

**Before  
Meghalaya State Electricity Regulatory Commission,  
Shillong**

**Petition  
For**

**Approval of Capital cost,  
Approval of AFC & Tariff For MYT Control Period  
FY 2018-19 to FY 2020-21  
Of 2 X 20 MW New Umtru  
Hydro Electric Project (NUHEP)**

**Filed By  
Meghalaya Power Generation Corporation Ltd.  
Lum Jingshai, Short Round Road, Shillong - 793 001**



**MePGCL**  
Generating Clean And Green Energy

BEFORE THE HON'BLE MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION  
FILE / PETITION NO: \_\_\_\_\_  
IN THE MATTER OF

APPROVAL OF CAPITAL COST AND ANNUAL REVENUE REQUIREMENT (ARR) FOR NEW UMTRU HYDRO ELECTRIC PROJECT (NUHEP) OF THE MEGHALAYA POWER GENERATION CORPORATION LIMITED (MePGCL) WITHIN THE STATE OF MEGHALAYA FOR THE FY 2018-19, 2019-20 AND 2020-21 UNDER THE MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION (MULTI YEAR TARIFF) REGULATIONS, 2014 AND UNDER SECTION-62 READ WITH SECTION 86 OF THE ELECTRICITY ACT 2003.

AND IN THE MATTER OF

MEGHALAYA POWER GENERATION CORPORATION LIMITED, SHORT ROUND ROAD, LUMJINGSHAI, SHILLONG – 793001, MEGHALAYA  
PETITIONER

IT IS RESPECTFULLY SUBMITTED BY THE PETITIONER THAT:

1. In exercising its powers conferred under sections 131 and 133 of the Electricity Act 2003, the State Government of Meghalaya notified "The Meghalaya Power Sector Reforms Transfer Scheme 2010" on 31st March 2010 leading to restructuring and unbundling of the erstwhile Meghalaya State Electricity Board (MeSEB) into four entities, namely,
  - a. Meghalaya Energy Corporation Limited (MeECL): the Holding Company;
  - b. Meghalaya Power Distribution Corporation Limited (MePDCL): the Distribution Utility;
  - c. Meghalaya Power Generation Corporation Limited (MePGCL): the Generation Company;
  - d. Meghalaya Power Transmission Corporation Limited (MePTCL): the Transmission Utility.
2. However, the holding company – MeECL - carried out the functions of distribution, generation and transmission utilities from 1st April 2010 onwards, even after restructuring. Therefore, through notification dated 31st March 2012, State Government notified an amendment to the Power Sector Reforms Transfer Scheme leading to effective unbundling of MeECL into MeECL (Holding Company), MePDCL (Distribution Utility), MePGCL (Generation company) and MePTCL (Transmission Utility) from 1st April 2012.
3. On 23rd December 2013, the Government of Meghalaya issued the transfer scheme notifying the Assets and Liabilities as on 1st April 2010 to be vested in MeECL. Subsequently, the Government of Meghalaya notified the 4<sup>th</sup> Amendment to the Transfer Scheme on 29th April 2015, wherein the opening balances of all the four entities namely, MePGCL, MePTCL, MePDCL and MeECL as on 1st April 2012 were notified.
4. MePGCL began segregated commercial operations as an independent entity from 1st April 2013 onwards.
5. The Meghalaya State Electricity Regulatory Commission (hereinafter referred to as "MSERC" or "the Hon'ble Commission") is an independent statutory body constituted under the provisions of Part – X (Sections 82 to 109) of the Electricity Act (EA), 2003. The Hon'ble Commission is vested with the authority of regulating the power sector in the State, inter alia, including determination of tariff for electricity consumers.

6. The MSERC, in exercise of its powers, has determined the Provisional Annual Fixed Charges (AFC) for New Umtru Hydro Electric Project (hereinafter referred to as 'NUHEP') for FY 2017-18 (w.e.f 1-7-2017) in accordance with Meghalaya State Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff) Regulations, 2014 in the order dated 6th November, 2018
7. Subsequently, the Hon'ble Commission vide its letter No.MSERC/MeECL/COR/2018/231 dated 20-9- 2018 continued with the extension of the provisional tariff of New Umtru for FY 2018-19 till 30th November, 2018.
8. MePGCL has prepared the present petition for approval of Capital Cost, AFC for the Control Period (FY2018-19 to FY 2020-21) and Tariff for FY 2019-20 in accordance with The Meghalaya State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2014 (hereinafter referred to as "MYT Regulations, 2014")
9. The tariff for New Umtru for FY 2017-18 was determined based on provisional capital cost in the order dated 06th November, 2018. Adjustment of tariff for FY 2017-18 due to audited and revised capital cost will lead to a revision of costs and revenue for FY 2017-18, which will be taken during true up of the year.
10. While filing the present petition, MePGCL, to the best of its ability, has endeavoured to discharge its obligations and comply with the various applicable legal and regulatory provisions, directions and stipulations.
11. The Board of Directors of MePGCL has accorded approval for the capital cost and ARR of NUHEP for FY 2018-19, FY 2019-20 and FY 2020-21 and authorized the undersigned to file this petition accordingly. A copy of the Board's resolution is enclosed as **Annexure-A**.

The petitioner, therefore, humbly prays before the Hon'ble Commission to kindly:

- a. Approve the completion cost of NUHEP at **Rs. 566.14 Crore** as on **30th June, 2017**.
- b. Approve the Annual Fixed Charges of Rs. **128.78** Crore, Rs. **126.31** Crore and Rs.**123.18** Crore for FY 2018-19, FY 2019-20 and FY 2020-21 (2<sup>nd</sup> MYT Control Period) respectively as proposed in this petition for NUHEP.
- c. Approve the tariff for the 2nd control period for NUHEP.
- d. To pass such orders, as the Hon'ble Commission may deem fit and proper and necessary in view of the facts and circumstances of the case.
- e. To condone any inadvertent omissions, errors & shortcomings and permit the petitioner to add/change/modify/alter this filing and make further submissions as required.

