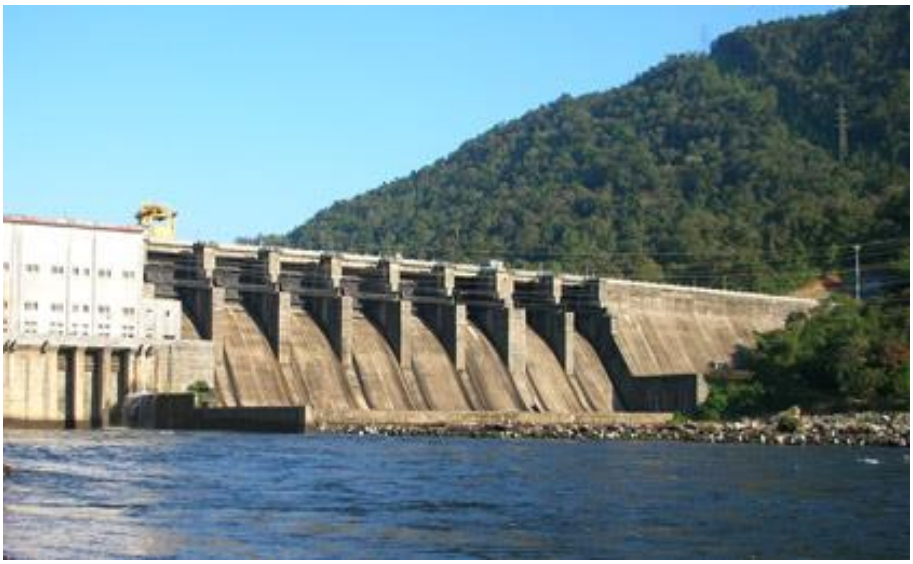
सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केंद्रीय विद्युत प्राधिकरण
Central Electricity Authority
जल विद्युत अभियांत्रिकी और प्रौद्योगिकी विकास प्रभाग
Hydro Engineering and Technology Development Division

जल विद्युत परियोजनाओं का नवीनीकरण एवं आधुनिकीकरण

अवधि 2022-27 व 2027-32 का कार्यक्रम तथा यथास्थिति



Renovation & Modernisation of Hydro Power Stations

Status/ Programme for the period 2022-27 & 2027-32

QUARTERLY PROGRESS REPORT

(October-December, 2022)

(3rd Quarter of 2022-23)

C O N T E N T S

Index of Schemes

Renovation & Modernisation (R&M) Schemes of Hydro Power Stations

Programme for the period 2022-27 & 2027-32

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Programmed for completion during 2027-32

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Remarks	Page No.
		Central	State				
Northern Region							
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RENOVATION, MODERNISATION & UPRATING OF HYDRO ELECTRIC POWER PROJECTS

BACKGROUND

Renovation & Modernisation (R&M) of the existing old Hydro Electric Projects is considered a cost effective option for retaining the operational capacity at end of its useful life by undertaking requisite R&M works to extend its operational life and also utilizing this opportunity for having uprated capacity, if feasible, by exploring the technological advancement. These type of works are also undertaken during the useful life of plant/ equipment for improvement in operational efficiency, reliability, security and on obsolescence of technology.

Recognizing the benefits of R&M of hydroelectric power projects, Govt. of India set up a National Committee in 1987 and a Standing Committee in 1998 and thereafter had identified the projects/ schemes to be taken up for implementation under R&M. The National Perspective Plan document for R&M of hydroelectric power projects in the country was also prepared in CEA during the year 2000. The status of various projects/ schemes already identified for implementation/ completion till the end of XI Plan, i.e. March, 2012 had been incorporated in the National Perspective Plan.

Achievements during VIII, IX, X, XI , XII Plan and Period 2017-22

The R&M works at 118 (26 in Central and 92 in State Sector) hydro power plants (13 up to the VIII Plan, 20 in the IX Plan, 32 in the X Plan, 18 in the XI Plan, 21 in the XII Plan & 14 during 2017-22) with an aggregate installed capacity of 22634.7 MW had been completed by the end of the year 2017-22 and total a benefit of 4139.56 MW through Life Extension (LE), Uprating (U) and Restoration had been accrued. The State-wise list of Hydro RM&U Schemes completed during VIII, IX, X, XI XII Plans and 2017-22 are given at Annex-I, II, III, IV ,V and VI respectively.

Programme during the period 2022-27

The Renovation, Modernization, Uprating and Life Extension works at 67 Hydro Electric Plants (HEPs) with an aggregate installed capacity of 11935.60 MW is programmed for completion during the year 2022-27 with its break-up as 2558.8 MW through R&M at 12 HEPs, 7405.8 MW through Life Extension at 43 HEPs and 1971 MW through Life Extension and Uprating at 12 HEPs. The 12 HEPs where both Life Extension & Uprating are envisaged, the aggregate installed capacity of 1971 MW shall get uprated after completion of R&M works to 2217.5 MW resulting in additional benefit of installed capacity of 246.5 MW. As such, the revised aggregate installed capacity after completion of RMU&LE works of these 67 projects would be 12182.10 MW. The State-wise list of hydro R&M schemes expected for completion during the year 2022-27 is given at Annex-VII.

During the year 2022-23, Six (6) Schemes with an aggregate installed capacity of about 1414.8 MW have been completed till December, 2022.

Programme during the period 2027-32

The Renovation, Modernization, Uprating and Life Extension works at 21 Hydro Electric Plants (HEPs) with an aggregate installed capacity of 2879.20 MW is programmed for completion during 2027-32 through Life Extension and Uprating. The State-wise list of hydro R&M schemes expected for completion during 2027-32 is given at Annex-VIII.

जल विद्युत परियोजनाओं का
नवीनीकरण, आधुनिकीकरण और उन्नयन

पृष्ठभूमि

संसाधनों के इष्टतम उपयोग, कुशल संचालन, बेहतर उपलब्धता सुनिश्चित करने के साथ-साथ देश में क्षमता वृद्धि (उन्नयन) करने के लिए मौजूदा पूर्वस्थापित जल विद्युत परियोजनाओं का नवीनीकरण और आधुनिकीकरण, तथा उन्नयन और जीवन विस्तार (आरएमयू एंड एलई) को एक लागत प्रभावी विकल्प माना जाता है।

जलविद्युत परियोजनाओं के नवीनीकरण और आधुनिकीकरण के लाभों को समझते हुए, भारत सरकार ने 1987 में एक राष्ट्रीय समिति और 1998 में एक स्थायी समिति का गठन किया था। इसके उपरांत आर एंड एम के तहत कार्यान्वयन आरंभ करने के लिए परियोजनाओं/योजनाओं को चिह्नित किया था। वर्ष 2000 के दौरान केंद्रीय विद्युत प्राधिकरण में देश में जलविद्युत परियोजनाओं के नवीनीकरण और आधुनिकीकरण के लिए राष्ट्रीय परिप्रेक्ष्य योजना दस्तावेज भी तैयार किया गया था। ग्यारहवीं योजना के अंत, अर्थात् मार्च, 2012 तक कार्यान्वयन/पूरी करने के लिए पूर्व में चिह्नित विभिन्न परियोजनाओं/योजनाओं की स्थिति को राष्ट्रीय परिप्रेक्ष्य योजना में शामिल किया गया था।

आठवीं योजना से बारहवीं योजना और 2017-2022 अवधि के दौरान उपलब्धियां

12वीं योजना के अंत तक 118 (26 केंद्रीय और 92 राज्य क्षेत्र में) जल विद्युत संयंत्रों (आठवीं योजना तक 13, नौवीं योजना में 20, दसवीं योजना में 32, ग्यारहवीं योजना में 18 ,बारहवीं योजना में 21, 2017-2022 के दौरान 14) जिनकी कुल स्थापित क्षमता 22634.7 मेगावाट थी में नवीनीकरण और आधुनिकीकरण का कार्य पूरा किया गया था, जिसके फलस्वरूप जीवन विस्तार, उन्नयन और पुनरुद्धार के माध्यम से 4139.56 मेगावाट का लाभ हुआ था। आठवीं, नौवीं, दसवीं, ग्यारहवीं ,बारहवीं योजनाओं और 2017-2022 के दौरान पूरी की गई जल विद्युत आरएम एंड यू स्कीमों की राज्यवार सूची क्रमशः अनुलग्नक- I, II, III, IV ,V और VI में दी गई है।

2022-27 की अवधि के दौरान कार्यक्रम

2022-27 के दौरान 11935.60 मेगावाट की कुल स्थापित क्षमता के साथ 67 जल विद्युत संयंत्रों पर नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार का काम पूरा करने के लिए कार्यक्रम बनाया गया है, जिसमे से 12 जल विद्युत संयंत्रों में 2558.8 मेगावाट की क्षमता नवीनीकरण एंव आधुनिकीकरण के माध्यम से, 43 जल विद्युत संयंत्रों में 7405.80 मेगावाट की क्षमता जीवन विस्तार के माध्यम से और 12 जल विद्युत संयंत्रों में 1971 मेगावाट की क्षमता जीवन विस्तार और उन्नयन के माध्यम से कार्य किया जाएगा। जिन 12 जल विद्युत संयंत्रों में जीवन विस्तार और उन्नयन दोनों की परिकल्पना की गई है, उनमें 1971 मेगावाट की कुल क्षमता में 2217.5 मेगावाट तक वृद्धि होगी, जिसके परिणामस्वरूप 246.5 मेगावाट स्थापित क्षमता का अतिरिक्त लाभ होगा। अत:, इन 67 परियोजनाओं की कुल क्षमता नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार (आरएमयू एंड एलई) के समापन के बाद 12182.10 मेगावाट हो जाएगी। 2022-27 के दौरान पूरी की जाने वाली जल विद्युत आर एंड एम स्कीमों की राज्यवार सूची अनुलग्नक-VII में दी गई है।

वर्ष 2022-23 के दौरान 1414.8 मेगावाट की कुल संस्थापित क्षमता वाली छह (6) योजनाओं को दिसंबर, 2022 तक पूर्ण कर लिया गया है।

