BEFORE
MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION,
SHILLONG

PETITION

FOR

APPROVAL OF BUSINESS PLAN
FOR THE FOURTH CONTROL PERIOD
FY 2024-25 TO FY 2026-27

FILED BY

MEGHALAYA POWER GENERATION CORPORATION LTD.
Lum Jingshai, Short Round Road,
Shillong - 793 001

BEFORE THE HON'BLE MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION

FILE / PETITION NO……

IN THE MATTER OF

APPROVAL OF BUSINESS PLAN FOR THE CONTROL PERIOD FY 2024-25 TO FY 2026-27 OF THE MEGHALAYA POWER GENERATION CORPORATION LIMITED (MePGCL) UNDER REGULATION 8 OF THE MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION (MULTI YEAR TARIFF) REGULATIONS, 2014.

AND IN THE MATTER OF

MEGHALAYA POWER GENERATION CORPORATION LIMITED; 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 erstwhile Meghalaya State Electricity Board (MeSEB) into four entities, namely;
   i. Meghalaya Energy Corporation Limited (MeECL), the Holding Company
   ii. Meghalaya Power Distribution Corporation Limited (MePDCL), the Distribution Utility
   iii. Meghalaya Power Generation Corporation Limited (MePGCL), the Generation Utility
   iv. 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 to 31st March 2012. Therefore, through notification dated 31st March 2012, the 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 utility) and MePTCL (Transmission Utility) from 1st April 2012 onwards.

3. On 23rd December 2013, the Government of Meghalaya notified the vesting of the Assets and Liabilities as on 1st April 2010, in the MeECL. Subsequently, the Government of Meghalaya notified the 4th Amendment to the Notified 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 indicated.

4. The unbundled utilities for generation, transmission and distribution started their independent commercial operation from FY 2013-14. MSERC has also issued the segregated tariff orders of generation, transmission and distribution separately from FY 2013-14.

5. MePGCL has begun segregated commercial operation as an independent entity from 1st April 2013 onwards.

6. Under the Meghalaya State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2014, MePGCL is filing the business plan petition for the 4th Control period.

7. The Board of Directors of MePGCL has accorded approval for filing of this petition and authorized the undersigned to file the petition accordingly. The copy of the Board's resolution is hereby enclosed as **Annexure-B.**

8. The applicant, therefore, humbly prays before the Hon'ble Commission to pass appropriate orders on the following:
   a. Approval of Business Plan for the 4th (fourth) Control Period of FY 2024-25 to FY 2026-27
   b. To approve the principles and methodology proposed by MePGCL.
   c. To pass such orders, as Hon'ble Commission may deem fit and proper and necessary in view of the facts and circumstances of the case.
   d. To condone any inadvertent omissions, errors & shortcomings and permit the applicant to add/change/modify/alter this filing and make further submissions as required.

M Lyngdoh

(M. Lyngdoh)
Superintending Engineer (P&RM)
For and on behalf of
Meghalaya Power Generation Corporation Ltd.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 Background

1.1 Introduction

1.1.1 The Power Supply Industry in Meghalaya had been under the control of the erstwhile Meghalaya State Electricity Board (MeSEB) with effect from 21st January 1975. On 31st March 2010, the State Government issued a Notification "The Meghalaya Power Sector Reforms Transfer Scheme 2010" thereby giving effect to the transfer of assets, properties, rights, liabilities, obligations, proceedings and personnel of the erstwhile MeSEB to four successor companies. On 31st March 2012, the Government of Meghalaya issued further amendment to the above-mentioned transfer scheme, to transfer Assets and Liabilities including all rights, obligations and contingencies with effect from 1st April 2012 to, namely:

- Generation: Meghalaya Power Generation Corporation Ltd. (MePGCL)
- Transmission: Meghalaya Power Transmission Corporation Ltd. (MePTCL)
- Distribution: Meghalaya Power Distribution Corporation Ltd. (MePDCL)
- Meghalaya Energy Corporation Limited (MeECL), the holding company

The Government of Meghalaya issued further notification on 23rd December 2013, thereby notifying the revised statement of Assets and Liabilities as on 1st April 2010 to be vested in Meghalaya Energy Corporation Limited.

1.1.2 The MSERC is an independent statutory body constituted under the provisions of the Electricity Regulatory Commissions (ERC) Act, 1998, which was superseded by 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.

1.2 Provision of Law for Business Plan

1.2.1 The Hon'ble Commission has notified the Meghalaya State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2014 which was published in the Meghalaya Gazette on 25th September 2014. It is submitted that Meghalaya State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2014 since amended vide notification dated 18thJune 2020, states as under:

"The applicability of these Regulations is hereby extended for a further period of 3 years with effect from 1.04.2024 to 31.03.2024 onwards".

1.2.2 It is further submitted that the Hon'ble Commission vide letter dated 3rd August 2023 has extended the validity of the existing Regulations up to 31st March 2027. Accordingly, MePGCL is filing the current Petition as per the provisions of MYT Regulations 2014.

1.2.3 As per Regulation 8 of the MYT Regulations, 2014, MePGCL has to file the Business Plan for the control period of FY 2024-25 to FY 2026-27. The relevant regulation is reproduced below:

*"**8 Business Plan***

8.1 The Generating Company, Transmission licensee, and Distribution Licensee for Distribution Business, shall file a Business Plan for the Control Period of three (3) financial years from 1st April 2015 to 31st March 2018, which shall comprise but not be limited to detailed category-wise sales and demand projections, power procurement plan, capital investment plan, financing plan and physical

targets, in accordance with guidelines and formats, as may be prescribed by the Commission from time to time:

Provided that a mid-term review of the Business Plan/Petition may be sought by the Generating Company, Transmission Licensee and Distribution Licensee through an application filed three (3) months prior to the specified date of filing of Petition for truing up for the second year of the Control Period and tariff determination for the third year of the Control Period.

1.3 Preamble

1.3.1 The petition for Business Plan for the Control Period (FY 2024-25 to FY 2026-27) is filed in accordance with the Meghalaya State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2014 (hereinafter referred to as "MYT Regulations, 2014") which have been notified by on 25th September 2014 and further amended on 28thAugust 2017, 18th June, 2020 and 03rd August, 2023

1.3.2 Based on the Business Plan, Meghalaya Power Generation Corporation Limited (MePGCL) is required to forecast the Aggregate Revenue Requirement (ARR) for three years of control period from FY 2024-25 to FY 2026-27. As per the MYT Regulations, Business Plan should comprise of estimates for demand and supply forecast, capital investment plan, power procurement plan, financing plan, physical targets etc.

1.3.3 The Business Plan depends upon various factors such as historical data, current and future financial estimates, growth estimates, economic, financial and business-related assumptions, current operational requirements, other foreseeable changes/ requirements in future etc. MePGCL has taken a rational and scientific approach while forecasting various components of Business Plan in order to arrive at realistic forecast with minimal expected deviations. The approach undertaken for preparation of various plans and forecasts is explained in detail in the relevant sections of Business Plan. This Business Plan, as submitted under MYT Regulations 2014, will be considered as a base for determination of ARR and tariff for future period.

1.4 Business Plan

1.4.1 As per the regulations of the Hon'ble Commission, MePGCL submits its Business plan for the fourth control period FY 2024-25 to FY 2026-27.

1.4.2 A business plan is conventionally defined as:
"*Business Plan is a formal statement of a set of business goals, the reasons why they are believed attainable, and the plan for reaching those goals. It may also contain background information about the organization or team attempting to reach those goals."*

1.4.3 Accordingly, this business plan is developed for the Control period bearing in mind the growth plan for the control period after considering the strength and weakness of the company and evaluating its business environment. MePGCL has taken a rational and scientific approach while forecasting various components of Business Plan in order to arrive at realistic forecast with minimal expected deviations. The approach undertaken for preparation of various plans and forecasts is explained in detail in the relevant sections of Business Plan.

1.4.4 There are a number of internal and external factors which affect the planning of the company and thus it makes this document a very dynamic document which calls for regular reviews of the plan with a view to introduce any mid-term corrections.

1.4.5 The primary objectives for developing the business plan are as follows:

- Providing a tool for Strategic Planning: The Business Plan is intended to chart the Company's way forward. The key objective for developing the business plan is to analyze and anticipate the major requirements of generation infrastructure commensurate with the expected demand growth of electricity. Business Plan may prove to be a tool to strategically plan for capital investments and its financing. Further, it may help in timely execution and monitoring of the works.
- For the regulatory compliance of submission of Business Plan as mandated by MSERC MYT Regulations, 2014.
- Aid in Decision Making and better operational efficiency: The Business Plan may aid in decision making while planning and execution of the project. Further, proactive actions may be taken during the execution of the project in order to achieve the company's goal of supplying quality power. This may help in improving the operational efficiency by running the power stations in accordance with the set performance target.

1.4.6 Due to changing business environment and uncertainty over the regulations governing the Generation business, it is submitted that Hon'ble Commission may take cognizance of the fact that the business plan is a dynamic document which may need to be updated at various intervals to align the growth path of the company with the external business environment and internal factors affecting the business/ operations of the company.

2 Company Profile-MePGCL

2.1 Introduction

2.1.1 MePGCL is a Generation Company within the meaning of Section 2 (28) of the Electricity Act 2003. Further, Section 7 and 10 of the Electricity Act 2003 prescribe the following major duties of the Generating Company:

- To establish, operate and maintain generating stations, tie-lines, sub-stations and dedicated transmission lines connected therewith in accordance with the provisions of this Act or the rules or regulations made there under
- To supply electricity to any licensee in accordance with this Act and the rules and regulations made there under
- To submit technical details regarding its generating stations to the Appropriate Commission and the Authority
- To co-ordinate with the Central Transmission Utility or the State Transmission Utility, as the case may be, for transmission of the electricity generated by it

2.1.2 As per Meghalaya Power Sector Transfer Scheme, MePGCL has been vested with the function of generation of power by the State Government of Meghalaya. The Business Scope of the Company falls within the legal framework as specified in the Act and includes:

- To supply electricity to any licensee in accordance with this Act and the rules and regulations made there under
- To initiate accelerated power development by planning and implementing new power projects
- To operate the existing generating stations efficiently & effectively
- To implement Renovation and Modernisation for existing plants to improve performance through constant R & M activities, regular maintenance, etc
- Achieve high reliability and safety levels in all operational areas
- Taking appropriate steps towards ensuring safety and adhering to environmental norms
- Adopt best industry practices to become the best and efficient generating company
- Other associated businesses like providing Training, Research and Development activities, Technical consultancy services and O&M related services

2.1.3 MePGCL started functioning as an independent commercial entity from 1st April 2013. The entire power generated by the MePGCL stations is sold to MePDCL as per the signed power purchase agreements and transmitted to MePDCL at MePTCL interface points. At present, MePGCL is having 10 Nos. Hydro Generating stations. The details of existing stations are mentioned below:

Table 1: Details of existing stations

Sl No.	Station	Type	No of Units/Capacity	COD		Capacity (MW)
1	Umtru MHP	ROR	4x2.8 MW	Unit–I	May-57	2.8
				Unit-II	May-57	2.8
				Unit–III	May-57	2.8
				Unit-IV	Jul-68	2.8
2	Umiam Stage-I HEP	Storage	4x9 MW	Unit–I	21.02.1965	9
				Unit-II	16.03.1965	9
				Unit-III	09.06.1965	9
				Unit-IV	09.11.1965	9
3	Umiam Stage-II HEP	Pondage	2x10 MW	Unit–I	22.07.1970	10
				Unit-II	24.07.1970	10
4	Umiam-Umtru Stage-III HEP	Pondage	2x30 MW	Unit–I	06.01.1979	30
				Unit-II	30.03.1979	30
5	Umiam-Umtru Stage-IV HEP	Pondage	2x30 MW	Unit–I	16.09.1992	30
				Unit-II	11.08.1992	30
6	Sonapani MHP	ROR	1x1.5 MW	Unit-I	27.10.2009	1.5
7	MyntduLeshka HEP	ROR	3x42 MW	Unit–I	01.04.2012	42
				Unit - II	01.04.2012	42
				Unit - III	01.04.2013	42
8	New Umtru HEP	Pondage	2x20 MW	Unit – I	01.07.2017	20
				Unit - II	01.07.2017	20
9	Lakroh MHP	ROR	1x1.5 MW	Unit-I	01.03.2019	1.5
	NEW PROJECT					
10	Ganol Small Hydro Project	ROR	3x7.5 MW	Unit-I	1.08.2023	7.5
				Unit-II		7.5
				Unit-III		7.5
Total						**378.2**

2.1.4 Upcoming Plants

There is one upcoming hydro project of the utility which is scheduled to be commissioned in the near future. The details of the plant are given below:

Table2: Details of Upcoming Plants

Sl No	Name of the Plant	Design Energy (MU)	Capex Outlay (INR. Crs)	Debt (INR Crs)	Equity (INR Crs)	Grant (INR Crs)	Year of Commissioning
1	Riangdo SH Project (3 MW)	17.92	39.97	11.4	8.57	20	2025-26 (tentative date)

2.1.5 Operational Performance of the Generating Stations- MePGCL

2.1.5.1 Energy Generation Trend in Past Years

All the Generating stations being hydro, the annual generation is heavily dependent on the rainfall during the year. The generation trend from FY 2019-20 to FY 2022-23 has been presented in the table below:

Table 3: Energy Generation Trend of MePGCL (MU)

Sl. No	Station	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
1	Umiam Stage-I	108.32	149.49	64.92	117.67

Sl. No	Station	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
2	Umiam Stage-II	55.25	76.09	33.9	62.11
3	Umiam-Umtru Stage-III	141.83	163.71	110.19	129.57
4	Umiam-Umtru Stage-IV	164.5	188.32	125.26	176.00
5	Sonapani MHP	3.59	6.08	5.55	6.47
6	MyntduLeshka HEP	421.65	420.61	380.34	359.69
7	New Umtru HEP	181.43	229.80	160.79	196.24
8	Lakroh MHP	2.11	3.69	4.04	3.43
Total		**1078.68**	**1237.81**	**884.99**	**1051.19**

2.1.5.2 Energy Generation in FY 2023-24& the fourth Control Period

Based on the previous generation trend for the existing stations and the projected energy generation from the new upcoming plants, the projected generation in FY 2023-24 & the 4thControl Period is tabulated below:

Table 4: Projected Energy Generation for MePGCL(MU)

Sl. No	Station	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27
1	Umiam Stage-I	116.00	116.00	116.00	116.00
2	Umiam Stage-II	46.00	46.00	46.00	46.00
3	Umiam-Umtru Stage-III*	139.00	139.00	0	128.7
4	Umiam-Umtru Stage-IV	207.00	207.00	207.00	207.00
5	Sonapani MHP	5.00	5.00	5.00	5.00
6	MyntduLeshka HEP	486	486	486	486
7	New Umtru HEP	235	235	235	235
8	Lakroh MHP	11	11	11	11
9	Ganol SHP	15	67	67	67
10	Riangdo SHP	0	0	8	17
Total		**1260**	**1312**	**1181**	**1318.7**

*The anticipated generation is after completion of RMU work w.e.f. July,2026 to Mar,2027.

2.1.5.3 Auxiliary Consumption of MePGCL Generating Stations: The actual auxiliary consumption from FY 2019-20 to FY 2022-23 for the generating stations of MePGCL is shown in the table below:

Table 5: Auxiliary Consumption (MUs)

Sl. No	Station	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
1	Umiam Stage-I	1.01	0.96	0.55	0.738
2	Umiam Stage-II	0.335	0.42	0.199	0.348
3	Umiam Stage-III	0.863	0.92	0.63	0.727
4	Umiam Stage-IV	1.12	1.18	0.846	1.23
5	Sonapani MHP	0.032	0.06	0.054	0.058
6	Leshka HEP	3.67	3.50	3.63	3.13
7	New Umtru HEP	1.3	1.48	1.11	1.35
8	Lakroh MHP	0.029	0.048	0.04	0.027
TOTAL		**8.356**	**8.568**	**7.059**	**7.608**

Table 6: Projected Auxiliary Consumption & Transformation losses (%) for the fourth control period

Sl. No	Station	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27
1	Umiam Stage-I	1.20	1.20	1.20	1.20
2	Umiam Stage-II	1.20	1.20	1.20	1.20

Sl. No	Station	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27
3	Umiam Stage-III	1.20	1.20	1.20	1.20
4	Umiam Stage-IV	1.50	1.50	1.50	1.50
5	Sonapani MHP	1.20	1.20	1.20	1.20
6	Leshka HEP	1.50	1.50	1.50	1.50
7	New Umtru HEP	1.50	1.50	1.50	1.50
8	Lakroh MHP	1.50	1.50	1.50	1.50
9	Ganol SHP	1.50	1.50	1.50	1.50
10	Riangdo SHP			1.50	1.50

Table 7: Plant Availability Factors (PAF %) Power Station-wise for FY 2020-21, FY 2021-22 & FY 2022-23

Sl. No	POWER STATION	2020-21	2021-22	2022-23
1	Stage-I Power Station, Sumer	95.08	75.94	96.04
2	Stage II Power Station, Umsumer	98.14	98.5	98.33
3	Stage III Power Station, Kyrdemkulai	80.45	83.1	82.6
4	Stage IV Power Station, Nongkhyllem	49.14	48.44	63.68
5	Umtru Power Station, Byrnihat	0.00	0	0
6	Sonapani Mini Power Station	98.19	92.37	98.51
7	Myntdu Leshka Power Station.	90.87	87.68	59.36
8	New Umtru Power station, Byrnihat	99.54	91.08	90.46
9	Lakroh Power Station	80.80	60.03	77.69

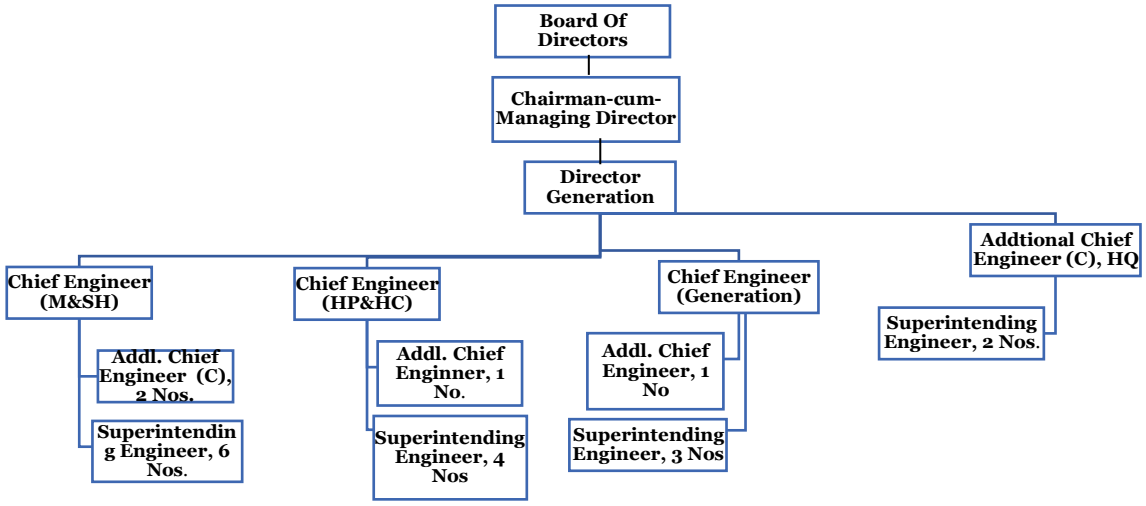
Table 8: Projected NAPAF (%) for the fourth control period

Sl. No	Station	FY 2024-25	FY 2025-26	FY 2026-27
1	Umiam Stage-I	59.83	59.83	59.83
2	Umiam Stage-II	85.00	85.00	85.00
3	Umiam Stage-III	63.67	63.67	63.67
4	Umiam Stage-IV	61.79	61.79	61.79
5	Sonapani MHP	45.00	45.00	45.00
6	Leshka HEP	39.00	39.00	39.00
7	New Umtru HEP	62.60	62.60	62.60
Projected CUF (%) for Small Hydro projects for the fourth control period				
8	Lakroh MHP	85.00	85.00	85.00
9	Ganol SHP	34.00	34.00	34.00
10	Riangdo SHP		68.19	68.19

2.2 Human Resource

2.2.1 Organization Structure

MePGCL has its Corporate Office at Shillong. The company is led by the CMD. The broad organisation chart is shown below:



2.2.2 Existing Human Resource

As on 31st March 2023, MePGCL had 604 Regular employees and 410 Casual employees. MePGCL boasts of a strong technical knowhow in the form of experienced engineers and operational staff. The technical progress of MePGCL has helped in establishing, operating and maintaining generating stations. It may be mentioned that there is a shortage of manpower. The class-wise number of Regular & Casual Employees in MePGCL is depicted in the table below:

Table 9: Class Wise No of Employees-MePGCL

	Class I					Class II					Class III					Class IV					Grand Total
Category	O/O the Director Generation	CE MSH	CE HP&HC	CE GEN	Total	O/O the Director ...	CE MSH	CE HP&HC	CE GEN	Total	O/O the Director ...	CE MSH	CE HP&HC	CE GEN	Total	O/O the Director ...	CE MSH	CE HP&HC	CE GEN	Total	
Regular	6	20	19	12	**57**	6	56	75	79	**216**	1	18	20	15	**54**	3	64	77	133	**277**	**604**
Causal	0	0	0	0	**0**	0	3	0	6	**9**	0	8	16	7	**31**	4	188	91	87	**370**	**410**
																					1014

2.2.3 Manpower Requirement Plan of MePGCL

The utility has planned to recruit new personnel which would be required when the upcoming projects would be operational and also for the existing power stations which are facing shortage of manpower. The table below represents the financial year-wise projected employee requirement of MePGCL during the fourth control period.