(A. LYGDOH)  
SUPERINTENDING ENGINEER  
(PROJECT MONITORING)  
FOR AND ON BEHALF OF  
MEGHALAYA POWER GENERATION CORPORATION LIMITED

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## 1. Capital Cost and General Details of Plant

### 1.1. Introduction

The Umtru River, a tributary of the Brahmaputra River, is the major source of hydropower in the State of Meghalaya. The power potential of Umtru Basin was planned for integrated development with the adjacent Umiam and Khri Basin schemes.

The power potential of Umtru has been developed progressively beginning in the first decade of independence of the country. Umtru H.E. Project (commissioned with three units of 2.8MW each in 1957 and the fourth unit of 2.8MW in 1968), was the first development in the basin and has served more than the useful life of Power Plants. Past operational experience of this plant indicated that the potential of the site was not optimally exploited and there was scope to provide additional capacity and energy benefits to Meghalaya Grid economically in a short time. In this context, the New Umtru Hydro Electric Project (2x20MW) was proposed alongside the Old Umtru Project with common water storage. A new Dam was constructed at the location of the now dismantled Umtru Weir of the old project to create an enhanced storage for both the existing and new projects.

#### 1.1.1. Location

The project site is approachable through the National Highway-40 from Guwahati to Byrnihat and thereafter through a state PWD road to the dam site at Dehal, passing through the existing Umtru Power House.

#### 1.1.2. Salient features of the project

The New Umtru HEP envisaged the following features:

- i) **Dehal Dam:** The Dam Axis was been fixed at 10.69 m downstream from the axis of the old un-gated structure. The spillway portion has 6(six) Radial Gates of size 13.40 m x 6.10m each with FRL at the original HFL of El. 130.10 m to cater to a design flood of 3820 cumec. The crest of the spillway is fixed at El. 124.00m. The Full Reservoir Level at El. 130.10m and Minimum Drawdown Level (MDDL) at El. 124.50m will create a live storage of 2.35 MCum. This will be the diurnal storage which regulates the flow from upstream power stations. It will be able to provide peak power from the New Umtru as well as the existing Power Station.
- ii) **Power Intake:** The new Intake block is located in the dam body in between the new Spillway and the Old Sluice and Intake combination. Beside the new Intake, a scouring sluice of size 3.00 X 5.00m is provided on silt consideration with invert level at El112.50m. The invert level of the Intake is at El 113.50m. The Trash Rack of the Intake is 9.50 m wide x 12.80m high and is provided in 8 segments / panels of size 4.75m x 3.20m each. The Power Intake has been designed to draw a discharge of 75.00 cumec. A fixed wheel gate of size 5.00mx5.00m is provided at the Intake with Rope Drum hoist to raise or lower the gate.
- iii) **RCC Conduit & Head Race Tunnel:** The water conductor takes off from the Intake block in the dam body in the form of RCC circular conduit of 5.00m diameter for a length of

146.20m and then through an underground tunnel (modified horse shoe shape) for a length of 630.50m upto the Surge Shaft. The alignment is almost parallel to the existing HRT. An Access/Construction Adit of 202.00 m inclined length at a distance of 140.00 m from the centre line of the Surge Shaft, was made to help in the excavation and concreting of HRT.

- iv) Surge Shaft:** Surge Shaft is provided at the end of the HRT and before commencement of the Pressure Shaft. The height of the shaft is 58.00m. It is connected to the HRT by means of a Vertical Riser of 7.00 m diameter and 21.60m height and a Surge tank of 17.20 m diameter and 32.50m height. The Surge Shaft is provided with a gate (Vertical Lift type of Size 4.46 mx4.40m) and a Rope drum Hoist to control flow into the Pressure Shaft.
- v) Pressure Shaft:** The Pressure Shaft connects the Head Race Tunnel and Surge Shaft to the Power House. Its total length is 167.47 m. The diameter of the main shaft is 4.40 m and its length is 112.765 m. The Pressure Shaft bifurcates into two 3.0 m diameter branches of length 27.35 m each upto the Power House (upto D-Line) and each branch is connected by a 2.55 m long reducer (reducing from 3.00m to 2.70m dia) to the Main Inlet Valve inside the power house . The Pressure Shaft is fully steel- lined and thickness of steel liner varies from 16 mm to 22 mm. An Access /Construction Adit 92.00m long is provided from EL 89.00 m on the point which houses the Pressure Shaft for its construction and also for getting an additional heading for construction of the HRT .
- vi) Power House:** The New Umtru Power House is a deep-set structure. It is located on the Left Bank of the River Umtru near the location where the HRT of the existing Umtru Project passes through a steel pipe conduit. The dimensions of the powerhouse are 33.00m×29.78m (L×B) at Generator Floor Level of 68.50m. Two Turbo-Generator sets of 20 MW each are erected in this Power House.
- vii) Switchyard:** The switchyard is located downstream of the Tail Pool of the Power House at EL 91.00m and its size is 60.00mx 40.00m.
- viii) Tail Race Tunnel including outlet works:** The Tail Race Tunnel is designed as a free-flow tunnel operating between the Tail Race Pool downstream of the Powerhouse at the entry point and the Umtru river at its exit end. It is a D-shaped 5.50m dia. tunnel. The length of TRT is 702.00m, with the invert level of 60.04 m at the entry point and the exit level of 57.50m at the point where it joins the river.
- ix) Hydro -Mechanical Equipment (Gates):** These are constructed to control the discharge as well as to facilitate planned and controlled reservoir operation and for maintenance purposes. These consist of the following:
- Six nos. of Radial Gates on the Spillway crest with rope drum hoists on top of the Dam.
  - Stop Log Gate on the Spillway crest.
  - Power Intake Service and Emergency gates of vertical fixed wheel roller type with rope drum hoist.