2027-32 की अवधि के दौरान कार्यक्रम

2879.20 मेगावाट की कुल स्थापित क्षमता वाले 21 जल विद्युत संयंत्रों में नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार कार्य की योजना 2027-32 के लिए बनाई गई है। 2027-32 के दौरान पूरा होने वाली इन संभावित जलविद्युत आर एंड एम योजनाओं की राज्य-वार सूची अनुलग्नक -VIII में दी गई है।

Summary of R&M of Hydro Electric Projects

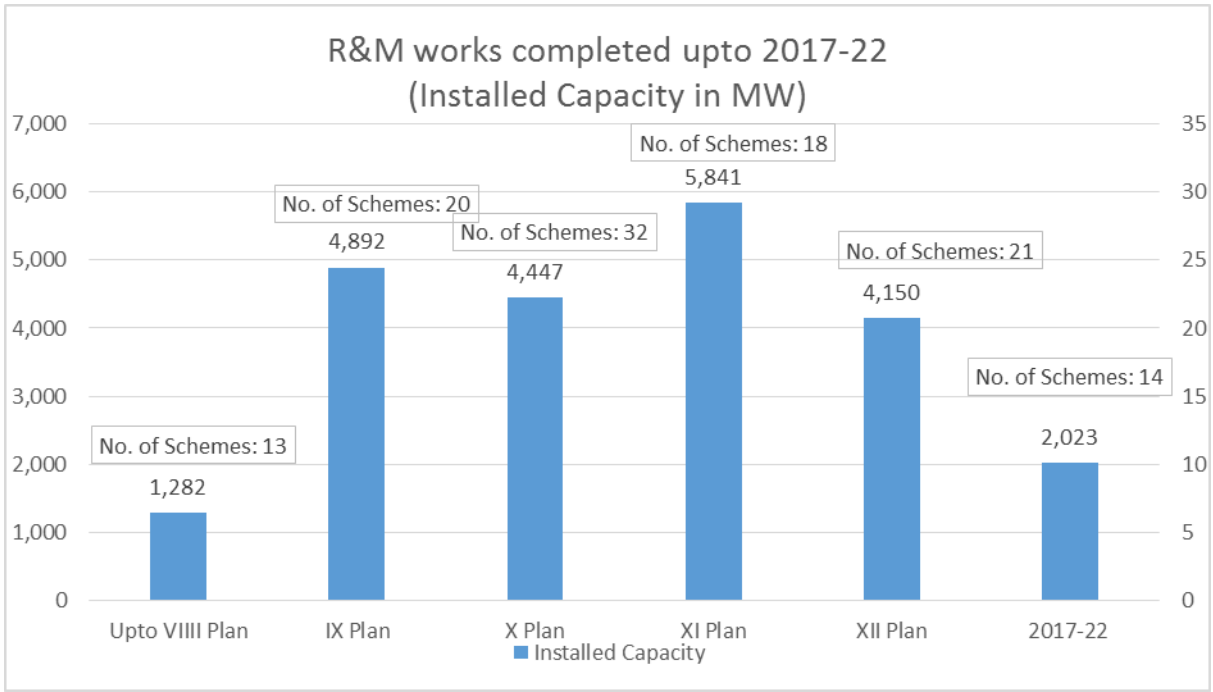
(As on 31.12.2022)

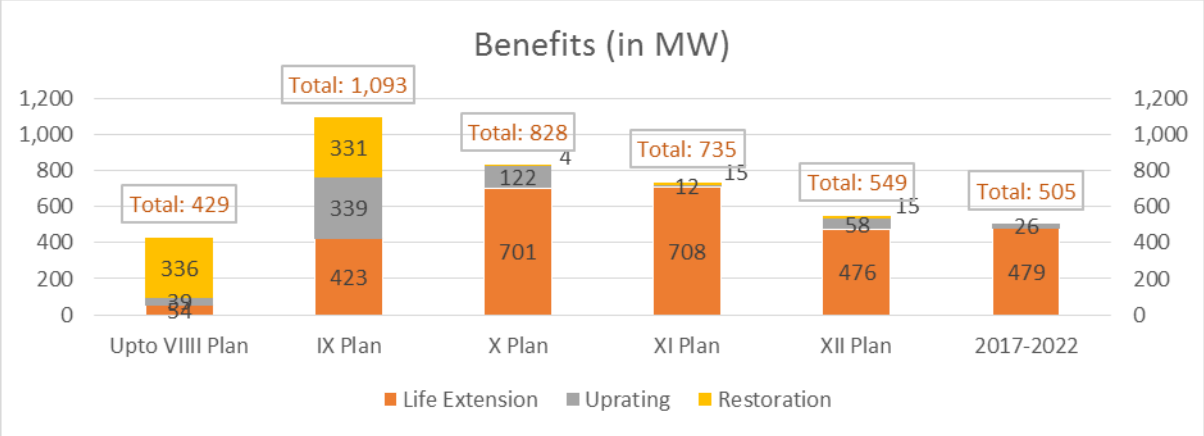
I Hydro R&M schemes completed up to 2017-22

Sl. No.	Plan Period	No. of Projects			Installed Capacity (MW)	Actual Expenditure (Rs. in Crs)	Benefit (MW)
		Central Sector	State Sector	Total			
1.	Upto VIII Plan Schemes	2	11	13	1282.00	127.37	429.00 [39.00(U) + 54.00LE+ 336.00(Res.)]
2.	IX Plan Schemes	8	12	20	4892.10	570.16	1093.03 [339.00(U)+ 423.00(LE) + 331.03(Res.)]
3.	X Plan Schemes	5	27	32	4446.60	1029.24	827.73 [122.05(U) + 701.25 (LE) + 4.43(Res.)]
4.	XI Plan Schemes	4	14	18	5841.20	294.84	735 [12 (U) + 708 (LE) + 15 (Res.)]
5.	XII Plan Schemes	2	19	21	4149.60	1146.02	549.40 [58 (U)+ 476.40 (LE)+15(Res.)]
6.	2017-2022	5	9	14	2023.2	848.68	505.4 [479.2(LE) + 26.2(U)]
	Total	26	92	118	22634.7	4016.31	4139.56 [596.25 (U)+ 2841.85 (LE)+ 701.46 (Res.)]

Abbreviations:

MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extension;





I Programme of R&M works during 2022-27

Sl. No.	Category	No. of Projects			Capacity covered under RMU&LE (MW)	Benefit (MW)
		Central Sector	State Sector	Total		
1.	Programmed	8	59	67	11935.6	9623.30 [9376.80(LE)+ 246.5(U)]
2.	Completed	0	6	6	1414.8	538 [538 (LE)+ 0(U)]
3.	Under Implementation	4	21	25	3889.75	2439.25 [2307.75(LE)+ 131.5(U)]
4.	Under Tendering	1	5	6	1633	1659 [1633(LE)+ 26(U)]
5.	Under DPR Preparation/ Finalisation/ Approval	1	5	6	836	742 [736(LE)+ 6(U)]
6.	Under RLA Studies	2	22	24	4162.05	4245.05 [4162.05(LE)+ 83(U)]

II Programme of R&M works during 2027-32

Sl. No.	Category	No. of Projects			Capacity covered under RMU&LE (MW)	Benefit (MW)
		Central Sector	State Sector	Total		
1.	Programmed	3	18	21	2879.2	2890.03 [2879.2(LE)+ 10.83(U)]
2.	Under Implementation	0	0	0	0	0
3.	Under Tendering	0	0	0	0	0
4.	Under DPR Preparation/Finalisation/ Approval	0	1	1	115	125.83 [115(LE)+ 10.83(U)]
5.	Under RLA Studies	3	17	20	2764.2	2764.2 [2764.2(LE)+ 0(U)]

Abbreviations:
MW – Mega Watt; Res. – Restoration; U – Uprating;
LE – Life Extension; RLA- Residual Life Assessment

Year-wise & State-wise Summary of Original & Anticipated Completion Schedule of R&M Schemes at Hydro Power Stations During 2022-27

Year 2022-23	Year 2023-24	Year 2024-25	Year 2025-26	Year 2026-27
Himachal Pradesh: Bhabha Power House, HPSEB, (3x40) =120 MW **(Completed in 2022-23)** **Uttarakhand:** Tiloth, UJVNL (3x30) =90 MW **(Completed in 2022-23)** **Uttar Pradesh:** Rihand, UPJVNL (6x50) =300 MW **(Completed in 2022-23)** **Karnataka:** Munirabad Dam Power House, KPCL, (2x9 + 1x10) =28 MW, **(Completed in 2022-23)** **Telangana:** i) Nagarjuna Sagar Ph-II, TSGENCO, (1x110+7x100.8) =815.6 MW (2022-23) **(Completed in 2022-23)** ii) Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)=61.2 MW (2024-25) **(Completed in 2022-23)**	**Himachal Pradesh:** Bhakra LB, BBMB, (5x108) =540 MW (2023-24) **Uttar Pradesh:** Obra, UPJVNL (3x33) =99 MW (2023-24) **Punjab:** Ranjit Sagar Dam, PSPCL, (4x150) =600 MW (2023-24) **Uttarakhand:** Dhalipur, UJVNL (3x17) =51 MW (2023-24) **Karnataka:** i) Gerusoppa Dam Power House, KPCL (4x60) =240 MW (2023-24) ii) Linganamakki Dam Power House, KPCL (2x27.5) =55 MW (2023-24) **Jharkhand:** Panchet U-1, DVC, (1x40) =40 MW (2023-24) **Assam:** Kopili Power Station, NEEPCO (4x50)=200 MW (2023-24)	**Himachal Pradesh:** Giri, HPSEB, (2x30) =60 MW (2024-25) **Karnataka:** i) Shivasamudram, KPCL, (6x3+4x6) =42 MW, (2024-25) ii) Kadra Dam Power House, KPCL (3x50) =150 MW (2024-25) iii) Kodasalli Dam Power House, KPCL (3x40) =120 MW (2024-25) iv) Supa Dam Power House, KPCL (2x50) =100 MW (2024-25) **Kerala:** i)Kuttiyadi, KSEB, (3x25) =75 MW (2024-25) ii) Sabarigiri, KSEB (Unit-6) (1x60)=60 MW (2024-25) **Tamil Nadu:** i)Kodayar PH-I, TANGEDCO (1x60) =60 MW (2024-25)	**Uttarakhand:** i)Dhakrani, UJVNL, (3x11.25) =33.75 MW, (2025-26) ii)Chilla Ph B, UJVNL (4x36)=144 MW (2025-26) **Gujarat:** Kadana PSS, GSECL (4x60) =240 MW (2025-26) **Madhya Pradesh:** i)Pench, MPPGCL, (2x80) =160 MW, (2025-26) **Andhra Pradesh:** i) Tungabhadra Dam, APGENCO, (4x9) =36 MW (2025-26) ii) Hampi Canal PH, APGENCO, (4x9) =36 MW (2025-26) iii) Nagarjunasagar Right Canal Power House, APGENCO (3x30)=90 MW (2025-26)	**Jammu & Kashmir:** Salal Stage-I (Unit 1,2 &3) NHPC (3x115)=345 MW (2022-27) **Himachal Pradesh:** Pong Power House, BBMB, (6x66) =396 MW (2026-27) **Punjab:** i) Anandpur Sahib, PSPCL, (4x33.5) =134 MW (2022-27) ii) Mukerian St.I, St.II, St.III & St.IV, PSPCL, (3x15, 3x15, 3x19.5& 3x19.5) =207 MW (2022-27) iii) Shanan, PSPCL, (1x50+4x15) =110 MW (2022-27) iv) UBDC St.I & St.II, PSPCL, (3x15+3x15.45) =91.35 MW (2022-27) **Uttarakhand:** i) Ramganga, UJVNL (3x66)=198 MW (2022-27) ii) Kulhal, UJVNL (3x10)=30 MW (2022-27) **Rajasthan:** Rana Pratap Sagar, RRVUNL, (4x43)=172, (2026-27)