Table 10: Projected Manpower Requirement of MePGCL for the Control Period from FY 2024-25 to FY 2026-27

Category	FY 2024-25	FY 2025-26	FY 2026-27
O/o Director Generation			
Director Generation	1	1	1
Addl. Chief Engineer	1	1	1
Superintending Engineer	2	2	2
Executive Engineer	2	2	2

Category	FY 2024-25	FY 2025-26	FY 2026-27
Asst. Executive Engineer/ Assist. Engineer	5	5	5
Junior Engineer	1	1	1
Class III	3	3	3
Class IV	7	7	7
Sub-Total (A)	22	22	22
Chief Engineer (Generation)			
Chief Engineer	1	1	1
Addl. Chief Engineer	1	1	1
Superintending Engineer	3	3	3
Executive Engineer	7	7	7
Asst. Executive Engineer/Asst. Engineer	65	66	66
Junior Engineer	54	55	55
Class III	92	92	92
Class IV	250	262	262
Sub-Total (B)	473	487	487
Chief Engineer (Medium and Small Hydro)			
Chief Engineer	1	1	1
Addl. Chief Engineer	2	2	2
Superintending Engineer	6	6	6
Executive Engineer	11	11	11
Asst. Executive Engineer/Asst. Engineer	41	42	42
Junior Engineer	46	47	47
Class III	43	45	45
Class IV	242	256	256
Sub-Total (C)	392	410	410
Chief Engineer (Hydro Planning and Hydro Constriction)			
Chief Engineer	1	1	1
Addl. Chief Engineer	1	1	1
Superintending Engineer	5	5	5
Executive Engineer	12	12	12
Asst. Executive Engineer/Asst. Engineer	57	57	57
Junior Engineer	54	54	54
Class III	134	134	134
Class IV	171	171	171
Sub-Total (D)	435	435	435
Grand Total	**1322**	**1354**	**1354**

MePGCL would like to submit that the currently there is acute shortage of manpower at various stations which is expected to deteriorate with the new plants being commissioned. The sanctioned manpower for the generation business is 1500 against which MePGCL is functioning with the 1014 (including casual employees) number of employees. In view of above MePGCL humbly prays the Hon'ble Commission to approve the projected manpower for MePGCL as depicted in the table above.

2.2.4 Revision of Pay for MeECL and its Subsidiaries.

Before corporatization, Meghalaya State Electricity Board (MeSEB) had a policy for considering revision of pay scale of employees every 5 years. This policy of revision of pay has continued till date even for the successor entities of MeSEB as per the decision taken by Employees Associations and Management in the year 2010.

As per this policy, MeECL and its subsidiary companies plan to implement a revised pay scale of employees effective from January 2025 with the following impact.

Table 11: Projection of Impact of ROP for the Control Period: FY 2024-25 to FY 2026-2027

Period 2024-2025	**Amount in crore**	**Remarks**
Basic Pay w.e.f. 1.4.2024 upto 31.12.2024	126.66	
Dearness Allowance w.e.f 01.04.2024 upto 31.12.2024	35.46	
Basic Pay w.e.f 01.01.2025 upto 31.3.2025	50.35	**Taking 1.59 as multiplying factor**
Dearness Allowance w.e.f 01.01.2025 upto 31.3.2025	0	
Period 2025-2026		
Basic Pay	207.43	
Dearness Allowance	6.22	
Period 2026-2027		
Basic Pay	213.65	
Dearness Allowance	12.82	

2.2.5 Capacity Building in Meghalaya Energy Corporation Limited (MeECL)

2.2.5.1 In order to meet the increasing demand for electricity, there is a requirement for addition of generating capacity, expansion of associated transmission and distribution networks and upgrading of technology. The challenge to provide power to all requires a corresponding increase, not only in the quantity, but also in the quality of human resources. Hence, the purpose of establishing the Human Resources Development Centre (HRDC) is to ensure that skilled manpower in adequate numbers is made available across various activities of MeECL. The HRDC therefore identifies the skill gaps, frame occupational standards, facilitate development of practical as well as high quality training contents and ensure adequate availability of faculty for capacity building. Thus, training and upgrading the skills of the manpower is the primary objective of HRDC.

2.2.5.2 At the national level, a statutory body, namely, the Central Electricity Authority (CEA) was constituted under the Electricity Act to promote measures for advancing the skill of persons engaged in electricity industry. CEA has already setup the standards for mandatory training required for various skills for the generation, transmission, distribution, etc.

2.2.5.3 Three types of training infrastructures and facilities are available for personnel in the power industry:

- Training institutes recognized by CEA for imparting statutory induction training: These training institutes recognized by the CEA, cater to the training needs of personnel working in thermal power stations, hydro generating stations, transmission utilities and distribution utilities. For example, the National Power Training Institute (NPTI) has established a Centre for Advanced Management & Power Studies (CAMPS) at its Faridabad campus. In addition to several short-term courses on Technology-Management interface. NPTI also conducts professional courses, integrating power-training experience with academics, like PDC & PGDC in Power Plant Engineering and B.E./ B.Tech. in Power Engineering etc. The other institution, the Central Board of Irrigation & Power (CBIP) also conducts power industry interfaced placement oriented long-

term training programs in generation, transmission and distribution, besides high-end short term programs in advanced technologies in all disciplines of power sector.

- Lineman Training Institutes: Most utilities are having at least one lineman-training center. These institutes are set up by the respective organizations for imparting training to their own employees.
- Other training facility include training program with academic institutions outside power sector.

2.2.5.4 Capacity Building in Meghalaya Energy Corporation Limited (MeECL) & Its Subsidiaries – Human Resource Development

Human Resources Development Centre (HRDC), Umiam, MeECL is entrusted with the training for the officers and staffs of the 3 (three) subsidiary corporations of MeECL, namely, Meghalaya Power Generation Corporation Limited (MePGCL), Meghalaya Power Transmission Corporation Limited (MePTCL) and Meghalaya Power Distribution Corporation Limited (MePDCL). Details of trainings conducted in FY 2022-23 and FY 2023-24 for the officers is given below:

Table 12: Training Details for FY 2022-23

Sl. No.	Name of Institution	Field of Training (Thermal/Hydro/Transmission/Distribution/Management)	Total Trainings (Days/man)
1	Engineering Staff College of India	Engineering Staff College of India "Best Practices in O&M of Hydro Power Plants" (for MePGCL, MePDCL, MePTCL)	14/12=1.17
2	M/s DGM & Associates	M/s DGM & Associates Consultants Technical & Accounts "Preparation of Cost records".	4/118=0.03
3	BOPT(ER)	Apprenticeship Training for Engineering stream	365/20=18.25
4	BOPT(ER)	Apprenticeship Training for General Stream.	365/13=28.08
		Total	**47.53**

Table 13 Training Details for FY 2023-24(As on July)

Sl. No.	Name of Institution	Field of Training (Thermal/Hydro/Transmission/Distribution/Management)	Total Training (Days/man)
1	NPT-NER Guwahati	One week capacity building programme "Open Access, Power Trading, Tariff & Forecasting" from 5th to 9th June, 2023	5/8=0.63
2	NPTI-NER Guwahati	One week capacity building programme "Operation and maintenance system" from 26th to 30th June, 2023	5/12=0.42
3	NESAC	Course on development of geospatial dashboard & mobile applications and geo web analytical tools from 17th to 21st July, 2023 at NESAC outreach Centre.	5/6=0.83
4	MATI	Awareness Programme on "Legal Awareness on Woman & Child from 20th June, 2023.	½=0.5
		Total	**2.38**

Human Resources Development Centre (HRDC), Umiam, MeECL is entrusted with the training for the officers and staffs of the three subsidiary corporations of MeECL, namely, MePGCL, MePTCL and MePDCL. Various initiatives taken for capacity building are highlighted as below:

- Capacity building under World Bank Project - The World Bank has proposed funding for capacity building for MePTCL and MePDCL for the next three years. Proposal under this scheme is being prepared by the nodal officers of the two corporations, namely, Chief Engineer (Transmission) & Chief Engineer (Distribution).
- Capacity building in various Training Institutes - Officers from the three subsidiary corporations are being sent regularly to free training programme organized by various training institutes like National Power Training Institute (NPTI), Indian Institute of Technology (IIT), Roorkee, National

Thermal Power Corporation Limited (NTPC) and many more. For such training, the respective corporations bear the expenditure of travelling and boarding only.

- Capacity building through own resources - The capacity building measures mentioned above are required to be supplemented by training programmes specifically required for the three corporations. These include training for field engineers in technical areas, management and human relationships, among others. For such training programmes, funding is being allocated in the budget of the respective corporations.

2.2.6 Way forward

In accordance with the CEA Guidelines & Apprentices Act, the HRDC, MeECL has been imparting On-the-job training, Induction training, C&D Trainings, R-APDRP Trainings, trainings on behavioral attitudes, etc. as required. The HRDC is striving to develop the entire human resources of MeECL by meeting the growing and evolving demands of the technological advancement.

3 Capital Investment Plan

3.1 Need for Capital Expenditure:

The present generating stations of MePGCL except MLHEP, NUHEP and Lakroh HEP are very old. Therefore, to maintain efficient generation from these stations, the generation utility needs to undertake various system improvement & augmentation activities. Moreover, to utilize the natural resources of Meghalaya, few hydro-electric projects have been undertaken, and some more will be added in the upcoming years. The Capital Expenditure can be broadly segregated into New Projects and additional investment in existing stations for augmentation, improvement, metering etc.

The overall capital investment plan for the 4th Control Period i.e., FY 2024-25 to FY 2026-27 has been divided in 3 broad categories:

a. Capital Investment Works pertaining to existing generation stations.

b. Capital Investment Works Related to New Projects and Up Coming Projects

c. Works related to survey and investigation,

The detail of the works under each category are described in details in the subsequent section of the Petition.

3.2 Details of Works on Existing Stations

3.2.1.1 System Augmentation & Improvement Projects

As the power stations and its dam are quite old, some of its components need to be augmented and improved. The details of projects that would be taken up during the fourth control period (FY 2024-25 to FY 2026-27) are mentioned below:

Table 14: System augmentation & Improvement Projects

Sl. No.	Project Name	Description/ Scope and Justification
A	**Umiam Stage I Power Station**	

Sl. No.	Project Name	Description/ Scope and Justification
1	Replacement of Two penstock butterfly Valve including By-pass valve along with all servo mechanism and related control system.	Over the year there is a heavy water leakage from the flange of the pipe of Penstock Butterfly Valve causing undue damage to the valve and adjacent pipes. This valve is necessary for the regular maintenance of penstock and turbine parts of the station. If these components of the station are not maintained regularly there may be catastrophes in future. It is to be noted that since installation of this valve in 1960, no major maintenance work has been carried out on this valve. Therefore, to avoid any catastrophes in the future and for smooth functioning of the station it is necessary to replace the two bypass valves with new ones. Further there is no control system for the valves and therefore new control system also needs to be procured.
2	Re-engineering of firefighting system of Generator and Transformer	*Generator:* The existing CO2 flooding system of fire protection for generator used the old cylinder, since 1965 have not been replaced. So it is required to replace existing cylinder along with the control circuit so that the same firefighting of generator housing can be made active. *Transformer:* At present the piping, valves and nozzles of the emulsifier system are not functioning due to broken pipes (because of aging), non-functioning valves and it is extremely dangerous to open the same as it may lead to flooding of power house. It is to be noted that the components of the emulsifier system have not been replaced since 1965. Therefore to make the fire fighting system functional it is necessary to renovate the piping and valves along with nozzles.
3	Replacement of transformer for Unit-1, Unit-2 and Unit-4.	Stage 1 Power Station has four numbers of Generator Transformers. The transformer No.3 was replaced by new one during April 2006 and the transformer No.1 and No.4 were replaced by transformer brought from Umiam Stage-II in June 2013 after reconditioning. These two transformers that were brought from Umiam Stage II Power Station after its Renovation, modernization and upgradation works are also the original transformers of 1965 and 1966 Make. These transformers were installed and commissioned along with the Generating units of Umiam Stage II Power Station in July 1970. Therefore, both the transformers has outlived its reliable lifespan of 35-40 years. The Generator Transformer No. 2 which of 1962 make had failed recently and need to be replaced with a new one. For a reliable and smooth operation of the Power Station, the other old transformers also need to be replaced by new ones which meets the current international standards and specifications

Sl. No.	Project Name	Description/ Scope and Justification
4	Construction of Transformer Yard to accommodate station service transformers, Unit-1 & Unit-3 and procurement of the same.	The Station Service Transformers of Unit-1 & Unit-3 have completed the useful life. Besides these transformers are oil based and are located inside the generator floor of the power house building. Therefore, it is proposed that these transformers be replaced with new ones of 500 KVA and placed outside the power house building.
5	Construction of Beams and By-pass Isolators for KPS-1, KPS-2 &Umiam feeders.	KPS-1, KPS-2 &Umiam 132KV Feeders Circuit Breakers do not have Bypass Isolators. In case of any problem of the Circuit Breakers, the feeders cannot be charged without the bypass isolators. As such it is required to construct switchyard structural beams to accommodate bypass isolators as well as installation of Master Isolators for smooth changeover from Main to Auxiliary Bus.
6	132 KV SF6 Circuit Breaker (Spare)	At Umiam Stage I Power Station, there are 4 nos Generator Circuit Breaker, 1 no Bus Coupler Circuit Breaker and 7nos 132 KV feeders Circuit Breaker. Altogether there are 12nos 132 KV Circuit Breakers installed in this station. As the circuit breakers are used for synchronizing to the grid for evacuation of power and also for protection during abnormal conditions of the generators and external fault in the grid and transmission line, hence its healthiness is of vital importance. In the event of its failure, the available electrical power to generate will not be possible to transmit. Also, in the event that it fails to operate when a protection relay signal to open, the generator and transformer will be expose to the electric stress due to external short circuit faults. This may even cause damages to all the power equipments of the Station. Hence, in order to maintain uninterrupted generation of power in the event of failure of any of these Circuit Breakers it is felt necessary that that two or more spare Circuit Breakers be procured to be made readily available for replacement of the damaged one.
7	Complete Installation of SCADA including Hardware and Software	There is a need for installation of a this centralized supervisory control system for monitoring and controlling of different electrical and mechanical parameters from control room to ensure proper monitoring of the generating units, to ensure instant detection of any abnormalities. Electrical parameters include online monitoring of various Current and voltages whereas mechanical parameters will include monitoring of temperature, pressure, vibration, cooling flow etc. which would ensure proper operation of the hydro generating Units from the safety and stability point of view so as to ensure its trouble free operation.

Sl. No.	Project Name	Description/ Scope and Justification
8	Replacement of Governor and AVR system.	The present Digital AVR and Governing system installed in 2001-2002 has become prone to malfunctioning due to damage of installed cards and modules which has lead to outage of the Units on several occasions. Further, the OEM has stated that the existing cards and modules have become obsolete and the manufacturing of these spare cards and modules have been discontinued and therefore it is evident that failure of these cards/modules will force the Generating Units into prolonged period of outages leading to huge generation loss. The same are mandatory need to be replaced now.
9	Replacement of Generator Stator Air Cooler for three Units	Umiam Stage I Power Station was Renovated and Modernized on 2001-2002 by Toshiba Company with funding from JBIC (now JICA). During R&M works, replacement of Stator Air Cooler was not included in the scope due to constraint of loan. After having been in service continuously for a period of 57 years the copper tubes of these coolers have shown signs of massive deterioration and the brittleness of these tubes have resulted in water leakages from the coolers persistently at an alarming rate which not only resulted in huge outage and consequent generation loss but is also detrimental to the health of the stator windings which may lead ultimately to the failure of insulation due to moisture ingression as a result of persistent leakage. Since the above leakage has both short time and longtime ramifications in the form of generation loss in case of ultimate insulation failure of the Stator Winding. Hence, it is proposed that the stator air coolers of Unit-I, II & III are completely replaced by new coolers at the earliest to avoid unnecessary prolonged shutdown and generation loss from these Units .
10	Upgradation of existing conventional AIS grid system with Gas insulated system (GIS)	Upgradation of existing conventional AIS grid systems with Gas Insulated Grid Systems for Stage-1 Power Station, Sumer is of utmost importance as a gas-insulated substation (GIS) uses a superior dielectric gas, SF6, at moderate pressure for phase-to-phase and phase-to-ground insulation. The high voltage conductors, circuit breaker interrupters, switches, current transformers, and voltage transformers are in SF6 gas inside grounded metal enclosures. This metal enclosure not only gives enhanced safety but is inherently reliable due its component being placed within a protective gas environment and prevent deterioration from exposure to atmospheric air, moisture, contamination, etc. Gas insulated grid systems aids in ease of installation, accommodation of more bays within the same area, long life of equipment low maintenance cost and higher reliability compared to conventional grid station.
11	Procurement and Installation of CCTVs at Stage I Power Station	As the power stations are vital installations of the State, it is necessary to install CCTVs camera at all vital locations in order to prevent theft, security breach and particularly to thwart untoward incidences for the safety of the women folk etc.