- Sluice Service and Emergency gates of vertical fixed wheel roller type with rope drum hoist.
  - Surge Shaft gate of vertical roller type with rope drum hoist.
  - Two Draft Tube Gates with rope drum hoist in Power House.
  - Tail Race Tunnel (TRT) outlet gate of vertical roller type with rope drum hoist.
- x) **Electro-Mechanical Works:** Two Vertical Francis Turbine-driven Generating Units, each of 20 MW capacity and operating under a Rated Head of 65.14 m are installed in the Power House. Two nos. 3-Phase Step-up 11/132 kV, 24.5 MVA Transformers are located in a Transformer Yard on the downstream Draft Tube Deck at an elevation of 76.50 m. The Transformer on the 11kV side is connected to the Generator by 11kV segregated phase Bus Ducts. The 132 kV side of the Transformer is connected through 132 kV overhead short lines to the 132 kV Outdoor Switchyard (60.00 m x 40.00 m) located at an elevation of 91.00 m and at a distance of 50 m from the Transformer Yard. The Switchyard has five 132 kV Bays (2-Incoming Bays, 1-Bus Coupler Bay and 2-Outgoing Bays). Power is evacuated through two nos. 132 kV feeders. One feeder is terminated in 132 Kv Switchyard of Old Umtru Power Station and the other in EPIP-II Sub- Station, Norbong. The Generating Units (Turbines, Generators and all other related electrical and mechanical equipment and auxiliaries) are designed for continuous 10% overload capability (over and above the Unit Rating of 20 MW at a Rated Head of 65.14 m), which may be utilized during occurrence of any of the two conditions viz., (i) Shutdown of any one of the two Units and (ii) High discharge conditions during monsoon period.

## 1.2. Capital Cost

### 1.2.1. Regulatory Provisions

Regulation 49 provides for norms of determining the Capital Cost. The same is reproduced below for reference.

#### **Regulation 49: Capital cost**

*“49 (1) The actual capital expenditure on the date of commercial operation in the case of new investment shall be subject to prudence check by the commission.*

*49 (2) Scrutiny of cost estimates by the Commission shall be limited to the reasonableness of the capital cost, financial plan, and interest during construction period, use of efficient technology, and such other matters for determination of tariff.*

.....

*49(7) The Commission shall issue guidelines for:*

*(a) Verifying the capital cost of Hydroelectric projects by an independent agency or expert and in such a case, the capital cost as vetted by such agency or expert may be considered by Commission while determining the tariff for hydro generating station.*

### 1.2.2. Capital Cost of NUHEP

The capital cost of New Umtru HEP has been audited by the statutory auditor. Details of asset wise breakup as certified by statutory auditor is attach as **Annexure - B**

The infirm power is calculated as the total units (6.09 MUs) multiplied by the UI rates based on monthly energy data submitted to NERLDC which comes to Rs 1.21 Cr. A copy of SLDC's letter furnishing the cost of infirm power is attached as **Annexure-C**. The same has been adjusted to arrive at the **net capital cost of Rs 566.14 Cr** for NUHEP

The total approved budget for the capital cost of New Umtru is Rs 629 Cr, against which the audited capital cost as on 30th June ,2017 is Rs 566.14. However, the company will incur additional capital costs on the following grounds:

- Capex for E&M Works included in the statutory audit report is till 31st March, 2017. The expenditure on the same from April, 2017 to 30<sup>th</sup> June,2017 has not been included now pending approval of time extension for E&M works from the Board of Directors. Expenses will be reflected in the revised capital cost once the approval from the Board of Directors is obtained.
- There are other expenditures which have been incurred after 30th June, 2017, i.e, after the CoD. These include compensation/payment for land and works like landscaping, walls, security fencing, drainage etc. which couldn't be taken up prior to 30th June, 2017.
- Interest during construction has increased above the costs approved for it in the budget, which was not approved by the Auditor in the cost audit.

MePGCL submits before the Hon'ble Commission to kindly approve the audited capital cost of New Umtru HEP at **Rs 566.14 Cr as on 30 June 2017**. The company also submits before the Hon'ble Commission that the capital cost may increase due to additional capitalization and will be adjusted in the true up of the relevant year as provided under Regulation 29.2 of MSERC MYT Regulations,2014.

The approval of the Board of Directors is attached as **Annexure-A**

### 1.2.3. Additional Capitalization



Regulation 29 of the MSERC Multi Year Tariff Regulations, 2014 provides for additional capitalization. The same is reproduced hereunder:

*“29 Additional Capitalization*

*29.1 The following capital expenditure, actually incurred or projected to be incurred, on the following counts within the original scope of work, after the date of commercial operation and up to the cut-off date may be admitted by the Commission, subject to the prudence check:*

- a) Due to Un-discharged liabilities within the original scope of work;*
- b) On works within the original scope of work, deferred for execution;*
- c) To meet award of arbitration and compliance of final and unappealable order or decree of a court arising out of original scope of works;*
- d) On account of change in law;*
- e) On procurement of initial spares included in the original project costs subject to the ceiling norm specified;*
- f) Any additional works/services, which have become necessary for efficient and successful operation of a generating station or a transmission system or a distribution system but not included in the original capital cost”*

*29.2 Impact of additional capitalization on tariff, as the case may be, shall be considered during Truing Up of each financial year of the Control Period.*

As per the regulation, the works which are within the original scope of works but deferred for execution and works due to un-discharged liabilities within the original scope of work, will form part of additional capitalization. The additional capital expenditure after the date of commercial operation and within the cut- off date (**31st March, 2020**) will be adjusted in true up of that year.