Year-wise & State-wise Summary of Original & Anticipated Completion Schedule of R&M Schemes at Hydro Power Stations During 2022-27

Year 2022-23	Year 2023-24	Year 2024-25	Year 2025-26	Year 2026-27
		ii) Moyar PH, TANGEDCO (3x12) =36 MW (2024-25) **West Bengal:** Maithon (U 1& 3), DVC, (2x20) =40 MW (2024-25) **Odisha:** i)Balimela, OHPC, (6x60) =360 MW (2024-25) ii) Hirakud-I (Burla), OHPC,Unit 7 (1x37.5 MW)=37.5 MW (2024-25) iii) Rengali, OHPC (5x50 MW)=250 MW (2024-25) iv) Upper Kolab, OHPC (4x80 MW)=320 MW (2024-25) **Assam:** Khandong Power Station, NEEPCO (2x23)=46 MW (2024-25)	**Karnataka:** i) Nagjhari U-1 to U-3, KPCL, (3x150) =450 MW, (2025-26) ii) Sharavathy Generating Station, KPCL (10x103.5) =1035 MW (2025-26) **Manipur:** Loktak, NHPC, (3x35) =105 MW (2025-26)	**Madhya Pradesh:** i) Bansagar Ton-I, MPPGCL, (3x105)=315 MW (2026-27) ii)Bargi, MPPGCL, (2x45)=90 MW (2026-27) **Maharashtra:** i) Vaitarna, MSPGCL (1x60)=60 MW (2026-27) ii) Koyna Dam foot (Right Bank), MSPGCL (2x20)=40 MW (2026-27) iii) Koyna St-3, MSPGCL (4x80)=320 MW (2026-27) iv) Tillari, MSPGCL (1x60)=60 MW (2022-27) v) Bhira Tail race, MSPGCL (2x40)=80 MW (2022-27) **Andhra Pradesh:** i) Upper Sileru Power House, APGENCO (4x60)=240 MW (2026-27) ii) Machkund St.I & St.II, APGENCO, (3x17+3x23) =120 MW (2026-27) iii) Lower Sileru, APGENCO, (4x115) =460 MW (2026-27) **Kerala:** i) Idukki 2nd stage, KSEB,

Year-wise & State-wise Summary of Original & Anticipated Completion Schedule of R&M Schemes at Hydro Power Stations During 2022-27

Year 2022-23	Year 2023-24	Year 2024-25	Year 2025-26	Year 2026-27
				(3x130) =390 MW (2022-27) ii) Sabarigiri, KSEB (Unit-1,2,3 & 5) (4x55)=220 MW (2022-27) iii) Idamalayar, KSEB (2x37.5)=75 MW (2022-27) **Karnataka:** MGHE, KPCL, (4x21.6+4x13.2) =139.2 MW (2026-27) **Telangana:** Pochampad HPS Stage -1, TSGENCO, (3x9) =27 MW (2026-27) **Tamil Nadu:** Kodayar PH-II, TANGEDCO (1x40) =40 MW (2026-27) **Jharkhand:** Subernrekha, JUUNL, (2x65) =130 MW (2022-27) **Meghalaya:** i) Umium St.III (Kyrdemkulai), MePGCL (2x30)=60 MW (2022-27) ii) Umium-umtru St.IV, MePGCL (2x30)=60 MW (2022-27)
1414.8 MW (6 Schemes)	**1825 MW (8 Schemes)**	**1756.5 MW (15 Schemes)**	**2329.75 MW (10 Schemes)**	**4609.55 MW (28 Schemes)**

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

NORTHERN REGION

JAMMU & KASHMIR **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies				
1.	**Salal Stage-I (Unit 1, 2 & 3)** 3x115 MW NHPC Nov 1987 T&G – BHEL **RM&LE** **2022-27**	**345 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	The RLA Studies shall be taken up during 2023-24.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

NORTHERN REGION

HIMACHAL PRADESH **(Amount in Rs. Crores)**

S. No.	Scheme / Category/ Completion Schedule	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES COMPLETED				
2.	**Bhabha Power House,** 3x40 MW HPSEBL 1989 T&G - BHEL **RM&LE** **2017-18** **2022-23**	**120 (LE)** 90.14 43.01	• Rehabilitation of Generator of Unit-1.	• Unit No.1 was earlier commissioned on 10.07.2016 but due to over speeding, stator winding was damaged & machine again stopped on 25.09.2016. Rehabilitation works completed by M/s BHEL and Unit re-commissioned on 04.12.2017 but tripped on 28.01.2018 due to internal fault. The machine has been re-commissioned on 09.03.2018 after rectification of fault by BHEL. • During execution of the rehabilitation works of Unit-1, it was found by M/s BHEL Engineers that the Nozzle servomotors of all machines need to be replaced and same has been awarded on 28.03.2017. The Nozzle Servomotors of all Units commissioned.
			• Replacement of Electro-Hydraulic Transducer (EHT) with handle, Main Distribution Valve (MDV) spool & sleeve assy., Pilot needle & sleeve assy., Duplex filter element only (inner & outer sleeve), Solenoid valve (Size 10) of MIV Hydro Control Panel (HCP), Pilot operating main distributing valve type for MIV HCP, NRV of PP Set, Nozzle Servomotors & Drain Pipe Lines Route of Decompression Valve & Seal Valve of MIV.	• Works completed.
			• Replacement of three (3) nos. Digital governors including oil pumping unit, pressure tank &sump tank, valves & piping to form an individual pressure system for each governor.	• The work of dismantling & replacement of existing Electro-Hydraulic Governor, excitation system, Unit Control board, Providing Control & Monitoring (SCADA) system and Power

			• Replacement of three (3) nos. Static Excitation and Digital AVR systems complete with accessories, equipment, devices, instruments, cabling and wiring etc. including all services, labour, tools and tackles in all respects. • Replacement of Unit Control Boards and providing control & monitoring system (DCS based SCADA) complete with accessories, equipment, devices, instruments, cabling and wiring etc. including all services, labour, tools and tackles in all respects. • Supply, laying, termination of all associated power and control cables for the above systems. • Supply of 2 nos. Forged Fabricated Pelton Runners (Spares Without coating) having 21 buckets suitable for single runner turbine with two jets developing 41240 KW (55282 HP) at a rated net head of 887.20 mtr and design discharge of 5.67 cumecs per unit.	& Control cables awarded to M/s. GE Power India Ltd. on 19.07.2018 and has been completed. • The tender has been awarded to M/s. Voith Hydro Pvt. Ltd. on 04.07.2019. The runners have been received in Feb., 2021. One runner installed during March, 2021 and second runner kept as spare.
B - SCHEMES ONGOING – Under Implementation				
3.	**Bhakra LB,** 5x108 MW BBMB 1985 5x90 MW (Original) 1960-61 **RMU&LE** **<u>2016-17</u>** **2023-24**	**540(LE)+ 90(U)** 489.77 570.38	**Turbine** Replacement of runners, guide vanes, guide vane operating mechanism, GV pads, turbine shaft sleeve and coupling cover, head cover, shaft sealing box. Governor oil pr. Motor pump, aeration pipe, instrument panel etc. **Generator** Replacement of stator winding, stator core and frame assembly, rotor pole assembly, thrust collar, air coolers, thrust bearing pads, upper and lower guide bearings, upper and lower bracket, braking system, generator temp. monitoring panel, excitation system, slip ring, NGT etc. **Auxiliaries** Control & Protection panels, Generator Transformers, Bus Bars with CTs, PTs etc. LAVT cubicle, switchyard equipments, control cables etc.	- Works awarded to consortium led by M/s Sumitomo Corporation, Japan (with other members i.e. M/s Hitachi Ltd. Japan and VA Tech Hydro, Gmbh, Austria) on 27.10.2007. - Contract agreements were signed on 02.11.2007 at a total cost of Rs. 489.77 Crores (including Rs. 29.57 Crores towards replacement of turbine & generator shafts). **<u>Unit 2</u>** - Works started from. 26.4.2010, with scheduled completion period of 210 days. The unit was synchronized on 23.06.2013. - Regarding localized cavitation, the modification of runner blade profile through solid piece welding carried out at the site by 10th June, 2016. - Unit was taken on shutdown for the joint inspection of modified runner on 20.11.17