Sl. No.	Project Name	Description/ Scope and Justification
12	Installation of 132/11 KV 5MVA Station Transformer and accessories to feed the Station Service Transformers.	At present the Outside source supply for the power station as well as for the adjoining employee's colony is derived from 11 KV Feeder coming from Umiam which is very prone to faults and outages, since the feeder passes through jungle route. Therefore, it is proposed that dedicated power transformer is installed which taps power from the 132 KV bus/grid for ensuring stable and reliable power supply for the station as well as employees' colony.
13	Replacement of Bypass Valve Stage-I	Since the commissioning of the Umiam Stage-I HEP in the year 1965, the Tunnels, Surge shaft, water conductor systems etc. of Umiam Stage-I HEP have not been inspected due to absence of an Intake gate. Moreover, the By-pass valve of Umiam Stage-I HEP is in a deteriorated condition and is leaking profusely and temporary sealing of the By-pass valve is being taken up from time to time, as the replacement of the Valve cannot be taken up at this juncture due to absence of any barrier to obstruct the flow through the water conductor system to provide a dry condition for the execution of the work. **OBJECTIVE AND SCOPE OF WORK:** There are two Butterfly valves for controlling the flow of water to the Penstock by opening and closing this valve. These valves have been in service since the time of commissioning (1965) and have been working erratically lately with lots of maintenance. The condition of the By-pass Valve and the control mechanism has deteriorated beyond repair and likely to cause havoc if the same is not replaced in time. The failure of this valve will cause immense flood downstream which cannot be controlled. This will also affect the operation of UmiamStage-1 Power Station as the Station will be partially inundated; the whole of MIV/Turbine Floor and part of the Generator Floor will be submerged ant therefore, affecting the AVRs and the Governor Regulating Panels. This will cause total shutdown of the Generators. In view of this, there is urgent need to replace the existing By-pass Valve and the control mechanism. **REQUIREMENT TO TAKE UP THE WORK:** The entire bypass valve assembly and its accessories need to be totally replaced with new one. On inspection it was observed that the bypass valve piping have pin hole leakage which have been repaired from time to time.
14	Repairing of PRV liners and Draft Tube of all four units of Stage-I power house	Since the commissioning of the Umiam Stage-I HEP in the year 1965, the Tunnels, Surge shaft, Water Conductor Systems etc of Umiam Stage-I HEP have not been inspected due to absence of an Intake Gate. An inspection to Draft tube liner, PRV liners other under water parts were carried out during the year 2014. The observation states that the PRV Liners of all the four units are damaged due to corrosion and the same need replacement.

Sl. No.	Project Name	Description/ Scope and Justification
		OBJECTIVE AND SCOPE OF WORK: PRV is a type of safety valve used to control or limit the pressure in a system, pressure might otherwise build up and create a process upset, instrument or equipment failure or fire. As per record available, the PRV pipe lines have not been replaced since commissioning. The PRV Liners of all the four units are damaged due to corrosion and the same need to be replaced. The concrete portions of the PRV and Draft tube outlets of all the four units as well as the bottom portion of the wall are eroded and the same needs repairing. **REQUIREMENT TO TAKE UP THE WORK:** The entire PRV liners need to be totally replaced with new one and repairing of the concrete portions of the PRV and Draft tube outlets of all the four units as well as the bottom portion of the wall are eroded is necessary.
15	Painting of Penstock of Umiam Stage-I HEP.	Since the commissioning of the Umiam Stage-I HEP in the year 1965, the Tunnels, Surge shaft, water conductor systems etc of Umiam Stage-I HEP have not been inspected due to absence of an Intake gate. The penstock and its components were designed and erected in the year 1962-65 and are more than 55 years old. Hence it is very essential that for the safety of the structures and also the life and properties of the population living downstream, Ultra Sonic Test of Penstock of Umiam Stage-I was conducted during the year to know their present condition. The test results were compared with the available drawings in the department. As seen from the comparison, corrosion or rust has been observed in many places/reaches along the penstock. An exploration was done in terms of strengthening the thickness of the penstock. An option to rehabilitate the lining of the penstock by painting is suggested. **OBJECTIVE AND SCOPE OF WORK:** To feed 4 units of 9000 KW two steel-lined tunnel of 1.98 m diameter take off from the surge shaft and continue for a distance of about 89.00m where from surface penstock commences. At the tunnel exit, an anchor block is provided and the two penstocks of 1.98 m diameter and these run parallel up to the powerhouse. The length of the penstock is 550.00 m. At the powerhouse, each penstock bifurcates into 2 penstocks of 1.98 m. diameter. Along the alignment of the penstock, anchor blocks are provided at places where the inclination of the penstock changes. There are five anchor blocks in all. There are no's of saddles with proper arrangements for sliding arising due to temperature changes. The structural steel components have not been painted since long. Steel Lined Penstocks should be protected against corrosion due to climate condition, abrasion due to different force acting on it etc. Fresh long-lasting protection with epoxy paint is to be provided to prevent corrosion otherwise this equipment may deteriorate to any

Sl. No.	Project Name	Description/ Scope and Justification
		extent that the replacement of parts may become necessary and such replacement may become difficult and costly. Therefore, it is necessary to do a painting to protect the equipment and to increase the life of parts. **REQUIREMENT TO TAKE UP THE WORK**: As seen from the comparison, corrosion or rust has been observed in many places/reaches along the penstock. An option to rehabilitate the lining of the penstock by painting is suggested for strengthening the thickness of the penstock.
16	ROV based Underwater inspection of tunnel interiors of the head race tunnel of Umiam Stage-I.	Since the commissioning of the Umiam Stage-I HEP in the year 1965, the Tunnels, Surge shaft, water conductor systems etc of Umiam Stage-I HEP have not been inspected due to absence of an Intake gate. The Tunnels were designed and erected in the year 1962-65 and are more than 58 years old. Hence it is very essential that for the safety of the structures and also the life and properties of the population living downstream, Underwater inspection of tunnel interiors of the Head Race Tunnel of Umiam Stage-I may be conducted to know their present condition. **OBJECTIVE AND SCOPE OF WORK:** To carry the water of the Umiam Reservoir into the Power Station, an 3.05 m internal diameter horse shoe type tunnel is provided. This tunnel is proposed to be lined with an average 250 mm thick concrete. The tunnel has a bed slope of 1 in 105 and is designed to carry a max. discharge of 30.80 cumec which is required to run 4 units of 9000 KW capacity under minimum head condition. The tunnel has a length of 2078.74 m from the intake point to the Surge Shaft with an invert level of 955.56 m. **REQUIREMENT TO TAKE UP THE WORK**: The Tunnels were designed and erected in the year 1962-65 and are more than 58 years old. Hence it is very essential that for the safety of the structures and also the life and properties of the population living downstream, Underwater inspection of tunnel interiors of the head Race tunnel of Umiam Stage-I may be conducted to know their present condition.
17	Repairing of work of Draft Tube and PRV Outlet pipe in Umiam Stage-I Power station	**BRIEF HISTORY:** Since the commissioning of the Umiam Stage-I HEP in the year 1965, the Tunnels, Surge shaft, Water Cconductor Ssystems etc of Umiam Stage-I HEP have not been inspected due to absence of an Intake Gate. An inspection to Draft tube liner, PRV liners other under water parts were carried out during the year 2014. The observation states that the PRV Liners of all the four units are damaged due to corrosion and the same need replacement. **OBJECTIVE AND SCOPE OF WORK:** PRV is a type of safety valve used to control or limit the pressure in a system, pressure might otherwise build up and create a process

Sl. No.	Project Name	Description/ Scope and Justification
		upset, instrument or equipment failure or fire. As per record available, the PRV pipe lines have not been replaced since commissioning. The PRV Liners of all the four units are damaged due to corrosion and the same need to be replaced. The concrete portions of the PRV and Draft tube outlets of all the four units as well as the bottom portion of the wall are eroded and the same needs repairing. **REQUIREMENT TO TAKE UP THE WORK:** The entire PRV liners need to be totally replaced with new one and repairing of the concrete portions of the PRV and Draft tube outlets of all the four units as well as the bottom portion of the wall are eroded is necessary.
B	**Umiam Stage II Power Station**	
1	Installation of 250 KVA, 11/0.4 kv substation dedicated to the station supply of Umiam Stage-II Power Station	The existing station service outside source is taken from the 11 KV rural substation from Umiam which feeds Umiam Stage II Power Station and nearby adjoining villages. There is heavy load unbalance at the low tension (LT) level among the three phases of this distribution transformer causing large neutral current to circulate. On many occasions, this current has caused tripping due to neutral over current in the AC Distribution Panel of the Power Station and thereby causing loss of power supply to the entire station. This unbalance of load also causes voltage unbalance among the three phases which leads to overheating in running the auxiliary equipment like EOT Crane, Oil pump motors, dewatering pump motors, air compressors, battery charger and other equipments installed in the Power Station. In order to have a stable and adequate supply it is necessary to install a dedicated outside source substation for the station. It may also to be noted that the work was beyond the scope of Renovation, Modernisation and Upgradation works carried out in 2011-12
2	Emulsifier system for Generator Transformer in both Units.	Presently there is no firefighting system for the Power transformer.
3	Installation of On Line Supervisory system (SCADA) for the entire Power Station	There is a need for installation of a this centralized supervisory control system for monitoring and controlling of different electrical and mechanical parameters from control room to ensure proper monitoring of the generating units, to ensure instant detection of any abnormalities. Electrical parameters include online monitoring of various Current and voltages whereas mechanical parameters will include monitoring of temperature, pressure, vibration, cooling flow etc which would ensure proper of the hydrogenating Unit from the safety and stability point of view so as to ensure its trouble free operation.

Sl. No.	Project Name	Description/ Scope and Justification
4	Replacement of 11 KV Switchgear Panel	Umiam Stage II Power Station was Renovated, Modernized and Upgraded in January 2012 by Toshiba Company with funding from JICA. The 11 KV Switchgear Panels were also renovated during 2012. However, numerous Problems have occurred inside the Switchgear Panels of both Units causing heavy loss to the corporation. The problems or faults were mostly short circuit between adjacent auxiliaries like PT's, C.T's, Surge Arrestors etc. A lot of care has been taken by the Station engineers and Staffs to insulate the adjacent components and seal numerous holes to avoid rodent inside but to no avail. Therefore, after numerous discussions with higher authority, a conclusion was drawn and that will be a complete replacement of the existing 11 KV Switchgear panel for both Units.
5	132 KV SF6 Circuit Breaker (Spare)	The Generator Circuit Breaker is used to synchronize the generator to the grid and to protect the generator in case of fault occurrence and also to prevent excessive stresses to the power equipments like transformers and generators for long duration due to external short circuit faults that may damage the generators or transformers. The two Generators and Turbine were upgraded in 2012 with all new auxiliaries including the 132KV SF6 Gas Circuit Breakers. At Umiam Stage-II, there are a total of 3 Nos 132KV SF6 Gas Circuit Breakers. 2 (Two) Unit Circuit Breakers to connect the generators with the 132KV Bus at Umsumer and one 132 KV Sumer-Umsumer Line Circuit Breakers to evacuate the electricity generated to Stag –I Power Station switchyard for onward transmission of power to the 132 KV Grid. Frequent operations are made to these two Machine Breakers during Starting and stopping of Generators and while taking Station Service from the grid when both the Generators are idle or under plant shutdown. These two Machine Breakers have been operation for about 9 years as of August 2020. Both the Circuit Breakers have crossed more than 5000 operations and during recent years they have started to malfunction causing a lot of unnecessary outages of Machines. As the circuit breakers are used for synchronizing to the grid for evacuation of power and also for protection during abnormal conditions of the generators and external fault in the grid and transmission line, hence its healthiness is of vital importance. In the event of its failure, the available electrical power to generate will not be possible to transmit. Also, in the event that it fails to operate when a protection relay signal to open, the generator and transformer will be expose to the electric stress due to external short circuit faults. This may even cause damages to all the power equipments of the Station

Sl. No.	Project Name	Description/ Scope and Justification
6	Upgradation of existing conventional AIS grid system with Gas insulated system (GIS)	Upgradation of existing conventional AIS grid systems with Gas Insulated Grid Systems for Stage-1 Power Station, Sumer is of utmost importance as a gas-insulated substation (GIS) uses a superior dielectric gas, SF6, at moderate pressure for phase-to-phase and phase-to-ground insulation. The high voltage conductors, circuit breaker interrupters, switches, current transformers, and voltage transformers are in SF6 gas inside grounded metal enclosures. This metal enclosure not only gives enhanced safety but is inherently reliable due its component being placed within a protective gas environment and prevent deterioration from exposure to atmospheric air, moisture, contamination, etc. Gas insulated grid systems aids in ease of installation, accommodation of more bays within the same area, long life of equipment low maintenance cost and higher reliability compared to conventional grid station.
7	Procurement and Installation of CCTVs at Stage II Power Station	As the power stations are vital installations of the State, it is necessary to install CCTVs camera at all vital locations in order to prevent theft, security breach and particularly to thwart untoward incidences for the safety of the women folk etc.
8	Rehabilitation of the power channel at Umiam Stage-II.	The Umiam Stage-lI Project is a Run of River Scheme with an Installed Capacity of (2X9MW) (2 Units) and commissioned way back in 1970. The Project is unique in character where it was built without any Reservoir Storage Facilities; however, it was operating by directly conveying the Runaway discharge of the Umiam Stage-I (4 X 9MW) to the Stage II Power Station. The Power Station operates by providing a Water Conductor Linking System from the Tail Race of Stage-I Powerhouse to Stage-II through the 1896.00 m and 1189.00 m length Link Tunnel and Open Power Channel respectively. A Fore bay was inbuilt towards the end of the Channel to act as Surge Tank before it finally conveys the runaway discharge of the Stage-I to the Stage-II Powerhouse through the Single Penstock Pipe. The project which is now running about 50 years without any major rehabilitation activities for the civil structures' components. However, there is a detailed site investigation report on the open power channel carried out in the year 2016 (Report enclosed). The Power Channel started from Chainage 1896.00 M, the exit of the Modified D Shaped HRT with smooth transition Open Channel before it flares up to take the Shape of a Trapezoidal Power Channel. It was constructed with a cross-sectional side slope 1:1.5 (Ver:Hor) and with a longitudinal gentle slope of 1:2000. The channel discharge carrying capacity is 28.3 cumec sand it was constructed with a Cement Concrete Lining of 100mm. Thickness throughout its length and Breadth and resting completely on the Natural Earth Foundation Embankment. **NEED OF THE PROJECT**: The seepages at Ch: 1000.00M was noticed in the year 1998 and was continuing. The leakages were repaired during May 2008 and

Sl. No.	Project Name	Description/ Scope and Justification
		in the year 201lduring the Renovation, Modernization and Upgradation of the Umiam Stage-II power station. On filling of the Power Channel, only minor leakages were detected and were being monitored. In the year 2016 it was noticed that there is the subsidence on the slope of the Right Embankment where there is a seepage water at Ch. 987.00m & El. 900.00 m. The base and concrete lining of the whole stretch of the channel were damaged especially at Ch: 0.00m to Ch: 400.00m, the damage at the base of the channel was severe due to the presence of crabs. Emergency repairing of the damaged portion of the power channel lining was taken up in the year 2016. The damage of the Concrete Lining of the Base of the Power Channel, Umiam Stage II HEP is observed at Ch: 3700.00ft to 3815.00ft. This damage may perhaps because of the weakness of the concrete lining due to the expansion or excess hydrostatic load. The seepage may be because of the sudden change of slope of the channel at the entry into the fore bay. A thorough inspection of the stretch of the Right Embankment of the Stage-II Power Channel was carried out on the 23.03.2021 to observe of any other seepage points or behaviour of the stretch of the Right Embankment of the Umiam Stage-II Power Channel at Chainage 1000.00 m. During inspection, it is observed that there is a cavity along the flow of the seepage beneath the ground level. It is anticipated that the erosion of soil by seepage or surface flow of water during every monsoon over a prolonged period has led to the formation of cavities and underground channel beneath the ground level which led to the subsidence on the slope of the right Embankment. It is also seen that a sandbag on the subsidence area along the flow of seepage were deteriorated. The Stone Masonry Retaining Wall has distorted at many portions. The scoring of water through the cavities towards the downstream slope thus making the Wall weaker. Since the commissioning of the project in the year 1970, no major renovation work has been taken up but only minor patch and stitch up repairing works taken up in the past year. Temporary/minor repair works which were carried out would not be sufficient for such structural condition. **PROECT PROPOSAL:** The Power Channel, which is about 1.88 Km, is proposed to carry out major repairing work. Initially, a thorough inspection will be carried out to locate the area where major or minor works must be done. Parts of a canal bank or the entire bank can be highly permeable to water as mentioned above so Water that seeps through the banks will be lost for power generation and may create waterlogging in the fields and roads adjacent to the canal. There are two ways to overcome seepage problems, either reduce the permeability of the canal bank or line the canal. The Inspection Report of the year 2016 strongly recommended

<table>
<tr><th>Sl. No.</th><th>Project Name</th><th>Description/ Scope and Justification</th></tr>
<tr><td></td><td></td><td>laying down a fresh Concrete lining with minimum Tensile Strength and strengthening the natural slope of the earthen embankment of the channel which will stabilize the channel, especially where minimal cover exists on the ground.

<table>
<tr><th>SlNo</th><th>Works</th><th>Amount (lakh)</th></tr>
<tr><td>1</td><td>Rehabilitation of the Stage-II Power Channel Lining.</td><td>1383.00</td></tr>
<tr><td>2</td><td>Rehabilitation of Hydro-Mechanical Item for the intake of Umiam Stage-II</td><td>81.00</td></tr>
<tr><td>3</td><td>Providing Brick Wall Fencing along the length of the Power Channel (both side) from Ch 0.00 M to 1200.00 M of Stage-ll at Lawbyrwa, Sumer.</td><td>373.00</td></tr>
<tr><td>4</td><td>Providing 15m High Mast Lighting tower I Sm Height at Intake including lighting of the Power Channel of Umiam Stage-ll HEP.</td><td>70.00</td></tr>
<tr><td></td><td>Total</td><td>1907.00</td></tr>
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<tr><td>9</td><td>Painting of penstock of Umiam Stage-II HEP.</td><td>Since the commissioning of the Umiam Stage-I HEP in the 1970. The penstock and its components were designed and erected in the 70s and are more than 50 years old. Hence it is very essential that for the safety of the structures and also the life and properties of the population living downstream, Ultra Sonic Test of Penstock of Umiam Stage-I was conducted during the year 2021 to know their present condition. The test results were compared with the available drawings in the department. As seen from the comparison, corrosion or rust has been observed in many places/reaches along the penstock. An exploration was done in terms of strengthening the thickness of the penstock. An option to rehabilitate the lining of the penstock by painting is suggested.

OBJECTIVE AND SCOPE OF WORK:
To feed 2 units of 9000 KW one steel-lined penstocks of 2.74 m diameter take off from the Fore bay and continue for a distance of about 333.00m and these run parallel up to the powerhouse. Along the alignment of the penstock, anchor blocks are provided at places where the inclination of the penstock changes. There are no’s of saddles with proper arrangements for sliding arising due to temperature changes. The structural steel components have not been painted since long. Steel Lined Penstocks should be protected against corrosion due to climate condition, abrasion due to different force acting on it etc. Fresh long-lasting protection with epoxy paint is to be provided to prevent corrosion otherwise this equipment may deteriorate to any extent that the replacement of parts may become necessary and such replacement may become difficult and costly. Therefore, it is necessary to do a painting to protect the equipment and to increase the life of parts.