The company has a budget of Rs 629 Cr as capital cost of NUHEP, against which the total audited capital cost for NUHEP is Rs 566.14 Cr as on 30th June, 2017. Adjustments due to additional capitalization and changes made to final audited capital cost can be taken up during truing up of that year in line with the regulations.

**1.3.Funding Pattern of NUHEP**

The project was planned to be funded 70% by loan and 30% by equity. However, the entire amount of equity as envisaged has not been availed yet as on COD. The remaining equity would be availed in subsequent financial years. The summary of capital funding availed and to be availed is as shown below:

Table: Funding pattern of NUHEP

	<b>Loan (INR Crore)</b>	<b>Equity (INR Crore)</b>	<b>Total (INR Crore)</b>
Capital funding planned	440.3	188.7	629
Funding already availed	440.3	131.2	571.5
Funding to be availed	0	57.43	57.43

The list of various letters relating to loan and equity disbursement and equity to be availed is provided as **Annexure –D(i) ,D(ii), D(iii) & D(iv)**

However, the audited capital cost as on 30th June, 2017 is **Rs 566.14**. The company is considering the actual amount received towards equity funding (i.e, **Rs.131.2 crore**) as equity which is **23.17%** of the audited capital cost while the rest (i.e, **Rs.434.94 crore**) as loan ,which constitutes the remaining **76.83%** of the audited project cost. The loan amount received so far is **Rs.440.3** crore while the remaining equity yet to be received is **Rs.57.43 crore**, which will be adjusted once the additional capitalisation is complete (capital cost will be revised as mentioned in Section 1.2.2)

The summary of capital funding considered for tariff based on audited capital cost is as shown below:

**Table : Funding pattern of NUHEP**

	<b>Loan (INR Crore)</b>	<b>Equity (INR Crore)</b>	<b>Total (INR Crore)</b>
Capital funding	396.30	169.84	566.14

The above funding details have been used to compute components of tariff in the subsequent sections.

## **1.4.Operational norms and Design Energy**

### **1.4.1. Norms of Operation**

Regulation 58 of the MSERC (Multi Year Tariff) Regulations, 2014 provides for norms of operation of Hydro Generating stations. The regulation is reproduced below for ready reference:

*“58 Norms of Operation*

*The norms of operation shall be as under:*

#### *58.1 Normative annual plant availability factor (NAPAF)*

- (a) Storage and pondage type plants where plant availability is not affected by silt and*
- (i) with head variation between Full Reservoir Level (FRL) and Minimum Draw Down Level (MDDL) of upto 8 % ..... 90 %*
- (ii) with head variation between FRL and MDDL of more than 8% = (Head at MDDL/Rated Head) x 0.5+0.2*
- (b) Pondage type plant where plant availability is significantly affected by silt.....85%*
- (c) Run –of- River type plants: NAPAF to be determined plant-wise, based on 10-day design energy data, moderated by past experience where available /relevant.*

*Note:*

- (i) A further allowance may be made by the Commission under special circumstances, e.g. Abnormal silt problem or other operating conditions, and known plant limitations.*
- (ii) A further allowance of 5 % may be allowed for difficulties in the North East Region.*
- (iii) In case of new hydro electric project the developer shall have the option of approaching the Commission in advance for further above norms.*

#### *60.2 Auxiliary energy consumption:*

- (a) Surface hydro electric power generating stations with rotating exciters mounted on the generator shaft .....0.7% of energy generated.*
- (b) Surface hydro electric power generating stations with static excitation system .....1.0% of energy generated.*
- (c) Underground hydro electric power generating stations with rotating exciters mounted on the generator shaft ....0.9% of energy generated.*
- (d) Underground hydro electric power generating stations with static excitation system .....1.2% of energy generated.*

#### *58.3 Transformation losses*

*From generation voltage to transmission voltage .....0.5% of energy generated.”*

The features of NUHEP in terms of type of plant, type of excitation etc. are provided in the table below:

**Table: Features of NUHEP**

Particulars	New Umtru
Type of Station	
Surface/ Underground	SURFACE (Deep set)
Purely ROR/ Pondage/ Storage	ROR with Pondage
Peaking/Non Peaking	NON PEAKING
No. of hours Peaking	NA
Overload Capacity	10%
Type of Excitation	Static type

#### 1.4.2. Design Energy

The plant is designed to generate **235 Million Units** of electricity in a year. It is submitted that for each year of the control period, the same Design Energy shall be adopted for computation of Energy charge. The month-wise and station wise design energy is provided in the **Format HG3 in Annexure - E**

#### 1.4.3. Normative Annual Plant Availability Factor (NAPAF)

Based on the Regulation 58.1 of the MYT Regulations, 2014 quoted above, the NAPAF for NUHEP works out to 67.60%. Considering the allowance of 5% for difficulties in North Eastern Region, the NAPAF for NUHEP is computed at 62.60%. The detailed computation of NAPAF is furnished as **Annexure - F**.