				after 2203 hours of operation at high head range (Total 9187.15 hours) by M/s Hitachi and BBMB. "No cavitation" has been observed on the modified portion at the leading edge of crown side of all the 17 nos. blades. The modification of runner has been found successful and has been approved by Board on 19.11.2018. BBMB issued TOC to consortium on 29.11.2018. **<u>Unit 5</u>** - Based on CPRI report, it has been decided that spare new Generator Shaft shall be used on Power House Unit no. 5. - Order placed on M/s Andritz Hydro GmbH, Austria on 14.10.2016 for replacement of existing spider, rim and other related parts along with replacement of existing generator shaft with new Generator Shaft. -The box up completed on 04.06.2018 after various activities viz assembly of LGB, UGB, TGB & Thrust bearing and other related works. Machine put on continuous load run for 72 hours on 12.06.2018. Unit commissioned on 15.06.2018. - M/s. Hitachi, Japan proposed to modify the runner blade profile of Unit-5 through solid piece welding as done in Unit-2 w.e.f. 01.03.2020, but due to recent COVID-19 situation, Japanese Nationals could not be allowed to visit India as per GOI guidelines. - M/s Hitachi specialized team from Japan reached site on 21.3.22 to carry out the work of modification of runner blade profile of this Unit which has been completed on 9.5.2022. The Unit was commissioned after modification of runner profile on 16.5.22. TOC issued by BBMB for this Unit on 27.06.2022

				Unit 4 BBMB along with M/s Hitachi carried out inspection (after completion of 11,200 hours of operation) on 22nd September, 2017 and observed cavitation on leading edge area of the runner almost the same. M/s Hitachi recommended to carry out unrestricted operation of the machine upto September, 2018 without cavitation repair. M/s Hitachi has completed the work for Modification of runner blade profile through solid piece welding on 18.05.2019. Unit is running with output of 126 MW. BBMB issued TOC of the Unit-4 to the consortium on 23.07.2019. **Unit 3** Unit taken on shutdown for RM&U works on 01.04. 2019. Work of Stator Assembly of Unit No. 3 in the service bay started on 22nd January, 2019. Stator frame segments joined and Final welding of sole plates with the stator frame completed. The work of dovetail bar completed on 11.03.2019 and core flux test of stator core completed successfully on 08.04.2019. The placement of bottom bars to the stator slots has been started on 25.04.2019 and completed on 05.05.2019. The HV test on bottom bars carried out successfully on 13.05.2019 and on Top bars on 25.05.2019. The work of stator terminal assembly completed on 23.07.2019. The Turbine runner along with shaft has been taken out from the pit on 17.05.2019. The High voltage test of complete stator winding carried out on 24.07.2019. Shaft decoupled from the runner on 29.05.2019. The NDT of turbine shaft carried out successfully by 13.06.2019. The work of positioning of new guide vanes to their respective location completed on

				23.08.2019. Final lowering of shaft with new runner into the pit carried out on 06.09.2019. Shaft free activities achieved on 30.09.2019. The lower bracket has been lowered into pit on dated 04.10.2019. The stator has been lowered into pit on dated 21.10.2019. The work of upper bracket assembly completed on 09.07.2020 & lowering has been completed on 12.08.2020. The work of rotor lowering completed on 29.07.2020. Final assembly of spider cover completed on 17.08.2020. Floor segment trial assembly, thrust pad assembly and thrust collar assembly completed on 19.08.2020. The assembly inside pit has been completed on 14.09.2020. The uncoupled run out checks, radial displacement & coupling gaps and upper bracket alignment of the rotor has been completed on 30.09.2020. Final measurement of runner gap, coupling of turbine shaft with generator shaft alongwith shaft locking were completed 21.04.2021. Commissioning the turbine part of the unit viz painting of servomotor pipes and draft tube man doors completed on 09.06.2021. Unit has been taken on trial run on 30.09.2021. The commissioning of the unit completed on 26.11.2021 and unit handed over to BBMB after completing 14 days full load trial run for commercial operation on 09.12.2021. Unit is running with output of 126 MW. **<u>Unit 1</u>** Works delayed due to COVID-19 situation. The work of stator stacking completed on 13.3.2021. The unit has been taken on shut down and handed over to consortium for carrying out RM&U works on 15.12.2021 & but due to leakage in penstock gate, the dismantling

				of the unit by consortium started after repair of gate on 10.01.2022. Due to single crane operator available at site, M/s. Hitachi started the dismantling work on 30.3.2022. Guide vanes and Runner taken out on 8.4.22. NDT of Turbine shaft and head cover carried out w.e.f 26.4.22 to 29.4.22. NDT of Generator shaft carried out w.e.f 4.4.22 to 5.4.22. NDT of rotor spider started on 22.4.22 and completed on 27.4.22. Site Machining started on 7.5.22 and completed by M/s. Hitachi on 2.6.22. The assembly of Runner on Generator floor by M/s Hitachi completed on 27.5.22. Drilling on liners completed on 03.07.2022. Shot blasting and painting of spiral case completed on 24.6.2022. Shaft free achieved on 16.09.2022. The shaft matching works completed by M/s Andritz Hydro on 29.10.2022. The assembly works rotor under Progress and R, M&U works are expected to be completed by May, 2023.
C - SCHEMES ONGOING – Under Tendering				
4.	**Giri, 2x30 MW HPSEBL 1978 T&G - BHEL RM&LE <u>2022-23</u> 2024-25**	**60 (LE)** 440.12 Nil	Brief description of work proposed to be undertaken are as given below: - **1. Civil works:** Repair of power house building & Control Room area and Tail Race Channel. Restoration of Flexible apron, protection works on left bank of upstream side of barrage. Replacement of Spherical roller bearing of spillway gates. Improvement of trash rake, stop logs. Centralized Control of operation of barrage gates from Barrage control room. Strengthening of civil works at 132 kV Switchyard. **2. Mechanical works:** Replacement of Guide vanes with stainless steel guide vanes of Unit -1, Overhauling of MIV, Add. Penstock gate in Surge Shaft, Replacement of Governors with modern digital governors, Revamping of Cooling water system, Provision of online discharge measurement and head	Revised scheme amounting to Rs.139.80 crore has been framed on the basis of negotiated rates offered by M/s BHEL (OEM) for EM equipment's& balance plant items. Revised administrative approval for Rs. 139.80 Cr. accorded on 30.12.2015. HPERC has accorded 'in principle' approval on 23.05.2017. PFC has funded the scheme on dated 18.05.2020. Revised scheme has been prepared to cover the scope of additional items which were not covered in earlier schemes. Administrative approval amounting to Rs. 440.123 Cr is

			measurement for both machines, replacement of penstock drainage valves and pipes, 3 Nos. new Francis runner (2+1 spare) with high efficiency ranging from (18 to 33) MW capacity. **3. Electrical works:** Replacement of 11 KV PILC cable with bus duct, Overhauling of 2x40 MVA, 11/132kV Generator Transformers and Unit Auxiliary Transformers, Replacement of Control and Protection panels, Replacement of rotor field windings with class "F" insulation and complete Overhauling of Generators, Replacement of semi-static exciter system by static excitation system. Replacement of ABCBs with SF6 breakers, Replacement of 33 kV MOCB with SF6 breaker, Replacement of Batteries and battery charging system, Aug. of 16/20 MVA, 132/33 kV Transformer into 25/31.5 MVA etc.	accorded by HPSEBL on 12.08.2022 Funds are being tied up from PFC for revised scheme. Approval of Hon'ble HPERC for revised scheme is awaited.
D - SCHEMES ONGOING – Under RLA Studies				
5.	**Pong Power House,** 6x66 MW BBMB 1977-83 T&G-BHEL **RMU&LE** **2026-27**	**396 (LE) + 54 (U)** 402 -	Hiring a consultant to finalise EPC contractor for carrying out RM&U along with Life Extension of 6 Units.	NIT No. 492/PHD/Pong- 359 dated 23.02.2022 has been floated on e-proc. punjab.gov.in and Part-I of the Tender has been opened on 23.06.2022 and bids under scrutiny. Memorandum shall be sent for FLPC (Field Level Purchase Committee) shortly.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