REQUIREMENT TO TAKE UP THE WORK:</td></tr>
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Sl. No.	Project Name	Description/ Scope and Justification
		As seen from the comparison, corrosion or rust has been observed in many places/reaches along the penstock. An option to rehabilitate the lining of the penstock by painting is suggested for strengthening the thickness of the penstock.
10	Repairing work of Draft Tube and PRV outlet pipe at Umiam Stage-II Power station	Since the commissioning of the Umiam Stage-II HEP in the year 1970, the Link Tunnels, Water Conductor Systems etc of Umiam Stage-II HEP have not been inspected. An inspection to Draft tube liner, PRV liners other under water parts were carried out during the year 2011 during the renovation and modernization of E-M of Umiam Stage-II Power Station. The PRV Liners are damaged due to corrosion and the same need replacement. Grouting on the damaged Draft Tube was also taken up. **OBJECTIVE AND SCOPE OF WORK:** PRV is a type of safety valve used to control or limit the pressure in a system, pressure might otherwise build up and create a process upset, instrument or equipment failure or fire. As per record available, the PRV pipe lines have not been replaced since commissioning. The PRV Liners are damaged due to corrosion and the same need to be replaced. The concrete portions of the PRV and Draft tube outlets as well as the bottom portion of the wall are eroded and the same needs repairing. REQUIREMENT TO TAKE UP THE WORK: The entire PRV liners need to be totally replaced with new one and repairing of the concrete Draft tube is necessary.
11	Providing Protection wall adjacent to the Power Channel Umiam Stage-II	**INTRODUCTION:** The corporation has substantial amount of road length that link to all the project sites. These roads are important for daily commuting to and from the project sites and more importantly for the maintenance of the hydraulic structures. The proposed retaining wall is along the service road leading to the Stage-II Power Channel Fore-bay and was constructed during the construction of the Stage-II project in the late 60's and the length of the road is 0.30 Km approximately. Construction of this retaining wall is very essential so as to protect the service road from landslide or any untoward incident of the Power channel. Proper maintenance is necessary to enable the personnel to quickly attend to their duties in case of electrical supply failures and for emergency opening of Intake Gate in case of any shutdown or maintenance of penstock. **BRIEF HISTORY:** After the completion of the Project in the year 1970 maintenance of this road was taken over by the Stage II Civil Maintenance Division, Sumer and then it was transferred to the Hydraulic Structure Maintenance Division in the year 2005. At present the road is a Katcha road. The road is frequently used by the Hydraulic sub-division for maintenance of the Power Channel, Intake Gate and Penstock.

Sl. No.	Project Name	Description/ Scope and Justification
		OBJECTIVE AND SCOPE OF WORK: Proper maintenance of this structure is necessary to enable the personnel to quickly attend to their duties in case of electrical supply failures and for emergency opening and closing of Intake Gate in case of any shutdown required in the Power Station and maintenance work of the Penstock. In the absence of proper maintained road, the time taken to reach the site takes much longer and sometimes when the vehicle breaks down it's an added problem. The delay in restoring the faults or to immediately address to the problems leads to the loss of generation which ultimately is the loss of income/revenue. Therefore, construction of this retaining wall plays an important role in achieving this goal and for the safety of the structures and also the life and properties of the population living downstream. **REQUIREMENT TO TAKE UP THE WORK:** Constructing of this Retaining wall is highly required to enable the vehicles to ply over it for transportation of required materials and for emergency opening and closing of Intake Gate in case of any shutdown required in the Power Station and maintenance/repairing of the Penstock. Further, this wall also plays an important role for the safety of the Power Channel and also the life and properties of the population living downstream.
C	**Umiam Stage III Power Station**	
1	Renovation Modernisation and Upgradation of Umiam Stage III HEPP.	The Plant is already past its useful life and has deteriorated for obvious reasons of aging. The generation of energy has been declining in recent years and forced shutdown has become the order of the day. Resolving the problem by implementing the renovation and modernization (R&M) will extend the life of the Plant by another 20 to 25 years. The LOA E&M Package of RMU works already issued.
2	Re-Engineering of 132 KV BUS.	The present 132 KV bus of stage III switchyard is of ACSR Panther since its inception i.e. 1979. But the bus loading has been increasing due to more power flow to the system, which has touched the tune of 114 MW and the bus loading equivalent to the tune of 500 Amps as against the maximum current carrying capacity of 371 Amps. Therefore, Bus conductor need to be upgraded from the present ACSR Panther Bus to ACSR ZEBRA or equivalent.
3	Construction of 33 KV Bus and Bay for Outside source power supply from the existing 132/33 KV 10 MVA Transformer	At present the Outside source supply for the power station as well as for the (a) adjoining employee's colony, (b) penstock butterfly valve house and (c) security barracks at penstock valve house is derived from 10 MVA 132/33 KV transformer located in the 132KV Switchyard of Stage-III Power Station, Kyrdemkulai. The present system of the 132/33KV, 10MVA substation is connected to the Four (4) pole structure which has two outgoing 33KV

Sl. No.	Project Name	Description/ Scope and Justification
		feeders that supply to Stage-IV power station, Stage-IV Dam and Zero point substation which caters to the public of many villages and Umsning town. A considerable amount of time and manpower is spent as two linemen in a shift consisting of four shift group and so a total no eight linemen have to be engaged 24X7 for monitoring the line and for the restoration as well as routine maintenance of the line which could have been better utilized in the maintenance of the power station. The outgoing feeders are protected only with the Dropout fuse switch which is not safe for the overall control of the protection of the transformer and lines and there are cases that it impact on the failure of the power system due to heavy fault which occurs in the lines. The routine as well as preventive maintenance works of the power station has been severely hampered due to the huge amount time, manpower and effort engaged for this line and thus there is an urgent need for installation of a 33KV bus with all switchgears like Circuit breakers with control and relay panels for the one incoming and three outgoing lines for ensuring stable and reliable outside source supply for the stations (Stage-III & Stage-IV), Stage-IV Dam as well as employee' colony along with penstock butterfly valve house and its surrounding. The proposal envisages installation of a suitable 33KV Bus and bay for the existing 132/33 KV Power Transformer, 10MVA along with necessary terminal equipments viz. Lightning Arrestors, Isolators, Current Transformer (CT), Circuit Breaker,33KV Cables, Control & Relay Panel along with four 33KV Bays for one incoming and three outgoing lines.
4	Procurement and Installation of CCTVs at Stage III Power Station	As the power stations are vital installations of the State, it is necessary to install CCTVs camera at all vital locations in order to prevent theft, security breach and particularly to thwart untoward incidences for the safety of the women folk etc.
5	Eye ROV based underwater inspection of tunnel interiors of low pressure tunnel of Face-I Stage III HEP Kyrdemkulai	Since commissioning of the Umiam Umtru Stage III HEP in the year 1979, the Link tunnel of the Umiam Umtru Stage III HEP and the Nongmahir pondage cannot be inspected as most of the part is sub-merged under water. Even if the water level is brought down upto the invert level which is 2195.00Ft only up to 180.00M can't be inspected, until unless the Nongmahir pondage is totally dried up then a thorough inspection can be achieved. Hence, under water inspection is required to assess any damage and following rehabilitation required can be carried out. **CONCLUSION:** -Therefore, in the interest of the Corporation in particular and the state of Meghalaya in general, renovating/repairing/undertaking of the above works is essential.

Sl. No.	Project Name	Description/ Scope and Justification
6	Proposed Additional Link Tunnel from Kyrdemkulai Reservoir to Nongmahir Forebay for Umiam Stage III HEP	**INTRODUCTION** The Third Stage (Kyrdemkulai) Project is one of the cascading Projects of Umiam-Umtru basin commissioned in 1979 and was envisaged to utilize the runoff from 150 Sq.Km. (57.92 Sq. miles) of the Umtru catchment by creation of a pondage on the river Umtru itself at Kyrdemkulai and a forebay at Nongmahir with FRLs at 679.90 m. (2230.00 ft.) and 672.07 m. (2205.00 ft respectively. A concrete gravity dam was constructed on the Umtru river creating the pondage at Kyrdemkulai, and earthen dykes were created on nallas for creation of the forebay at Nongmahir. Water from the Kyrdemkulai pondage is led to the Nongmahir forebay through an existing connecting tunnel of about 3.05 m diameter and length of 2917 m (9570') and it is taken down to the Third Stage (Kyrdemkulai) Power Station of installed capacity 60 MW (2 units of 30 MW) through a low-pressure tunnel of 3.96 m diameter and of length 640.05 m and two penstocks of 2.59 m diameter and 433 m length for an average drop of 163.07 m and net head of 150 m. **NEED OF ADDITIONAL LINK TUNNEL** The discharge from Umiam Stage I HEP (4x9 MW) at full generation capacity is 30.80 cumecs, which, after being utilized by the Stage II Power House (2x10 MW), is discharged into the Stage III Dam. However, the discharge capacity of the link tunnel connecting Kyrdemkulai reservoir and Nongmahir forebay is only 28.30 cumecs, less by 2.50 cumecs than the discharge from Umiam Stage I. This excess water of 2.50 cumecs has to be spilled over from the Kyrdemkulai Dam along with the inflow from its own catchment of 150 sq. km. during the monsoon period. The present Renovation, Modernisation and Upgradation (RMU) of the Stage III Power Station will be more meaningful if an additional link tunnel is provided, since the water availability to the Power Station will not be restricted by the only existing Link Tunnel. Hence, to optimize the power generation of the Power Station, providing of an additional link tunnel between the Stage III Reservoir and the Nongmahir Forebay is therefore required in order to avoid spillage of water through the radial gates of the Stage III Dam and instead utilizing it for generation of energy. **COST ESTIMATES** The cost for the construction of Link Tunnel amounts to about Rs.87.29 Crore.
D	**Umiam Umtru Stage IV Power Station.**	

Sl. No.	Project Name	Description/ Scope and Justification
1	Automation and monitoring of MIV of the Generating units	Presently Stage IV Power Station is running in the Manual Operation mode in respect of all the systems of generation. Therefore automation in respect of the following is proposed: *Operation of MIVs, GV Servomotors.* *Operation of Station Auxiliaries viz. Cooling Water system both for Turbine & Generator.* *Operation of other Station Auxiliaries viz. Motorized Valves, Compressors and Lubricating Plants etc.* *Excitation Control System.* *Synchronization facilities through Auto-mode System.* *Miscellaneous works which may have to be interfaced through certain microprocessor with CCBs/UCBs/UABs etc.* In view of all the above, certain components with modifications shall be required to in-built in the system viz. Proximity Switches, Sensors, Motorized Values, Pressure Transducers, Transmitter, OFC, and Cabling works etc. Further certain piping shall be needed to rectify both for Water Cooling System, Lubricating System etc. RTUs may as well be involved for direct Data Communication with SLDC. As such UPS, Monitors, CPUs, bay Controllers etc. shall be required to be incorporated.
2	A. Overhauling and replacement of damaged parts of Unit-II	Since Commissioning of the stations, no overhauling works have been carried out except for annual maintenance and the condition of underwater parts viz guide vane, PRV, MIV seal/seat, bearing pads both for LCB, UGB, Pressure Tensioning Bolts/ Nuts in all the fronts associated with both Axial and Tangential forces etc is found to be deteriorating rapidly with each yearly inspection which necessitates immediate overhauling of the machine and replacement of underwater parts. LOA for the work has been issued to M/s Multitech Engineers, and the work will be completed tentatively in the month of June 2023.
	B. Procurement of excitation transformers	Due to ageing and loading of the Excitation Transformers 375 KVA, 11/0.240 KV of the generating units got tripped on many occasions. Moreover, due to spiking the Transformer may have had an extra burden. Therefore, the old Excitation Transformers at Stage IV need to be replaced by new ones. Hence, in order to maintain the generation level of Stage IV Power Station; 2 new Excitation Transformers need to be procured.
3	Online Vibration monitoring of Generating Units	The present system of measurement of vibration is use of an offline vibration meter. In case of any abnormality to avoid aggravation of the abnormality into a major outage, it is important that the operator immediately stops the Unit and initiate preventive measures. However with the present system early detection of fault is not possible.

Sl. No.	Project Name	Description/ Scope and Justification
		Therefore it is proposed to have an online vibration monitoring system for instant monitoring of any abnormality in the generator and turbine Bearings, under water parts such as runner, guide vane, draft tube etc.
4	Dedicated and reliable Outside Source power supply from 132 KV Bus.	At present the Outside source supply for the power station as well as for the adjoining employee's colony is derived from 10 MVA 132/33 kV transformer at stage-III Power Station thorough a 33 KV Line which is prone to frequent outages as the line passes through a reserve forest area in difficult terrain. Therefore, it is proposed that dedicated outside source transformer is installed which taps power from the 132 KV grid for ensuring stable and reliable outside source supply for the station as well as employee's colony.
5	Telecommunication and Internet Facility	At present the telecommunication facility at Umiam Stage-IV is very poor. Therefore for continuous sharing and exchange of information between the Power Station, SLDC and Head office it is important to have proper Telecommunication along with an internet network.
6	Supervisory Control System	At present the Umiam Stage-IV station is being run on semiautomatic mode. The speed and voltage is being controlled automatically. Whereas, the start and stop of the machine needs to be done on manual basis. With increase of speed in operation, it is necessary to have a system for centralized automatic monitoring and control of the machine parameters. Therefore it is proposed that SCADA system is implemented to enable centralized automatic monitoring and control of various station parameters such as temperature, pressure, flow of water, load condition of machine etc. This will reduce the dependent on manpower and also increase reliability.
7	Procurement of Spare Runner	Spare runner is required for ready availability in case of any problem in the fitted runner of any one of the units, to avoid generation loss.
8	Hydraulic Power Pack with Control Panel for Butterfly Valve	The Power Station is having two-surfaced steel penstock for feeding water to two hydro-generating Units of the Station. There are two Butterfly valve for controlling the flow of water to the Penstock by opening and closing this valve. The Butterfly valve is operating with the help of the Control system which is by hydraulic oil in recent time due to aging all the control system has damaged and it become difficult to operate the valve whenever the shutdown is required in the Power Station. This may pose danger especially during emergency situation. Hence it is required that the control equipments of these valves are replaced with new ones.

Sl. No.	Project Name	Description/ Scope and Justification
9	Installation of Firefighting Scheme for Generator Stators	The proposal for installation of generator stator firefighting envisages complete refurbishment of existing non-functional firefighting scheme which includes replacement of damaged cylinders, replacement of associated valves, pipelines ,nozzles etc along with replacement of existing control panel by a new panel to achieve a automatic and fast response to any kind of inferno in the Generator Stator section which includes earliest detection within a shortest possible time and initiation of action by release of CO_2 to ensure minimum damage to the Stator in particular and also to control the fire in spreading in the vicinity which could otherwise have a catastrophic effect on all other healthy equipments resulting in huge amount of loss and also endangering the safety of operating personnel. Further as per the latest insurance guidelines, it is mandatory to have a working fire protection system in place for any insurance claims in the event of any unfortunate fire related accidents
10	Residual Life Assessment (RLA) of Stage IV Power Station	Umiam-Umtru Stage-IV Power Station was commissioned in the year September-1992 with 2 (Two) units of 30MW each. With the growing demand of power it is necessary that healthiness of different part of the generating unit has to be maintained along with the different auxiliaries to enable the regular generation of the power from these generating units. Of late due to frequent running of the machine, most of the parts have deteriorated and forcing unit to be kept under shutdown for rectification. The most affected part are:- 1. The runner, where heavy cavitations has occurred. 2. The gate mechanism, where cavitations of guide vane have occurred and cause heavy leakage of water. 3. The worn out of link mechanism of guide apparatus causing shutdown of units. 4. The shaft sleeve, where water leakage occurred frequently needing total shutdown of the station. 5. The leakage from the bypass valve and Pressure relief valve causing loss of water. 6. Frequent occurrence of rotor earth fault due aging and looseness of connecting part. 7. Water leakage from the cooler. 8. Water leakage from the main inlet valve system. On many occasion, because of the above conditions, it was found that the generating unit has to be put under shutdown for rectification and this cause heavy loss of generation The generating units have been operating for almost 30 (Thirty) years and to enable the system to operate longer it is necessary to renovate and modernize the generating unit. The remaining life of the Power Station needs to be studied and assess so as to know the exact nature of the problem before the Renovation and modernization is carried out. The Request for Proposal from two firms has been received and the Evaluation etc are under process.

Sl. No.	Project Name	Description/ Scope and Justification
11	Procurement and Installation of CCTVs at Stage IV Power Station	As the power stations are vital installations of the State, it is necessary to install CCTVs camera at all vital locations in order to prevent theft, security breach and particularly to thwart untoward incidences for the safety of the women folk etc.
12	a) Painting the internal and external surface of 2 nos. penstocks of Umiam Stage-IV HEP. b) Construction of bridge at Ch-16.00 Km on the road to Stage-IV power house Nongkhyllem c) Protection work to controlled the seapage from upstream at the Tail Race Stage-IV.	The work is required to be taken up as follows: - • Painting the internal and external surface of 2 Nos. Penstock of Umiam Stage-IV HEP. • Black Top Road along the with side drain form Stage-IV Dam up-to Stage-IV Power-House Nongkhyllem, including Surge-Shaft, Valve House, Colony, Nongkhyllem.(L=14258.00m) • Construction of bridge at Ch:16.00Km on the road to Stage-IV Power-House, Nongkhyllem. • Protection work to control the seepage form upstream at the tail race, Stage-IV Power-House. **NECESSITY: -** Painting of Penstock is required since the same was not done right from the time of inception. The road from Zero Point to Nongkhyllem is in a very dilapidated condition and this has hampered the R&M works. The maintenance road leading to Surge-Shaft and Valve house also are in very poor condition. The bridge at this location needs to be strengthened and widened. Considerable seepage from the river to the tail race was reported and this impedes the operation and maintenance work of the powerhouse. Protection works has been suggested in this regard. **CONCLUSION: -**Therefore, in the interest of the Corporation in particular and the state of Meghalaya in general, renovating/repairing/undertaking of the above works is essential
E	**Umtru Power Station**	
	Procurement and Installation of CCTVs at Umtru Power Station	As the power stations are vital installations of the State, it is necessary to install CCTVs camera at all vital locations in order to prevent theft, security breach and particularly to thwart untoward incidences for the safety of the women folk etc.
F	**Sonapani Mini Hydro Power Plant**	
1	a. Procurement and Installation of 415V 3 Ph LT panel. b. Relays and Cards to replace some existing defective ones and spares. c. Generator Circuit Breaker to replace the existing one.	The existing LT Panel is out of order and the LT power control has been temporarily used. Therefore it is proposed that a new 415V 3 Phase LT Panel be procured. Most of the relays and cards are not functioning and spares also not available. Therefore, it is proposed that Relays and Cards be procured to replace some existing defective ones and as spares. The existing Generator Circuit Breaker is giving problem and requires frequent maintenance leading to force outage of the

