BEFORE
MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION,
SHILLONG

PETITION

FOR

APPROVAL OF BUSINESS PLAN

FOR CONTROL PERIOD

FY 2021-22 TO FY 2023-24

FILED BY

MePGCL
Generating Clean And Green Energy

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 2021-22-FY 2023-24 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 3rd 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-C.**

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 Control Period of FY 2021-22 to FY 2023-24
   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.

08/09/2020

(A. Lyngdoh)
Superintending Engineer (PM)
For and on behalf of
Meghalaya Power Generation Corporation Ltd

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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 Gazzette on 25th September 2014. It is submitted that Meghalaya State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2014 since amended vide notification dated 18th June 2020, states as under:

"The applicability of these Regulations is hereby extended for a further period of 3 years with effect from 1.04.2021 to 31.03.2024 onwards".

1.2.2 As per Regulation 8 of the MYT Regulations, 2014, MePGCL has to file the Business Plan for the control period of FY 2021-22 to FY 2023-24. 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 2021-22 to FY 2023-24) 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 28th August 2017 and 18th June, 2020.

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 2021-22 to FY 2023-24. 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. However, due to a number of uncontrollable externalities and impact of Covid-19, deviations are expected and they shall be brought to the notice of the Hon'ble Commission in accordance with the provisions of MYT Regulations. 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 third control period FY 2021-22 to FY 2023-24.

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 analyse 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 The Company 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 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 9 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-1957	11.2
				Unit - II	May-1957	
				Unit – III	May-1957	
				Unit - IV	July-1968	
2	Umiam Stage-I HEP	Storage	4x9 MW	Unit – I	21.02.1965	36
				Unit - II	16.03.1965	
				Unit - III	09.06.1965	
				Unit - IV	09.11.1965	
3	Umiam Stage-II HEP	Pondage	2x10 MW	Unit – I	22.07.1970	20
				Unit - II	24.07.1970	
4	Umiam-Umtru Stage-III HEP	Pondage	2x30 MW	Unit – I	06.01.1979	60
				Unit - II	30.03.1979	
5	Umiam-Umtru Stage-IV HEP	Pondage	2x30 MW	Unit – I	16.09.1992	60
				Unit - II	11.08.1992	
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	126
				Unit - II	01.04.2012	
				Unit - III	01.04.2013	

Sl. No.	Station	Type	No of Units/Capacity	COD		Capacity (MW)
8	New Umtru HEP	Pondage	2x20 MW	Unit – I	01.07.2017	40
				Unit - II	01.07.2017	
9	Lakroh MHP	ROR	1x1.5 MW	Unit-I	01.03.2019	1.5
Total						**356.2**

2.1.4 Upcoming Plants

There are two ongoing hydro projects of the utility which are scheduled to be commissioned in the near future. The details of these plants 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	Ganol SH Project (3x7.5 MW)	67	507.71	223.11	54.62	229.98	May,2022
2	Riangdo SH Project (3 MW)	17.92	33.99	11.40	20.00	2.59	2022-2023

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 depends on the rainfall for the year. The generation trend from FY 2016-17 to FY 2019-20 has been presented in the table below:

Table 3: Energy Generation Trend of MePGCL (MU)

Sl. No	Station	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	Umiam Stage-I	96.63	128.61	85.12	108.32
2	Umiam Stage-II	50.23	63.92	43.31	55.25
3	Umiam-Umtru Stage-III	65.3	132.15	133.83	141.83
4	Umiam-Umtru Stage-IV	166.12	217.48	166.61	164.5
5	Sonapani MHP	7.63	7.47	7.12	3.59
6	Myntdu Leshka HEP	443.85	502.57	363.06	421.65
7	New Umtru HEP	-	167.79	179.82	181.43
8	Lakroh MHP	-	-	0.05	2.11
Total		**829.756**	**1219.99**	**978.92**	**1078.68**

2.1.5.2 Energy Generation in FY 2020-21 & the Third Control Period: Based on the previous generation trend for the existing stations and the projected energy generation for the upcoming plants, the projected generation in FY 2020-21 & the 3rd Control Period is given below:

Table 4: Projected Energy Generation for MePGCL(MU)

Sl. No	Station	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
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	139.00	139.00
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	Myntdu Leshka HEP	486	486	486	486
7	New Umtru HEP	235	235	235	235
8	Lakroh MHP	11	11	11	11
9	Ganol SHP	-	-	67	67
Total		**1245.31**	**1245.31**	**1312**	**1312**

2.1.5.3 Auxiliary Consumption of MePGCL Generating Stations: The auxiliary consumption from FY 2016-17 to FY 2019-20 for the generating stations is shown in the table below:

Table 5: Auxiliary Consumption (MUs)

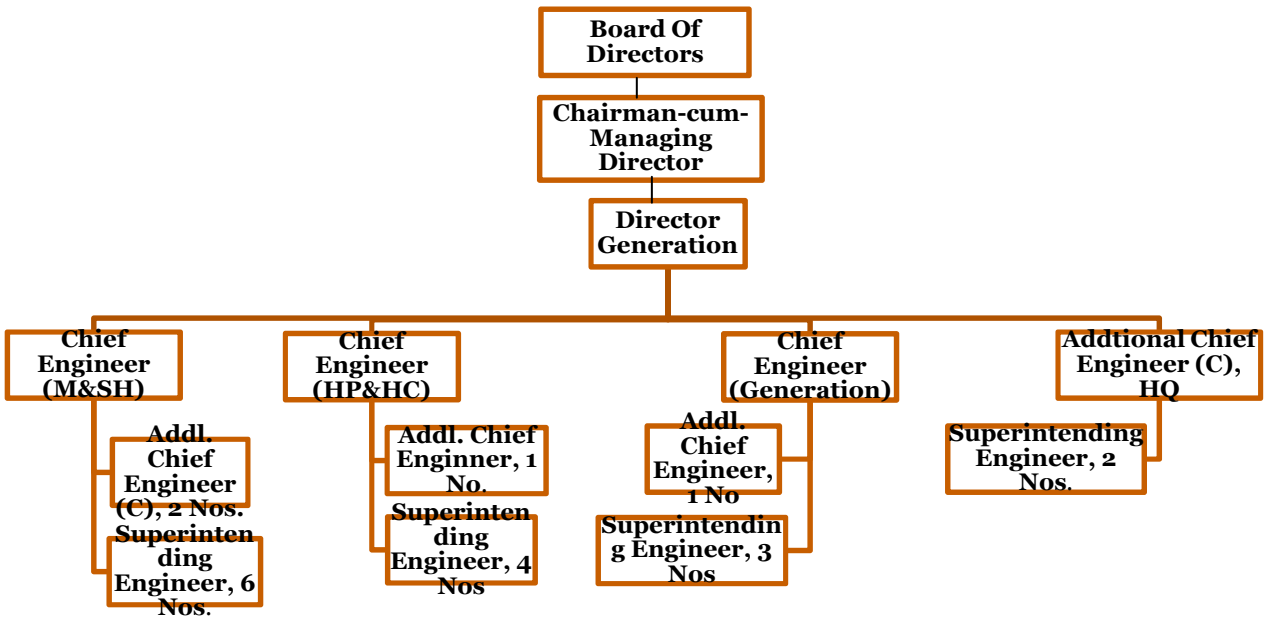
Sl. No	Station	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	Umiam Stage-I	1.07	1.20	0.933	1.01
2	Umiam Stage-II	0.34	0.386	0.909	0.335
3	Umiam Stage-III	0.53	0.910	1.12	0.863
4	Umiam Stage-IV	1.17	1.41	2.75	1.12
5	Sonapani MHP	0.06	0.05	1.47	0.032
6	Leshka HEP	3.15	1.39	0.27	3.67
7	New Umtru HEP	-	3.415	0.05	1.3
8	Lakroh MHP	-	-	0	0.029
TOTAL		**6.32**	**8.77**	**7.503**	**8.36**

2.2 Human Resource

2.2.1 Organisation Structure

MePGCL has its Corporate Office at Shillong. The CMD heads the Company. The broad organisation chart is shown below:

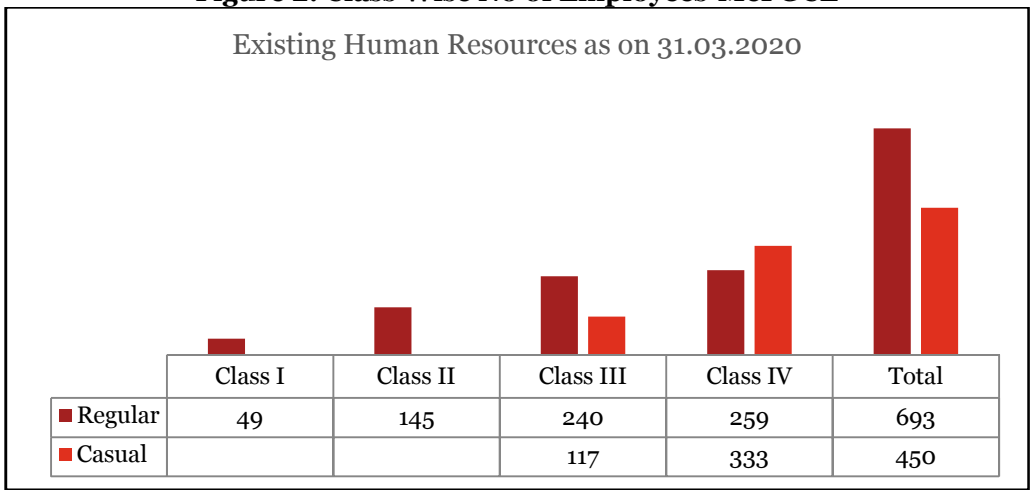
Figure 1: Organisation Chart-MePGCL



2.2.2 Existing Human Resource

As on 31st March 2020, MePGCL had 693 Regular employees and 450 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. The class-wise number of Regular & Casual Employees in MePGCL is depicted in the chart below:

Figure 2: Class Wise No of Employees-MePGCL



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 employee requirement of MePGCL during the third control period.