#### 1.4.4. Auxiliary Consumption and Transformation Losses

The New Umtru HEP is a surface hydroelectric power generating station with static excitation system. Therefore, based on Regulation 58.2 and 58.3 of the MSERC MYT Regulations, 2014, the normative auxiliary consumption and transformation losses applicable for NUHEP are as shown below:

**Table: Auxiliary Consumption and Transformation Losses of NUHEP**

Particulars	Rate
Auxiliary consumption for surface hydroelectric power generating stations with static excitation system	1%
Transformation losses from generation voltage to transmission voltage	0.5%

#### 1.4.5. Gross and Net Generation for NUHEP

Net Generation for FY 2017-18 (actual July, 2017 to March,2018), FY 2018-19 (actual upto 31st Oct,2018) are provided in the table below:

**Table: Actual Generation of NUHEP**

Year	Gross Generation (MU)	Normative Aux. Consumption @ 1% of Energy Generated (MU)	Normative Transformation Loss @ 0.50% of Energy Generated (MU)	Net Generation (MU)
FY 2017-18 (July – March)	168.81	1.69	0.84	166.28
FY 2018-19 (As on Oct 31st)	139.30	1.39	0.70	137.21

## 2. ARR for the 2nd Control Period of FY 2018-19 to FY 2020-21

### 2.1. Approach

In accordance with the provisions of the MYT Regulations, 2014, MePGCL hereby submits ARR for FY 2018-19, FY 2019-20 and FY 2020-21 based on latest actual data.

MePGCL submits that Power Purchase Agreements (PPA) for supply of power to MePDCL was signed and as per the PPA, power will be supplied on cost plus basis. Therefore, MePGCL submits that the tariff for hydro generating stations may be determined on cost plus basis.

### 2.2. Operational norms and Design Energy

**Details of Design Energy, NAPAF, features of the NUHEP in terms of type of plant, type of excitation have been provided in Section 1.4**

Estimated Gross and Net Generation for FY 2018-19 (Estimated), FY 2019-20 (Projected) and FY 2020-21 (Projected) are provided in the table below:

**Table: Estimated/ Projected Generation of NUHEP**

Year	Gross Generation (MU)	Normative Aux Cons @ 1% of Energy Generated (MU)	Normative Transformation Loss @ 0.50% of Energy Generated (MU)	Net Generation (MU)
FY 2018-19	235	2.35	1.175	231.48
FY 2019-20	235	2.35	1.175	231.48
FY 2020-21	235	2.35	1.175	231.48

The figures of generation for the control period is projected based on the the generation data of FY 2017-18 and FY 2018-19 (till October)

MePGCL submits before the Hon'ble Commission to kindly approve the total net generation for NUHEP as provided in the table above.

### 2.3. Components of Tariff

Regulation 54 of the MYT Regulations, 2014, provides the Components of tariff for MePGCL. The relevant regulation is reproduced below for ready reference:

***“54 Components of tariff***

*54.1 Tariff for supply of electricity from a hydro power generating station shall comprise of two parts, namely, annual capacity charges and energy charges to be in the manner provided hereinafter.*

*54.2 The fixed cost of a generating station eligible for recovery through annual capacity charges shall consist of:*

*(a) Return on equity as may be allowed*

*(b) Interest on Loan Capital;*

(c) *Operation and maintenance expenses;*

(d) *Interest on Working Capital;*

(e) *Depreciation as may be allowed by the Commission;*

(f) *Taxes on Income.*

*54.3 The annual capacity charges recoverable shall be worked out by deducting other income from the total expenses”*

Based on above provisions, MePGCL computes and provides herewith various cost elements for determination of tariff.

### **2.3.1. Gross Fixed Assets (GFA) & Additional Capex & Capitalization**

MePGCL has requested the Hon'ble Commission to approve the capital cost of NUHEP as Rs 566.14 as on June, 2017. Based on the approved funding for the project and revision of capital cost requirement (Section 1.2.2), the company will make adjustment on account of added capitalization in the true up of the year during which the additional capex is made.

Based on the above submissions, the closing GFA for each year of the control period ( i.e, FY 2018-19, FY 2019-20 and FY 2020-21) is worked out , including projected capitalization during the control period.

**Table: Gross Fixed Asset Details (Rs. Cr)**

<b>Particulars</b>	<b>FY 2017-18 (Estimated)</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
<b>Opening Value of Gross Fixed Assets (Rs Cr)</b>	566.14	566.14	566.14	566.14
Additions during the year( Rs. Cr)				-
Retirements during the year (Rs. Cr)	-	-	-	-
<b>Closing Value of Gross Fixed Assets ( Rs. Cr)</b>	<b>566.14</b>	<b>566.14</b>	<b>566.14</b>	<b>566.14</b>

MePGCL submits before the Hon'ble Commission to kindly approve Gross Fixed Assets for NUHEP as submitted in the above table.

### **2.3.2. Return on Equity (RoE)**

Return on equity is based on actual funding towards equity contribution, i.e, Rs 131.20 Cr. The adjustments based on further equity to be disbursed and net equity for revised capital cost will be done during true up of that year.

The return on equity for NUHEP would be computed based on Regulation 31 read with Regulation 27 of the MSERC MYT Regulations, 2014. The relevant sections of the Regulations is reproduced hereunder:

***“31 Return on Equity***

31.1 Return on equity shall be computed on the equity base determined in accordance with regulation 27 and shall not exceed 14%.

...

### **27 Debt-Equity Ratio**

27.1 For a project declared under commercial operation on or after 1.4.2015, if the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan;

Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff.”

Since the actual equity infused till date is less than 30% of the estimated project cost, the same is being considered for the computation of return on equity.