Sl. No.	Project Name	Description/ Scope and Justification
		machine. Therefore, it is proposed that a new generator circuit breaker be procured.
G	**Generation System Protection Division**	
1	Procurement of Diagnostic Tools, Plant & Machineries for Generation system protection division	For Improvement of Generation System Protection and Communication System along with Diagnostic Tools and installation of Optical Fiber Cable Link at different Generating Stations.
2	Installation of OPGW for communication system between Stage III & Stage IV, Stage I & Stage II and Umtru-New Umtru Power Stations including all Fiber Optics terminal equipments.	The only existing communication system between various power stations is through PLCC. Considering the importance and relevance attached to the Power Generating Station it is mandatory to have an alternative and more reliable communication system through OPGW, besides considering the limitation of PLCC system. Moreover, availability of telemetry data of both analog and digital data of Power Stations can be improved considerably by use of OPGW. Further, the maintenance cost of OPGW is negligible.
3	Procurement of Online Oil Filtration Machine for all Generator Transformer under MePGCL	At present, whenever oil filtration of the Generator Transformer is required, shutdown of the affected Generator Transformer is mandatory to be taken and this result in huge generation loss since this type of work is time consuming and usually completed in days or weeks together, especially if the period is during monsoon season. Therefore, in order to avoid this type of shutdown for oil filtration, online oil filtration machine for all generator transformer is strongly recommended.
4	Installation of ADSS OFC for communication system (Dam Water Level monitoring) of Stage-3, Stage-4 and Leshka power stations including all Transducers, Converter ,Fiber Optic Terminal Equipments and all associated accessories	At present, the dam water level monitoring system of Stage III, Stage IV is not available. The actual levels at the dams are physically monitored at frequent intervals and then send by voice/sms communication to the relevant recipients. Hence there is an urgent need to have a reliable communication system of the dams water levels by installation of ADSS OFC and related equipments etc. for the purpose.
	MyntduLeshka HE Project	
1	Supply and erection of spare Generator Transformer 1Ø, 17.5 MVA, 132/33 KV with accessories for Leshka Power Station	MyntduLeshka Power Station has 3 (three) Units of 42 MW each, with 9 Nos of 17.5 MVA, 11/132 KV Single Phase Generator Transformers (3 Nos for each Unit). A 10th Spare Generator Transformer has been kept as a provision, in the event of failure of any of the Single Phase Generator Transformers. Since, commissioning of the MyntduLeshka Power Station in 2011, 2 (two) Nos of Generator Transformers had failed due to various factors. These GTs have been repaired twice. One of the repaired GTs is put in service and the other has been kept as spare. As the reliability and dependability of the repaired GTs are very unpredictable, it is proposed that 2 (two) new Single Phase Generator Transformers 17.5 MVA, 11/132 KV

Sl. No.	Project Name	Description/ Scope and Justification
		with accessories etc are procured to replace the repaired GT in service and the latter to be kept as spare. Since, the Power Supply depends on the reliability and availability of the GTs, any breakdown is fatal. Considering, the *importance to optimise maximum generation during high hydro monsoon season at the MLHEP area*, to cater and maintaining/regulating un-interrupted power generation for grid stability throughout the year, it is very vital for procurement of 2 (two) new Single Phase Generator Transformer, 17.5 MVA, 11/132 KV with accessories etc, for the MLHEP Power Station, to meet the ever growing System Demand.
2	Replacement of Switchgear & Protection System for Leshka Power Station	The existing switchgears in Leshka have often encountered with pole discrepancies problem due to which machines are often forced shutdown. This leads to unwanted loss of revenue and due to outage of the machine. It is therefore, considered that the existing switchgear be placed out with the new switchgears.
3	Replacement of Air coolers including accessories for Stator for all 3 Units for MyntduLeshka Power Station	The MyntduLeshka Stage-I Power Station being Run of the River scheme, has been designed with a plant load factor of 44% and is expected to generate around 484 MU by design per annum. The existing Cooling System for the three units of 42 MWs each of the MyntduLeshka Power Station is of a closed loop system, which include the primary and secondary cooling water pumps. The breakdown of these pumps during their continuous operation usually contributes to the outages of the units. With the proposed Cooling System in place, it will mitigate the outages due to the failure of cooling water pumps, grid disturbances and clogging of heat exchangers, reduction in maintenance cost of the primary cooling water system consisting of pipes, flanges, valves, pumps, filters and heat exchangers due to exposure to acidic nature of the water. This will be vital for the maintaining the availability of Power Generation in the region and in particular the state of Meghalaya. The Power House is also equipped with 4 Nos of Drainage Pump and 6 Nos of Dewatering Pumps. These Pumps are of VT shaft type. These Pumps are unreliable and not dependable as they are prone to fail due to deformed shaft or broken couplings. To prevent and avoid flooding of Power House, it is proposed that the existing Dewatering and Drainage Pumps be replaced with Submersible Type of Pumps in line with the guidelines of CEA. Further, the existing system for dewatering of the tail race water in the event of any emergency/planned or forced maintenance of the underwater components of the T&G set is only through the Primary Cooling, Drainage and Dewatering System of U3, wherein, its delivery outlet pumps the water to the Lynriang River. This system takes around approximately 60 hours to deliver the tail race water (approx. 50,00,000 ltrs) to the river. By modification of the system, and extending the Primary , Drainage and Dewatering

Sl. No.	Project Name	Description/ Scope and Justification
		Water conductor Piping system of Unit 1 & 3 to the Lynriang River, this will greatly reduce the dewatering of Tail Race water to around 24 Hrs and Outage Hours of the whole Power Station by around 36 Hours. In line with the above, it is proposed that an open looped cooling system and Improvement of the Dewatering System for the benefit of the MyntduLeshka Stage –I Power Station and the stability of the grid as a whole.
4	Communication from Leshka Dam to Leshka Power House:	In order that optimum generation from MLHEP Stage – I PS can be achieved, effective monitoring in digital form of Dam level from Power House including Voice and Data communication is required between MyntduLeshka Dam, BFV and Power Station.
5	Painting Of External Surface Of The Penstock Pipes (3 Numbers)	MyntduLeshka Hydro Electric Project Stage-I (3x42MW) is Run of the River(ROR) Scheme constructed across River Myntdu flowing through East and West Jaintia Hills District of Meghalaya .The Dam is constructed just downstream of the confluence (Leshka) of the three rivers namely-Myntdu, Lamu and Amshariang to utilized the discharges from these three rivers from the total Catchment area of about 350 Sq.km. The Latitude and Longitude of Dam site are 25°15'47"N and 92°12' 03.38"E respectively. All the three (3) Units of the Project were commissioned in the year 2012-2013. The project is located in the Jaintia Hills District of Meghalaya. The Power House Site of the project is accessible by road. The road length of 64km from Shillong to Jowai is under N.H.44. The road from Jowai to Amlarem a length of about 27km is under N.H.44(E) and from Amlarem to Pdengshakap Village length of about 10km is under State P.W.D and is fully blacked topped. The road from Pdengshakap Village to Dam Site, a distance of about 10km is fully blacked topped and the road from DamSite to Power house , a distance of about 14km are under MeECL are fully blacked topped. The Myntdu River is acidic in nature due to rat-hole mining in the upstream plateau top on either side of Myntdu basin within the catchment area where the strong corrosion action of acidic water which may be led to an increase the deteriorating of the H-M Equipments of the Dam, Penstock Pipes, Power House equipments etc. Moreover, it may be mentioned that painting of Penstock Pipes was carried out only during construction stage of the Project. Therefore, Painting of Penstock Pipes was very much required in order to prevent the development of deep corrosion, etc. and to apply modern paint with long service life.
H	**New Umtru Power Station**	
1	Procurement and Installation of CCTVs at New Umtru Power Station	As the power stations are vital installations of the State, it is necessary to install CCTVs camera at all vital locations in order to prevent theft, security breach and particularly to thwart untoward incidences for the safety of the women folk etc.

Sl. No.	Project Name	Description/ Scope and Justification
	Heavy Duty Log Boom	A heavy duty Dam Boom is adebris containment boom for surface and submersed trash, litter, natural debris and large flooting objects in rivers, hydro power plan, reservoirs and dam. A dam boom larger in diameter float designed (18"/0.45m and 24"/0.6m) provide increased freeboard for optimal surface debris capture and visibility. The float are couple with rugged log conection hardware with a 4.75 tonne working load limit. The heavy duty boom has been tested to a breaking strength of 60,000 lb/27.216 kg. The system is engineered to maintain reserve buoyancy,even while supporting the optimal debris screen. The system includes- Corrugated double walled HDPE DWC pipeClosed cell foam Heavy duty connectors60,000lb/27.216kg breaking strength High load bearing steel beamDurable aluminium signage Option: Brute Backer, Debris screen, Anchor system, Solar lights, Mooring buoysHeavy duty tidal compensator Upto 5 tonne Working load limit.
	Lakroh Power Station	
1	Replacement of Generator Transformer (with 3.3/33 KV, 2.5 MVA) including augmentation of Switchyard from 11 KV to 33 KV for Lakroh Power Station:	The present voltage evacuation from Lakroh is at 11 KV and this has been observed to be very unstable and had frequently failed leading to long outage of the plant. In order to improve the stability and reliability of power evacuation, it is being considered to step up the voltage from 11 KV to 33 KV. In doing so, the present switchyard would have to be augmented and thus the 3.3/33 KV, 2.5 MVA transformer including other switchyard accessories will be necessary. The estimate for the above mentioned work has been submitted via letter No. MePGCL/SE(El)/Gen-II/T-10/Pt-V/2023-24/27 dated 23rd June, 2023 and awaiting for approval
2	Communication for Lakroh PS with SLDC	Lakroh power station is a mini hydel project with a capacity of (1 x 1.5 MW). Presently the power station is running independently with no communication system. It is necessary that the generating station should have a communication system to link it with SLDC, as the system operator for communication. This would ensure proper communication between the system operator and the station and thus help in effectively running of station.

3.2.2 Dam Rehabilitation and Improvement Project (DRIP- II & III)

Dam Rehabilitation and Improvement Project (DRIP) is one of the flagship projects of the Ministry of Water Resources (MoWR), River Development (RD) and Ganga Rejuvenation (GR), Govt. of India and the World Bank with an objective to improve safety and operational performance of selected dams in the country.

The MoWR, RD&GR, Govt. Of India has initiated the DRIP-II &III with the assistance of the World Bank.18 (eighteen) states and 2 (two) Central Organisations are included for DRIP-II&III at a total financial outlay of Rs. 10,200 crore with assistance of Rs. 7000 crore from the World Bank. Meghalaya

is one of the 18 (eighteen) states included for DRIP-II&III. Six number of dams under MePGCL are proposed under the project as follows:

i. Umiam Stage-I Dams
   a) Concrete Dam
   b) Umiam Stage-I Dyke-I
   c) Umiam Stage-I Dyke-II
ii. Umiam-Umtru Stage-III Concrete Dam
iii. Umiam-Umtru Stage-IV Concrete Dam
iv. MyntduLeskha Stage-I Concrete Dam

The initial proposed financial outlay for the project was Rs. 109 crore which was later revised and submitted to Central Water Commission (CWC) at Rs. 441.00 crore. The World Bank has finalised the amount **of Rs.441 Cr. for** Meghalaya.

The funding pattern of the project will be 80(Loan):20 (Counterpart) ratio for Special Category States like Meghalaya, 80% of the cost will be financed by World Bank as Loan Component to the Govt. of India. 90% of the loan component will be passed on to the Government of Meghalaya as Grant and 10% will be borne by the State government as Loan. The balance 20% shall be counterpart funding by the State Government.

i). Dam Rehabilitation And Improvement Project (Drip) Of Umiam Stage-I HEP

Since the commissioning of the Umiam Stage-I HEP in the year 1965, no major renovation works have been taken up. An inspection was carried out by the Dam Safety Organization, CWC in 2010. The report mentioned about the seepages on the downstream of Non-Overflow Section. The seepage is apparently happening through the lift joints in concerned blocks. The root cause of the problem is perhaps linked with the issue of the original quality of construction; through aggravation over prolonged period (with or without linkages to vibration studies) may also be a factor for present state of seepage. The condition of the choked drain was not good for overall health of the dam and remedial measure needed to be taken at the earliest possible instant. It is also mentioned about that the current frequency and extent of vehicular loading on the dam might not have been anticipated at the designed stage. The team was doubtful about the capacity of the two span of Spillway Bridge (above overflow section) in handling of the excessive vehicular load where the bridge is made up of conventional grid beams. The reports also stated that on account of the dam safety issues, an alternative road shall be taken up with utmost priority.

LOCATION OF THE PROJECT: -

State	Meghalaya
District	Ri-Bhoi District
Village	Umiam
Access Road	Shillong-Guwahati Road (NH40)
Distance	Approx. 16 Km from Shillong

SCOPE OF WORKS: -

The work is required to be taken up as follows: -

I. Structural Rehabilitation Works
II. Structural Measures for Ensuring Hydrological Safety
III Non-structural Measures
IV. Basic Facilities Improvement
V. Instrumentation, SCADA, Surveillance system, etc
VI. Tourism/Fisheries/Hydropower Development

VII. Others (Investigation, Design Studies, Consultancy)

ii). Dam Rehabilitation And Improvement Project (Drip) Of Umiam Stage-III HEP

The Umaim-Umtru Stage III Concrete Dam is a Runoff River Project in which its main feed is from the upstream power Stations which is Stage I and Stage II. Its maximum water level is 2230.00Ft and its situated at the Umiam-Umtru River near Umdiker Village which is around 2.50Km from Zero Point Juncture. The Height of the concrete Dam is 27.50m and Its also called the Diversion Dam as the Water is accumulated and diverted through a link tunnel around 2.30Km to Nongmahir Poundage where the Water is used for generating electricity. The Stage III Power House has an installed capacity of 60MW and will have a coordinated operation with the Umiam Stage IV Power Stations.

LOCATION OF THE PROJECT: -

State	Meghalaya
District	Ri-Bhoi District
Village	Kyrdemkulai.
Access Road	Shillong-Guwahati Road (NH40)
Distance	Approx. 44.50 Km from Shillong

SCOPE OF WORKS: -

The work is required to be taken up as follows: -

I. Structural Rehabilitation Works
II. Structural Measures for Ensuring Hydrological Safety
III. Non-structural Measures
IV. Basic Facilities Improvement
V. Instrumentation, SCADA, Surveillance system, etc.
VI. Tourism/Fisheries/Hydropower Development
VII. Others (Investigation, Design Studies, Consultancy)

CONCLUSION: - The above work is very essential for the health, longevity of the structure and to uplift the generation at the state as a whole.

iii). Dam Rehabilitation and Improvement Project (Drip) Of Umiam Stage-IV HEP

Stage-IV Umiam-Umtru Project is being located in Kyrdemkulai, Ri Bhoi District and it is being constructed across the RiverUmtru. The Project is located approximately around 48Km from the capital of Meghalaya. The project was commission in 1992with an Installed capacity of 2x30MW. The Stage-IV Power-House is at a distance of about 21Kms from Zero Point where the nearest office of Hydraulics Maintenance is located.

LOCATION OF THE PROJECT:-

State	Meghalaya
District	Ri-Bhoi District
Village	Kyrdemkulai.
Access Road	Shillong-Guwahati Road (NH40)
Distance	Approx. 54.50 Km from Shillong

SCOPE OF WORKS: -

The work is required to be taken up as follows: -

I. Structural Rehabilitation Works
II. Structural Measures for Ensuring Hydrological Safety
III. Non-structural Measures:
IV. Basic Facilities Improvement
V. Instrumentation, SCADA, Surveillance system, etc
VI. Tourism/Fisheries/Hydropower Development
VII. Others (Investigation, Design Studies, Consultancy)

CONCLUSION: - The above work is very essential for the health, longevity of the structure and to uplift the generation at the state as a whole.

iv). Dam Rehabilitation and Improvement Project (Drip) Of MyntduLeshka HEP

MyntduLeshka Hydro Electric Project Stage-I (3x42MW) is Run of the River(ROR) Scheme constructed across River Myntdu flowing through East and West Jaintia Hills District of Meghalaya. The Dam is constructed just downstream of the confluence (Leshka) of the three rivers namely-Myntdu, Lamu and Amshariang to utilized the discharges from these three rivers from the total Catchment area of about 350 Sq.km. The Latitude and Longitude of Damsite are 25°15'47"N and 92°12' 03.38"E respectively. All the three (3) Units of the Project were commissioned in the year 2012-2013.

The project is located in the Jaintia Hills District of Meghalaya. The Power House Site of the project is accessible by road. The road length of 64km from Shillong to Jowai is under N.H.44. The road from Jowai to Amlarem a length of about 27km is under N.H.44(E) and from Amlarem to Pdengshakap Village a length of about 10km is under State P.W.D and is fully blacked topped. The road from Pdengshakap Village to Dam Site, a distance of about 10km is fully blacked topped and the road from DamSite to Power house, a distance of about 14km are under MeECL are fully blacked topped.

The design team from Gates (E&NE), CWC had visited the Leshka Dam on the 20.11.2015 to inspect the existing hydro-mechanical equipments provisioned to meet the project requirements. The team was informed that the project was facing considerable problems due to substantial leakage beyond the permissible limit through sluice radial gates. Blistering and scaling of paint films were visible on most of the hydro-mechanical equipments. The detail observations & recommendations may be referred from the Inspection Note of design team from Gates(E&NE), CWC on its visit to multiple hydro projects in Meghalaya from 19.11.2015 to 21.11.2015.

Subsequently, the Members of Dam Safety Review Panel(DSRP) had made a visit to Leshka Dam on the 31.10.2019. After thorough inspected of the Dam, many issues were observed pertaining to – Hydrology, Dam and its Appurtenant Structures, Hydro-Mechanical Items, Instruments, Geological, Non-Structural measures, etc. Recommendations on these issues for rectification/renovation/repairing which was much required had been approved in the "Dam Rehabilitation & Improvement Project -II &III" for the safety of the Dam and its components.

LOCATION OF THE PROJECT: -

State	Meghalaya
District	East and West Jaintia Hills District
Village	Leshka
Access Road	Shillong-Guwahati Road (NH40)
Distance	Approx. 114 Km from Shillong

SCOPE OF WORKS: -

The work is required to be taken up as follows: -

I. Structural Rehabilitation Works

II. Structural Measures for Ensuring Hydrological Safety
III. Non-structural Measures:
IV. Basic Facilities Improvement
V. Instrumentation, SCADA, Surveillance system, etc
VI. Tourism/Fisheries/Hydropower Development
VII. Others (Investigation, Design Studies, Consultancy)

CONCLUSION: - The above work is very essential for the health, longevity of the structure and to uplift the generation at the state as a whole.

3.3 New Plants for MePGCL

3.3.1 Ganol Small Hydro Project (3X7.5MW)

The Ganol Small Hydro Project was conceived and planned way back in 2006-07 to enhance the power generation in the State especially in Garo Hills region. It is the first Hydro Project in Garo Hills which is expected to relieve the region from frequent interruption of power supply. The installed capacity of the project is 3x7.5MW. The annual energy is 67.09 MU at PLF of 0.34.

The construction of the project was started in 2014 and the project was commissioning in August, 2023.Due to change in drawings, additional items of works and time over run the project cost has to be revised. The revised cost of the project yet to be approved is Rs. 596.11 crore.

Other Capital works under Ganol Small Hydro Project which will be taken up during this control period:

The project was commission on 1st August, 2023. Some unforeseen capital works in Dam, Power House, etc., projected to be taken up after commissioning of the project amounting to Rs. 45 crore for the fourth control period.

Existing / New projects Summary

The estimated total expenditure for Existing/New projects is Rs 1239.36 crore, the break-up of which is given in the table below:

Table 15: Expenditure for Existing/New projects

SI No.	Particulars	Project cost (Rs Cr)
Existing project		
1	Umiam Stage-I HE Project (36 MW)	114.83
2	Umiam Stage-II HE Project (20MW)	48.74
3	Umiam Stage-III HE Project (60MW)	499.46
4	Umiam Stage-IV HE Project (60 MW)	31.67
5	Umtru Power Station (11.2 MW)	0.10
6	Sonapani MHP (1.5 MW)	0.34
7	GSPD	8.99
8	Myntdu Leshka HE Project (126MW)	46.85
9	New Umtru HE Project (40MW)	0.64
10	Lakroh MHP (1.5 MW)	1.74
11	DRIP	441.00
	TOTAL	**1194.36**
10	Ganol SHP (22.5 MW)	45
	Total existing projects	**1239.36**

3.4 On-going plant of MePGCL

3.4.1Riangdo Small Hydro Project (3MW)

The Riangdo SHP is located at Swanggre village, Shallang, West Khasi Hills. The Installed Capacity is (3MW). The total project cost is estimated at Rs. 39.97 Crores. The annual energy from the project is 17. 92MU.The project is scheduled to be completed in 3(three) years.