Table 6: Financial Year-Wise Employee Requirement for MePGCL for the Control Period from FY 2021-22 to FY 2023-24

Sl. No.	Category	Requirement		
		FY 2021-22	FY 2022-23	FY 2023-24
Class I				
1.	Regular	-	-	-
2.	Casual	-	-	-
	Sub-total (I)	**-**	**-**	**-**
Class II				
1.	Regular	10	27	19
2.	Casual	-	-	-
	Sub-total (II)	**10**	**27**	**19**
Class III				
1.	Regular	30	41	52
2.	Casual			
	Sub-total (III)	**30**	**41**	**52**
Class IV				
1.	Regular	10	21	40
2.	Casual			
	Sub-total (IV)	**10**	**21**	**40**
	Grand Total (I+II+III+IV)	**50**	**89**	**111**

The power station-wise/ office-wise employee requirement of MePGCL during the control period is represented below:

Table 7: Power station wise/ office wise Employee Requirement of MePGCL for the Control Period from FY 2021-22 to FY 2023-24

	FY 2021-22	FY 2022-23	FY 2023-24
Chief Engineer (Generation)			
Assistant Engineer	5	6	3
Junior Engineer	5	7	2
Grade-III	30	33	40
Grade IV	10	9	20
Sub-total (a)	**50**	**55**	**65**
Chief Engineer (Medium and Small Hydro)			
Assistant Engineer		6	
Junior Engineer		8	
Grade-III		8	
Grade IV		12	
Sub-total (b)		**34**	
Chief Engineer (Hydro Planning and Hydro Construction)			
Assistant Engineer			6
Junior Engineer			8
Grade-III			12
Grade IV			20
Sub-total (c)			**46**
Grand total (a+b+c)	**50**	**89**	**111**

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 decided on the 25th October 2019 to implement a revised pay scale of employees effective from January 2020 with the following impact.

Table 8:Impact of RoP 2020 on Employee Expenses

Particulars	Amount (INR Cr)
Existing Monthly Employee Costs before ROP 2020	**23.37**
Revised Monthly Employee Costs after ROP 2020	**29.68**
Total Financial Implications due to ROP 2020	**6.31**
% Change in Employee Costs due to ROP 2020	**27%**

The Board's approval for RoP 2020 along with the detailed financial implication and other supporting documents is given in **Annexure B**. For the third MYT control period, the

subsidiaries of MeECL will take into account the impact of ROP 2020 in its employee expense projections.

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 set up the standards for mandatory training required for various skills for the generation, transmission, distribution, etc. The CEA has recognized 74 (seventy-four) training institutes throughout the country under the Government and Private Sector, for providing such training at various levels.

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 programmes in generation, transmission and distribution, besides high-end short term programmes 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 **Statutory training requirement:** The Central Electricity Authority notifies the mandatory training (measures relating to safety and electricity supply) Regulations 2010, specifically the regulations 6 & 7 of the said CEA Regulations 2010. For implementing the above regulations effectively and on rational basis, the CEA has framed guidelines and norms to prescribe the procedure to be followed by CEA/ MoP for recognition and grading of the training institutes for power sector in the country. Presently, following types of training are provided to the workforce in power segment for electricity generation, transmission and distribution personnel: Operation & Maintenance Training to all existing employees engaged in O&M of generating projects and transmission & distribution system ranging from 4 Weeks to 30 Weeks. This includes classroom training, simulator training for

Thermal & Hydro and On-Job training.

- Induction level training for new recruits for 1 month (Technical & Non-Technical).
- Refresher/Advanced training of 5 Days in a year to all existing personnel of varying degrees in various specializations in line with National Training Policy for Power Sector.
- Management training of 5 Days in a year to the senior Executives/Managers in India/abroad in line with National Training Policy for Power Sector.
- Distance Learning Certificate Programs on Power Distribution Management for JEs/ AEs.
- Certificate of Competency in Power Distribution (CCPD).
- Training under Distribution Reforms, Upgrades and Management (DRUM). C&D Employees Training (Non-executives in secretarial staff, accounts wing, technical staff in nonexecutives and Class-IV are categorized as C&D employees).
- Franchisee Training.

2.2.5.5 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 2019-20 and FY 2020-21 for the officers is given below:

Table 9:Training Details for FY 2019-20

Sl. No	Name of Institute	Field of Training (Thermal/ Hydro/ Transmission/ Distribution/ Management)	Total Training (Days/ Man)
1	Training programme on **"Technician Development Programme"**, organized by Power Grid Corporation of India Ltd. (PGCIL), Lapalang, Shillong under Capacity Building & Institutional Strengthening (CBIS) of NERPSIP, with effect from 16.04.2019 to 10.05.2019 at Powergrid, Misa Substation, Nowgaon, Assam. **Total Personnel-25 (twenty-five) [Technical]. Linemen-25.**	**Transmission**	**20 x 25 = 500**
2	Workshop on **"National eVidhan Application (NeVA)"**, organized by Meghalaya Legislative Assembly, held on the 24th& 25th April 2019 at the Annexe Hall, Assembly Building, Rilbong, at 10:30 A.M. **Total Personnel-2 (two) [Technical]. AEE-1, JE-1.**	**Management**	**2 x 2 = 4**
3	Training programme on **"*Finance & Accounts Practices*",** organized by Power Grid Corporation of India Limited (PGCIL) from 22nd to 24th April 2019 at 10:00 A.M in the ICSSR Hall, NEHU, Shillong. **Total Personnel-26 (twenty-six) [Technical]. CE-1, ACE-4, SE-8, EE-8, RE-5**	**Management**	**2 x 26 = 52**
4	Training Programme, organised by the Central Project Management Unit (CPMU) of Dam Rehabilitation and Improvement Project, CWC, New Delhi in association with the IIT, Roorkee and Motilal Nehru National Institute of Technology, Allahabad on **"Conventional and Advanced Hydrometric Technique for Discharge Estimation"** held on The 10th – 12th June, 2019 at Indian Institute of Technology, Roorkee, Uttarakhand. **Total Personnel-2(two) [Technical], AEE(C)-2.**	**Hydro**	**2 x 3 = 6**
5	Training Programme respectively under IPDS conducted by PFC Ltd, held on the 8th& 9th May 2019 at 10.00 A.M in the Hotel Polo Towers, Shillong. **Total Personnel-83(eighty-three) [Technical], AEE (Elect)-23, JE-24, ES-1, Linemen-II- 11, Electrician-3, C/Electrician-2, Jugali-19.**	**Distribution**	**2 x 83 = 166**
6	Training Programme, organised by the Central Project Management Unit (CPMU) of Dam Rehabilitation and Improvement Project, CWC, New Delhi in association with the IIT, Roorkee and Motilal Nehru National Institute of Technology, Allahabad on **"Hydrological and Hydraulic Methods of Flood Routing"** held on the 13th -14th June, 2019 at Indian Institute of Technology, Roorkee, Uttarakhand. **Total Personnel-2(two) [Technical], AEE(C)-2.**	**Management**	**2 x 2 = 4**
7	Programme on "**Power System Logistics Conclave**" organized by North Eastern Regional Load Dispatch Centre (NERLDC), POSOCO, Lower Nongrah, Lapalang, Shillong to be held on 6th& 7th June 2019 at NERLDC Conference Hall, Shillong. **Total Personnel-2(two) [Technical], SE(Elect)-1, EE(Elect)-1.**	**Transmission**	**2 x 2 = 4**

Sl. No	Name of Institute	Field of Training (Thermal/ Hydro/ Transmission/ Distribution/ Management)	Total Training (Days/ Man)
8	Training Programme, organised by the Central Project Management Unit (CPMU) of Dam Rehabilitation and Improvement Project, CWC, New Delhi in association with the IIT, Roorkee and Motilal Nehru National Institute of Technology, Allahabad on **"Geotechnical and Seismic consideration in Dams"** held on the 17th -18th June, 2019 at Indian Institute of Technology, Roorkee, Uttarakhand. **Total Personnel-2(two) [Technical], AEE (C)-2.**	**Management**	**2 x 2 = 4**
9	Training Programme, organised by the Central Project Management Unit (CPMU) of Dam Rehabilitation and Improvement Project, CWC, New Delhi in association with the IIT, Roorkee and Motilal Nehru National Institute of Technology, Allahabad on **"Geotechnical and Seismic consideration in Dams"** held on the 19th -21st June, 2019 at Indian Institute of Technology, Roorkee, Uttarakhand. **Total Personnel-2(two) [Technical], AEE(C)-2.**	**Management**	**2 x 3 = 6**
10	Workshop on **"Latest Trends in Inspection & Investigations of Dam"**, organised by AF Academy under the aegis of Central Water Commission and in association with Central Board of Irrigation & Power (CBIP), ICID-CIID and World Bank on 30th& 31st May 2019 at New Delhi. **Total Personnel-2(two) [Technical], CE(C)-1, SE(C)-1**	**Management**	**2 x 3 = 6**
11	Training programme on "Emerging Trends in Power Sector –NER" for senior management, organized by POWERGRID from 17th to 19th June 2019 at POWERGRID Academy of Leadership (PAL), Manesar, Gurugram, Haryana. **Total Personnel-4(four) [Technical], SE(Elect)-2, EE(Elect)-2**	**Management**	**4 x 3 = 12**
12	Training on "***Capacity Development Proramme***", organized by Asian Development Bank held on 8th - 10th July 2019 at ASCI, Hyderabad. **Total Personnel-1(one) [Technical], SE(Elect)-1.**	**Distribution**	**1 x 3 = 3**
13	Training programme on **"Project Planning Implementation, Monitoring & Evaluation"** organized by Department of Public Enterprises (DPE), Government of India held on 15th -19th July 2019 at IIT Kharagpur. **Total Personnel-1(one) [Technical], AEE(C)-1**	**Hydro**	**1 x 5 = 5**
14	Training Programme on "**Website Quality Certification**" at Electronics Test & Development Centre, STQC Directorate, Ministry of Electronics & Information Technology, Government of India, 1st& 2nd Floor, Central Block, HOUSEED Complex, Beltola-Basistha Road, Dispur, Guwahati – 781006 from 10:00 A.M to 5:00 P.M on the 15th – 16th July, 2019. **Total Personnel-1(one) [Technical], AEE (Comp. Engr)-1.**	**Management**	**1 x 2 = 2**
15	The 22nd National Conference on e-Governance (NCeG) 2019 to be held on the 8th and 9th August 2019 at State Convention Centre, Shillong. **Total Personnel-1(one) [Technical], SE(Elect)-1, EE(Elect)-1**	**Management**	**2 x 2 = 4**
16	Training programme on **"*Finance & Accounts Practices*"** (INDAS), to be organized by Power Grid Corporation of India Limited (PGCIL) under Capacity Building & Institution Strengthening (CBIS) of NERPSIP on 2nd& 3rd September 2019 from 9.30 A.M in the ICSSR Hall, NEHU, Shillong. **Total Personnel-26 (twenty-six) [Accounts], DAO/SO-26.**	**Management**	**2 x 26 = 52**
17	Training programme on **"Online Right to Information Portal"** organized by Meghalaya Administrative Training Institute", Shillong held on 4.10.2019 at IT Training Hall, IT&C Department at 11.00 A.M.	**Management**	**1 x 6 = 6**