The RoE of NUHEP for the 2<sup>nd</sup> MYT Control Period is shown in the table below:

**Table: Return on Equity (RoE) of NUHEP (Rs Cr)**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
Opening Equity (INR Crore)	169.84	169.84	169.84
Additions During the Year (INR Crore)	-	-	-
Closing Equity (INR Crore)	169.84	169.84	169.84
Average Equity Considered for RoE (INR Crore)	169.84	169.84	169.84
% RoE as per Regulation	14%	14%	14%
<b>Return on Equity</b>	<b>23.78</b>	<b>23.78</b>	<b>23.78</b>

MePGCL submits before the Hon'ble Commission to kindly approve the Return on Equity as computed in the above table for NUHEP for the control period.

### **2.3.3. Interest on Loan and Finance Charges**

Regulation 32 read with regulation 27 of the MYT Regulations, 2014 provides the guidelines for computation of interest and finance charges on loan capital and the relevant sections of the regulations are reproduced below:

#### **“32 Interest and finance charges on loan capital**

32.1 Interest and finance charges on loan capital shall be computed on the outstanding loans, duly taking into account the schedule of loan repayment, terms and conditions of loan agreements, bond or debenture and the lending rate specified therein.

Provided that the outstanding loan capital shall be adjusted to make it consistent with the loan amount determined in accordance with regulation 27.”

As detailed in the section 1.3 above, MePGCL had availed a loan of **Rs 440.3 Crore** for the New Umtru HEP and is fulfilling the interest obligations as on date.

The Interest on Loan for the control period has been computed by considering interest obligation for the present project loan. The detailed Loan statement along with repayment schedule is enclosed as

**Format-7 of Annexure E.** The summarized statement of Interest and Finance charge for the Control Period is shown below:

**Table: Computation of Interest on Loan - NUHEP (Rs. Cr)**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
Opening Balance	479.47	444.11	416.57
Addition during the Year	-	-	-
Repayment during the Year	35.37	35.37	35.37
Closing Balance	444.11	408.74	381.21
Average Interest Rate	11.81%	12.06%	11.93%
<b>Interest Payable</b>	<b>55.23</b>	<b>51.41</b>	<b>47.59</b>

MePGCL submits before the Hon'ble Commission to kindly approve **Rs. 55.23 Cr, Rs.51.41 Cr** and **Rs. 47.59 Cr** as Interest and Finance Charges for FY 2018-19, FY 2019-20 and FY 2020-21 respectively for NUHEP.

### **2.3.4. Operation and Maintenance Expenses**

As per Regulation 56 of the MYT Regulations, 2014, the Operation and Maintenance Expenses for new generating plants (commissioned after 1<sup>st</sup> April ,2009) is to be determined on a normative basis. The extract of the relevant regulation is reproduced below:

*"56 Operation and maintenance expenses*

...

*56.7 In case of hydro generating stations declared under commercial operation on or after 01/04/2009, O&M expenses shall be fixed at 2% of the original project cost (excluding cost of rehabilitation and resettlement works) and shall be subject to annual escalation at 5.72% for the subsequent years"*

Since NUHEP will achieve its CoD after 1.04.2009, its O & M expenses have been computed as per Regulation 56 (7) based on the above regulations and are shown below:

**Table: O & M Expenses of NUHEP (In Rs Cr)**

<b>Particulars</b>	<b>Amount</b>
Project Cost (As on 30 <sup>th</sup> June, 2017)	566.14
O&M Expenses for FY 2017-18 (2% of Project Cost)	11.32
O&M Expenses for FY 2018-19 (5.72% escalation over previous Year)	11.97
O&M Expenses for FY 2019-20 (5.72% escalation over previous Year)	12.66
O&M Expenses for FY 2020-21 (5.72% escalation over previous Year)	13.38

MePGCL submits before the Hon'ble Commission to kindly approve the O&M expenses of NUHEP as computed above for the control period FY 2018-19 to FY 2020-21



### 2.3.5. Depreciation

Depreciation is computed as per Regulation 33 of the MYT Regulations, 2014. The depreciation is computed on the final gross value of the assets by straight line method using depreciation rates as prescribed in the Depreciation Schedule ( Annexure – II ) of the MSERC MYT Regulations, 2014.

Since the details of category-wise assets (break up as in Format- 6) are not available at this point of time, MePGCL has computed the depreciation at a flat rate of 5.25% on the average GFA for the year. The Hon'ble Commission in the tariff order for provisional tariff for NUHEP had computed Rs 27.27 Cr depreciation on asset base of Rs 518.54 Cr, from which average depreciation of 5.26% has been derived by the Utility.

Based on the above, the depreciation of NUHEP for the control period is computed below:

**Table: Depreciation of NUHEP**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
Average Value of Assets	566.14	566.14	566.14
Average depreciation (%)	5.26%	5.26%	5.26%
<b>Net Depreciation</b>	<b>29.77</b>	<b>29.77</b>	<b>29.77</b>

The Utility will adjust the depreciation based on category-wise assets with the projected depreciation in the true up for the year. Based on the above submissions, MePGCL submits before the Hon'ble Commission to kindly approve the Depreciation for NUHEP as computed above.

### 2.3.6. Interest on Working Capital

As per Regulation 34.1 (iii) of the MYT Regulations, 2014, the components of working capital will be:

#### ***“34 Interest on Working Capital***

##### ***34.1 Generation***

...

*(iii) In case of hydro power generating stations, working capital shall cover:*

- *Operation and maintenance expenses for one (1) month;*
- *Maintenance spares at the rate of 15% of O & M expenses escalated at 6% from the date of commercial operation; and*
- *Receivables equivalent to two (2) month of fixed cost:*

...