NORTHERN REGION

PUNJAB (**Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation				
6.	**Ranjit Sagar Dam,** 4x150 MW PSPCL 2000 T&G – BHEL **R&M** **2023-24**	- 95.48 8.52	1. Installation and commissioning of Electro Hydraulic Governor capable of Restricted Governing Operation Mode (RGMO). Procurement of 2 no. high pressure compressors.	1. PO placed on M/s BHEL on 04.12.2018. Material received at site. Old governors of Unit No. 1, 3 and 4 have been replaced. Fine-tuning of Unit#2 is under process.
			2. Replacement of existing old Auto Sequencers & AVR with Unit Control System compatible with SCADA application.	2. T.E.no. 281/HPs/ED-II/RSD-104 dt. 21.12.2021 has been opened on 26.05.2022 following 3 firms have participated: 1. M/s BHEL 2. M/s. Flovel & 3 M/s. ABB. The technical evaluation is under process.
			3. Procurement of T&P (Digital Insulation Tester).	3. Material has been received and work completed.
			4. Replacement of 220 KV Circuit Breakers of 7 nos. feeders.	4. Approval has been accorded by PPC/HPs vide UO.No.69 dtd.17.01.2022. NIT has been pre-audited by AO (P), SPK vide UO no. 257 dt. 01.07.2022. Tender Enquiry is under progress.
			5. R&M of emulsifier system of Generator Transformer and CO2 system.	5. T.E No. 02/O&M/2021-22 DT. 03.06.2021 floated online for the work of R&M of emulsifier system of GTs by Dy.CE/RSD office. Purchase order issued to M/s Mehta Consultant Vadodara For procurement of CO_2 system for Generator, T.E dt. 14.12.2021 has been floated online with date of opening is 22.04.2022. The price bids of 2 nos. firms i.e M/s Safe N Secure Fire System Pune & M/s Advent Electric Technologies Pvt. Ltd. Delhi were opened on dated 02.09.2022 and purchase proposal is under process.
			6. Capital maintenance of Unit 2.	6. May be deferred to next control period.
			7. Renovation of AC plants.	7. W.O dt. 30.06.2020 has been issued to M/s Jamalpur Co-Op.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				L&C Society Ltd for dismantling of 3x52 Ton central AC unit UCB-II from GNDTP Bathinda & Re-installation at RSPP. Now the budgetary offer has been taken from M/S Blue star for repair of these AC Units and case file is under process.
			8. Providing additional portable dewatering pump set.	8. Joint inspection was carried out by ASE/MMC & irrigation department for suitability of submersible pump instead of portable pump on 09.02.2022. But competent authority of WRD hasn't accorded approval yet.
			9. Capital Maintenance of Unit 3.	9. Case under preparation by site office.
			10. Up-gradation of HP compressors of condenser mode operation.	10. Erection & Commissioning has been completed.
			11. Replacement of drainage pumps of unit bay side 2.	11. PO dt. 18.03.2021 amounting to Rs.1.195 Cr. issued to M/s Hydraulic Engineering Company, Solan for pumps of RSD, UBDC & MHP. Material received at site and Commissioned.
			12. Capital Maintenance of Unit-1. (Replacement of runner disc to be carried out)	12. PO placed on M/s BHEL on 30.07.2019 for runner disc replacement. Work completed.
			13. Replacement of flow meters.	13. PO dt. 12.11.2021 has been placed on M/S JPS Engineer Chandigarh. Material has been supplied by the firm on dt. 20.04.2022. Flow meter has been installed on Unit no.2 and minor work is pending on unit no.2. Flow meters are yet to be installed on unit no.1, 3 & 4.
			14. Replacement of drainage pumps of service bay side-2.	14. Case under preparation by site office.
			15. Construction of Porches over all entry points of Power House Building.	15. Case under preparation by site office.
			16. Providing Detachable scaffolding set for Power Plant Maintenance.	16. Case under preparation.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			17. Procurement of 11/0.415kV, 1250kVA, Dry type Station Service Transformers.	17. PO dt. 20.04.2021 issued to M/s AMES IMPEX GUJARAT, against TE dated 11.10.19. Material received at RSD site.
			18. Procurement of 4 nos. Magnetic Float Level Indicators with switching contacts.	18. Work completed. (BHEL).
			19. Replacement of defective fire alarm panel other accessories (work being executed by site).	19. Work completed.
			20. Replacement of valves of Power House.	20. Case file is under process by site office.
			21. Overhauling of 3 nos. GTs out of 12 nos.	21. WTDs accorded Administrative approval for the Capital overhauling of 3no. GTs, Work has been executed departmentally from grid Construction Divn., Amritsar. Out of 3 No., GT's. Work of 1 no. GT out of 3 has been completed. Permission sought vide memo no. 1687/90 dt.10/06/2022 for shifting of next GT from RSD to Verpal for capital overhauling.
			22. Overhauling of semi gantry crane and EOT Crane.	22. Case under preparation by site office
			23. Replacement of 2 no. service compressors.	23. Case under preparation by site office.
			24. Design, manufacturing, testing supply, supervision of erection & commissioning of 1 no. 62.5MVA, 13.8/220/√3 kV single phase GT.	24. PO-cum-Contract Agreement No. 89 /HPs/ED-II//RSD/O&M-4268, VOL-II Dt. 21.09.2021 has been placed on BHEL. The supply of material shall be completed within 16 months from the date of placement of PO cum work order or approval of drawings whichever is later. Main GT Drawings submitted by BHEL are approved nd stage inspections are under process.
			25. Procurement of Transformer oil BDV testing set	25. PO cum CA dt. 26.11.2021 issued to M/s The Motwane Manufacturing Company

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				Private Limited, Nasik. Delivery Material is received at site.
			26. Replacement of one oil filtration set (Make: Alpha Laval)	26. Case under preparation by site office.
			27. Supply, Installation, Testing & commissioning of two float cum boost chargers of 220V Battery Bank for 4X150MW Ranjit Sagar Dam Powerhouse, Shahpur Kandi.	27. PO dt. 03.12.2021 issued to M/S Statcon Energiaa Noida. The material is received at site.
			28. R&M of LP Compressors Make: ELGI working Pressure: 7 kg/cm2	28. Case under preparation by site office.
			29. Up-gradation of five HP compressors of condenser mode operation	29. Case under preparation by site office.
			30. Procurement of transformer oil filtration set 6000 LPH.	30. Administrative approval under process.
			31. R&M of two 24 Volts float cum booster battery chargers	31. Case under preparation by site office. Administrative approval is under process
			32. Overhauling of next three GTs (out of twelve)	32. May be deferred to next control period.
			33. R&M of two PP sets oil pumps. (Make: Tushako)	33. Case under preparation by site office.
			34. Design, Manufacturing, Testing, Supply, Delivery & Commissioning under firm's supervision for 2 nos. Tubular Battery Banks of 220 V, 2000 AH in SAN Containers.	34. Batteries commissioned successfully by M/s Exide Ltd, Delhi at Rs. 78.321 Lacs.
			35. Supply, Installation, Testing & commissioning of two float cum boost chargers of 220V Battery Bank for 4x150MW Ranjit Sagar Dam Powerhouse, Shahpur Kandi.	35. PO No. 95HPs/ED-II/RSD-103 dt. 03.12.2021 issed to M/S Statcon Energiaa Noida. The delivery period is 4 months from the date of issue of PO. On dated 04.07.2022, the inspection call given by the firm.
B - SCHEMES ONGOING – Under RLA Studies				
7.	**Anandpur Sahib Hydel Project – I&II, 4x33.5 MW**	134 (LE)	Studies for Renovation, Modernization & Uprating (RMU) & Life Extension (LE) work of 4x33.5 MW Hydro Generating Machines of	T.E No. 286/ASHP/ DPR was floated and 3 no. bids have been received from: i) M/s Mecon Ltd Ranchi

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
	(2x33.5 MW PH-l ,2x33.5 MW PH-II) PSPCL 1985-86 T&G – BHEL **RM&LE** **2022-27**		Anandpur Sahib Hydel Project - Preparation of DPR including measurement of input energy parameters (head, discharge etc), Scope of work, Technical Specifications & Tender Document.	ii) M/s WAPCOS Ltd. New Delhi iii) M/s CBIP New Delhi Technical and commercial evaluation is under process.
8.	**Mukerian HEP,** 3x15 MW (St.-I), 3x15 MW (St.-II), 3x19.5 MW (St.-III) & 3x19.5 MW (St.-IV) PSPCL 1983 (St.-I), 1988-89 (St.-II), 1989 (St.-III) & (St.-IV) T&G - BHEL **RM&LE** **2022-27**	207 (LE) 2.5 -	Preparation of feasibility studies for uprating, study of available input energy, head & discharge, preparation of DPR as per latest CEA guidelines, preparation of complete Scope of Work & Technical Specification, Bid/Tender stage Document	Administrative approval to carry out RLA & RMU study has been accorded by WTDs. Following 3 no. tenders were received and opened on 06.12.2022 against TE no. 296 dated 28.10.2022: i) M/s Tata Consulting Engineers Limited., Mumbai ii) M/s Mecon Ltd. Ranchi. iii) M/s WAPCOS Ltd., New Delhi . Tender under technical and commercial evaluation
9.	**Shanan HEP,** 4x15 MW+1x50 MW PSPCL 1932(U1 to U4) T - Ganz Mavag, Hungary G – BTH, UK 1982 (U5-extn) T&G - BHEL **RM&LE** **2022-27**	110 (LE) 8.02 -	To conduct RLA studies, detailed feasibilities studies and preparation of Detailed Project Report along with specifications for :- a) up-rating of 4x15 MW & 1x50 MW machines, b) rehabilitation & uprating of House Generator Set of 648 KVA , c) Setting up a mini/ small hydel power plant at existing head works at Barot, PSPCL, Joginder Nagar(H.P.).	Administrative approval to carry out RLA & RMU study has been accorded by WTDs. Two number of tenders were received and opened on 09.11.2022 against TE no. 287 dated 30.05.2022: i). M/s Sharp Hydro Engineering Pvt. Ltd. ii). M/s WAPCOS Ltd., New Delhi. Tender under technical and commercial evaluation.
10.	**UBDC St.I & St II,** 3x15 MW (St.-I) & 3x15.45 MW (St.-II) PSPCL 1971-73 (St.-I) & 1989-92 (St.-II) St. I T&G-AEI, UK St.-II T&G-BHEL **RM&LE** **2022-27**	91.35 (LE) 1.71 -	RLA and RMU Study of UBDC Stage-I Power Houses and preparation of DPR, Technical Specs and commercial Specs.	Administrative approval to carry out RLA & RMU study has been accorded by WTDs. TE 288 dated. 30.06.2022 dropped on due to prices offered by the L-1 firm found on very much higher side. Fresh TE no. 297 floated on 01.12.2022 with due date of opening as 11.01.2023.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

NORTHERN REGION

UTTARAKHAND **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES COMPLETED				
11.	**Tiloth,** 3x30 MW UJVN LTD. 1984 T&G – BHEL **RM&LE** **2019-20** **2022-23**	**90(LE)** 384.66 171.27	-Refurbishment of turbine, three nos new runners& one spare runner, new sets of guide vanes. Repairing of various gates and gantry cranes. -Refurbishment of generators with new class F insulated stator & rotor winding. New SEE, Replacement of ABCBs by SF6 breakers, 11 kV Switchgear. Installation of numerical type protection system. -Civil works of barrage, power channel, power station & Tail race channel.	Agreement for Rs.139.9 Cr. signed with M/s Andritz Hydro Pvt. Ltd (AHPL) on 14.12.2016. **Works Completed** **Unit 1** • Unit-1 (Machine 1) has been successfully synchronized with grid at a load of 30 MW on 21.03.2020. All parameters were found ok. After successful 72 hour trial run, Unit has been taken over by UJVNL for further commercial operation. Commissioning date : 17.04.2020 **Unit 3** • Dismantling of MIV of machine No. 2 started on 04.03.2021 and completed on 13.03.2021. • Bulk Head installation completed on 16.03.2021. • Installation of refurbished MIV of machine no. 3 completed on 25.03.2021. • MIV of machine No. 2 transported to M/s AHPL works, Prithla for refurbishment on 13.04.2021. • RMU works of machine no. 3 (2nd unit under RMU) completed and machine boxed up on 18.06.2021. Machine successfully test synchronized with grid on 30.06.2021. • Load Rejection Test, bearing heat run test etc. successfully completed up to 03.07.2021. • Machine no. 3(RMU 2nd Unit) taken over by UJVN Ltd. for commercial operation on 06.07.2021. Machine is capable of running continuously at 34.1 MW.