Sl. No	Name of Institute	Field of Training (Thermal/ Hydro/ Transmission/ Distribution/ Management)	Total Training (Days/ Man)
	Total Personnel-6(six) [Administration], CE-4, ACE(C)-1, Under Secretary-1		
18	Training programme on **"Project Planning Implementation, Monitoring & Evaluation"** organized by Department of Public Enterprises (DPE), Government of India to be held on 15th -19th July 2019 at IIT Kharagpur. **Total Personnel-1(one) [Technical], AEE(C)-1.**	**Hydro**	**5 x 1 = 5**
19	Training programme on **"Smartgrid"** organised by Power Grid Corporation of India Limited, at Smart Grid Knowledge Centre, Manesar, Haryana with effect from 9th – 11th September 2019. **Total Personnel-1(one) [Technical], AEE (Elect)-1.**	**Distribution**	**3 x 1 = 3**
20	Training programmme on **"Urban Planning & Management"** conducted by Meghalaya Administrative Training Institute (MATI), Shillong held on 24.10.2019 from 9.30 A.M at MATI, Shillong. **Total Personnel-3(three) [Technical], AEE (Elect)-2, AEE (C)-1.**	**Management**	**1 x 3 = 3**
21	Training programmme on **"ADB Procurement, bid Evaluation (Technical & Financial etc)"** conducted by ADB on the 20th& 21st November 2019 in the Conference Hall, Lumjingshai, MeECL, Shillong from 10.00 A.M onwards. **Total Personnel-32(thirty-two) [Technical], CE(Elect)-2, Comp Secretary-1, ACE-4, SE-8, Dy. CAO-1, Sr. AO-1, EE-8, AAO-3, AEE-3, DAO-1**	**Management**	**2 x 32 = 64**
22	Workshop on **"Breakdown Analysis and Remedies of Electrical Equipment"** conducted by NTPC, Bhubaneswar to be held on26.11.2019from 10.00 A.M to 4.00 PM in the HRD Centre Hall Umiam. **Total Personnel-40(forty) [Technical], SE-2, EE(Elect)-12, EE (C)-6, AEE/RE-20**	**Distribution**	**1 x 40 = 40**
23	Workshop on **"a cloud based modular HR Management system under CBIS Programme of NERPSIP Project"** organized by the Power Grid Corporation of India Ltd., to be held on the 28th February 2020 in the Conference Hall, Lumjingshai, Shillong from 11.00 A.M onwards. **Total Personnel-21(twenty-one) [Technical], Directors-3, CEs-7, Comp. Secretary-1, CAO(I/C)-1, ACEs/ Dy. Director (HRDC)-9**	**Management**	**1 x 21 = 21**
24	Seminar on "Implementation of Smart Metering System" organized by Genus Power Infrastructures Limited, New Delhi held on 27th February 2020 in the Conference Hall, Lumjingshai, Shillong from 1:00 P.M onwards. **Total Personnel-20(twenty) [Technical], Director-1, CEs-3, ACEs-6, SE-4, EEs-6**	**Distribution**	**1 x 20 = 20**
25	Workshop todemonstrate **"a cloud based modular HR Management system under CBIS Programme of NERPSIP Project"** organized by the Power Grid Corporation of India Ltd., held on the 28th February 2020 in the Conference Hall, Lumjingshai, Shillong from 9.30 A.M onwards. **Total Personnel-28(twenty-Eight) [Technical], Directors-3, CS-1, CEs-7, CFO-1, CAO(I/C) -1, Jt. Secretary-1, Dy. Director (HRDC) 1, ACEs-11, Dy. CAO-1, EE-1**	**Management**	**1 x 28 = 28**

Table 10:Training Details for FY 2020-21 (As on August):

Sl. No.	Name of Institute	Field of Training (Thermal/ Hydro/ Transmission/ Distribution/ Management)	Total Training (Days/ Man)
1	Training on **"E-learning Course on Project management through live Webinars under CBIS Programme of NERPSIP for Executives"** organized by Power Grid held on 12th June 2020 from 3:00 P.M onwards. **Total Personnel-29 (twenty-nine) [Technical]. CE-1, ACE-1, EE-8, AEE/ RE-19.**	**Management**	**1 x 29 = 29**
2	Training on **"Webinar on Contract Management, Project Management & Risk Assessment"** organized by Power Grid Corporation of India Ltd. (PGCIL), held on 15th& 16th May 2020 from 3:00 P.M onwards. **Total Personnel-10 (ten) [Technical]. CE-1, ACE/Dy Dir-1(HRDC)-2, SE-1, EE-5, AEE-1.**	**Management**	**2 x 10 = 20**
2	E-learning course under CBIS –NERPSIP on "**PreventionofSexual Harassment for Internal Committee"** organized by the PGCIL held from 7th July 2020 to 10th July 2020 from 11.A.M to 1.P.M. **Total Personnel-4 (four) [Technical/Administration]. SE-1, Under Secy-1, AEE-1, AE-1**	**Management**	**4 x 4 = 16**
3	Training programme on the subject "**Accounting Finance (Basic)"** (Capacity Building plan 2020-22) under CBIS –NERPSIP, organized by the PGCIL through Administrative Staff College of India (ASCI) Hyderabad, held from 20th July 2020 to 24th July 2020. **Total Personnel-25 (twenty-five) [ACCOUNTS]. CFO-1, Sr. AO-1, DAO-23**	**Management**	**5 x 25 = 125**
4	Online training programme on the topic **"CEA Contractual Standards for Distribution Works"** organized and sponsored by TATA Power DDL, New Delhi through Chief Program Manager, REC Ltd, RO, Shillong held on 5th August 2020 from 11:00 A.M to 12:30 P.M. **Total Personnel-30 (thirty)[TECHNICAL].EE-13, AEE-17.**	**Distribution**	**1 x 30 = 30**

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 behavioural 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.

3.2 Details of Works on Existing Stations

3.2.1 Umiam Stage-I

3.2.1.1 System Augmentation & Improvement Projects

As the Umiam Stage-I station 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 FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 11: System augmentation & Improvement Projects- Umiam Stage-I

Sl. No.	Project Name	Description
1	Replacement of Intake gate and provision of Stoplog gate at Umiam Stage I HEP.	The intake structure of Umiam Stage-I HEP is located on the left bank of the dam with the invert level is kept at EL 955.50 m. The water from the reservoir is diverted to the power house through the intake to the tunnel of diameter 3.05 m and length of 2078 m and into the penstock (2 nos) of diameter 1.98 m each. A surge shaft of height 54.40 m and diameter 4.88 m connect the HRT and penstock. The bypass valve connects to the butterfly valve and is situated just upstream of penstock. These valves require replacement since they have developed leakage and may fail, which will result in flooding of the Power Station and villages downstream due to uncontrolled flow from the Umiam reservoir. To replace the Butterfly and Bypass Valves, the Intake Gate has to be closed to cut off the flow of water into the water conductor system. Since the present Intake Gate and embedded parts which were installed way back in 1960's have become heavily rusted and not functioning anymore, a new Intake Gate along with Stoplog gate have to be installed.
2	Replacement of two penstock Butterfly Valves including By-pass valves along with all servo mechanism and related control system.	Over the years 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 the 1960's, 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.
3	Re-engineering of firefighting system of Generator and Transformer	**Generator:** The existing flooding system of fire protection for generator uses the old cylinder which since 1965 has not been replaced. So, it is required to replace existing cylinder along with the control circuit so that the same firefighting of generator

Sl. No.	Project Name	Description
		housing can be made active. **<u>Transformer:</u>** 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 powerhouse. It is to be noted that the components of the emulsifier system have not been replaced since 1965. Therefore, to make the firefighting system functional, it is necessary to renovate the piping and valves along with nozzles.
4	Replacement of transformer for Unit-1, Unit-2 and Unit-4.	The existing transformers have been in service for quite a long time. The transformer No.3 was replaced by new one in April 2006 and the transformer No.1 and No.4 were replaced by transformers 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. These transformers were installed and commissioned along with the Generating units of Umiam Stage II Power Station in 1970. Therefore, both the transformers have outlived their useful lifespan. For reliable and smooth operation of the Power Station, these transformers too need to be replaced by new ones which meet the current international standards and specifications
5	Construction of Transformer Yard to accommodate station service transformers of Unit-1 & Unit-3 and procurement of the same.	The Station Service Transformers of Unit-1 & Unit-3 have completed their useful life. Besides, these transformers are oil based and are located inside the generator floor of the powerhouse building. Therefore, it is proposed that these transformers be replaced with new ones of 500 KVA be placed outside the power house building.
6	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 change over from Main to Auxiliary Bus.
7	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 signals to open, the generator and transformer will be exposed 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 two spare Circuit Breakers be procured to be made readily available for replacement of the damaged one.

