl. No.	Name of Station	Division/Zone	Capital Cost (Rs. In Lakh)	Depreciation Amount @ 5.28% P.A. (Rs. In Lakh) for FY 2018-19
1	Mago MHS	Western Zone	140.44	6.67
2	Ayingmuri MHS	Western Zone	175	8.32
3	Limeking MHS	Western Zone	21	1.00

Secretary (I/C)

4	Mechuka	Eastern Zone	113.022	5.37
5	Sirikorang MHS	Eastern Zone	646.11	30.70
6	Awapani at Gepuline	Eastern Zone	714.46	33.95
7	Mukto MHS	Eastern Zone		
8	Dura Nallah	Western Zone	404.87	19.24
9	Kachopani MHS	Eastern Zone	393.33	18.69
10	Jigaon	Eastern Zone	71.85	3.41
11	Zhongdongrong	Western Zone	1406.44	66.83
Total			4086.522	194.19

5.5 Annexure 5 - O&M Cost for FY 2018-19

Sl. No.	Name of Station	Division/Zone	Installed Capacity (MW)	O & M COST for FY 2018-19 (Rs. In Lakh)
1	Kitpi Ph-I	Western Zone	1.50	57.09
2	Nuranang	Western Zone	6.00	171.24
3	T. Gompa	Western Zone	0.05	1.90
4	Dudunghar (chellengk- Ph-I)	Western Zone	0.03	1.14
5	Bramdhongchung	Western Zone	0.10	3.81
6	Shakti Nallah	Western Zone	0.10	3.81
7	Kitpi MHS Ph-II	Western Zone	3.00	114.18
8	Chellengkang Ph-II	Western Zone	0.03	1.14
9	Bongleng	Western Zone	0.10	3.81
10	Thimbu	Western Zone	0.10	3.81
11	Bramdhongchung Ph-II	Western Zone	0.10	3.81
12	Tsechu Nallah	Western Zone	0.10	3.81
13	Rahung	Western Zone	0.75	28.55
14	Dirang	Western Zone	2.00	76.12
15	Sessa	Western Zone	1.50	57.09
16	Rupa	Western Zone	0.20	7.61
17	Dokumpani	Western Zone	0.03	1.14
18	Domkhong	Western Zone	2.00	76.12
19	Sinchung	Western Zone	0.05	1.90
20	Ankaling	Western Zone	0.03	1.14
21	Khet	Western Zone	0.10	3.81
22	Mago MHS	Western Zone	0.10	3.81
23	Dikshi	Western Zone	0.03	1.14
24	Khadiyabey	Western Zone	0.20	7.61
25	Saktangrong	Western Zone	0.30	11.42
26	Seppa	Western Zone	0.30	11.42
27	Pakke Kessang	Western Zone	0.03	1.14
28	Pacha MHS	Western Zone	3.00	114.18
29	Pakoti	Western Zone	0.10	3.81
30	Patta Nallah	Western Zone	0.10	3.81
31	Watte Mame	Western Zone	0.05	1.90
32	Kade Nallah	Western Zone	0.05	1.90
33	Patte MHS at Tali	Western Zone	0.03	1.14
34	Koye	Western Zone	0.05	1.90
35	Chambang	Western Zone	0.03	1.14
36	Paya MHS at Hiya	Western Zone	0.10	3.81
37	Mai Ph-I	Western Zone	2.00	76.12
38	Mai Ph-II	Western Zone	1.00	38.06
39	Tago	Western Zone	4.50	171.27
40	Dulom (Daporijo)	Western Zone	0.40	15.22

Secretary (I/C)