				Unit 2 • Machine No.2 (RMU 3rd unit) handed over to M/s AHPL for RMU on 07.07.2021. • Dismantling of Turbine with auxiliaries has been completed on 05.08.2021. • Dismantling of Generator with auxiliaries has been completed on 08.08.2021. Rotor shaft dispatched for machining works on 24.08.2021. • Removal of Draft Tube liner plate has been completed on 12.09.2021. • Demolition of draft tube concrete started from 13.09.2021. • The turbine efficiency test (Thermodynamics) of turbine has been completed on 21st September, 2021. • Stator Winding HV test successfully completed at 23 kV on 24.12.2021. • Stator Winding Tan Delta test successfully completed on 26.12.2021. • Stator lowering in pit successfully completed on 05.02.2022. • Rotor successfully lowered on 22.02.22. • Rotor dielectric test and CSI completed. • Common Power House closure has not been allowed due to ongoing energy shortage as a result there is delay in installation of MIV of M/c No.2, works in 220 kV switchyard and other associated works. • Machine no. 2 taken over by UJVN Ltd. for commercial operation on 08.09.2022.
B - SCHEMES ONGOING - Under Implementation				
12.	**Chilla (Ph-B),** 4x36 MW UJVNL 1980(U-1 to 3) 1981(U-4) T&G – BHEL **RMU&LE** **2025-26**	**144 (LE) +** **12 (U)** 490.56 NIL	-Replacement of existing Kaplan turbine and their complete auxiliaries, refurbishment of existing generators. Complete replacement of switchyard equipment along with Power Transformer, Replacement of 11 kV system, New Excitation system, New Electronic Governors, new control metering & protection system & SCADA, HM Works and Civil Works. -Uprating from 4x36 MW i.e. 144 MW to 4x39 i.e. 156 MW.	• DPR prepared by M/s SNC Lavlin and approved by the Board. However, GoU cancelled signing of agreement. Revalidation of DPR was done by AHEC, IIT Roorkee and approved by UJVN Board on 26.11.13. • Capital Investment approval accorded by UERC on 29.01.2016. Revised Tender floated. • Tender cancelled after BoD order dated 31.12.2018. • New tender uploaded on 09.01.2019 and Pre-bid meeting held on 11.02.2019.

				• Techno-commercial Bid opened on 30.05.2019. • Price bid opened on 22.08.2019. • BoD accorded financial approval of Rs. 212 Cr. including insurance, freight and duties & taxes for award of contract. • LOI issued to L-1 bidder M/s BHEL on 30.10.2019 & UJVN Ltd., received acceptance letter from M/s BHEL on 07.11.2019. • Agreement between M/s BHEL and UJVN Ltd signed on 22.01.2020. • Reverse engineering work has been completed. • Design and Engineering works of other E&M and Hydro mechanical components are in progress. • As per Contract Schedule the turbine model test was to be conducted by Nov 2020. However, due to COVID-19 pandemic situation and delay in Govt. approval (Global bidding is not allowed by the Government departments and PSUs for value below Rs. 200 Cr.), same could not be delivered in that period. • M/s BHEL has submitted approval request to Cabinet Secretariat, Govt. of India to allow global tender enquiry for placing the order (Value less than 200 Cr) on foreign party. GoI has been granted conditional approval on 30.03.2021. BHEL informed that tender has been floated on 27.07.2021. • M/s BHEL has informed that Purchase order for Turbine Model Test is placed on 22.04.2022. Model testing is likely to be carried out in the month of March, 2023 by IIT, Roorkee.
13.	**Dhalipur,** 3x17 MW UJVNL 1965-70 T - Litostroj, Yugo. G - Rade Konkar,Yugo **RM&LE** **<u>2020-21</u>** **2023-24**	**51 (LE)** 152.65 79.66	-Replacement of turbine, new governors, new sets of guide vanes. Repairing of various gates and gantry cranes. -Refurbishment of generators with new stator core and new class F insulated stator & rotor winding. New SEE, Replacement of 11 kV Switchgear. Installation of numerical type protection system. -Civil works of power channel, power station & Tail race channel.	Order placed on M/s Gogoal Energo Pvt. Limited (GEPL), New Delhi for Rs. 78.25 Crs. on 28.12.2016. **<u>Work Completed</u>** Reverse Engineering Works for Unit-B completed on 19.07.2017. Order for optional items and extra items placed on M/s GEPL on 20.06.2018 & 29.09.2018. Computational Fluid Dynamics (CFD) analysis for Turbine has been witnessed and approved.

				LOI for additional essential items for Unit A & C placed on 17.12.2021. Unit-A is handed over for RMU on 07.12.2021. Unit-A commissioned on 26.10.2022 **Unit-B** Unit-B handed over on 11.02.2019 after shutdown for RM&LE works. Supply of hydro-mechanical and electro-mechanical equipments completed. Dismantling and refurbishment work, supply and erection work completed. Commissioning and synchronization of Unit-B have been successfully completed. Commissioning date: 07.06.2021 **Unit- C** Supply & Erection work of Unit-C is under progress. Physical Progress- 85.25%.
14.	**Dhakrani,** 3x11.25MW UJVNL 1965-70 T - Litostroj, Yugoslavia. G - Rade Konkar, Yugoslavia **RM&LE** **<u>2020-21</u>** **2025-26**	**33.75 (LE)** 137.31 6.64	-Replacement of turbine, new governors, new sets of guide vanes. Repairing of various gates and gantry cranes. -Refurbishment of generators with new class F insulated stator & rotor windings. New SEE, Replacement of ABCBs by SF6 breakers, 11 kV Switchgear. Installation of numerical type protection system. -Civil works of barrage, power channel, power station & Tail race channel	• Decision was taken to cancel KfW loan. Approval accorded for inviting fresh bids on National Competitive Bidding (NCB) route through domestic funding. • DPR was revised based on present price level and Specifications were reframed. Revised DPR was approved by Board on 30.09.2015. • UERC accorded approval on 27.06.2017. • Financial approval accorded by CPC on 16.11.2017. BoD directed to put up the proposal again with modifications. Revised e-tender uploaded on e-portal on 16.09.2019. E-tender has been extended on 18.11.2019. Due to CORONA pandemic E-Tender extended on dated 27.06.2020 on e-procurement portal. Last date for submission of bid on website is 15.07.2020 & opening date of bid on website is 20.07.2020. Part-I of bid opened. • AHEC IIT Roorkee has been engaged as an external agency for techno-commercial bid evaluation.

				• Technical & Financial bid has been opened and bid evaluation work completed. • After recommendation of CPC dated 08.02.2021 and CoD dated 11.02.2021, agenda has been submitted to BoD for approval. • LOI has been issued to M/s Flovel on 25.06.2021 and Agreement inked on 05.07.2021. • Head measurement of Dhakrani HEP was carried out on 18.09.2021. • Unit#A handed over to M/s Flovel for reverse engineering on 02.02.2022. Work of measurements has been completed on 15.03.22. • LOI for additional works for restoration work of Unit A was placed to M/s Flovel on 19.04.2022. Restoration works of Unit A has been completed on dated 09.08.2022 • Design related activities are under progress.
C - SCHEMES ONGOING - Under Tendering				
15.	**Ramganga,** 3x66 MW UJVNL 1976 T&G-BHEL **RM&LE** **<u>2017-18</u>** **2022-27**	**198 (LE)** 455.20 NIL	-Replacement of runner, rehabilitation of generators, installation of intake hoisting arrangement, installation of DT gantry crane, 11 kV Circuit Breakers, control protection and replacement of Switchyard equipment, instrumentation, governors, pumps and life extension of units based on RLA studies.	• DPR was prepared in-house and was reviewed by AHEC, IIT Roorkee. Specifications were vetted by AHEC. Tender on turnkey basis floated on e-portal. • Tender has been scrapped as UERC declined Investment approval on 12.02.2016. • Appeal has been filed in Hon'ble Appellant Tribunal, New Delhi. Matter is under hearing.
C - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval				
16.	**Kulhal,** 3x10 MW UJVN LTD. 1975 T&G - BHEL **RM&LE** **2022-27**	**30(LE)** 115.24 NIL	-Replacement of turbine, new governors, new sets of guide vanes. Repairing of various gates and gantry cranes. -Refurbishment of generators with new stator core and new class F insulated stator & rotor windings. New SEE, Replacement of 11 kV Switchgear. Installation of numerical type protection system. -Civil works of barrage, power channel, power station & Tail race channel	• LoI issued to M/s Gogoal-Emeco (Consortium) on 04.03.2014. UERC declined approval vide order dt. 13.03.2015 with the advice that on account of obsolescence of protection equipment, suitable proposal be mooted. UJVNL approached commission with suitable modifications. However, UERC declined Investment approval vide order dated 11.02.2016 due to better availability of the machines. • Appeal has been filed in the Appellant Tribunal New Delhi. • Reply related to Kulhal power house as required by Hon'ble Appellant Tribunal New Delhi submitted on 29.02.2020. Matter is under hearing.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