Sl. No.	Project Name	Description
8	Complete Installation of SCADA including Hardware and Software	There is a need for installation of a 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 currents and voltages whereas mechanical parameters will include monitoring of temperature, pressure, vibration, cooling flow etc which would ensure proper monitoring of the hydrogenating Units from the safety and stability point of view so as to ensure their trouble-free operation.
9	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 led to outage of the Units on several occasions. Further, the Original Equipment Manufacturer (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
10	Replacement of Generator Stator Air Cooler for three Units	Umiam Stage I Power Station was Renovated and Modernized in FY 2001-02 by M/s Toshiba with funding from JBIC (now JICA). During R&M works, replacement of Stator Air Cooler was not included in the scope due to loan constraint. After having been in service continuously for a period of 55 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 leading 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 and ultimate insulation failure of the Stator Winding, it is proposed that the stator air coolers of Unit-I,II&III be completely replaced by new coolers at the earliest to avoid prolonged generation loss from these Units .
11	Modification of cooling system for Stage-I Power station	The present cooling system at Umiam Stage-I Power station needs to be modified in order to control the outages which occur due to factors like clogging of the cooling water system and tripping of cooling water pumps which can cause much energy losses. However, if this cooling water system is modified accordingly, then the outages due to the cooling water system will practically be nil.

The Project cost is shown in the table below:

Table 12: Project cost for Umiam Stage-I System Augmentation &Improvement Projects

Sl. No.	Particulars	Project Cost(INR Cr)
1.	System Augmentation & Improvement Umiam Stage-I	77.56

3.2.2 Umiam Stage-II

3.2.2.1 System Augmentation& Improvement Projects

As the Umiam Stage-II station is quite old, some of its components need to be augmented and improved. The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 13: System Augmentation& Improvement Projects- Umiam Stage-II

Sl. No.	Project Name	Description
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 imbalance 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 imbalance of load also causes voltage imbalance 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. Therefore, it is necessary to provide this system for safety of operation.
3	Installation of On Line Supervisory System (SCADA) for the entire Power Station	There is a need for installation of a 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 and 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 monitoring of the hydrogenating Units from the safety and stability point of view so as to ensure their trouble-free operation.
4	Replacement of 11 KV Switchgear Panel	Umiam Stage II Power Station was Renovated, Modernized and Upgraded in January 2012 by M/s Toshiba with funding from JBIC (now 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 circuits between adjacent auxiliaries like PT's, C.T's, Surge Arrestors etc. A lot of care has been taken by the Station engineers and staff to insulate the adjacent components and seal numerous holes to avoid rodents inside but to no avail. Therefore, after numerous discussions with higher authority, a decision was made for complete replacement of the existing 11 KV Switchgear panel for both Units.

Sl. No.	Project Name	Description
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 Turbines 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 Breaker 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 in 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 signals to open, the generator and transformer will be exposed to the electric stress due to external short circuit faults. This may even cause damages to all the power equipments of the Station

The Project cost is shown in the table below:

Table 14: Funding for Umiam Stage-II System Augmentation &Improvement Projects

Sl. No.	Particulars	Project Cost (INR Cr)
1.	System Augmentation & Improvement - Umiam Stage-II	21.11

3.2.3 Umiam-Umtru Stage-III

3.2.3.1 System Augmentation Projects

The Umiam-Umtru Stage-III Power station and hydraulic structures being very old, some of the components need to be augmented and improved. The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 15: System Augmentation& Improvement Projects- Umiam-Umtru Stage-III

Sl. No.	Project Name	Description
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
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 to 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, current carrying capacity of Bus needs to be enhanced. It is proposed that the present ACSR Panther Bus be replaced by ACSR ZEBRA.
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 employees' 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 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 groups i.e, a total of 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 impacts 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 of 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 employees' colony along with penstock butterfly valve house and its surroundings. 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.

The Project cost is shown in the table below:

Table 16: Funding for Umiam-Umtru Stage-III System Augmentation& Improvement Projects

Sl. No.	Particulars	Project Cost (INR Cr.)
1.	System Augmentation & Improvement- Umiam-Umtru Stage-III	410.77

3.2.4 Umiam-Umtru Stage-IV

3.2.4.1 System Augmentation &Improvement Projects

The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 17: System Augmentation &Improvement Projects- Umiam-Umtru Stage-IV

Sl. No.	Project Name	Description
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 be 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 the 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 station, 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.
	b) Procurement of excitation transformer	Due to ageing and loading of the Excitation Transformers 375 KVA, 11/0.240 KV, on many occasions the units got tripped. Moreover, due to spiking, the Transformers 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 uses of an offline vibration meter. In case of any abnormality and 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. Therefore, it is proposed to have an online vibration

Sl. No.	Project Name	Description
		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 Souce power supply from 132 KV Bus.	At present, the outside source supply for the power station as well as for the adjoining employees' 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 reserved forest area in difficult terrain. Therefore, it is proposed that dedicated outside source transformer is installed which will tap power from the 132 KV grid for ensuring stable and reliable outside source supply for the station as well as employees' colony.
5	Telecommunication and Internet Facility	At present, the telecommunication facility at Umiam Stage-IV is very weak. 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-Umtru Stage-IV power station is being run on semiautomatic mode. The speed and voltage are being controlled automatically. Whereas, the start and stop of the machine needs to be done manually. With increase in speed of 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 dependence 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	Refurbishment of Stator winding of Unit 1	On the 2nd August 2019, Unit-1 of Stage IV Power Station was connected to the grid w.e.f 18:25 hrs. With 30 MW load, the Unit suddenly tripped at 19:20 hrs of 2nd August 2019 due to damage of Stator winding. The machine needs to be refurbished in order to make it operational.
9	Hydraulic Power Pack with Control Panel for Butterfly Valve	The Power Station is having two surface steel penstocks for feeding water to two hydro-generating Units of the Station. There are two Butterfly valves for controlling the flow of water to the Penstocks by opening and closing these valves. The Butterfly valve is operated with the help of the Control system which is by hydraulic oil. In recent time due to aging, all the control system has been damaged and it becomes difficult to operate the valves whenever shutdown is required in the Power Station. This may pose danger especially during emergency situation. Hence it is required that the control equipment of these valves is replaced with new one.
10	Installation of Firefighting Scheme for Generator Stators	The proposal for installation of generator stator firefighting envisages complete refurbishment of existing non-functional firefighting system 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 automatic and fast response to any kind of inferno in the Generator Stator section, which includes earliest detection within the shortest possible time and initiation of action by release of C02 to ensure minimum damage to the Stator in particular and also to control the fire from spreading to 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

Sl. No.	Project Name	Description
		insurance claims in the event of any unfortunate fire related accidents
11	Residual Life Assessment (RLA of Umiam-Umtru Stage-IV power station	The Stage-IV power station was commissioned in 1972 and is now giving problems as it nears the end of its useful life. It is therefore necessary to carry out RLA studies of the power station to know the extent/scope of R&M works to be taken up once the station reaches the end of its useful life.

The Project cost is shown in the table below:

Table 18: Funding for Umiam-Umtru Stage-IV System Augmentation & Improvement Projects

Sl. No.	Particulars	Project cost (INR Cr.)
1.	System Augmentation & Improvement Umiam-Umtru Stage-IV	35.98

3.2.5 Umtru HEP

- There was a drastic decrease in generation from Umtru Power Station during the last few years and the generation from this power station was completely stopped when the New Umtru Project was in the final stages of construction. It is of utmost importance to resume its generation by taking up Renovation, Modernization and Upgradation (RM&U) works.
- The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 19: System Augmentation &Improvement Projects- Umtru HEP

Sl. No.	Project Name	Description
1	Residual Life Assessment (RLA) of Umtru HEP (4x2.8 MW)	The Old Umtru HEP (4x2.8MW) has stopped functioning due to aging of the machines. Moreover, during the modification of the existing diversion structure to develop a larger head fo**r** the New Umtru Project (2x20MW), a huge amount of silt has accumulated in the Powerhouse. To augment the capacity of peaking from New Umtru Project during lean season and to utilize the excess water during monsoon, it is proposed to revive the Old Station by adopting the same alignment and utilizing the same components/structures of the Old Umtru Project to draw water from the common reservoir and to install a single Francis Turbine of 11MW capacity with a rated head of 60.14 m. With the installed capacity of 11MW, the annual energy and design energy at 95% plant availability is worked out approximately to be 40.42 Mu and 40.03 Mu respectively. The annual PLF is 41.95%. The strength and quality of all the components of all the Civil Structures from the Intake to the power house have to be ascertained. For this, the existing components/structures will have to be investigated by conducting the Residual Life Assessment (RLA) at the cost of about INR 50 lakhs. Based on the report of the study, the components are to be strengthened as found necessary.
2	Renovation Modernisation and Upgradation of Umtru Power Station.	Umtru H.E. Project was commissioned with three Units of 2.8 MW each in 1957 and the fourth Unit of 2.8 MW was commissioned in 1968. It was the first Hydro Electric Project developed in the Umtru River Basin of Meghalaya. The station has outlived its useful life. During these last few years, the hydro-generating units are under shutdown. It is possible to revive the station by taking up Renovation, Modernization and Uprating (RM&U) activities

Sl. No.	Project Name	Description

The Project cost is shown in the table below:

Table 20: Funding for Umtru HEP System Augmentation & Improvement Projects

Sl. No.	Particulars	Project Cost (INR Cr.)
1.	Projects for Umtru HEP	110.50

3.2.6 SonapaniMini Hydel Project

- Sonapani Mini Power Station is an old power station which has been running since 1922 for supplying power to Shillong. As the power house building has become old and the machines at the power station have become obsolete, a new Power house with one new machine of 1500 KW was installed and commissioned in 2009.
- The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 21: System Augmentation &Improvement Projects- Sonapani Mini Hydel Project

Sl. No.	Project Name	Description
1	Procurement and Installation of 415V 3 Ph LT panel	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
2	Relays and Cards to replace some existing defective ones and spares.	Most of the relays and cards are not functioning and spares are also not available. Therefore, it is proposed that Relays and Cards be procured to replace some existing defective ones and as spares
3	Generator Circuit Breaker to replace the existing one.	The existing Generator Circuit Breaker is giving problem and requires frequent maintenance leading to forced outage of the machine. Therefore, it is proposed that a new generator circuit breaker be procured.