State Electricity Regulatory Commission
Arunachal Pradesh

Page 48

41	Maro	Western Zone	0.03	1.14
42	Sippi	Western Zone	4.00	152.24
43	Ayingmuri MHS	Western Zone	0.25	9.52
44	Limeking MHS	Western Zone	0.03	1.14
45	Pinto Karo MHS	Western Zone	0.03	1.14
46	Sikin Karo	Western Zone	0.20	7.61
47	Sinyum Koro	Western Zone	0.10	3.81
48	Kojin Nallah	Western Zone	0.10	3.81
49	Pagi (Basar)	Eastern Zone	0.10	3.81
50	Along	Eastern Zone	0.40	15.22
51	Ego-Echi (Dali)	Eastern Zone	0.40	15.22
52	Mechuka	Eastern Zone	0.15	5.71
53	Yomcha	Eastern Zone	0.05	1.90
54	Beye	Eastern Zone	0.03	1.14
55	Kambang	Eastern Zone	6.00	171.24
56	Liromoba	Eastern Zone	2.00	76.12
57	Yingko Sikong at Rapum	Eastern Zone	0.05	1.90
58	Angu	Eastern Zone	0.05	1.90
59	Solegomang MHS	Eastern Zone	0.05	1.90
60	Sirikorang MHS	Eastern Zone	0.50	19.03
61	Yingkiong Ph-I	Eastern Zone	0.15	5.71
62	Sikut/ Tuting	Eastern Zone	0.10	3.81
63	Yingkiong Ph-II	Eastern Zone	0.20	7.61
64	Selli at Geku	Eastern Zone	0.50	19.03
65	Sirnyuk	Eastern Zone	2.00	76.12
66	Kopu at Tuting	Eastern Zone	0.25	9.52
67	Silingri	Eastern Zone	0.05	1.90
68	Singa	Eastern Zone	0.03	1.14
69	Ngaming	Eastern Zone	0.05	1.90
70	Sika	Eastern Zone	0.02	0.76
71	Mayung	Eastern Zone	0.01	0.19
72	Gosang	Eastern Zone	0.50	19.03
73	Kote MHS	Eastern Zone	0.05	1.90
74	Sijen MHS at Adi pasi	Eastern Zone	0.05	1.90
75	Pyabung MHS	Eastern Zone	0.03	1.14
76	Pasighat	Eastern Zone	0.20	7.61
77	Yembung	Eastern Zone	2.00	76.12
78	Silli	Eastern Zone	0.03	1.14
79	Rina	Eastern Zone	2.00	76.12
80	Deopani Ph-I	Eastern Zone	0.75	28.55
81	Abhapani	Eastern Zone	0.45	17.13
82	Deopani Ph-II	Eastern Zone	0.75	28.55
83	Anini/ Awapani Ph-I	Eastern Zone	0.15	5.71
84	Tah Ahfra Ph-I and Tah Ahfra Ph-II	Eastern Zone	0.10	3.81
85	Chini Afra	Eastern Zone	0.25	9.52
86	Echi Ahfra	Eastern Zone	0.40	15.22

87	Awapani Ph-II	Eastern Zone	0.50	19.03
88	Echito Nallah	Eastern Zone	0.04	1.52
89	Rupapani	Eastern Zone	0.04	1.52
90	Chu Nallah	Eastern Zone	0.03	1.14
91	Awapani at Gepuline	Eastern Zone	0.50	19.03
92	Mukto MHS	Eastern Zone	6.00	228.36
93	Dura Nallah	Western Zone	0.50	19.03
94	Tafragram	Eastern Zone	0.25	9.52
95	Kaho	Eastern Zone	0.01	0.38
96	Kebitho	Eastern Zone	0.03	1.14
97	Mati Nallah	Eastern Zone	0.50	19.03
98	Yapak Nallah	Eastern Zone	0.20	7.61
99	Teeapani	Eastern Zone	0.50	19.03
100	Krawti Nallah	Eastern Zone	0.10	3.81
101	Hathipani	Eastern Zone	0.10	3.81
102	Tah Nallah	Eastern Zone	0.10	3.81
103	Maipani	Eastern Zone	0.06	2.28
104	Ashapani	Eastern Zone	0.06	2.28
105	Langpani	Eastern Zone	0.40	15.22
106	Tissue	Eastern Zone	0.40	15.22
107	Jongkey Nallah	Eastern Zone	0.03	0.95
108	Ngonalo at Vijaynagar	Eastern Zone	0.10	3.81
109	Tinning	Eastern Zone	0.06	2.28
110	Chicklong	Eastern Zone	0.15	5.71
111	Thiratju	Eastern Zone	1.00	38.06
112	Charju	Eastern Zone	0.60	22.84
113	Sumhok Nallah	Eastern Zone	0.10	3.81
114	Tahin Nallah	Eastern Zone	0.10	3.81
115	Kachopani MHS	Eastern Zone	0.20	7.61
116	Jigaon	Eastern Zone	0.10	3.81
117	Zhongdongrong	Western Zone	1.00	38.06
TOTAL AMOUNT (Rs.in Lakh)				2533.97