The Physical Progress of the Project is 31% (Civil Works only)

Salient features of the Project:

Project Location	Shallang,West Khasi Hills District
Project Cost	Rs. 39.97 Crores
Installed Capacity	3.00 MW
Design Head	135m
Design Discharge	2.52cumecs
Annual Energy	17.92Mu
Weir	58 m long, RCC, 1 Intake Gate
WCS	458 m long
Forebay	312.23Sq.m
Penstock	1x1100mm dia.,390 m long
Power-House	Surface,30mx12.5mx8m
Turbine	Francis, 3no
Tailrace	Rectangular,20mx2mx1.5m
Switchyard	1no.
Completion	3 years from date of commencement

Financial Details: Funding Pattern

Particular	Amount (in Cr)
Equity	8.57
Loan	11.4
Grant	20
Total	**39.97**

3.5 UPCOMING PLANTS FOR MePGCL

1. MYNTDU LESHKA STAGE-II HE PROJECT (210 MW)

MyntduLeshka Stage-II HE Project is located in West and East Jaintia Hills District of Meghalaya. It is a Run of the River type development with a catchment area of about 480 Sq.Km harnessing a head of about 249.47 m.

The Project with a proposed installation of 210MW (3x70MW) afford an annual energy generation of 613.80MU in a 90% dependable year. The proposed MLHEP Stage-II dam is located near the Bataw village on the left Bank and Trangblang village on the right bank of 920 -13'-45" E and 250-13'-45" N downstream of confluence of the river Myntdu with the river Lynriang about 3km downstream of the tailrace of MLHEP Stage-I. The live capacity available between the FRL of 270 m and the MDDL 254.50 m is 2.73MCM.

The Project cost has been indicated as Rs. 2187.88 Cr with a proposal for external funding from ADB.

Funding pattern of the project:

External Assistance	State Govt.	Total Cost
Rs. 1750.30 Cr	Rs. 437.58 Cr	Rs. 2187.88 Cr

2. UMRINA STAGE-I SHP (6MW)

The Project site is located near Mawpen village on Shillong-Mairang road (NH-44E) and then via Mairang-Nongkhlaw Road and then via a village road upto Mawpen village with a total distance of about 68 Km from Shillong and 20 Km from Mairang. The Installed Capacity is projected at (6MW). The project cost is estimated at Rs. 122.91Crores.

The Weir lies at an altitude of 1320m, Latitude of 25º38'53"N and Longitude: 91º40'5" E. For utilizing the inflow of the Umiam River from the Catchment area of about 57.75 Sq.Km, (as per Topo Sheet No. 78 O/10) a diversion weir will be constructed to divert the water into the Power Channel. The Power Channel of about 2720 m long will convey the water to the Forebay where a steel Penstock Pipe of about 229.85 m will guide the water to the Power House for generating electricity.

For generating power from the first stage of the Umrina river, a drop of about 129.00m from the proposed Weir site and Power house can be utilized along with a design discharge of 4.43 cumecs.

The Electrical energy that can be generated from this project can directly supply to the neighbouring villages such as Nongkhlaw, Nongthymmai, Nongrmai, Mawblei, Mawpen, Nonglang, Sohtyngkhur, Laitdom, Mawpyrdoi, Mairang Villages etc, located withing 15 kms radial distance.

3. NAN-RAMNIAN SHP (9MW)

The River Nan Ramnian is also Known as Um salamang in the upstream and Umkhynri in the downstream portion. It is one of the north flowing rivers of Meghalaya and is also a tributary of river Um Khrisynia. The Nan – Ramnian originates near Village Umdum at a Latitude of 25^0 32' 25"N and Longitude of $91^0$26' 25"E. From the point of origin the river flow northwest through dense mixed jungle for a distance of about 10.00 Km, then it takes a sharp turn northeast near Mawlangsu village and continues to flow for a distance of about 12Km where it finally joins the river Um Krisiniya at a Latitude of 25^0 39' 20"N and Longitude of 91^0 26'25"E.

The Project is located in West Khasi Hills District of Meghalaya. The Project site is approachable by road from Shillong on the Shillong – Nongstoin road (NH-44E) upto UmliehVillage for a distance 75 Km and thereafter Via Village road connected upto Nongriat Village for a distance of about 25 Km.

The total estimated cost of the Nan-RamnianSmall Hydel Project (9MW) is INR 163.70Crores.

After commissioning of the Nan-RamnianUmkhynri Stage-I Small Hydel Project, the electrical energy produced shall be utilized for augmenting the energy supply in the local rural distribution network around Nongriat, Umjakoid, Mawlum, Nongriat, Massar, Dumbah, Umdum, Mawlongsu, etc.The energy availability will also improve the voltage profile and reliability of the power system in this area.

4. GANOL St-II SHP (14 MW)

Ganol Stage-II HE Project with the proposed Installed Capacity of 2x7 MW is located in the West Garo Hills District Meghalaya which is about 16.0 KM from Tura Town. The river length from Ganol Stage I dam to the proposed power house site of Stage II is about 17 km downstream of Ganol St-I (3x7.5 MW) Small Hydro Project.

Location:

The Ganol St II SHP is situated in West Garo Hills District Meghalaya where the dam is located at Latitude 25°32'42.10" N and Longitude 90°08'54.47" E and the power house at Latitude 25°32'30.83" N and Longitude 90°08'21.58" E.

The Ganol Stage-II HEP (2x7 MW) is located in Tura, the Headquarter of West Garo Hills District, which is about 323 km from Shillong via Guwahati. The project sites are accessible from two roads i.e, via Dakopgre and via AMPT (Ampati-Mankachar-Phulbari-Tikrikila) Road. The proposed Dam and Power House sites are located in Gambagre village, which are approximately 18 km and 19 km respectively from the Ganol Project Office at Rongkhon via Dakopgre whereas the project sites are at a distance of approximately 23 Km and 24 Km respectively via AMPT Road.

5. UPPER KHRI DIVERSION PROJECT

The Upper Khri Diversion Project is planned for construction of a 63.00m high concrete gravity dam across the river Khri for creation of a storage reservoir to be located near the village Nongkhlaw at $24^0$43'51" N and $91^0$39'49" E of West Khasi Hills District of Meghalaya for creation of a 27.23MCum storage covering 6.6 Sq.km of reservoir area at FRL level.

The water from this reservoir will then be diverted through a 3.0 m D-shaped Tunnel with a length of 9.0 Km having a regulated discharge capacity of 9.0Cumecs that will flow into the Umiam-Umtru Stage-III Concrete Dam Reservoir, Kyrdemkulai. This water will enable the augmenting of additional power generation from all the existing cascading Power Stations located at Umiam-Umtru Stage-III (2x30MW) Kyrdemkulai Project and downstream, such as Umiam-Umtru Stage-IV (2x30MW) Kyrdemkulai, New Umtru (2x20 MW) Dehal Byrnihat, Old Umtru (4x2.8MW) and even the future upcoming plan of Umiam-Umtru Stage-V which has an ample scope of revival in near future.

Overall Benefits:

At present the annual energies, on the basis of 90% dependability, available from Stage-III and Stage-IV Power Stations are 124 and 171 million units respectively with Plant Load Factor less than 35%. Hence, with Upper Khri Diversion Scheme,PLF will be improved considerably resulting in increases in the firm output in Stage-III and Stage-IV Power Stations with additional energy of 89.35 and 95.48 Million Units (MU) respectively including 45MU at the New Umtru Hydro Electric Project which was commissioned in 2017. *Total additional accumulated Energy benefits that will be obtained from Stage-III, Stage-IV and NUHEP is approximately more or less around 229.67MU detailed break up are tabulated below: .*

Name of the Station		Continuous Power Potential with Umiam release (MW)	Continuous Power Potential with both Umiam& Upper Khri release (MW)	Benefit from Upper Khri Water (MW)	Additional Annual Energy from Upper Khri Water (MU)	Levelized Tariff
Existing Projects	Umiam-Umtru Stage-III	13.4	23.6	10.2	89.35	**Rs.3.82**
	Umiam-Umtru Stage-IV	14.7	25.6	10.9	95.48	
	New Umtru	19	24.3	5.0	44.84	
			Total=	26.1	**Total Energy = 229.67**	
Future Proposal	Umiam-Umtru Stage-V	9	15.7	6.7	58.69	Consider future generation expansion.
			Total consider with Stage-V	**33.1**	**Total Energy = 288.36**	

On-going/Upcoming projects Summary

The estimated total expenditure for Ongoing projects is Rs 3697.78 crore, the break-up of which is given in the table below:

SI No.	Particulars	Project cost (Rs Cr)
Ongoing project		
1	Riangdo SHP (3MW)	39.97
Upcoming projects		
2	MyntduLeshka Stage-II HE Project (210 MW)	2187.88
3	Umrina Stage-I SHP (6MW)	122.91
4	Nan-Ramnian (9MW)	163.70
5	Ganol Stage-II (14MW)	283.73
6	Upper Khri Diversion Project	899.59
	Total On-going/Upcoming projects	**3697.78**

3.6 SURVEY & INVESTIGATION PROJECTS

An ideal approach for covering the total gamut of Survey and Investigation of hydropower projects constitute Pre-Feasibility Stage, Feasibility Stage and Detailed Investigation (DPR) Stage.

Pre-Feasibility Stage: It is more of a desk study with limited field checks. Based on the 1:50000 or 1:25000 scale Survey of India topo sheets, possible hydroelectric sites are marked. These sites are examined by preliminary field traverses wherein topography, broad geological aspects in terms of locating the project components is looked into. If required, broad assessment of the terrain at the likely site is also carried out by geophysical survey to understand the sub surface condition of the rocks.

a) Feasibility Stage: After selecting the site during Pre-feasibility stage, intensive field traverses are undertaken. The scope of works involved during this stage are broadly classified as under.

i. **Hydro-meteorological Survey**: Existing Hydroelectric projects as well as the proposed Hydel projects in the state of Meghalaya are all rain dependent. One of the parameters that is very important to assess accurately is the volume of water that is available in a basin. These surveys are carried out to establish Rainfall, Gauge Discharge, Sediments, Water quality, Evaporation, Availability of water for benefits envisaged and Design flood for various structures. The Ministry of Water Resources, Government of India in its Guidelines for preparation of Detailed Project Reports of Irrigation & Multipurpose Projects has specified that the length for collecting these data depends on the type of scheme, e.g., diversion projects without pondage / with pondage and storage projects.

ii. **Topographical Survey:**Topographical survey for dam, water conductor system, reservoir power house, etc is carried out for the various alternatives considered to justify the final choice of the location of different components of the project.

iii. **Engineering Geological, Geophysical, Seismological and Construction Material Survey:** These investigations are now considered as fundamental requirements for planning & design of large civil engineering structures pertaining to hydroelectric projects. Subsurface explorations comprising particularly of diamond core drilling and exploratory drifts are the mainstay of geological investigations. Geological investigations of hydroelectric projects are of paramount importance in understanding the geological set up of varied terrains and their geo-dynamic development. The purpose of most engineering geological work is to ensure that a proposed structure is built at the lowest cost consistent with currently accepted safety standards.

iv. **Environment & Forest Survey:** These surveys are carried out to get the firsthand information on the flora & fauna presence in the project area. Rapid assessment on the impact of the environment by the project is also carried out during this stage and thereafter to formulate the environment management plan.

Based on the data above, layout of the project is prepared, and its techno-economic viability is established and once the project is viable, it is taken for Detailed Investigation.

b) Detailed Investigation (DPR) Stage: Detailed geological mapping is undertaken during this stage for all the sites in which major hydraulic structures are proposed to be set up like dam, power house, etc. Exploratory drilling for a dam is carried out by drilling few holes on either abutment or in the river. The depth of the holes depends on the geological set up and type and height of dam, but generally the holes are drilled into fresh and sound rock to the extent of 10 to 25 metres. Exploratory drilling for water conductor tunnels (HRT/TRT) is carried out to establish rock cover available above the proposed crown level of the tunnel especially in low cover zones such as in the beds of stream and to know the substrata along the proposed alignment of the tunnel. Drill holes are also proposed at the intake and portal sites at outlet and along proposed alignment of the tunnel. These holes are drilled to the proposed invert level of the tunnel. As such, all geological maps are updated in this stage. Similarly, drill holes for ascertaining the geology of surge shaft and pressure shaft etc. are also carried out.

3.6.1 Survey & Investigation of projects above 25MW

1. Myntdu Leshka Stage-II HEP (3x70 MW)

The Survey and Investigation works including DPR preparation of the MLHEP-II was started in the year 2006 with a sanctioned by NEC for an amount of Rs. 293.75 lakhs (Gross) and Rs. 268.37 lakhs (Net). This Project was funded by NEC with 90% grant and 10% State share loan. The MeECL, erstwhile MeSEB, had sign an MOU with the Central Water Commission (CWC) to carry out this particular assignment for a period of 3years. The CWC during the course of Survey and Investigation works had asked for a revised estimate of Rs. 455.62 lakhs (Gross) and Rs. 447.35lakhs (Net) and the same was sanctioned by NEC for an amount of Rs. 359.42 lakhs by NEC vide Letter no NEC/IRGN/ANP/MEGH/2K/2/Vol I / 890 -915 dated 23rd March 2010. The Survey & Investigation works like Topographical, Hydro-meteorological, and Construction material survey were completed by the Central water Commission (CWC) and the Interim report of the project was submitted to MeECL. On Geo-technical and Sub-surface investigation works, these were mainly carried out by MePGCL. However due to financial constraint by MePGCL, CWC could not carry further the survey and investigation works. Then, it was mutually agreed by MePGCL and CWC to end the contract with CWC and MePGCL will have to complete the remaining works. Also, the data that are available with CWC will be handed over to MePGCL. On handing over of the works to MePGCL, the estimate was again revised for an estimated amount of Rs. 973.59 lakhs (Gross) and Rs. 960.19 lakhs (Net) and the same was sanctioned by NEC for an amount of Rs. 960.00 lakhs by NEC vide Letter no NEC/IRGN/ANP/MEGH/2K/2/Vol s- I / dated 24th March 2018.

The Myntdu Leshka Stage-II Hydro Electric project located in West & East Jaintia Hills District of Meghalaya State envisages utilization of the water of the river Myntdu for power development on a Run of River type development, harnessing a head of about 249.47m.

The project with a proposed installation of 210 MW (3 x 70 MW) would afford an annual energy generation 613.80 MU in a 90% dependable year. The diversion site is located at Latitude 25^{O}13’45”N, Longitude 92^{O}13’45”E near village Trangblang D/s of the Myntdu Leshka Stage-I Hydro Electric Project. The Dam is located at a distance of 113 km from Shillong via Jowai in West Jaintia Hills District of Meghalaya State. The nearest rail head is located at Guwahati (103 Km from Shillong) and the nearest Airport is at Shillong/ Guwahati.

The Myntdu Leshka Stage- II Hydro Electric Project envisages construction of:

- A 44.0m high concrete gravity dam across the River Myntdu to provide a Live Storage of 2.73MCum with FRL at EL 270.0m and MDDL at EL 254.50m
- A 6.164km long and 6.0mdia head race tunnel terminating in a surge shaft
- A 72m high, 21 m dia surge shaft
- A 837 m long,4.8m dia pressure shaft

- A Surface power house having an installation of 3 Francis Turbine driven generating unit of 70 MW each operating under a rated head of 228.28m; and
- Tail water level at an elevation of 13m to release water back to the river.

MyntduLeshka Stage-II HEP involves simple civil works and could be completed in 6 years. The project would afford design energy of 603.72 MU.

2. Umngi HEP (2x31 MW)

Pre-Feasibility Report on the development of Hydro Projects of Umngi Basin was carried out by M/S WAPCOS in 2004. Recently, the Investigation Division-I & Design Division -I, MePGCL, has carried out the studies of Umngi Storage Stage-I HE Project as per the site proposed by WAPCOS and found that the project is not feasible and viable. Due to the unfeasibility of the Umngi Stage I HE project, new diversion site has been proposed which is about 6.75Km downstream from the existing site.

The Umngi Hydroelectric Project located in East and West Khasi Hills District of Meghalaya State envisages utilization of the waters of the river Umngi, a tributary of Jadukata River for power generation on storage type development, harnessing a head of about 525.0m. The project with a proposed installation of62MW (2x31MW) would afford an annual energy generation of 276.42 MU in a 90% dependable year. The diversion site is located at Latitude $25^0$23'15"N; Longitude $91^0$32'45.57"E. The dam site is located at a distance of 55.0 Km from Shillong and is approachable from Shillong by road via Mawphlang highway. The nearest rail head is located at Guwahati in Assam (103km from Shillong) and nearest airport is located at Shillong.

The river Umngi drains a catchment of area of about 191.0 sq km at the proposed dam site. The water availability considered in the power potential studies is based on the observed data w.e.f 1999-2014. The Umngi Stage-I Revised is proposed to be a storage scheme Project, with a view to utilize its storage in a cascading manner to achieve power benefits and thus enhanced the power potential in all the 3(three) downstream projects. The release from Umngi St-I HEP is further utilize in the power potential study of Nongkohlait HEP. Thus the regulated discharge of the project at the upstream and its own discharge has been considered in the studies of power potential of the immediate project. The estimate for the New proposed site amounting to Rs. 982.00 Lakhs has been submitted to NEC for funding.

3. Mawblei HEP (2x38 MW)

Mawblei H.E.Project envisages utilization of the waters of Wahblei river for generation of hydel power. Wahblei is a tributary of Kynshi river, a south flowing river which flows into Bangladesh.

The Mawblei H.E.Project is a storage type development/scheme with the setting up of a 2x 38 MW power station. It is located in Mawshynrut C&RD Block, West Khasi Hills District of Meghalaya where the dam site is located at latitude 25˚ -31"- 41.21″ N and Longitude 91˚ -02' -02.20″ E near Nongmawlong and Nongpyndengmawlieh villages on the Right and Left bank respectively.

The Length of the dam at the proposed height and location as per PFR studies was found to be 1035m long. This would entail a huge structure to be constructed. This site was also found to be not suitable from geological consideration.

After the detailed survey of the area, the site at about 900 meter downstream from the proposed dam axis as depicted in the Preliminary Feasibility Report (PFR) was found suitable for locating the dam and other hydraulic components of the project.

With the objective to arrive at an optimum viable option, the following Alternatives project layouts scenarios have been considered for survey and investigation.

Alt-I: An underground power house with pressure shaft

Alt-II: Surface power house with pressure shaft

Alt-III: Surface power house with surface penstock.

SCOPE OF WORKS

The Mawblei HE Project envisages construction of:

- 36.37m high concrete Gravity dam across the River Wahblei to provide a live storage of 20.61M Cum with FRL at EL 762.00m and MDDL at EL 750.80m; with a Tail Race channel to drain back to water to the river.
- 3.813Km long and 3.00mØ Head Race Tunnel terminating at a surge shaft
- 59.00m high 15.0mØ pressure shaft
- Surface Power House having an installation of 2 Pelton Turbine driven generating units of 37.5MW each operating under a rated head of about 367.34m

4. Nongkohlait HEP (2x31 MW)

The proposed Nongkohlait Hydro Electric Project envisages utilization of the waters of Umngi river for Power generation on a run-of-the river (ROR) type development. The dam site is located at Latitude 25˚20'8.49" N and 91˚32'39.91"E.