The Project cost is shown in the table below:

Table22 : Project cost for Sonapani SHP System Augmentation & Improvement Projects

Sl. No.	Particulars	Project Cost (INR cr.)
1.	System Improvement projects	0.34

3.2.7 MePGCL System Protection and Communication

The works to be taken up under this head during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 23: Works Description under System Protection and Communication

Sl. No.	Project Name	Description
1	Procurement of Diagnostic Tools, Plant & Machineries for Generation system protection division	Procurement of these items is necessary for improvement of Generation System Protection and Communication System along with Diagnostic Tools and installation of Optical Fiber Cable Link at different Generating Stations. These will improve the performance of power station and will enable quick response in case of emergency.
2	Installation of OPGW for communication system between Stage-3 & Stage-4, Stage-1 & Stage-2 and Umtru-New Umtru power stations including all Fibre Optic Terminal Equipments.	
3	Procurement of Online Oil Filtration Machine for all Generator Transformers under MePGCL.	

Sl. No.	Project Name	Description
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	

The Project cost for the above works is shown in the table below:

Table 24 : Project cost for System Protection and Communication

Sl. No.	Particulars	Project Cost (INR cr.)
1.	System Protection and Communication	8.98

3.2.8 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 DRIP-I which envisaged rehabilitation of 198 dams at an estimated cost of Rs. 3466 crore across 7 (seven) states is slated to be completed by 2020.

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. 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. Myntdu Leskha 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.

3.2.9 Myntdu Leshka Hydro Electric Project (MLHEP)

- For the Myntdu Leshka Hydro Electric Project, the following R&M works are proposed to be undertaken during FY 2020-21 or third control period:
- The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 25: System Augmentation &Improvement Projects- Myntdu Leshka Hydro Electric Project (MLHEP)

Sl. No.	Project Name	Description
1	Cooling System modification & improvement	Due to frequent clogging of the cooling water system during monsoons, much energy is lost due to forced shutdown. The present system is of closed loop type. It is proposed to convert this system into an open loop system which will be more efficient than the present system and it is expected that forced shutdowns will be reduced on account of clogging and tripping of the system.
2	Supply and erection of spare Generator Transformer 1Ø, 17.5 MVA, 132/33 KV with accessories for Myntdu Leshka Power Station	Myntdu Leshka Power Station is a generating station with three installed Units, where each unit is of capacity 42 MW. The overall generating capacity of this station is 3 X 42 MW i.e., 126 MW. Each unit of this generating station is provided with three single phase generator transformers. In the event of failure of any one of the generator transformers, a spare transformer will be required for its replacement to maintain the smooth functioning and un-interrupted generation of power supply. The present spare transformer has failed and is not reliable with its history of similar failure in the past. Considering the importance of maintaining un-interrupted generation, it is necessary to procure a new spare transformer for the power station.
3	Replacement of Switchgear & Protection System for Myntdu Leshka Power Station	The existing switchgears in Leshka have often encountered pole discrepancies problem due to which machines are often forced to shut down. This leads to unwanted loss of revenue and due to outage of the machine. It is therefore, proposed that the existing switchgears are re placed with new switchgears.
4	Upgradation of SCADA for Myntdu Leshka Power Station	The MLHEP is SCADA controlled plant; however, the existing system is obsolete and is required to be upgraded to a newer and higher system, to ensure smooth and reliable operation of the plant.
5	Communication from Myntdu Leshka Dam to Leshka Power house	In order that optimum generation from MLHEP PS can be achieved, effective monitoring in digital form of reservoir levels from Powerhouse including Voice and Data communication is required between Myntdu Leshka Dam, BFV and Power Station.
6	Replacement of Air coolers including accessories for Stator for all 3 Units for Myntdu Leshka PS	MLHEP power station was commissioned in the year 2012-13. In the last 8 (eight) years the generating station has been generating maximum power during the monsoon season. As such the units in the generating station are provided with their respective air coolers to maintain the temperature of the stator winding and its accessories. It has been observed that in the course of generation, the cooling pipes embedded within the air coolers have deteriorated as a result of clogging, rust accumulation resulting in the decrease in the inner dimension of the pipe which reduces the actual flow of water through it. This has affected the cooling of the stator of the machine and other accessories leading to disruption of generation. In order to avoid the occurrence of such events in the future, replacement for air coolers are required.

The estimated cost for the above works is shown in the table below:

Table 26: Funding for MLHEP System Augmentation & Improvement Projects

Sl. No.	Particulars	Project Cost (INR Cr.)
1.	System Improvement projects	16.31

3.2.10 Lakroh Mini Hydel Project (1 X 1500 Kw)

- The Lakroh Mini Hydel Project is a run-of- the river project developed on the Lakroh River near Muktapur village in West Jaintia Hills District of Meghalaya. The project was successfully commissioned on 6thDecember, 2018 and the Commercial Operation Date declared on 1st March, 2019.
- The system augmentation & improvement projects that would be taken up during FY 2020-21 and the third control period (FY 2021-22 to FY 2023-24) are mentioned below:

Table 27: System Augmentation &Improvement Projects-Lakroh MHP

Sl. No.	Project Name	Description
1	Replacement of Generator Transformer (with 3.3/33 KV, 2.5 MVA) including augumentation of Switchyard from 11 KV to 33 KV for Lakroh PS	The present voltage evacuation from Lakroh Power Station is at 11 KV and this is 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.
2	Communication for Lakroh PS with SLDC	Lakroh power station is a mini hydel project having 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 the station.

The Project cost is shown in the table below:

Table 28: Funding for Lakroh HEP System Augmentation & Improvement Projects

Sl. No.	Particulars	Project Cost (INR Cr.)
1.	System Improvement projects	1.54

3.3 Upcoming Plants for MePGCL

3.3.1 Ganol Small Hydro Project (3X 7.5MW)

- **Introduction:** The Ganol Small Hydro Project, the first power project in Garo Hills, was envisioned to be implemented at an installed capacity of 22.5 MW with 3 units of 7.5 MW each. It is located at 7 km from Tura, the Headquarters of West Garo Hills District and will contribute 67.09 million units of energy in a year. This is expected to bring a significant change in the power scenario of Garo Hills which is suffering from frequent power cuts and perpetual voltage fluctuations. The construction of the project was started in 2014 and its completion is scheduled in May 2022. The revised cost of project is INR 507.71 crore.

Table29: Salient features of the Project:

Project Location	West Garo Hills Dist., Meghalaya
Project Cost	INR507.71 Crores
Installed Capacity	3x7.5 MW
Net Rated Head	148 m
Dam	Concrete Gravity, 98.10 m long, 35 m high
Spillway	Gated Radial Sluice Spillway (3 no.of gates)
Intake	1 no. with Vertical Fixed Wheel Type Gate
Headrace Tunnel	3.20 m dia, 1990 m long, D-Shaped
Surge Shaft	8 m dia, 47 m height

Pressure Shaft	2.20 m dia, 708.90 m long
Power House	Surface
Turbines	Francis, Horizontal

- **Financial Details:**

Table 30: Funding pattern

Particular	Amount (Rs Cr)	Percentage (%)
Equity	54.62	10.76%
Loan	223.1	43.94%
Grant	229.98	45.30%
Total	**507.71**	**100.00%**

3.3.2 Riangdo Small Hydro Project (3000 KW)

- **Introduction:** The Riangdo SHP is located at Swanggre village, Shallang, West Khasi Hills. The Installed Capacity is proposed at 3MW. The total project cost is estimated at INR33.99 crore. The annual energy from the project is 17.92 MU.
- Land acquisition has been completed and tendering is under process. The project is scheduled to be completed in 3 (three) years.

Table31: Salient features of the Project:

Project Location	Shallang, West Khasi Hills District
Project Cost	Rs 33.99 Crores
Installed Capacity	3.00 MW
Design Head	135m
Design Discharge	2.52 cumecs
Annual Energy	17.92 Mu
Weir	58 m long, RCC, 1 Intake Gate
WCS	458 m long
Forebay	312.23 Sq.m
Penstock	1x1100mm dia., 390 m long
Power-House	Surface, 30mx12.5mx8m
Turbine	Francis, 3 no
Tailrace	Rectangular, 20mx2mx1.5m
Switchyard	1 no.
Completion	3 years from date of commencement

- **Financial Details:**

Table 32: Funding Pattern

Particular	Amount (INR Cr)	Percentage (%)
Equity	2.59	7.62%
Loan	11.4	33.54%
Grant	20	58.84%
Total	**33.99**	**100.00%**

3.3.3 Myntdu Leshka Stage-II HEP

Myntdu Stage-II HE Project, proposed to be located in West Jaintia Hills district of Meghalaya, is a run of the river type development downstream of existing Myntdu Stage-I (126MW) H.E. Project. The catchment area of Myntdu Stage II is 480 SqKm.