NORTHERN REGION

UTTAR PRADESH **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES COMPLETED				
17.	**Rihand,** 6x50 MW UPJVNL 1962 (U-1to5) 1966 (U-6) T&G - EE, UK **RM&LE** **2017-18** **2022-23**	**300 (LE)** 132.20 (Revised) 127.60	- Replacement of Stator Core, and Coils insulation with Class F. - Replacement of insulation of field coils with Class F - Replacement of Governors - Replacement of Excitation Equipment, 60 MVA generator transformers by 67.5 MVA Transformers, switchyard equipments, Bus bars and under water parts - New Air Cooler and Ventilation system.	Works of all six units completed by M/s BHEL (Units Commissioned on: U-1: 16.09.2016, U-2: 14.02.2018, U-3: 15.06.2015, U-4: 04.08.2014, U-5: 23.04.2011 and U-6: 31.05.2017). All works completed except some overhauling works of intake gates. Scheme is declared completed in 2022-23

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
B - SCHEMES ONGOING - Under Implementation				
18.	**Obra,** 3x33 MW UPJVNL 1970 (U-1&2), 1971 (U-3) T&G - BHEL **RM&LE** **<u>2017-18</u>** **2023-24**	**99 (LE)** 58.80 46.40	- Replacement of Stator coil, core & rotor pole etc. (Unit#1, 2 & 3). - Replacement of rotor spider arm (Unit# 1&3). - Replacement of digital governor (Unit#1, 2 & 3). - Supply of Gov. oil pump (Unit#1, 2 & 3). - Supply & installation of Static Excitation System (Unit#1, 2 & 3). - Supply of Gen. Air coolers (Unit#1). - Rehabilitation of Intake gate of Units - Rehabilitation of stop logs, draft tube gates. - Refurbishment of draft tube gate crane. - New earthing of Switchyard - Station battery. - Replacement of 132KV Breakers. - Overhauling of 132KV Isolator (32 Set). - Supply of replacement of 132KV CT&PT. - Replacement of numeric relay panels of Units & Feeders. - Replacement of station battery - Installation of Radio Remote Control of both EOI cranes. - Smoke Fire detection system. - Supply of dewatering pumps, air compressor. - Supply & replacement of Elevator (1 No.). - Supply of 1 No. Electrostatic Liquid Cleaner (ELC) & 1 No. Low Vacuum Dehydration (LVDH) Machine. - SCADA - Other works covered in various packages approved by ETF.	**<u>UNIT No. 1</u>** **All work executed except the following:** Capital overhauling along with replacement of vapour seal, spring mattress, support of thrust bearing, brake-jack system, carbon segment gland; inception of HS lube oil system, backwash type cooling water strainer, centralized self-lubricating system, refurbishment of runner, runner chamber, GV & Stay vanes, liner of pivot ring etc. **<u>UNIT No. 2</u>** **All work executed except the following:** Capital overhauling along with replacement of vapour seal, spring mattress support of thrust bearing, brake-jack system, carbon segment gland; inception of HS lube oil system, backwash type cooling water strainer, centralized self-lubricating system, refurbishment of runner, runner chamber, GV & Stay vanes, liner of pivot ring etc. The R&M Works of this unit 2 will be taken up after completion of similar works of Unit 1. **<u>UNIT No. 3</u>** All works completed. **COMMON WORKS :** 1. Provision of station supply from Obra HEP 132 KV Bus- Under Progress 2. SCADA- Under Tendering.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

NORTHERN REGION

RAJASTHAN **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - Under RLA Studies				
19.	**Rana Pratap Sagar Power Station,** (4x43 MW) RRVUNL 1970 T- Johnson & Co. G- General Electric, Canada **RM&LE** **2026-27**	**172 (LE)** - -	1. RLA study of Unit No. 1, 2, 3 & 4.	1. Detailed Project Report of RMU Work for Generators of RPSPS has submitted by M/S SHEPL-BHEC (Joint Venture), Faridabad. Work Order for replacement of Generator of Unit#2 placed upon M/s Andritz is under progress. 2. Final Detailed Project Report for RLA study of Turbine and associated equipments of one unit (43 MW) & Complete Civil Structure of RPSPS, Rawatbhata has been submitted by M/s MECON Ltd. Ranchi and final approval is under process.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

WESTERN REGION

MADHYA PRADESH (**Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval				
20.	**Pench** 2x80 MW MPPGCL 1986-87 T&G – BHEL **RM&LE** **2025-26**	160 (LE) - -	1. Comprehensive R&M of Pench HPS	1. RLA study has been completed by M/s WAPCOS. Budgetary offers are being called for DPR & Tender for DPR preparation, tender document & availing Project Monitoring Consultancy (PMC) services is to be issued.
B - SCHEMES ONGOING - Under RLA Studies				
21.	**Bansagar Tons-I,** 3x105 MW MPPGCL 1991-92 T&G – BHEL **RM&LE** **2026-27**	315 (LE) - -	RLA study of Unit No. 1, 2 & 3.	The RLA Study of U#2 to be taken up in 2024.
22.	**Bargi,** 2x45 MW MPPGCL 1988 T&G – BHEL **RM&LE** **2026-27**	90 (LE) - -	1. RLA Study of Unit-1 & Unit-2	1. Order for RLA Study of units has been placed on M/s MECON Ltd., Ranchi. 2. RLA study is in progress.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

WESTERN REGION

GUJARAT **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under Tendering				
23.	**Kadana PSS,** 4x60 MW GSECL Units 1&2 1989-90 T&G-Skoda Units 3&4 1998-99 T&G-BHEL **R&M** **2025-26**	240 (LE) +20 (U) 750.25 -	i) Plant Design, Engineering, Manufacture, Shop testing, Supply, Transportation, Storage, Erection, Testing, Commissioning and PG Test for Renovation, Modernization & Uprating of 4x60 MW ii) RLA of Civil Structure of Power House	The IFB/ICB/ tender for R&M of project of 4x60 MW Units of KHEP has been published by GSECL on 18.10.2022 In response, the two MNC's Design, Engineering, Marketing etc. representative's viz. firms i) M/s Andritz Hydro Private Limited Delhi/ Bhopal ii) M/s Voith, Noida have visited the Kadana Hydro Power Project site on 15.11.2022 & 22.11.2022 respectively. For RLA studies letters sent to various expert agencies for site survey, detatil scope of work & budgetary offer. Till now only one offer received on 20.12.2022.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

WESTERN REGION

MAHARASHTRA (**Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies				
24.	**Vaitarna,** (1x60) MSPGCL, 1976 **RM&LE** **2026-27**	**60 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Budgetary offers for preparation of cost estimate of RLA and Uprating study and DPR Preparation is invited from various agencies. Estimate for RLA study is under scrutiny. • Completion of RLA study & DPR preparation – Feb 2025 to July 2025. • Bidding process and Finalization of contract after tendering – Aug 2025 to Dec 2025. • Completion of RMU Work – Jan 2026 to Dec 2026.
25.	**Koyna Dam foot (Right Bank),** (2x20) MSPGCL, 1980-81 **RM&LE** **2026-27**	**40 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study to be taken up. • Completion of RLA study & DPR preparation – Jan 2025 to June 2025. • Bidding process and Finalization of contract after tendering – July 2025 to Nov 2025. • Completion of RMU Work – Dec 2025 to Nov 2026.
26.	**Koyna St-3,** (4x80) MSPGCL, 1975-78 **RM&LE** **2026-27**	**320 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study to be taken up. • Completion of RLA study & DPR preparation – Nov 2024 to April 2025. • Bidding process and Finalization of contract after tendering – May 2025 to Sept 2025. • Completion of RMU Work – Oct 2025 to Dec 2026.
27.	**Tillari,** (1x60) MSPGCL, 1986 **RM&LE** **2022-27**	**60 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study to be taken up.

28.	**Bhira Tail Race,** (2x40) MSPGCL, 1987 **RM&LE** **2022-27**	**80 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study to be taken up.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

SOUTHERN REGION

ANDHRA PRADESH **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation				
29.	**Upper Sileru Power House** 4x60 MW APGENCO 1967-1968 (St.-I) & 1994-1995 (St.-II) St.-I: T- Excherwyss, Charmilies Switzerland G - Oerlikon, Switzerland St.-II: T - BHEL G - BHEL **R&M** **2026-27**	- - -	a) Supply, Erection, Testing & Commissioning of Micro Processor based Dual Channel Static Excitation System (Digital AVR's). b) Supply, Erection, Testing & Commissioning of SCADA system including field instruments for Unit No. 1 to 4, common auxiliary equipment and switchyard .	1. Purchase order was placed on M/s. Andritz Hydro Pvt. Ltd. 2.Old AVR excitation system replaced with new DVR Tender for SCADA floated and evaluation is under progress.
30.	**Nagarjuna sagar Right Canal Power House** 3x30 MW APGENCO 1983 (Unit – 1 & 2) 1990 (Unit – 3) T- M/s. BOVING, U.K G-M/s. GEC Large Machines Ltd., U.K **R&M** **2025-26**	- - -	a) DVR: Replacement AVRs with Modern Digital Voltage Regulator based Static Excitation System. b) SCADA: Replacement of relay logic based automatic system with SCADA system along with GPS for all the 3 units and Power House. c) Penstock Intake Gate: Overhauling of Penstock intake gates.	1. Purchase order was placed on M/s. ABB India Ltd. Old excitation system replaced with new DVR System. Tender for SCADA floated and evaluation is under progress. 1. Replacement of Penstock Intake gate No. 2 is completed. 2. Tender for Replacement of Penstock Intake gate No. 1.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
31.	**Tungabhadra HE(J) Scheme,** (4x9 MW) APGENCO 1957-64 Unit-1&2 T-Escherways, Zurich G- Browin Bovert, Switzerland Unit-3&4 T- Hitachi, Japan G- Toshiba,Japan **RM&LE 2025-26**	**36 (LE)** - -	Partial renovation works involves Capital Overhaul works on all units for replacement of equipment/components worn out over a period of 60 years along with replacement of equipment like governors & Excitation systems, which are affecting the station performance	The main objective of Tungabhadra HEP is being irrigation and electricity generation is dependent on water releases as per irrigation requirements. Because of this the average load factor of TBHES is less than 30% for past 5 years. Due to the limitation in discharge capacity of canal that leads to Hampi Power House, the max. generation possible in Hampi is 21 MW against 36 MW installed capacity. The investment for RMU works out to be 330 Cr. excluding IDC (as per budgetary offer of M/s Andritz Hydro) which doesn't yield required benefit economically. In view of above limitaions, Tungabhadra board has given consent to carry out partial renovation works only. At present capital overhauling works on Unit # 3 at Tungabhadra HEP is completed and COH on unit 4 planned during this F.Y. Order for capital over haul works is awarded to M/s Hi-Power Associates. The replacement of Governor, Excitation equipment for Stage-1 (Unit 1&2) of Dam PH with latest art of new technology, tendering under progress. Proposal for RMU of first two units of Hampi Power House was submitted to Tungabhadra Board with a request to call for Budgetary offers from reputed manufacturer.
32.	**Hampi Canal PH,** (4x9 MW**)** APGENCO 1958-64 Unit-1&2 T-Charmilles, Switzerland G- Browin Bovert,Switzrland Unit-3&4 T- Hitachi, Japan G- Toshiba,Japan **RM&LE** **2025-26**	**36 (LE)** - -	Partial renovation works on all units involves capital overhauling and replacement of worn out equipment/ component.	
B - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/Approval				