Secretary (I/C)

5.6 Annexure 6 - ROE for FY 2018-19

Sl. No.	Name of Station	Division/Zone	COD	Capital Cost (Rs. In Lakh)	RoE (Rs. In Lakh) for FY 2018-19
1	Nuranang	Western Zone	01-04-1996	985.00	51.89
2	Bramdhongchung	Western Zone	01-04-2008	105.30	5.55
3	Shakti Nallah	Western Zone	01-04-2008	109.32	5.76
4	Kitpi MHS Ph-II	Western Zone	01-04-2008	3373.83	177.73
5	Chellengkang Ph-II	Western Zone	01-04-2008	54.94	2.89
6	Bongleng	Western Zone	01-04-2009	114.27	6.02
7	Thimbu	Western Zone	01-04-2009	126.91	6.69
8	Bramdhongchung Ph-II	Western Zone	01-04-2010	134.71	7.10
9	Tsechu Nallah	Western Zone	01-04-2010	157.75	8.31
10	Sessa	Western Zone	01-04-1992	131.00	6.90
11	Domkhong	Western Zone	01-04-2008	2845.77	149.92
12	Sinchung	Western Zone	01-04-2008	54.48	2.87
13	Ankaling	Western Zone	01-05-2009	66.35	3.50
14	Khet	Western Zone	01-04-2009	144.27	7.60
15	Mago MHS	Western Zone	01-04-2014	140.44	7.40
16	Dikshi	Western Zone	01-04-2010	56.86	3.00
17	Khadiyabey	Western Zone	01-04-2011	282.91	14.90
18	Pacha MHS	Western Zone	01-04-2008	3992.80	210.34
19	Pakoti	Western Zone	01-04-2010	138.37	7.29
20	Patta Nallah	Western Zone	01-04-2010	140.80	7.42
21	Watte Mame	Western Zone	01-04-2010	145.50	7.66
22	Kade Nallah	Western Zone	01-04-2010	95.09	5.01
23	Koye	Western Zone	01-04-2009	98.00	5.16
24	Chambang	Western Zone	01-04-2009	109.55	5.77
25	Paya MHS at Hiya	Western Zone	01-04-2011	237.93	12.53
26	Sippi	Western Zone	01-04-2008	3832.92	201.92
27	Ayingmuri MHS	Western Zone	01-04-2012	175.00	9.22
28	Limeking MHS	Western Zone	01-04-2012	21.00	1.11
29	Pinto Karo MHS	Western Zone	01-04-2011	83.11	4.38
30	Sikin Karo	Western Zone	01-04-2011	387.61	20.42
31	Sinyum Koro	Western Zone	01-04-2011	197.06	10.38