The project with a proposed installation of 120 MW (2 X60 MW) would afford an annual energy generation of 385.24 Gwh considering upstream Umngi HE Project and 332.87 based on natural inflow without Umngi HE Project in a 90% dependable year. The project envisages construction of 43m high concrete gravity dam above the deepest foundation level across river Umngi to provide a live storage of 0.46m cum with FRL at 880m abd MDDL at 871m, 5.32Km long and 3.5m dia D-Shaped Head Race Tunnel terminating in a Surge shaft of 57m high 10m, 655m long and 2.70m dia penstock. The Power House has been proposed as underground having an installation of 2 vertical axes Pelton driven generating units of 60 MW each operating under a rated head of 463m long tail race tunnel to carry the power house releases back to the river.

The Optimization study of Umngi Basin carried by MePGCL indicated that the Nongkohlait HEP as per the layout/proposal at the PFR stage may not be feasible wherein Revised Planning is required.

5. Selim HEP (2x40 MW)

At the preliminary stage Selim HEP has been proposed as a Storage Scheme. The Survey and Investigation of the project was initially carried out as per the details provided in the Preliminary Feasibility Report (PFR) where the dam site was located (at Shkamynjai) at 25˚ 21' 48.99"N and 92˚ 11' 38.52 "E near Umsalang (mistaken as Selim) village.

Fixing of the Dam Axis and location of the Intake were carried out jointly with the officials of the GSI, EGD, NER, Shillong after which detailed Topographical survey of the Dam area, the Reservoir area, the alignment of the Water Conductor System (WCS) and the Power House area were carried out with reference to the proposed height of the dam of 77m as depicted in the PFR. The actual reduced levels were also established simultaneously at the dam site by carrying out fly-levels from a GST benchmark located at Jowai which is about 30 Km away.

After the topographical survey had been completed it was established that there were vast differences in the details and quantities of the actual survey carried out from those provided in the PFR. Besides, it was established the presence of the fall named Rynji at about 1.2 Km upstream of the proposed dam axis.

In order to arrive at an optimum viable option, studies were made by adopting the following Alternatives.

Particulars	As per PFR	Alternative-I		Alternative-II
		Stage-I	Stage-II (Final)	Combined
Catchment area (Sq.km)	174	147	170.803	147
Dam Location	Downstream of Rynji Fall	Upstream of Rynji Fall	As per PFR (downstream of Rynji Fall)	Upstream of Rynji Fall
Installed Capacity	2x85Mw	2x11Mw	2x40Mw	2x42.50Mw

Particulars	As per PFR	Alternative-I		Alternative-II
FRL(m)	1210	1200	1103.5	1200
MDDL(m)	1191	1189.6	1093.5	1194.35
Power House Location	As depicted in the PFR (left bank)	Right bank	As per PFR(Left Bank)	As per PFR (Left Bank)
Annual Energy (MU)	534.68	73.44	273.52	286.64
		347		

3.6.2 Survey & Investigation of projects below 25 MW

1. AMKSHAR-II SHP (21 MW)

The Project is located in West Jaintia Hills District of Meghalaya near Sohkha village. The Project site is approachable byroadfromShillongontheShillong–Jowai(NH-44)–and Jowai Amlaremroad(NH-40E) upto Sohkha Village for a distance of about 105 Km or via Shillong-Dawki (NH-40) and Dawki-Amlarem(NH-40E)uptoSohkhaVillageforadistanceofabout93Km.

The power generated from the Project can be fed to the neighboring villages like Lamin, Shnongpdeng, Darang, Dawki, Kudeng Rim, Kudeng Thymmai, Nongbareh, Khonglah, Sohkha, Mawngap, Amtapoh,Pamtdong,Padu,Nongtalang,Amlaremetc.or can be connected to the nearest 33/11 kV substation at Sohkha village which is at an aerial distance of about 3.00km from the proposed Power house.

2. LOWER RONGDI SHP (15 MW)

The project is located in the South Garo Hills District of Meghalaya. The Project site is approachable byroad via Nongstoin State Highway upto Shahlang about 166 Km from Shillong and from Shahlang to Bokchung about 13 Km along village road and then to Dobakol Chonggalgittim along jungle road.

The power generated from the Project can be fed to the neighboring villages like Dobakol Chonggalgittim, Nangalbibra, Jongkhol, Dengkandi, Bolsalgittim, Rongkandi Songgittal, Chimagre Songgital, Gare Songmong, Gare Chigitchak, Swanggiri etc.

3. NAN-RAMNIAN UMKHYNRI STAGE-II SHP (15 MW)

The Project is located in West Khasi Hills District of Meghalaya. The project site is approachable by road from Shillong on the Shillong-Nongstoin road (NH-44 E) upto Umlieh Village for a distance 74 Km and thereafter via Village road connected upto Nongriat Village for a distance of about 26 Km.

Power House is proposed to be at an aerial distance of about 6 Km from the nearest 33/11 KV Substation at Nongkhlaw.

The presence of the project in the area will enhance the power generation of the State and ensures uninterrupted power supply to the neighboring villages which at present are dependent on the long transmission lines. This in turn will reduce the cost of maintenance of the existing long transmission lines.

The power generated from the project can be fed to the neighboring villages like Umjakoid, Mawlum, Nongriat, Massar, Dumbah, Umdum, Mawlongsu, Myrchiang, Nongum, Mawsynram etc.

4. SIDIGURI SHP (13 MW)

The Sidugiri Small Hydel project development is located in the remote areas of the WestKhasiHillsdistrictborderingEastGaroHillsdistrict.TheSidugiriHydroelectricProjectenvisages utilization of water of the river Rongdi as a run-of-the-river scheme. The catchment of the river Rongdi has a vast potential for water resources development. The need for Sidugiri Hydroelectric Project has been considered in the context of power shortage particularly peaking capacity in Meghalaya and the project is also proposed to meet the local energy demand of the area. The project is also aimed in significantly improving the overall development in the area.

After commissioning of the Sidugiri Small Hydel Project, the electrical energy produced shall be utilized for augmenting the energy supply in the local rural distribution network around the villages of Sidugiri, Swanggre, Swanggre Rongkhong, Swanggre Chengsi, Dimit,Nongshram, etc and stabilize grid connectivity at e 132 KV Rongjeng Sub-station. The energy availability will also improve the voltage profile and reliability of the power system in this remote area in and around the project area.

Survey and Investigation Works Summary

The estimated total expenditure for S&I works is Rs 41.42 crore, the break-up of which is given in the table below:

Table 16: Details of Survey & Investigation Costs

SI No.	Particulars	Project cost (Rs Cr)	Remarks
1	MLHEP-II (3X70)MW	2.13	Approved
2	UMNGI(2X31)MW	9.82	Fresh estimate was submitted
3	SELIM(2X40)MW	4.66	Approved
4	MAWBLEI(2X38)MW	5.62	Approved
5	NONGKOHLAIT(2X60)MW	8.84	Fresh estimate was submitted
6	AMKSHAR STAGE-II (21 MW)	3.01	Estimate submitted to GoM
7	LOWER RONGDI SHP (15MW)	2.72	Estimate to be submitted
8	NAN RAMNIAN UMKHYRNI STAGE-II SHP (15MW)	2.79	Estimate to be submitted
9	SIDIGURI SHP (13 MW)	1.83	Estimate submitted to GoM
	TOTAL S&I WORKS	**41.42**	

3.7 Fund Requirement& Capitalization for the Control Period

Within Meghalaya, the objective of the schemes is to revitalize the power sector to achieve sustainable development in long term. The maintenance of existing stations as well as addition of new plants is required for catering to growing demand throughout the state. Given below is the fund requirement for capex works in the fourth control period.

Table 17: Fund Requirement for MePGCL Works (Rs Cr)

Category	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28
Existing Plants	140.27	346.315	306.13	447.73	0
On-Going/Upcoming Generation Plants	13.73	402.212	526.80	524.264	112.56
Survey & Investigation	8.24	12.03	12.43	7.43	1.27
Total Fund Requirement (Generation)	**162.24**	**760.557**	**845.36**	**979.428**	**113.83**

Some of the schemes under implementation are scheduled to complete during the fourth control period. The same will add to existing asset base of MePGCL. The details of expected capitalization in the fourth control period are given below:

Table 18: Expected Capitalization in the Control Period (Rs Cr)

Category	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27
Existing Plants	596.11	1.6	46.14	1191.71
Upcoming Generation Plants/ S&I	0	0	39.97	1469.93
Survey &Investigation	2.13	0	0	39.28
Total Capitalization (Generation)	**598.24**	**1.6**	**86.11**	**2700.92**

**Garnol Project has been commissioned in FY 2023-24 and the capital cost of the plant would be capitalized in FY 2023-24.*

3.8 Summary of Capital Expenditure (CAPEX)

The station wise investment plan with details is attached as Investment Plan Format. The station wise summarized capital expenditure is shown in the table below:

Table 19: CAPEX-Station wise summary

Sl No	Station	CAPEX	Funding Pattern (Rs. Cr)		
			Equity	Debt	Grant
A. Existing Stations					
1	Umiam Stage-I HE Project (36 MW)	114.83	79.095	35.73	
2	Umiam Stage-II HE Project (20MW)	48.74	40.866	7.964	
3	Umiam Stage-III HE Project (60MW)	499.49	151.8	63.63	284.13
4	Umiam Stage-IV HE Project (60 MW)	31.67	11.02	20.74	
5	Umtru Power Station (11.2 MW)	0.10	0.09	0.10	
6	Sonapani MHP (1.5 MW)	0.34	0.102	0.238	
7	MyntduLeshka HE Project (126MW)	46.85	42.175	4.925	
8	New Umtru HE Project (40MW)	0.64	0.126	0.1	
9	Lakroh MHP (1.5 MW)	1.74	1.57	0.17	
10	System Protection and Communication	8.99	2.697	6.293	
11	Dam Rehabilitation and Improvement Project (DRIP)	441	123.48		317.52
12	Ganol SHP (22.5 MW)	45	13.5	31.5	
	Total Existing projects	**1239.36**	**466.521**	**171.39**	**601.65**
B. On-going Generation plants					
13	Riangdo SHP (3MW)	39.97	8.57	11.4	20
Up-coming Generation Plants					
14	MyntduLeshka Stage-II HE Project (210 MW)	2187.88	113.81	248.24	1707.11
15	Umrina Stage-I SHP (6MW)	122.91	6.45	15.05	101.40
16	Nan-Ramnian (9MW)	163.70	1.44	3.36	158.90
17	Ganol Stage-II (14MW)	283.73	85.16	198.71	
18	Upper Khri Diversion Project	899.59	269.82	629.71	
	Total On-going/Upcoming projects	**3697.78**	**485.25**	**1106.47**	**1987.41**

C. Survey & Investigation					
19	MLHEP-II (3X70)MW	2.13		0.213	1.917
20	UMNGI(2X31)MW	9.82		0.982	8.838
21	SELIM(2X40)MW	4.66		0.466	4.194
22	MAWBLEI(2X38)MW	5.62		0.562	5.058
23	NONGKOHLAIT(2X60)MW	8.84		0.884	7.956
24	AMKSHAR STAGE-II (21 MW)	3.01			3.01
25	LOWER RONGDI SHP (15MW)	2.72			2.72
26	NAN RAMNIAN UMKHYRNI STAGE-II SHP (15MW)	2.79			2.79
27	SIDIGURI SHP (13 MW)	1.83			1.83
	TOTAL S&I WORKS	**41.42**	**0**	**3.107**	**38.313**
	GRAND TOTAL (A+B+C)	**4978.56**	**951.77**	**1280.97**	**2627.37**

MePGCL would like to submit that though the Ganol project has been commissioned in FY 2023-24 and the entire project cost is expected to be capitalized in 2023-24. However, since the plant is still under stabilization phase and there might be some unforeseen expenses, balance works etc. Keeping this in view MePGCL has kept a provision of Rs. 45 Crs in the fourth control period i.e., FY 2024-25 to FY 2026-27. MePGCL requests Hon'ble Commission to grant in principle approval for the same. MePGCL would approach the Commission along with all the relevant details as when it incurs expenditure against the in principle approval granted.

Detailed Investment Plan as per MSERC Formats

The detailed Capital Expenditure plan for FY 2020-21 and the third control period is provided as **Annexure-A** as per prescribed format of MSERC vide MYT Regulations, 2014. The format includes the ongoing and proposed works under different schemes, total project cost, start and end date of completion of works and its funding pattern.

MePGCL submits before the Hon'ble Commission to kindly approve the Investment Plan for the control period FY2024-25 to FY 2026-27

Investment Plan for MePGCL

(A) **New works under Existing projects for FY 2024-25 to FY 2026-27**

(Rs Crs)

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate code from below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (Rs Crs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme					
													Debt Component				Capital/Subsidies/grant components	Remarks
													Loan Amount		Loan Source			
													Loan 1	Loan 2	Loan 1	Loan 2		
A	**Umiam Stage I Power Station**																	
1	Replacement of Two penstock butterfly Valve including By-pass valve along with all servo mechanism and related control system etc.	2024	c	Yes	April'24	Mar'27	6.14	0.14	3	3		5.53	0.61		GoME			
2	Re-engineering of firefighting system of Generator and Transformer	2024	c	Yes	Feb '24	Mar'27	0.09	0.04	0.05			0.08	0.01		GoME			
3	Replacement of transformer for Unit-1, Unit-2 and Unit-4.	2024	c	Yes	August '23	Mar'27	8.73	2.91	2.91	2.91		7.86	0.87		GoME			
4	Construction of Transformer Yard to accommodate station service transformers, Unit-1 & Unit-3 and procurement of the same.	2024	c	Yes	April'24	Mar'27	0.35		0.35			0.32	0.03		GoME			
5	Construction of Beams and By-pass Isolators for KPS-1, KPS-2 &Umiam feeders.	2024	c	Yes	April'24	Mar'27	0.49		0.25	0.24		0.44	0.05		GoME			

(Rs Crs)

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate code from below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (Rs Crs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme					
													Debt Component				Capital/Subsidies/grant components	Remarks
													Loan Amount		Loan Source			
													Loan 1	Loan 2	Loan 1	Loan 2		
A	**Umiam Stage I Power Station**																	
6	132 KV SF6 Circuit Breaker (Spare)	2024	c	Yes	April'24	Mar'27	0.36		0.2	0.16		0.32	0.04		GoME		PSDF phase 2	
7	Complete Installation of SCADA including Hardware and Software	2024	e	Yes	Jan '24	Mar'27	18.12	1.8	8.16	8.16		16.31	1.81		GoME		NESIDS (propose)	
8	Replacement of Governor and AVR system.	2024	c	Yes	Jan '24	Mar'27	33.20	3.32	9.96	9.96	9.96	29.88	3.32		GOME		NESIDS (proposed)	
9	Replacement of Generator Stator Air Cooler for three Units	2024	c	Yes	April '24	Mar'27	3.51		1.76	1.75		0.35	3.16		GOME		NESIDS (proposed)	
10	Upgradation of existing conventional AIS grid system with Gas insulated system (GIS)	2024	c	No	April '24	Mar'27	35.50		11.83	11.83	11.84	10.5	25		GOME		NESIDS (propose d)	
11	Procurement and Installation of CCTVs at Stage I Power Station	2024	c	No	April '24	Mar'27	0.10		0.03	0.03	0.04	0.09	0.01		GOME		NIRBH AYA Scheme (to be propose d)	

(Rs. Crs.)

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate code from below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (RsCrs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme					
													Debt Component				Capital/Subsidies /grant components	Remarks
													Loan Amount	Loan Source				
													Loan 1	Loan 2	Loan 1	Loan 2		
A	**Umiam Stage I Power Station**																	
12	Installation of 132/11 KV 5MVA Station Transformer and accessories to feed the Station Service Transformers.	2024	c	No	April '24	Mar'27	3.50		1.17	1.17	1.16	3.15	0.35		GOME			
13	Replacement of Bypass Valve Stage-I	2023	c	No	2023-24	2026-27	1.00	0.25	0.27	0.23	0.25	0.90	0.1		GOME			
14	Repairing of PRV liners and Draft Tube of all four units of Stage-I power house.	2023	c	No	2023-24	2026-27	0.70	0.10	0.19	0.33	0.09	0.63	0.07		GOME			
15	Painting of Penstock of Umiam Stage-I HEP.	2023	c	No	2023-24	2026-27	1.58	0.40	0.40	0.38	0.40	1.42	0.158		GOME			
16	ROV based Underwater inspection of tunnel interiors of the head race tunnel of Umiam Stage-I.	2023	c	No	2023-24	2026-27	0.99	0.20	0.23	0.25	0.32	0.89	0.099		GOME			
17	Repairing work of Draft Tube and PRV Outlet pipe in Umiam Stage - I Power Station.	2023			2023-24	2026-27	0.47	0.15	0.15	0.15	0.02	0.42	0.047		GOME			
							114.83	**9.30**	**40.89**	**40.54**	**24.07**	**79.09**	**35.73**					
B	**Umiam Stage II Power Station**																	

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate code from below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (RsCrs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme					
													Debt Component				Capital/Subsidies /grant components	Remarks
													Loan Amount	Loan Source				
													Loan 1	Loan 2	Loan 1	Loan 2		
1	Installation of 250 KVA, 11/0.4 kv substation dedicated to the station supply of Umiam Stage-II Power Station including cables etc	2024	c	Yes	April '24	Mar'27	0.09		0.09			0.08	0.01		GoME			
2	Emulsifier system for Generator Transformer in both Units.	2024	b	Yes	April '24	Mar'27	0.10		0.1			0.09	0.01		GoME			
3	Installation of On Line Supervisory system (SCADA) for the entire Power Station	2024	e	Yes	April '25	Mar'27	9.06			4.53	4.53	8.15	0.91		GoME			
4	Replacement of 11 KV Switchgear Panels	2024	c	Yes	April '25	Mar'27	2.72			1.36	1.36	2.45	0.27		GoME			
5	132 KV SF6 Circuit Breaker (Spare)	2024	c	Yes	April '25	Mar'27	0.24			0.12	0.12	0.22	0.02		GoME		PSDF phase 2	
6	Upgradation of existing conventional AIS grid system with Gas insulated system (GIS)	2024	c	No	April '24	Mar'27	15.00		5	5	5.00	10.5	4.5		GoME		NESIDS (proposed)	

(Rs Crs)

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate code from below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (Rs Crs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme						
													Debt Component					Capital/Subsidies/grant components	Remarks
													Loan Amount			Loan Source			
													Loan 1	Loan 2		Loan 1	Loan 2		
7	Procurement and Installation of CCTVs at Stage II Power Station	2024	c	No	April '24	Mar'27	0.10		0.03	0.03	0.04	0.09	0.1			GOME		NIRBHAYA Scheme (to be proposed)	
8	Rehabilitation of the power channel at Umiam Stage-II.	2023	c	No	2023-24	2026-27	19.07	5.00	5.80	5.20	3.07	17.16	1.91			GoME			
9	Painting of penstock of Umiam Stage-II HEP.	2023	c	No	2023-24	2026-27	0.50	0.125	0.10	0.18	0.10	0.45	0.05			GoME			