The Myntdu Stage-II H.E. Project for the Meghalaya Energy Corporation Ltd. had envisaged construction of about 44 m high concrete gravity dam with FRL at El.270 m just downstream of confluence of Myntdu and Lynriang rivers in Myntdu Basin and about 7km. downstream of Myntdu Stage-I dam. Water from the dam is proposed to be diverted to a surface power house through a 7km. long circular HRT of 5.8m dia. for power generation. The power house, proposed to be located on the right bank of Myntdu River, is near Borghat, 10km downstream of the proposed dam.

An installation of 180 MW is proposed, with 3 X 60 MW. The annual energy generation in 90% dependable year is 562.34Mu and in 50% dependable year is 737.24 MU.

3.3.4 Solar Parks

The proposed 20 MW solar park in Meghalaya is an initiative undertaken by the Meghalaya Power Generation Corporation (MePGCL) and the Solar Energy Corporation of India (SECI) and is one of the first among the North-Eastern states of the India. It is located in the Jaintia Hills District and is to be implemented over two sites, at the villages of Thamar and Suchen, distanced 8 km by road, the sites are owned by MePGCL. The power is to be evacuated as follows:

i. The 10MW Power of Thamar will be evacuated to Amlarem 33 KV Sub Station by Tapping on the existing Amlarem MLHEP-I 33KV Line at Thamar.
ii. The 10MW from Suchen will be evacuated through a new 33KV transmission in line directly to Rymbai Sub-Station which is under construction.

The system output from the proposed 20 MW plant in terms of annual energy generation is estimated to be about 30 million units. The corresponding annual capacity utilization factor (CUF) is estimated to be 17 %.

The Cost for development of the Solar Parks is INR 11.64 crores. The breakup is as follows:

i.	Cost of Land	:	**INR3.495 crs.**
ii.	Road Infrastructure	:	**INR1.136 crs**
iii.	Water infrastructure	:	**INR 0.68 crs.**
iv.	Electrical Infrastructure (Power Evacuation)	:	**INR4.13crs**

3.3.5 Umshamphu SHP (2x1.5 MW)

The Project site is at Shkentalang village (Near Jarain) on Jowai-Amlarem-Dawki Road (NH 40E) at a distance of about 20 Km from Jowai. The proposed project is located across the Umshamphu River which is a tributary of the Myntdu River. The total estimated cost of the Umshamphu Small Hydel Project (2 x 1500 kW) is INR 4870.00 Lakhs, with the Civil Works at INR 2748.81 Lakhs, the E & M Works at INR 1499.00 Lakhs, the Other Costs at INR 318.60 Lakhs and the IDC amounting to INR303.15 Lakhs.

The Project is being targeted to complete within 3 years from the date of start of the major components of the civil structure of the project.

3.3.6 Amkshiar SHP

The Amkshar Stage-I Small Hydel Project is located near Kudengrim Village under Amlarem Civil Sub-Division, West Jaintia Hills District.

The main objective of any small hydro project is to ensure more reliable power supply to the villages surrounding the project site. Similarly, the Amkshar Stage-I Small Hydel Project will ease the problems of frequent power cuts experienced by the nearby villages especially during monsoon period when the maintenance of the long transmission line from the grid supply become difficult. The project will also enable utilization of the natural potential in the neighbourhood and allow relief to the grid power source to divert the power to bigger load centres.

The Project is being targeted to complete within 3 years from the date of start of the major components of the civil structure of the project. The total project cost is estimated at INR 46.24 crore.

3.3.7 Umrina SHP Project

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

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 4.5 MW. The project cost is estimated at INR 75.08 crore.

3.4 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. There are 9 (nine) nos. of projects under Survey & Investigation works under MePGCL; namely, Umngot HEP, MLHEP-II, Mawblei HEP, Nongkohlait HEP, Selim HEP, Umngi HEP, Upper Khri Stage-II, Nongnam and Mawput HEP.

a) **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.

b) **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.

c) 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.

3.4.1 Umngot HEP (3x70MW)

The Umngot H.E. Project envisages a storage scheme (within the year storage) for generation of peak power with the setting up of a 3 x 70 MW power station on the river Umngot, a south flowing river which flows into Bangladesh with an annual energy of 708.98 MU in a 90% dependable year and 901.56 Mu in a 50% dependable year.

The Umngot H.E. Project is situated in the border of East Khasi Hills District and Jaintia Hills District of Meghalaya. The catchment area of 304 Sq.km is upto dam site, with an average inflow ranges from 70,000 Ham to 80,000 Ham. The reservoir submerges an area of 253.85 Ha upto FRL 1040m.

The compliance to the major observations of CWC on the Dam is in progress and the DPR is likely to be completed by December 2020

3.4.2 Myntdu Leshka Stage-II HEP (3x70 MW)

The Myntdu Leshka Stage-II Hydro Electric project located in West 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 236.83m.

The project with a proposed installation of 210 MW (3 x 70 MW) would afford an annual energy generation of 562.34 MU and 737.24 MU in a 90% dependable year and 50% dependable year respectively.

The S & I works of the projects is in progress and the preparation of DPR on different chapters is on full swing and is likely to be completed by Dec, 2020.

3.4.3 Mawblei HEP (2x38 MW)

The Mawblei H.E. Project was conceived by the Meghalaya Power Generation Corporation Limited envisages utilization of the waters of Wahblei for generation of hydel power. Wahblei is a tributary of Kynshi river, a south flowing river which flows into Bangladesh. It is a storage type scheme which envisages the setting up of a 2x38 MW power station. The project with the proposed installation of 76 MW would generate an annual energy generation of 277.08MU and 322.20MU in 90% & 50% dependable year respectively.

The S & I works of the projects is in progress and the preparation of DPR on different chapters is on full swing and is likely to be completed by Dec, 2021.

3.4.4 Nongkohlait HEP (2x31 MW)

The S & I works of the project is in progress and the preparation of DPR on different chapters is on full swing and is likely to be completed by Dec, 2022.

The Dam site of the proposed Nongkohlait H.E. Project is located between East and South West Khasi Hills District whereas other components fall in South West Khasi Hills District of Meghalaya. It envisages utilization of the regulated water of the proposed Umngi Project(2x31MW) and the waters of the river Umngi (own catchment) for power generation on a run- of –the river (ROR) type development. The project with the proposed installation 62 MW (2X31 MW), would afford an annual energy generation of 276.35 Gwh.

3.4.5 Selim HEP (2x40 MW)

The Selim H.E. Project is located in East Jaintia Hills District of Meghalaya. It envisages utilization of the waters of the river Myntdu for power generation. It is a run- of –the river (ROR) type development. The project with the proposed installation 80 MW (2X40 MW), would afford an annual energy generation of 315.67MU in 90% dependable year.
The S & I works of the projects is in progress and the preparation of DPR on different chapters is on full swing and is likely to be completed by March, 2022.

3.4.6 Umngi HEP (2x31 MW)

The Umngi H.E. Project is located in East Khasi Hills District of Meghalaya. It envisages utilization of the waters of the river Umngi for power generation. It is a storage type development/scheme with the setting up of a 2x31 MW power station. The project with the proposed installation of 62 MW would generate an annual energy generation of 276.42MU in 90% dependable year corresponds to about 50.90 % Plant Load Factor with a minimum peaking hour of about 4 hours during the lean season.

The S & I works of the projects is in progress and the preparation of DPR on different chapters is on full swing and is likely to be completed by Dec, 2022.

3.4.7 Upper Khri Stage-II (2x48 MW)

The Upper Khri Stage-II HE Project located in the West Khasi Hills District of Meghalaya envisages utilization of the waters of river Khri for power generation on storage type development, harnessing a head of above 290m. The project with the proposed installation of 48MW (2x24MW) would afford on annual energy generation of 165.00 MU. The location of the dam is at latitude 250 46’ 17” N and longitude 910 36’ 33” E. the nearest rail head is located at Guwahati in Assam (103.00 Km from Shillong) and nearest Airport is located at Umroi (34.00 Km from Shillong).

3.4.8 Nongnam (2x15 MW)

The Nongnam H.E. Project located in West Khasi Hills District of Meghalaya envisages utilization of the waters of river Umngi for Power Generation on storage type development, harnessing a head of about 130m.

The project with the proposed installation of 30MW (2 x 15 MW) would afford an annual energy generation of 118.92 MV.

The dam site is located at latitude 250 16' 19" N and longitude 910 28' 33.5" E. the nearest rail head is located at Guwahati in Assam (103Km from Shillong) and nearest Airport is located at Umroi (34Km from Shillong).

3.4.9 Mawput H.E. Project (2x19 MW)

The Mawput H.E. Project located in West Khasi Hills District of Meghalaya envisages utilization of the waters of Umngi for Power Generation on storage type development, harnessing of about 130m.

The project with the proposed installation of 38 MW (2 x 19 MW) would afford an annual energy generation of 146.17MV.

The dam site is located at latitude 250 16' 15.5" N and longitude 910 26' 11.8" E. The nearest rail head is located at Guwahati and airport at Umroi.

3.4.10 Survey and Investigation Works Summary

The estimated total expenditure for S&I works is Rs 83.81 crore, the break-up of which is given in the table below:

Table 33: Details of Survey & Investigation Costs

SI No.	Particulars	Project cost (Rs Cr)
1	MLHEP-II(3X70)MW	9.6
2	UMNGI(2X31)MW	5
3	UMNGOT(3X70)MW	8.35
4	SELIM(2X48)MW	7.92
5	NONGKOHLAIT(3X31)MW	5.02
6	MAWBLEI(2X37.5)MW	8.92
7	Upper Khri Stage-II HEP	13.00
8	Nongnam HEP	13.00
9	Mawput HEP	13.00
	Total S&I Works	**83.81**

3.5 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 FY 2020-21 and the third control period.