32	Kojin Nallah	Western Zone	01-04-2011	184.35	9.71
33	Mechuka	Eastern Zone	04-01-2015	113.02	5.95
34	Kambang	Eastern Zone	01-04-2008	3832.92	201.92
35	Liromoba	Eastern Zone	01-04-2008	3073.73	161.92
36	Yingko Sikong at Rapum	Eastern Zone	01-04-2009	40.14	2.11
37	Angu	Eastern Zone	01-04-2010	39.46	2.08
38	Solegomang MHS	Eastern Zone	01-04-2011	88.83	4.68
39	Sirikorang MHS	Eastern Zone	01-04-2013	646.11	34.04
40	Sirnyuk	Eastern Zone	01-04-1996	2464.32	129.82
41	Kopu at Tuting	Eastern Zone	01-04-2007	259.60	13.68
42	Silingri	Eastern Zone	01-04-2008	101.68	5.36
43	Singa	Eastern Zone	01-04-2008	122.98	6.48
44	Ngaming	Eastern Zone	01-04-2008	103.04	5.43
45	Sika	Eastern Zone	01-04-2008	50.00	2.63
46	Mayung	Eastern Zone	01-04-2009	22.22	1.17
47	Gosang	Eastern Zone	01-04-2011	826.00	43.51
48	Kote MHS	Eastern Zone	01-04-2011	96.70	5.09
49	Sijen MHS at Adi pasi	Eastern Zone	01-04-2011	91.41	4.82
50	Pyabung MHS	Eastern Zone	01-04-2011	74.13	3.91
51	Rina	Eastern Zone	01-04-2008	3024.45	159.33
52	Deopani Ph-II	Eastern Zone	01-04-2004	290.10	15.28
53	Tah Ahfra Ph-I and Tah Ahfra Ph-II	Eastern Zone	04-01-2009	49.63	2.61
54	Echi Ahfra	Eastern Zone	01-04-2005	484.79	25.54
55	Awapani Ph-II	Eastern Zone	01-04-2005	714.46	37.64
56	Echito Nallah	Eastern Zone	01-04-2010	74.04	3.90
57	Rupapani	Eastern Zone	01-04-2010	74.65	3.93
58	Chu Nallah	Eastern Zone	01-04-2011	73.84	3.89
59	Awapani at Gepuline	Eastern Zone	01-04-2014	714.46	37.64
60	Mukto MHS	Western Zone	Under Trial Run	7798.70	410.84
61	Dura Nallah	Eastern Zone	01-04-2013	404.87	21.33
62	Mati Nallah	Eastern Zone	01-04-2004	598.56	31.53
63	Yapak Nallah	Eastern Zone	01-04-2005	317.71	16.74
64	Teepani	Eastern Zone	01-04-2009	675.47	35.58
65	Krawti Nallah	Eastern Zone	01-04-2009	119.07	6.27
66	Hathipani	Eastern Zone	01-04-2009	120.44	6.34

67	Tah Nallah	Eastern Zone	01-04-2009	122.99	6.48
68	Maipani	Eastern Zone	01-04-2010	98.14	5.17
69	Ashapani	Eastern Zone	01-04-2011	99.98	5.27
70	Langpani	Eastern Zone	01-04-2011	543.91	28.65
71	Tissue	Eastern Zone	01-04-1986	617.00	32.50
72	Jongkey Nallah	Eastern Zone	01-04-2011	144.50	7.61
73	Ngonalo at Vijaynagar	Eastern Zone	01-04-2010	408.45	21.52
74	Tinning	Eastern Zone	01-04-2010	99.98	5.27
75	Chicklong	Eastern Zone	01-04-2011	98.14	5.17
76	Sumhok Nallah	Eastern Zone	01-04-2009	198.90	10.48
77	Tahin Nallah	Eastern Zone	01-04-2011	222.98	11.75
78	Kachopani MHS	Eastern Zone	01-04-2014	393.33	20.72
79	Jigaon	Western Zone	01-04-2016	71.85	3.79
80	Zhongdongrong	Western Zone	01-04-2016	1406.44	74.09
Total				50831.32	2677.79


Secretary (I/C)