*Interest on working capital shall be allowed at a rate equal to the State Bank Advance Rate (SBAR) as on 1<sup>st</sup> April of the financial year in which the Petition is filed.”*

As per the above-mentioned regulation, the computation of Interest on Working Capital for NUHEP is shown below:

**Table: Interest on Working Capital of NUHEP (In Rs Cr)**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
O & M Expenses for 1 month	1.00	1.05	1.11
Maintenance Spares @15% of O&M plus	1.80	1.90	2.01
Receivables @ 2 months of Fixed Cost	21.46	21.05	20.53
<b>Total Working Capital requirement</b>	<b>24.26</b>	<b>24.01</b>	<b>23.65</b>
SBI short term PLR as on 01.04.2017	13.85%	13.85%	13.85%
<b>Interest on Working Capital</b>	<b>3.36</b>	<b>3.32</b>	<b>3.28</b>

MePGCL submits before the Hon'ble Commission to kindly approve the Interest on Working Capital for NUHEP as computed above.

### 2.3.7. Income Tax

Regulation 35 of the MYT Regulations, 2014, provides for claim of Income Tax as expenses. MePGCL submits that in the control period, income tax would be charged at the effective Minimum Alternate Tax (MAT) rate on the return on equity. The effective MAT rate prevailing is as shown below:

**Table: Effective Tax Rate**

<b>Particulars</b>	<b>Rate</b>
Minimum Alternate Tax (MAT)	18.50%
Surcharge rate for net income > 1 Cr	15.00%
MAT + Surcharge	21.28%
Education and Higher Education Cess thereon	3.00%
<b>Total effective tax rate</b>	<b>21.91%</b>

Accordingly, the tax payable on the Return on Equity of NUHEP works out as below:

**Table: Income tax on NUHEP**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
Return on equity (INR Crore)	23.78	23.78	23.78
Effective tax rate (%)	21.91%	21.91%	21.91%
<b>Tax payable (INR Crore)</b>	<b>5.21</b>	<b>5.21</b>	<b>5.21</b>

MePGCL submits before the Hon'ble Commission to kindly approve the Income Tax for NUHEP as computed above.

### 2.3.8. Connectivity and SLDC Charges

The Regulation 59 of MYT Regulations, 2014 provides for claim of SLDC & Connectivity charges as expenses. MePGCL submits that as per the tariff order for MYT FY 2018-21 dated 31 March 2018, the total approved SLDC charges applicable for MePGCL (old plants & Leshka) for FY 2018-19, FY 2019-20 & FY 2020-21 are Rs 1.21 Cr, Rs 1.27 Cr, Rs 1.33 Cr respectively

Based on this, the SLDC charges for NUHEP for the control period has been proportionately worked out as shown below:

**Table: Connectivity and SLDC Charges**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
Total SLDC charges for MePGCL (INR Crore)	1.21	1.27	1.33
Total Installed Capacity of MePGCL (MW)	314.70	314.70	314.70
Installed Capacity of NUHEP (MW)	40.00	40.00	40.00
<b>SLDC charges for NUHEP (INR Crore)</b>	<b>0.15</b>	<b>0.16</b>	<b>0.17</b>

MePGCL submits before the Hon'ble Commission to kindly approve the SLDC charges for NUHEP as computed above.

### **2.3.9. Summary of Fixed Charges of New Umtru Hydro Electric Plant**

Based on the submissions in the previous sections, the summary of the total fixed charge of NUHEP for for 2nd MYT Control Period is provided in the table below:

**Table: Total Fixed Charge of NUHEP**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
Interest on Loan capital	54.54	51.41	47.59
Depreciation	29.77	29.77	29.77
O&M Expenses	11.97	12.66	13.38
Interest on working capital	3.36	3.32	3.28
Return on Equity	23.78	23.78	23.78
Income Tax	5.21	5.21	5.21
SLDC Charge	0.15	0.16	0.17
<b>Total Annual Fixed Cost</b>	<b>128.78</b>	<b>126.31</b>	<b>123.18</b>
Less: Non Tariff Income	-	-	-
<b>Net Annual Fixed Cost</b>	<b>128.78</b>	<b>126.31</b>	<b>123.18</b>

MePGCL prays before the Hon'ble Commission to kindly approve the Fixed Cost of NUHEP for MYT Control period FY 2018-19 to FY 2020-21 as shown in the table above.

### 3. Computation of Capacity Charge and Energy Charge

#### 3.1. Regulatory Provisions

MePGCL submits that based on the Annual Fixed Cost approved by Hon'ble Commission, it will calculate the capacity charge and energy charge based on the following provisions of the MYT Regulations, 2014:

***“57 Computation and payment of capacity charge and energy charge for Hydro generating stations.***

***57.1 Capacity Charges:***

*(1) The fixed cost of a hydro generating station shall be computed on annual basis, based on norms specified under these regulations, and recovered on monthly basis under capacity charge (inclusive of incentive) and energy charge, which shall be payable by the beneficiaries in proportion to their respective allocation in the saleable capacity of the generating station, that is to say, in the capacity excluding the free power to the home State:*

*Provided that during the period between the date of commercial operation of the first unit of the generating station and the date of commercial operation of the generating station, the annual fixed cost shall provisionally be worked out based on the latest estimate of the completion cost for the generating station, for the purpose of determining the capacity charge and energy charge payment during such period.*