Table 34: Fund Requirement for MePGCL Works (Rs Cr)

Sl. No.	Category	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
1	Existing Plants	27.90	106.66	223.25	254.79	**612.61**
2	Upcoming Generation Plants	87.00	160.00	77.27	112.18	**436.45**
3	Investigation Survey	10.59	3.13	9.75	9.75	**33.22**
	Total Fund Requirement (Generation)	**125.49**	**269.79**	**310.27**	**376.72**	**1082.28**

Some of the schemes under implementation are scheduled to complete in FY 2020-21 and during the third control period. The same will add to existing asset base of MePGCL. The details of expected capitalization in FY 2020-21 and the third control period is given below:

Table 35: Expected Capitalization in the Control Period (Rs Cr)

Sl. No.	Category	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
1	Existing Plants	0.50	39.47	57.25	57.69	**154.90**
2	Upcoming Generation Plants/ S&I	27.97	16.84	507.71	45.63	**598.15**

Sl. No.	Category	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
	Total Capitalization (Generation)	**28.47**	**56.31**	**564.96**	**103.32**	**753.05**

3.6 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 36: CAPEX-Station wise summary

Sl No	Station	CAPEX	Funding Pattern (Rs. Cr)		
		(Rs. Cr)	Equity	Debt	Grant
Existing Stations					
1	Umiam Stage-I	77.56	69.81	7.76	
2	Umiam Stage-II	21.11	19.00	2.11	
3	Umaim Stage-III	410.77	115.08	2.36	293.33
4	Umaim Stage-IV	35.98	10.79	25.19	
5	Umtru HEP	110.50	33.00	77.00	0.50
6	Sonapani	0.34	0.10	0.24	
7	Leshka	16.31	14.68	1.63	
8	New Umtru HEP				
9	Lakroh HEP	1.54	1.39	0.15	
10	MePGCL System Protection and Communication	8.98	2.69	6.29	
11	Dam Rehabilitation and Improvement Project (DRIP)	441.00	123.48		317.52
	Sub-Total (a)	**1124.10**	**390.02**	**122.72**	**611.35**
Upcoming Generation Plants					
1	Ganol SHP	507.71	54.62	223.1	229.98
2	Riangdo SHP	33.99	2.59	11.4	20
3	MLHEP Stage-II (3x60 MW)	2069.23	113.88	248.24	1707.11
4	Solar Park (10MW each) in Suchen and Thamar	11.64	9.24	0	2.4
5	Umshamphu (2x1.5 MW)	48.7	14.61	34.09	
6	Amkshar (2x1.20 MW)	46.24	13.87	32.37	
7	Umrina (3x1.50 MW)	75.08	22.52	52.56	
	Sub-Total (b)	**2792.59**	**231.33**	**601.76**	**1959.49**
Projects under Survey & Investigation					
1	MLHEP-II(3X70)MW	9.6		0.96	8.64
2	UMNGI(2X31)MW	5		0.5	4.5
3	UMNGOT(3X70)MW	8.35		0.835	7.515
4	SELIM(2X48)MW	7.92		0.792	7.128
5	NONGKOHLAIT(3X31)MW	5.02		0.502	4.518
6	MAWBLEI(2X37.5)MW	8.92		0.892	8.028
7	Upper Khri Stage-II HEP	13		13	0
8	Nongnam HEP	13		13	0
9	Mawput HEP	13		13	0
	Sub-Total ©	**83.81**		**43.481**	**40.329**
Grand Total(a+b+c)		**4000.50**	**621.35**	**767.96**	**2611.17**

3.7 Impact of Covid-19 on Capex Works:

COVID-19 is having a massive impact on capex projects of MePGCL. The various restrictions put in place to control the effects of the virus have triggered shortages of raw material and manpower and disrupted supply chains. Construction has been halted and there has been a delay in resumption of construction works. The construction workers are staying away from work sites due to fear over corona virus infection and many of them have returned to their villages. The scenario implies that the construction works will be slow, pushing costs upward given the interest and debt servicing needed for that extra period. These disruptions can lead to possible time and cost overruns for the licensee.

3.8 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 FY2021-22 to FY 2023-24.

Annexure- A: Investment Plan for MePGCL

a) Proposed and Ongoing Renovation & Modernisation works for Existing Stations

Sl. No.	Project Details				Total capital Expenditure Approved by MSERC/ Govt/ DPR/ FI (INR Cr)	Project Outlay in FY 2020-21 (Projected) In INR Cr	Project Outlay in FY 2021-22 (Projected) In INR Cr	Project Outlay in FY 2022-23 (Projected) In INR Cr	Project Outlay in FY 2023-24 (Projected) In INR Cr	Source of financing for the scheme			
	Name of the Scheme	Nature of Project (Select Appropriate Code from below)	Project Start Date (DD-MM-YY)	Project Competition Date (DD-MM-YY)						Equity Component	Debt Component		Capital/ Subsidies/ Grant components
											Loan Amount (INR Cr)	Loan Source	
											Loan 1	Loan 1	
A	**Umiam Stage I Power Station**												
1	Replacement of Intake gate and Trash Rack of Intake structure at Umiam Stage I HEP.	c	2020-21	2022-23	3.96	0.89	2.07	1.00		3.56	0.40	State Govt.	
2	Replacement of Two penstock butterfly Valve including By-pass valve along with all servo mechanism and related control system.	c	April'21	Mar'22	6.14		2.14	4.00		5.53	0.61	State Govt.	
3	Re-engineering of firefighting system of Generator and Transformer	c	April'22	Mar'23	0.09			0.09		0.08	0.01	State Govt.	PSDF Phase 2
4	Replacement of transformer for Unit-1, Unit-2 and Unit-4.	c	April'23	Mar'24	8.73				8.73	7.86	0.87	State Govt.	
5	Construction of Transformer Yard to accommodate station service transformers, Unit-1 & Unit-3 and procurement of the same.	c	April'23	Mar'24	0.35				0.35	0.32	0.04	State Govt.	
6	Construction of Beams and By-pass Isolators for KPS-1, KPS-2 &Umiam feeders.	c	April'22	Mar'23	0.49			0.49		0.44	0.05	State Govt.	
7	132 KV SF6 Circuit Breaker (Spare)	c	April'21	July'21	0.36		0.36			0.32	0.04	State Govt.	PSDF Phase 2
8	Complete Installation of SCADA including Hardware and Software	e	April'22	Oct'22	18.12			18.12		16.31	1.81	State Govt.	PSDF Phase 2
9	Replacement of Governor and AVR system.	c	April'23	Mar'24	33.20				33.20	29.88	3.32	State Govt.	PSDF Phase 2
10	Replacement of Generator Stator Air Cooler for three Units	c	April '22	Oct'22	3.51			3.51		3.16	0.35	State Govt.	PSDF Phase 2

Sl. No.	Project Details				Total capital Expenditure Approved by MSERC/ Govt/ DPR/ FI (INR Cr)	Project Outlay in FY 2020-21 (Projected) In INR Cr	Project Outlay in FY 2021-22 (Projected) In INR Cr	Project Outlay in FY 2022-23 (Projected) In INR Cr	Project Outlay in FY 2023-24 (Projected) In INR Cr	Source of financing for the scheme			
	Name of the Scheme	Nature of Project (Select Appropriate Code from below)	Project Start Date (DD-MM-YY)	Project Competition Date (DD-MM-YY)						Equity Component	Debt Component		Capital/ Subsidies/ Grant components
											Loan Amount (INR Cr)	Loan Source	
											Loan 1	Loan 1	
11	Modification of cooling system for improvement at Stage-I Power station	c	Jan-21	Jun-21	2.62	0.92	1.70			2.35	0.26	FI	
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	c	April'22	July'22	8.99			8.99		8.09	0.90	State Govt.	PSDF Phase 2
2	Emulsifier system for Generator Transformer in both Units.	b	April'22	Mar'23	0.10			0.10		0.09	0.01	State Govt.	
3	Installation of On Line Supervisory system (SCADA) for the entire Power Station	e	Apr-23	Mar-24	9.06				9.06	8.15	0.91	State Govt.	
4	Replacement of 11 KV Switchgear Panel	c	Apr-23	Mar-24	2.72				2.72	2.45	0.27	State Govt.	PSDF Phase 2
5	132 KV SF6 Circuit Breaker (Spare)	c	April'21	July'21	0.24		0.24			0.22	0.02	State Govt.	PSDF Phase 2
C	**Umiam –Umtru Stage III Power Station**												
1	Renovation Modernisation and Upgradation of Umiam-Umtru Stage III HEPP.	c	Sept'20	Dec '24	407.40		5.31	87.62	97.46	91.50		JICA	315.90
2	Re-Engineering of 132 KV BUS.	c	April'21	Mar'22	1.50		1.50			0.45	1.05	State Govt	
3	Construction of 33 KV Bus and Bay for Outside source power supply from the existing 132/33 KV 10 MVA Transformer	C	April'21	March'22	1.87		1.87			0.56	1.31	State Govt	
D	**Umiam-Umtru Stage IV Power Station.**												
1	Automation and monitoring of MIV of the	c	April'22	Mar'23	1.06			1.06		0.32	0.74	State	