10	Repairing work of Draft Tube and PRV outlet pipe at Umiam Stage-II Power station	2023	c	No	2023-24	2026-27	0.49	0.10	0.11	0.13	0.15	0.44	0.05		GoME			
11	Providing Protection wall adjacent to the Power Channel Umiam Stage-II	2023	c	No	2023-24	2026-27	1.37	0.30	0.35	0.36	0.36	1.23	0.14		GoME			
							48.74	**5.525**	**11.58**	**16.90**	**14.73**	**40.87**	**7.96**					
C	**Umiam Stage III Power Station**																	
1	Renovation Modernisation and Upgradation of Umiam Stage III HEPP.	2021	c	Yes	Jan'21	April'26	407.36	51.92	138.05	78.00	139.39	123.33			JICA		284.13	
2	Re-Engineering of 132 KV BUS.	2024	c	Yes	April '24	Mar'27	1.50		0.5	1		0.45	1.05		GoME			
3	Construction of 33 KV Bus and Bay for Outside source power supply from the existing 132/33 KV 10 MVA Transformer	2024	C	Yes	April '24	Mar'27	1.87		0.5	0.50	0.87	0.56	1.31		GoME			
4	Procurement and Installation of CCTVs at Stage III Power Station	2024	c	No	April '24	Mar'27	0.10		0.03	0.03	0.04	0.09	0.01		GOME		NIRBHAYA Scheme (to be proposed)	
5	Eye ROV based underwater inspection of tunnel interiors of low pressure tunnel of Face-I Stage-III HEP Kyrdemkulai..	2023	c	No	2023-24	2026-27	1.34	0.3	0.35	0.38	0.31	1.206	0.134		GOME			
6	Proposed Additional Link Tunnel from Kyrdemkulai Reservoir to Nongmahir Forebay for Umiam Stage III HEP	2024	a	No	April, 24	Oct, 26	87.29		35	35	17.29	26.16	61.13		GoMe			
							499.46	**52.25**	**174.431**	**114.91**	**157.90**	**151.9**	**63.63**					

(RsCrs)

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate codefrom below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (RsCrs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme					
													Debt Component				Capital/Subsidies/grant components	Remarks
													Loan Amount		Loan Source			
													Loan 1	Loan 2	Loan 1	Loan 2		
D	**Umiam Stage IV Power Station**																	
1	Automation and monitoring of MIV of the Generating units	2024	c	Yes	April '24	Mar'27	1.06		1.06			0.32	0.74		GoME			
2	1. Overhauling and replacement of damaged parts of Unit-II. 2. Procurement of excitation transformers	2024	c	Yes	Nov '22	Mar'27	5.04	2.25	2.00	0.79		1.51	3.53		GoME			
3	Online Vibration monitoring of Generating Units	2024	c	Yes	April '24	Mar'27	0.50		0.50			0.15	0.35		GoME			
4	Dedicated and reliable Outside Source power supply from 132 KV Bus.	2024	c	Yes	April '24	Mar'27	2.79		0.5	2.29		0.84	1.95		GoME			
5	Telecommunication and Internet Facility	2024	e	Yes	April '24	Mar'27	0.24		0.24			0.07	0.17		GoME			
6	Supervisory Control System (SCADA)	2024	e	Yes	April '24	Mar'27	8.73		4.37	4.36		2.62	6.11		GoME			
7	Procurement of Spare Runner	2024	c	Yes	April '24	Mar'27	6.50		3.25	3.25		1.95	4.55		GoME			
8	Hydraulic Power Pack with Control Panel for Butterfly Valve	2024	C	Yes	April '24	Mar'27	0.80		0.5	0.3		0.24	0.56		GoME			

9	Installation of Fire fighting Scheme for Generator Stators	2024	c	Yes	April '24	Mar'27	0.36		0.36			0.11	0.25		GoME			
10	Residual Life Assessment (RLA) of Stage IV Power Station	2024	e	Yes	April '24	Mar'27	3.12		2	1.12		0.94	2.18		GoME			
11	Procurement and Installation of CCTVs at Stage IV Power Station	2024	c	No	April '24	Mar'27	0.10		0.03	0.03	0.04	0.09	0.1		GOME		NIRBHAYA Scheme (to be proposed)	
12	Painting the internal and external surface of 2 nos. penstocks of Umiam Stage-IV Hep.	2023	c	No	2023-24	2026-27	1.57	0.38	0.395	0.35	0.445	1.41	0.16		GOME			
13	Construction of bridge at Ch-16.00 Km on the road to Stage-IV power house Nongkhyllem	2023	c	No	2023-24	2026-27	0.74	0.25	0.23	0.20	0.06	0.67	0.07		GOME			
14	Protection work to controlled the seepage from upstream at the Tail Race Stage -IV	2023	c	No	2023-24	2026-27	0.12	0.3	0.3	0.3	0.3	0.11	0.01		GOME			
							31.67	**3.18**	**15.73**	**12.99**	**0.85**	**11.02**	**20.74**					
E	**Umtru Power Station**																	
	Procurement and Installation of CCTVs at Umtru Power Station	2024	c	No	April '24	Mar'27	0.10		0.03	0.03	0.04	0.09	0.1		GOME		NIRBHAYA Scheme (to be proposed)	
							0.10		**0.03**	**0.03**	**0.04**	**0.09**	**0.1**					
F	**SonapaniMHP**																	
1	a) Procurement and Installation of 415V 3 Ph LT panel. b) Relays and Cards to replace some existing defective ones and spares. c) Generator Circuit Breaker to replace the existing one.	2024	b	Yes	April '24	Mar'27	0.34		0.17	0.17		0.10	0.24		GoME			
							0.34		**0.17**	**0.17**		**0.10**	**0.24**					
G	**Generation System Protection Scheme**																	

1	Procurement of Diagnostic Tools, Plant & Machineries for Generation system protection division	2024	b	Yes	April '24	Mar'27	2.51		1.51	1		0.75	1.76		GoME		PSDF phase 2	
2	Installation of OPGW for communication system between Stage III & Stage IV, Stage I & Stage II and Umtru-New Umtru Power Station including all Fiber Optics terminal equipments.	2024	b	Yes	April '24	Mar'27	3.19		1.19	2		0.96	2.23		GoME		PSDF phase 3	
3	Procurement of Online Oil Filtration Machine for all Generator Transformer under MePGCL	2024	c	Yes	April '24	Mar'27	2.11		0.2	1	0.91	0.63	1.48		GoME		PSDF phase 4	
4	Installation of ADSS OFC for communication system (Dam Water Level monitoring) of Stage-3, Stage-4 and Leshka power stations including all Tranducers, Converter ,Fibre Optic Terminal Equipments and all associated accessories	2024	b	Yes	April '24	Mar'27	1.18		0.39	0.39	0.40	0.35	0.83		GoME		PSDF phase 5	
							8.99		**3.29**	**4.39**	**1.31**	**2.70**	**6.29**					
H	**Myntdu Leshka Power Station**																	
1	Supply and erection of spare Generator Transformer 1-Phase, 17.5 MVA, 132/33 KV with accessories for Leshka Power Station		c	Yes	Nov, 24	Nov, 25	7.5		2.63	4.87		6.75	1		FI			
2	Replacement of Switchgear & Protection System for Leshka Power Station		c	Yes	June, 24	Sept, 25	35			12.25	22.75	31.5	3.5		FI			
3	Communication from Leshka Dam to Leshka Power House		c	Yes	Dec, 23	July, 24	1.00		0.34	0.66		0.91	0.09		FI			
4	Replacement of Air Coolers including accessories for Stator for all 3 units for Leshka Power Station		c	Yes	Oct, 24	April, 25	2.00			1.6	0.4	1.8	0.2		FI			
5	MLHEP Stage-I : Painting of the External Surfaces of the Penstock Pipes (3 Numbers).		c	No	April, 26	April, 27	1.35				1.35	1.215	0.135		FI			
							46.85	**0.00**	**2.97**	**19.38**	**24.50**	**42.175**	**4.925**					

I	**New Umtru Power Station**																	
1	Procurement and Installation of CCTVs at New Umtru Power Station	2024	c	No	April '24	Mar'27	0.14		0.05	0.05	0.04	0.13	0.1		GOME		NIRBHAYA Scheme (to be proposed)	
2	Heavy duty log boom	2024	e	No	Dec,2024	April, 2025	0.50		0.500						GOME		0.50	
							0.64	**0.00**	**0.55**	**0.05**	**0.04**	**0.13**	**0.10**					
J	**LakrohPower Station**																	
1	Replacement of Generator Transformer (with 3.3/33 KV, 2.5 MVA) including augmentation of Switchyard from 11KV to 33 KV for Lakroh PS		b	Yes	Nov, 24	Oct, 25	1.14		0.4	0.74		1.03	0.11		FI			
2	Communication for Lakroh PS with SLDC		e	Yes	Mar, 23	Nov, 24	0.6	0.09	0.39	0.12		0.54	0.06		FI			
							1.74	**0.09**	**0.79**	**0.86**		**1.57**	**0.17**					
	GANOL SHP (3X7.5 MW)	2024	a	No	April, 24	Mar, 27	45		15	15	15	13.5	31.5					

(Rs.Crs)

Sl. No.	Name of the Scheme	Year of start	Nature of Project(select appropriate code from below)	Whether the scheme is part of approved business plan* (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date(DD-MM-YY)	Total capital Expenditure approved by MSERC/Govt/DPR/FI (RsCrs)	Project Outlay in FY 2023-24actual/projected) In Crs	Project Outlay in FY 2024-25 (projected) In Crs	Project Outlay in FY 2025-26(projected) In Crs	Project Outlay in FY 2026-27(projected) In Crs	Equity Component	Source of financing for the scheme					
													Debt Component				Capital/Subsidies/grant components	Remarks
													Loan Amount		Loan Source			
													Loan 1	Loan 2	Loan 1	Loan 2		
K	**Dam Rehabilitation Improvement Project**																	
	Umiam Stage-I H.E.P (HYDRAULIC)																	
	Dam Rehabilitation and Improvement Project (DRIP) Phase-2 and 3 for Umiam Stage-I.	2020	c	Yes	2020-21	2026-27	215.45	16.54	31.53	31.53	135.85	60.326			World Bank		155.124	
	Umiam-Umtru Stage-III H.E.P (HYDRAULIC)																	
	Dam Rehabilitation and Improvement Project (DRIP) Phase-2 and 3 for Umiam-Umtru Stage-III.	2020	c	Yes	2020-21	2026-27	73.10	16.54	10.71	10.71	35.14	20.468			World Bank		52.632	
	Umiam Umtru Stage IV (HYDRAULIC).																	
	Dam Rehabilitation and Improvement Project (DRIP) Phase-2 and 3 for Umiam-Umtru Stage-III.	2020	c	Yes	2020-21	2026-27	77.42	16.54	11.29	11.29	38.30	21.6776			World Bank		55.7424	
	MLHEP																	

	MLHEP Stage-I Dam (DRIP-II &III)	2020	c	Yes	2020-21	2026-27	75.03	20.33	27.35	27.35	0.00	21.0084					54.022	
							441.00	**69.95**	**80.88**	**80.88**	**209.29**	**123.48**					**317.52**	

NOTE:

*** Support with appropriate paper work i.e. Detailed Project Reports and other documents, as necessary**

**** Provide break up of Government and Private share**

Codes for selecting Nature of work (Distribution)

a. EHV Schemes

b. Distribution schemes

(i) System augmentation

(ii) System improvement

(iii) Schemes for loss reduction

c. Metering schemes

d. Capacitor

e. SCADA / DMS etc

f. Miscellaneous

Codes for selecting Nature of work (Generation and Transmission)

a. New project

b. System augmentation

c. System improvement

d. Metering

e. Miscellaneous

(Rs. Cr)

NAME: MePGCL																			
Investment Plan of MePGCL(Amount in Crs)																			
(B) Works for Ongoing/Upcoming Plants in FY 2024-25 to FY 2026-27																			
Project Details							**Total Capital expenditure approved by MSREC/Govt/DPR/FI (in Crs)**	**Project Outlay in FY 2023-24 (actual) in Crs**	**Project Outlay in FY 2024-25 (projected) in Crs**	**Project Outlay in FY 2025-26 (projected) in Crs**	**Project Outlay in FY 2026-27 (projected) in Crs**	**Project Outlay in FY 2027-28 (projected) in Crs**	**Source of Financing for Scheme**						
														Debit Component				**Grants**	
														Loan Amount		**Loan Source**			
Sl No	**Name of Scheme**	**Year of Start**	**Nature of Project (Select appropriate code fro, below)**	**Whether the Scheme is part of Approved Business Plan (YES/No)**	**Project Start Date (DD-MM-YY)**	**Project Completion & Date (DD-MM-YY)**							**Equity Component**	**Loan-1**	**Loan-2**	**Loan-1**	**Loan-2**	**Capital Subsidies/ Component (in Crs)**	**Remarks**
1	Riangdo SHP (3MW)	2020	a	Yes	2020	31.03. 2025	39.97	13.73	13.00	13.00			8.57	11.4				20.00	
2	MyntduLeshka Stage-II HEP (3x70MW)		a	yes	2023-24	2029-30	2187. 88					70	113.8 1	82.71	165. 53	Mark et Loan	Go ME	1707. 11	
3	Umrina St-I (6 MW)	2025 (Projected)	a	No	2023-24	2026-27	122.9 1		30.72 75	43.018 5	49.16 4		6.451 5	15.05 4				101.4 048	
4	Nan- Ramnian (9 MW)	2024 (Projected)	a	No	2023-24	2026-27	163.7 0		40.92 5	57.295	65.48		1.439 8	3.359 6				158.9 006	

5	Ganol St-II SHP (14 MW)	2025 (Projected)	a	No	2023-24	2026-27	283.73		42.5595	113.492	85.119	42.5595	85.16	198.71					
6	Upper Khri Diversion Project	2024 (Projected)	a	No	2023-24	2026-27	899.59		275	300	324.5		269.82	629.71					
							3697.78	**13.73**	**402.212**	**526.8055**	**524.263**	**112.5595**	**485.251**	**940.9433**	**165.53**	**0**	**0**	**1987.4154**	

NAME: MePGCL

Investment Plan of MePGCL

(c) Survey & Investigation Projects for FY 2024-25 to FY 2026-27 (Amount in Crore)

Sl. No.	PROJECT DETAILS						Total Expenditure projected (Cr)	Project Outlay in FY 2023-24 (actual in Cr.)	Project Outlay in FY 2024-25 (Projected in Cr.)	Project Outlay in FY 2025-26 (Projected in Cr.)	Project Outlay in FY 2026-27 (Projected in Cr.)	Project Outlay in FY 2027-28 (Projected in Cr.)	SOURCE OF FINANCING FOR SCHEME						Remarks
	Name of Scheme	Year of Start	Nature of project (Select appropriate code from below)	Whether the Scheme is part of Business Plan (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date (DD-MM-YY)							Equity Component	Loan Amount		Loan Source		Capital/Subsidies/Grants Components	
														Loan-1	Loan-2	Loan-1	Loan-2		
ABOVE 25 MW																			
1	MyntduLeshka HEP-II (3x70MW)		a	Yes	26.03.2006	Oct-23	2.13	2.13										90% Grant from NEC	Target completion is Oct.2023

2	Umngi HEP (2 x31MW)		a	Yes	05.03.2014	Fresh estimate submitted to NEC	9.82	1.47	2.95	3.44	1.96			0.982				90% Grant from NEC	Fresh estimate submitted to NEC for funding

NAME: MePGCL

Investment Plan of MePGCL

(c) Survey & Investigation Projects for FY 2024-25 to FY 2026-27 (Amount in Crore)

Sl. No.	PROJECT DETAILS						Total Expenditure projected (Cr)	Project Outlay in FY 2023-24 (actual in Cr.)	Project Outlay in FY 2024-25 (Projected in Cr.)	Project Outlay in FY 2025-26 (Projected in Cr.)	Project Outlay in FY 2026-27 (Projected in Cr.)	Project Outlay in FY 2027-28 (Projected in Cr.)	SOURCE OF FINANCING FOR SCHEME						
	Name of Scheme	Year of Start	Nature of project (Select appropriate code from below)	Whether the Scheme is part of Business Plan (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date (DD-MM-YY)							Equity Component	Loan Amount		Loan Source		Capital/Subsidies/Grants Components	Remarks
														Loan-1	Loan-2	Loan-1	Loan-2		
ABOVE 25 MW																			
3	Selim HEP (2 X 40 MW)		a	Yes	25.03.2008	2026-2027	4.66	1.32	1.52	0.83	0.99			0.466				90% Grant from NEC	Target completion is March 2027

4	Mawblei HEP (2 X 38 MW)		a	Yes	23.01.2009	2026-2027	5.62	1.99	1.05	1.60	0.98			0.562				90% Grant from NEC	Target completion is March 2027
5	Nongkohlait HEP (2 X 31 MW)		a	Yes	05.03.2014	Fresh estimate submitted to NEC	8.84	1.33	2.65	3.09	1.77			0.884				90% Grant from NEC	Fresh estimate submitted to NEC for funding

NAME: MePGCL

Investment Plan of MePGCL

(c) Survey & Investigation Projects for FY 2024-25 to FY 2026-27 (Amount in Crore)

Sl. No.	PROJECT DETAILS						Total Expenditure projected (Cr)	Project Outlay in FY 2023-24 (actual in Cr.)	Project Outlay in FY 2024-25 (Projected in Cr.)	Project Outlay in FY 2025-26 (Projected in Cr.)	Project Outlay in FY 2026-27 (Projected in Cr.)	Project Outlay in FY 2027-28 (Projected in Cr.)	SOURCE OF FINANCING FOR SCHEME						Remarks
	Name of Scheme	Year of Start	Nature of project (Select appropriate code from below)	Whether the Scheme is part of Business Plan (Yes/No)	Project Start Date (DD-MM-YY)	Project Completion Date (DD-MM-YY)							Equity Component	Loan Amount		Loan Source		Capital/Subsidies/Grants Components	
														Loan-1	Loan-2	Loan-1	Loan-2		
BELOW 25 MW																			
1	Amkshar-II SHP (21 MW)	2023 (Projected)	a	No	2023-24	2026-27	3.01		1.20	0.90	0.45	0.45	--	--	--	--	--	3.01	

2	Lower Rongdi SHP (15 MW)	2023 (Projected)	a	No	2023-24	2026-27	2.72		1.08	0.82	0.40	0.40							
3	Nan-Ramnian Umkhynri Stage-II SHP (15 MW)	2023 (Projected)	a	No	2023-24	2026-27	2.79		1.12	0.84	0.42	0.42						2.79	
4	Sidiguri SHP (13 MW)	2023 (Projected)	a	No	2023-24	2025-26	1.83		0.46	0.91	0.46	-	--	--	--	--	--	1.83	i) under e-proposal system ii) Funded by State Govt. (already Sanctioned vide POWER 138/2011/4 Dt: 13.09.2011) is Rs. 53.17 Lakhs out of which Rs. 30.00 Lakhs had already been released.
							41.42	**8.24**	**12.03**	**12.43**	**7.43**	**1.27**		**2.89**				**35.59**	

Notes:

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**** Provide break up of Government and Private share**

Codes for selecting Nature of work (Distribution) **Codes for selecting Nature of work (Generation and Transmission)**

a. EHV Schemes
b. Distribution schemes
(i) System augmentation
(ii) System improvement
(iii) Schemes for loss reduction
c. Metering schemes
d. Capacitor
e. SCADA / DMS etc
f. Miscellaneous

a. New project
b. System augmentation
c. System improvement
d. Metering
e. Miscellaneous