5.7 Annexure 7. Interest on working capital for FY 2018-19

Sl. No.	Name of Station	Division/Zone	Installed Capacity (MW)	COD	Interest on Working capital (Rs. In Lakh) for FY 2018-19
1	Kitpi Ph-I	Western Zone	1.50	01-04-1977	2.63
2	Nuranang	Western Zone	6.00	01-04-1996	9.38
3	T. Gompa	Western Zone	0.05	01-04-2001	0.09
4	Dudunghar (challengk- Ph I)	Western Zone	0.03	01-04-2004	0.05
5	Bramdhongchung	Western Zone	0.10	01-04-2008	0.33
6	Shakti Nallah	Western Zone	0.10	01-04-2008	0.34
7	Kitpi MHS Ph-II	Western Zone	3.00	01-04-2008	10.34
8	Challengkang Ph-II	Western Zone	0.03	01-04-2008	0.14
9	Bongleng	Western Zone	0.10	01-04-2009	0.35
10	Thimbu	Western Zone	0.10	01-04-2009	0.37
11	Bramdhongchung Ph-II	Western Zone	0.10	01-04-2010	0.38
12	Tsechu Nallah	Western Zone	0.10	01-04-2010	0.41
13	Rahung	Western Zone	0.75	01-04-1972	1.32
14	Dirang	Western Zone	2.00	01-04-1977	3.51
15	Sessa	Western Zone	1.50	01-04-1992	2.83
16	Rupa	Western Zone	0.20	01-04-1997	0.35
17	Dokumpani	Western Zone	0.03	01-04-2000	0.05
18	Domkhong	Western Zone	2.00	01-04-2008	7.79
19	Sinchung	Western Zone	0.05	01-04-2008	0.17
20	Ankaling	Western Zone	0.03	01-05-2009	0.15
21	Khet	Western Zone	0.10	01-04-2009	0.39
22	Mago MHS	Western Zone	0.10	01-04-2014	0.46
23	Dikshi	Western Zone	0.03	01-04-2010	0.14
24	Khadiyabey	Western Zone	0.20	01-04-2011	0.78
25	Saktangrong	Western Zone	0.30	01-04-2011	0.53
26	Seppa	Western Zone	0.30	01-04-1980	0.53
27	Pakke Kessang	Western Zone	0.03	01-04-2001	0.05
28	Pacha MHS	Western Zone	3.00	01-04-2008	11.28
29	Pakoti	Western Zone	0.10	01-04-2010	0.38
30	Patta Nallah	Western Zone	0.10	01-04-2010	0.39
31	Watte Mame	Western Zone	0.05	01-04-2010	0.31
32	Kade Nallah	Western Zone	0.05	01-04-2010	0.23
33	Patte MHS at Tali	Western Zone	0.03	01-04-2004	0.05
34	Koye	Western Zone	0.05	01-04-2009	0.24
35	Chambang	Western Zone	0.03	01-04-2009	0.22
36	Paya MHS at Hiya	Western Zone	0.10	01-04-2011	0.53
37	Mai Ph-I	Western Zone	2.00	04-01-1977	3.51

Secretary (I/C)

State Electricity Regulatory Commission
Arunachal Pradesh

Page 54

38	Mai Ph-II	Western Zone	1.00	01-04-1982	1.75
39	Tago	Western Zone	4.50	01-04-1992	7.90
40	Dulom (Daporijo)	Western Zone	0.40	01-04-1981	0.70
41	Maro	Western Zone	0.03	01-04-2002	0.05
42	Sippi	Western Zone	4.00	01-04-2008	12.79
43	Ayingmuri MHS	Western Zone	0.25	01-04-2012	0.79
44	Limeking MHS	Western Zone	0.03	01-04-2012	0.10
45	Pinto Karo MHS	Western Zone	0.03	01-04-2011	0.18
46	Sikin Karo	Western Zone	0.20	01-04-2011	0.93
47	Sinyum Koro	Western Zone	0.10	01-04-2011	0.47
48	Kojin Nallah	Western Zone	0.10	01-04-2011	0.45
49	Pagi (Basar)	Eastern Zone	0.10	01-04-1972	0.18
50	Along	Eastern Zone	0.40	01-04-1975	0.70
51	Ego-Echi (Dali)	Eastern Zone	0.40	01-04-1987	0.70
52	Mechuka	Eastern Zone	0.15	04-01-2015	0.49
53	Yomcha	Eastern Zone	0.05	01-04-2001	0.09
54	Beye	Eastern Zone	0.03	01-04-2004	0.05
55	Kambang	Eastern Zone	6.00	01-04-2008	13.67
56	Liromoba	Eastern Zone	2.00	01-04-2008	8.14
57	Yingko Sikong at Rapum	Eastern Zone	0.05	01-04-2009	0.15
58	Angu	Eastern Zone	0.05	01-04-2010	0.15
59	Solegomang MHS	Eastern Zone	0.05	01-04-2011	0.22
60	Sirikorang MHS	Eastern Zone	0.50	01-04-2013	2.18
61	Yingkiong Ph-I	Eastern Zone	0.15	01-04-1980	0.26
62	Sikut/ Tuting	Eastern Zone	0.10	01-04-1984	0.18
63	Yingkiong Ph-II	Eastern Zone	0.20	01-04-1992	0.35
64	Selli at Geku	Eastern Zone	0.50	01-04-1994	0.88
65	Sirnyuk	Eastern Zone	2.00	01-04-1996	7.22
66	Kopu at Tuting	Eastern Zone	0.25	01-04-2007	0.83
67	Silingri	Eastern Zone	0.05	01-04-2008	0.24
68	Singa	Eastern Zone	0.03	01-04-2008	0.24
69	Ngaming	Eastern Zone	0.05	01-04-2008	0.24
70	Sika	Eastern Zone	0.02	01-04-2008	0.11
71	Mayung	Eastern Zone	0.01	01-04-2009	0.04
72	Gosang	Eastern Zone	0.50	01-04-2011	2.12
73	Kote MHS	Eastern Zone	0.05	01-04-2011	0.23
74	Sijen MHS at Adi pasi	Eastern Zone	0.05	01-04-2011	0.23
75	Pyabung MHS	Eastern Zone	0.03	01-04-2011	0.16
76	Pasighat	Eastern Zone	0.20	01-04-1974	0.35
77	Yembung	Eastern Zone	2.00	01-04-1994	3.51
78	Silli	Eastern Zone	0.03	01-04-2001	0.05
79	Rina	Eastern Zone	2.00	01-04-2008	8.06
80	Deopani Ph-I	Eastern Zone	0.75	01-04-1986	1.32
81	Abhapani	Eastern Zone	0.45	01-04-1994	0.79