Sl. No.	Project Details				Total capital Expenditure Approved by MSERC/ Govt/ DPR/ FI (INR Cr)	Project Outlay in FY 2020-21 (Projected) In INR Cr	Project Outlay in FY 2021-22 (Projected) In INR Cr	Project Outlay in FY 2022-23 (Projected) In INR Cr	Project Outlay in FY 2023-24 (Projected) In INR Cr	Source of financing for the scheme			
	Name of the Scheme	Nature of Project (Select Appropriate Code from below)	Project Start Date (DD-MM-YY)	Project Competition Date (DD-MM-YY)						Equity Component	Debt Component		Capital/ Subsidies/ Grant components
											Loan Amount (INR Cr)	Loan Source	
											Loan 1	Loan 1	
	Generating units											Govt	
2	a) Overhauling and replacement of damaged parts of Unit-II b) Procurement of excitation transformer	c	April'21	Mar'22	5.04		5.04			1.51	3.53	State Govt	
3	Online Vibration monitoring of Generating Units	c	April'21	Mar'22	0.50		0.50			0.15	0.35	State Govt	
4	Dedicated and reliable Outside Source power supply from 132 KV Bus.	c	April'21	Mar'22	2.79		2.79			0.84	1.95	State Govt	
5	Telecommunication and Internet Facility	e	April'22	Mar'23	0.24			0.24		0.07	0.17	State Govt	
6	Supervisory Control System	e	April'22	Mar'23	8.73			8.73		2.62	6.11	State Govt	
7	Procurement of Spare Runner	c	April'21	Mar'22	6.50			6.50		1.95	4.55	State Govt	
8	Refurbishment of Stator winding of Unit 1	c	Sep-20	Aug-21	6.84	2.00	4.84			2.05	4.79	State Govt	
9	Hydraulic Power Pack with Control Panel for Butterfly Valve	C	Apr-21	Mar-22	0.80		0.80			0.24	0.56	State Govt	
10	Installation of Firefighting Scheme for Generator Stators	c	Apr-21	Mar-22	0.36		0.36			0.11	0.25	State Govt	
11	Residual Life Assessment of Power Station	e	Sep-21	Mar-23	3.12		0.78	2.34		0.94	2.18	State Govt	
E	**Umtru Power Station**												
1	Residual Life Assessment (RLA) of Umtru HEP	c	April,20	Mar,21	0.50	0.50							0.50
2	Renovation Modernisation and Upgradation of Umtru Power Station.	b	April'23	Mar,26	110.00				25.00	33.00	77.00	State Govt	

Sl. No.	Project Details				Total capital Expenditure Approved by MSERC/ Govt/ DPR/ FI (INR Cr)	Project Outlay in FY 2020-21 (Projected) In INR Cr	Project Outlay in FY 2021-22 (Projected) In INR Cr	Project Outlay in FY 2022-23 (Projected) In INR Cr	Project Outlay in FY 2023-24 (Projected) In INR Cr	Source of financing for the scheme			
	Name of the Scheme	Nature of Project (Select Appropriate Code from below)	Project Start Date (DD-MM-YY)	Project Competition Date (DD-MM-YY)						Equity Component	Debt Component		Capital/ Subsidies/ Grant components
											Loan Amount (INR Cr)	Loan Source	
											Loan 1	Loan 1	
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.	b	April,22	Aug-23	0.34			0.14	0.2	0.102	0.238	State Govt	
G	**Generation System Protection and Communication**												
1	Procurement of Diagnostic Tools, Plant & Machineries for Generation system protection division	b	April'21	May-22	2.51		1.51	1.00		**0.75**	1.76	State Govt	PSDF Phase 2
2	Installation of OPGW for communication system between Stage-3 & Stage-4, Stage-1 & Stage-2 and Umtru-New Umtru power stations including all Fibre Optic Terminal Equipments.	b	Oct-21	Dec-22	3.19		1.19	2.00		**0.96**	2.23	State Govt	PSDF Phase 3
3	Procurement of Online Oil Filtration Machine for all Generator Transformers under MePGCL.	c	Jan-22	Dec-23	2.11		0.20	1.00	0.91	0.63	1.47	State Govt	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	b	Apr-22	Dec-23	1.18			0.50	0.68	0.35	0.83	State Govt	PSDF Phase 5
H	**Dam Rehabilitation and Improvement**	b	2020-21	2026-27	441	22.0	69.8	69.8	69.82	123.4		World	317.52

Sl. No.	Project Details				Total capital Expenditure Approved by MSERC/ Govt/ DPR/ FI (INR Cr)	Project Outlay in FY 2020-21 (Projected) In INR Cr	Project Outlay in FY 2021-22 (Projected) In INR Cr	Project Outlay in FY 2022-23 (Projected) In INR Cr	Project Outlay in FY 2023-24 (Projected) In INR Cr	Source of financing for the scheme			
	Name of the Scheme	Nature of Project (Select Appropriate Code from below)	Project Start Date (DD-MM-YY)	Project Competition Date (DD-MM-YY)						Equity Component	Debt Component		Capital/ Subsidies/ Grant components
											Loan Amount (INR Cr)	Loan Source	
											Loan 1	Loan 1	
	Project (DRIP): Phase 2 and 3					5	25	25	5	8		Bank	
I	**Name of Establishment: MyntduLeshka Stage - I PS, MePGCL, Suchen**												
1	Cooling System modification & improvement @ 251 lakhs	C	Dec. 2020	May. 2021	2.51	1.00	1.51			2.26	0.25		
2	Supply and erection of spare Generator Transformer 1Ø, 17.5 MVA, 132/33 KV with accessories for Leshka Power Station		Jun-21	Apr-22	1.25		0.44	0.81		1.13	0.13	FI	
3	Replacement of Switchgear & Protection System for Leshka Power Station		Apr-22	Sep-24	10.00			3.50	6.50	9.00	1.00	FI	
4	Upgradation of SCADA for Leshka Power Station		Mar-20	Oct-21	1.40	0.49	0.91			1.26	0.14	FI	
5	Communication from Leshka Dam to LeshkaPower House		Dec-21	Jul-22	0.35		0.12	0.23		0.32	0.04	FI	
6	Replacement of Air coolers including accessories for Stator for all 3 Units for Leshka PS		Oct-22	Apr-24	0.80			0.64	0.16	0.72	0.08	FI	
J	**Lakroh Mini Hydel Project**												
1	Replacement of Generator Transformer (with 3.3/33 KV, 2.5 MVA) including augumentation of Switchyard from 11 KV to 33 KV for Lakroh PS		Nov-21	Oct-22	1.14		0.40	0.74		1.03	0.11	FI	
2	Communication for Lakroh PS with SLDC		Mar-21	Nov-22	0.40	0.06	0.26	0.08		0.360	0.04	FI	

b) Ongoing & Upcoming Plants/Solar Parks

Project Details					Total Capital Expenditure Approved by MSREC/Govt/DPR/FI (in INR Crs)	Project Outlay in FY 2020-21 (Projected) in INR Crs	Project Outlay in FY 2021-22 (Projected) in INR Crs	Project Outlay in FY 2022-23 (Projected) in INR Crs	Project Outlay in FY 2023-24 (Projected) in INR Crs	Equity Component	Source of Financing for Scheme				
											Debit Component				
											Loan Amount (INR Crs.)		Loan Source		Capital Subsidies/ Grants Component (in INR Cr)
Sl. No.	Name of Scheme	Whether the Scheme is part of Approved Business Plan (YES/No)	Project Start Date (DD-MM-YY)	Project Completion & Date (DD-MM-YY)							Loan-1	Loan-2	Loan-1	Loan-2	
1	GANOL -1		01.07.2014	May, 2022	507.71	80.00	150	55.13		54.62	100	123.1	FI	FI	229.98
2	RIANGDO		12.05.2020	May, 2023	33.99	7	10.00	12.00	4.99	2.59	11.40		FI		20.00
3	MLHEP Stage-II (3x60 MW)	No	2023-24	2029-30	2069.23				70	113.88	82.71	165.53	Market Loan	GoME	1707.11
4	Solar Park (10MW)each in Suchen and Thamar	Yes	2020-21	2023-24	11.64			1.64	7.19	9.24					2.40
5	Construction of Umshamphu hydel project (2x1.5 MW)	No	Aug-22	Jan-25	48.7			2.435	10	14.61	34.09		FI		
6	Construction of Amkshar hydel project (2x1.20 MW)	No	Sep-22	Feb-25	46.24			2.312	10	13.87	32.37		FI		
7	Construction of Umrina hydel project (3x1.50 MW)	No	Nov-22	Mar-25	75.08			3.754	10	22.52	52.56		FI		

c) Survey & Investigation projects

Sl. No.	Project Details			Total Expenditure projected (INR Cr.)	Project Outlay in FY 2020-21 (Projected in NR Cr.)	Project Outlay in FY 2021-22 (Projected in NR Cr.)	Project Outlay in FY 2022-23 (Projected in NR Cr.)	Project Outlay in FY 2023-24 (Projected in NR Cr.)	Source of Financing for Scheme						
	New H.E. Project Details								Equity Component	Debt Component				Capital Subsidies/ Grant Component (INR Cr.)	Consumer Contribution Component
	Name of Scheme	Project Start Date (DD-MM-YY)	Project Completion Date (DD-MM-YY)							Loan Amount (NR Cr.)		Loan Source			
										Loan-1	Loan-2	Loan-1	Loan-2		
1	MLHEP-II(3X70)MW	Nov,2006	2020-21	9.6	4.86					0.96		State Govt.		8.64	
2	UMNGI(2X31)MW	March,2014	2020-21	5	0.2					0.5		State Govt.		4.5	
3	UMNGOT(3X70)MW	Nov,2006	2020-21	8.35	2.37					0.835		State Govt.		7.515	
4	SELIM(2X48)MW	March,2008	2021-22	7.92	1.18	1.18				0.792		State Govt.		7.128	
5	NONGKOHLAIT(3X31)MW	March,2014	2020-21	5.02	0.05					0.502		State Govt.		4.518	
6	MAWBLEI(2X37.5)MW	Jan, 2009	2021-22	8.92	1.93	1.95				0.892		State Govt.		8.028	
7	Upper Khri Stage-II HEP	2022-23	2025-26	13.00			3.25	3.25		9.36	3.64	ADB	State Share		
8	Nongnam HEP	2022-23	2025-26	13.00			3.25	3.25		9.36	3.64	ADB	State Share		
9	Mawput HEP	2022-23	2025-26	13.00			3.25	3.25		9.36	3.64	ADB	State Share		