*(2) The capacity charge (inclusive of incentive) payable to a hydro generating station for a calendar month shall be*

$$= AFC \times 0.5 \times NDM / NDY \times (PAFM / NAPAF) \text{ (in Rupees)}$$

*Where,*

*AFC = Annual fixed cost specified for the year, in Rupees.*

*NAPAF= Normative plant availability factor in percentage*

*NDM = Number of days in the month*

*NDY = Number of days in the year*

*PAFM = Plant availability factor achieved during the month, in percentage*

*(3) The PAFM shall be computed in accordance with the following formula:*

$$PAFM = 10000 \times \sum_{i=1} DC_i / \{ N \times IC \times (100 - AUX) \} \%$$

*Where,*

*AUX = Normative auxiliary energy consumption in percentage*

*DC<sub>i</sub> = Declared capacity (in ex-bus MW) for the ith day of the Month which the station can deliver for at least three (3) hours, as certified by the nodal load dispatch centre after the day is over.*

*IC = Installed capacity (in MW) of the complete generating station*

*N = Number of days in the month*

***57.2 Energy Charges:***

*(1) The energy charge shall be payable by every beneficiary for the total energy scheduled to be supplied to the beneficiary, excluding free energy, if any, during the calendar month, on ex power plant basis, at the computed energy charge rate. Total Energy charge payable to the generating company for a month shall be:*

$$= (\text{Energy charge rate in Rs. / kWh}) \times \{ \text{Scheduled energy (ex-bus) for the month in kWh} \} \times (100 - FEHS) / 100.$$

*(2) Energy charge rate (ECR) in Rupees per kWh on ex-power plant basis, for a hydro generating station, shall be determined up to three decimal places based on the following formula, subject to the provisions of clause (4):*

$$ECR = AFC \times 0.5 \times 10 / \{ DE \times (100 - AUX) \times (100 - FEHS) \}$$

Where,

DE = Annual design energy specified for the hydro generating station, In MWh, subject to the provision in clause (6) below.

FEHS = Free energy for home State as fixed from time to time, by competent authority.

(3) In case actual total energy generated by a hydro generating station during a year is less than the design energy for reasons beyond the control of the generating company, the following treatment shall be applied on a rolling basis:

(i) in case the energy shortfall occurs within ten years from the date of commercial operation of a generating station, the ECR for the year following the year of energy shortfall shall be computed based on the formula specified in clause (2) with the modification that the DE for the year shall be considered as equal to the actual energy generated during the year of the shortfall, till the energy charge shortfall of the previous year has been made up, after which normal ECR shall be applicable;

(ii) in case the energy shortfall occurs after ten years from the date of commercial operation of a generating station, the following shall apply:

Suppose the specified annual design energy for the station is DE MWh, and the actual energy generated during the concerned (first) and the following (second) financial years is A1 and A2 MWh respectively, A1 being less than DE. Then, the design energy to be considered in the formula in clause (5) of this Regulation for calculating the ECR for the third financial year shall be moderated as (A1 + A2 – DE) MWh, subject to a maximum of DE MWh and a minimum of A1 MWh.

(iii) Actual energy generated (e.g. A1, A2) shall be arrived at by multiplying the net metered energy sent out from the station by 100 / (100 – AUX).

(4) In case the energy charge rate (ECR) for a hydro generating station, as computed in clause (5) above, exceeds eighty paise per kWh, and the actual saleable energy in a year exceeds { DE x (100 – AUX) x (100 – FEHS) / 10000} MWh, the Energy charge for the energy in excess of the above shall be billed at eighty paise per kWh only:

Provided that in a year following a year in which total energy generated was less than the design energy for reasons beyond the control of the generating company, the energy charge rate shall be reduced to eighty paise per kWh after the energy charge shortfall of the previous year has been made up.

(6) The concerned Load Despatch Centre shall finalise the schedules for the hydro generating stations, in consultation with the beneficiaries, for optimal utilization of all the energy declared to be available, which shall be scheduled for all beneficiaries in proportion to their respective allocations in the generating station.”

### 3.2. Capacity Charge and Energy Charge for New Umtru

As submitted in the previous sections, the net Annual Fixed Charges to be considered for the determination of final tariff of NUHEP is as shown below:

**Annual Fixed Charges – New Umtru HEP (INR Crore)**

Particulars	FY 2018-19 (Projected)	FY 2019-20 (Projected)	FY 2020-21 (Projected)
Net Annual Fixed Cost projected for Control Period	128.78	126.31	123.18

Now, based on the Regulations, 50% of the Annual Fixed Charges is to be recovered as capacity charge and the balance is to be recovered as energy charge from the beneficiary. Therefore, the capacity charge and energy charge for NUHEP for the Control Period FY 2018-19 to FY 2020-21 would be as computed below:

**Table: Capacity and Energy Charges for New Umtru HEP for the Control Period**

<b>Particulars</b>	<b>FY 2018-19 (Projected)</b>	<b>FY 2019-20 (Projected)</b>	<b>FY 2020-21 (Projected)</b>
<b>Net AFC for Computation of Tariff</b>	<b>128.78</b>	<b>126.31</b>	<b>123.18</b>
Design Energy (MU)	235	235	235
Less: Auxilliary Consumption @ 1%	2.35	2.35	2.35
Less: Transformation Loss @ 0.5%	1.18	1.18	1.18
Net Energy (MU)	231.48	231.48	231.48
<b>Fixed Charge (Rs. Cr.)</b>	<b>64.39</b>	<b>63.16</b>	<b>61.59</b>
<b>Variable Charge (Rs./kWh)</b>	<b>2.78</b>	<b>2.73</b>	<b>2.66</b>

Based on all the above submissions, the petitioner humbly prays before the Hon'ble Commission to kindly approve the final tariff of New Umtru Hydro Electric Project as computed in the above table to be recovered in the 2nd MYT Control Period FY 2018-19 to FY 2020-21.