Secretary (I/C)

State Electricity Regulatory Commission
Arunachal Pradesh

Page 55

82	Deopani Ph-II	Eastern Zone	0.75	01-04-2004	1.75
83	Anini/ Awapani Ph-I	Eastern Zone	0.15	01-04-1994	0.26
84	Tah Ahfra Ph-I and Tah Ahfra Ph-II	Eastern Zone	0.10	04-01-2009	0.25
85	Chini Afra	Eastern Zone	0.25	01-04-2001	0.44
86	Echi Ahfra	Eastern Zone	0.40	01-04-2005	1.43
87	Awapani Ph-II	Eastern Zone	0.50	01-04-2005	1.95
88	Echito Nallah	Eastern Zone	0.04	01-04-2010	0.18
89	Rupapani	Eastern Zone	0.04	01-04-2010	0.18
90	Chu Nallah	Eastern Zone	0.03	01-04-2011	0.16
91	Awapani at Gepuline	Eastern Zone	0.50	01-04-2014	2.32
92	Mukto MHS	Western Zone	6.00	Under Trial Run	18.42
93	Dura Nallah	Eastern Zone	0.50	01-04-2013	1.70
94	Tafragram	Eastern Zone	0.25	01-04-1984	0.44
95	Kaho	Eastern Zone	0.01	01-04-2004	0.02
96	Kebitho	Eastern Zone	0.03	01-04-2004	0.05
97	Mati Nallah	Eastern Zone	0.50	01-04-2004	1.78
98	Yapak Nallah	Eastern Zone	0.20	01-04-2005	0.83
99	Teepani	Eastern Zone	0.50	01-04-2009	1.89
100	Krawti Nallah	Eastern Zone	0.10	01-04-2009	0.35
101	Hathipani	Eastern Zone	0.10	01-04-2009	0.36
102	Tah Nallah	Eastern Zone	0.10	01-04-2009	0.36
103	Maipani	Eastern Zone	0.06	01-04-2010	0.25
104	Ashapani	Eastern Zone	0.06	01-04-2011	0.26
105	Langpani	Eastern Zone	0.40	01-04-2011	1.52
106	Tissue	Eastern Zone	0.40	01-04-1986	1.63
107	Jongkey Nallah	Eastern Zone	0.03	01-04-2011	0.26
108	Ngonalo at Vijaynagar	Eastern Zone	0.10	01-04-2010	0.79
109	Tinning	Eastern Zone	0.06	01-04-2010	0.26
110	Chicklong	Eastern Zone	0.15	01-04-2011	0.41
111	Thiratju	Eastern Zone	1.00	01-04-1978	1.75
112	Charju	Eastern Zone	0.60	01-04-1984	1.05
113	Sumhok Nallah	Eastern Zone	0.10	01-04-2009	0.47
114	Tahin Nallah	Eastern Zone	0.10	01-04-2011	0.51
115	Kachopani MHS	Eastern Zone	0.20	01-04-2014	1.15
116	Jigaon	Western Zone	0.10	01-04-2016	0.32
117	Zhongdongrong	Western Zone	1.00	01-04-2016	4.60
Total			69.58		191.61