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
33.	**Lower Sileru,** (4x115 MW**)** APGENCO **RM&LE** **2026-27**	**460 (LE)** 350 1.8	Residual Life Assessment (RLA)/ Life Extension Studies and Preparation of Detailed Project Report along with technical specifications for R, M & U of Lower Sileru Hydro Electric Project.	The 175th board meeting of APGENCO approved to conduct the RLA/ LE studies and Preparation of DPR for R, M & U of all four units (4x115 MW) of LSHEP. Work has been awarded to M/s MECON for Rs 1.8 Crore to carry out RLA. RLA studies of all four units completed. DPR likely to be furnished by December 2022 by M/s MECON. Commissioning of 2 Nos. New units (U#5 & 6, 2x115 MW) are likely to be completed by April 2024. R&M works of the existing four units will be taken up by the time of completion of Unit 5 & 6. Due to space & EOT constraints. R&M works of existing 4 units can be commenced after erection of additional two units (new) which is scheduled for commissioning by April 2024. Tentative schedule of R&M Works: a) Proposed time required for R&M works : 40 Months . b) Finalisation of DPR: December 2022. c) Finalisation of contract: December 2023. d) Zero date for site activities: January 2024. e) Commencement of works at site: March 2024 f) Completion of R&M works@ 9 months/ Unit 3: March 2027.
C - SCHEMES ONGOING - Under RLA Studies				
34.	**Machkund,** 3x17 MW (St.-I) & 3x23 MW (St.-II) APGENCO 1955-56 (St.-I) & 1959 (St.-II)	**120 (LE)+ 9 (St.-I) (U)** 500 (approx.) -	Residual Life Assessment studies (RLA) on Civil structures, penstocks, Hydro Mechanical and all Electrical & Mechanical equipment of all six units.	The Govt. of AP (APGENCO)& Govt. of Odisha(OHPC) mutually agreed for carrying out RM&U by sharing the costs & benefits in the ratio of 50:50. Modified agreement was entered on 23.10.2020 by both APGENCO and OHPC officials.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	St.-I: T - M.Smith, USA G - W.House,USA St.-II: T - J.M.Voith, W. Germany G - Westing House, USA **RMU&LE** **2026-27**		**Note:** Three units of Stage-I each rated at 17 MW are proposed to be uprated to 20 MW.	In Machkund HEP, Stage-I Units were running at derated capacity of 16 MW and Stage –II Units were running at derated capacity of 21 MW against their original capacity of 17 MW and 23 MW respectively. Work awarded to M/s Tata Consulting Engineers (TCE), Bangalore for carrying out RLA Study. TCE has made site visit along with APGENCO officials during preliminary studies for obtaining the required data on the power project for studies. RLA studies on Unit- 1 & 6 are completed. RLA studies of Unit-2, 3, 4 & 5 completed partially. Balance studies on Unit no. 4 scheduled in 2nd week of January 2023 and likely to be completed by 3rd week of January. RLA/ LE studies in progress to prepare comprehensive DPR for carrying out RMU works. Tentative Schedule of R&M works: a) Completion of RLA Studies & finalisation of DPR: June-2023. b) Finalisation of Tender for R,M & U: December 2023. c) Completion of R&M of first unit , 12 months from Zero date: December 2024. d) Balance five units @06 months/Unit: June 2027.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations during 2022-27

SOUTHERN REGION

TELANGANA **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A – SCHEMES COMPLETED				
35.	**Nagarjuna Sagar Phase II works,** 1x110 + 7x100.8 MW, TSGENCO 1978-85 Unit-1: T&G - BHEL Units 2 to 8: PT - Hitachi, Japan MG - MELCO, Japan **R&M** **2018-19** **2022-23**	- 22.17 14.34	1. Replacing existing AVRs with latest DVRs alongwith thyristor modules for 7 units at NSPH. 2. Replacement of all L.T. Breakers of all units and SABs of NSPH. 3. Retrofitting of Numerical Relays of Generator Protection Schemes of Units 2 to 8. 4. Overhauling of EOT Cranes and Gantry cranes at NSPH. 5. Procurement of control cables of different sizes for units 1 to 8, common auxiliaries, Switchyard equipments and switchyard marshalling boxes and laying of Power Cables and Control Cables for Penstock Inlet Gates from main control room for NSPH. 6. Procurement of 245 KV Section Breaker for BUS-A, BUS-B at NSPH switchyard, Bus Coupler at 220 KVRS and the related Isolators and accessories, erection, repositioning of PTs etc. at NSPH Switchyard. 7. Servicing and reconditioning/ procurement of new Isolators required for motoring mode operation for 89G, 89M, 189S1 and 189S2 for units-1 to 8. 8. Procurement of 245 KV SF6 Circuit Breakers.	1. Completed (BHEL) 2. Completed (ABB Ltd.) 3. Completed (ABB Ltd.) 4. Completed (WMI) 5. Necessary defective cables identified and replaced with new cables 6. Not feasible for Nagarjuna Sagar Power House Switch Yard due to space constraint and hence dropped. 7. Completed (GR Power Switchgear) 8. Completed (CGI, Alstom and Siemens)

			9. Overhaul of stop log gates, penstock gates and seals replacement for draft tube gates for all units of NSPH including trash rack at tail race.	9. i) Overhauling of stoplog gates: 18 elements are yet to be taken up. ii) Estimate sanction for rectification & modification of stop log gates is under progress. iii) Penstock gates seals replacement will be taken up after overhauling of stoplog gates is completed. iv) Trash rack rectification works at tail race and reservoir side completed. v) Draft gates seals replacement completed for 8 Nos. gates.
			10. Replacement of switchyard equipment that have completed 25 years of service of 220 KV CVTs (10 Nos.), 132 KV CVTs (17 Nos.), 220 KV PTs (5 Nos.), 132 KV PTs (8 Nos.), 220 KV LAs (13 Nos.) and 132 KV LAS (13 Nos.) for NSHES.	10. Completed (LA's: Lamco & PT's: Toshiba)
			11. Procurement of 220 KV CTs (18 Nos.) for units (silicon rubber composite type).	11. Completed (Siemens)
36.	**Nagarjuna Sagar Left Canal Power House (NSLCPH),** 2x30.6 MW TSGENCO 1992 T-Boving, UK G-General Electric, UK **R&M** **<u>2018-19</u> 2022-23**	- 29.74 1.5	1. Replacing existing AVRs with latest DVRs along with thyristor modules for 2 units.	1. It is proposed to postpone the work of replacing existing AVRs with latest DVRs along with thyristor modules for Unit-2 in to the R&M works.
			2. Capital overhauls on generator and turbine and its auxiliaries including spares and consumables for all 2 units.	2. Unit-1 overhauling completed. Unit found normal and taken into service on 20.11.17. It is proposed to postpone the capital overhaul of Unit-2 into R&M works as the unit running hours are less and there is no major problem in Turbine & Generator.
			3. Overhauling of EOT Cranes and gantry cranes.	3. Work order issued (LOI). Gantry cranes overhauling has been completed. All work completed.
			4. Procurement of 132KV SF6 Circuit Breakers for both units and its feeders.	4. Completed (Siemens)
			5. Implementation of SCADA.	5. Completed (ABB)
			6. Providing of latest version of EHG System for 1 Unit.	6. Completed (BHEL)
			7. Cooling water line erections.	7. Completed.

B- SCHEMES ONGOING - Under Implementation				
37.	**Pochampad Hydro Power Station Stage -1** 3 x 9 MW TSGENCO 1987-88 T- BHEL G-BHEL **R&M** **2026-27**	- 9.655 -	1. Design, manufacturing, inspection and testing at manufacturers works before, dispatch, delivery on F.O.R. project site basis and supervision on erection, testing and commissioning of advanced numerical protection relay panels with Time synchronizing feature along with DR Evaluation Unit with required hardware and software along with recommended spares for protection of generator, generator transformer and UAT/Excitation transformer for Units # 1,2 and 3 2. Design, manufacture, inspection & shop testing at manufacturers works before dispatch, delivery on F.O.R. project site basis and supervision of erection, testing and commissioning of 3 sets of Digital Automatic Voltage Regulator (DAVR) based Static excitation equipment (SEE) for Generating Units # 1, 2 & 3 3. Auto sequencer and Governor control, Governing system, Control room SCADA (MMI/DAS), Vibration monitoring system, field instruments, instrumentation cables, control cables and Service portion for Units# 1, 2 & 3.	1. Drawing approved 2. LOI issued to M/s BHEL. 3. Proposal of works is in scrutiny stage.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

SOUTHERN REGION

TAMILNADU (**Amount in Rs. Crores)**

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation				
38.	**Moyar PH,** 3x12 MW TANGEDCO 1952-53 T – Boving,UK G -Metropolitan Vickers Electric Co. limited,UK **RMU&LE** **2024-25**	**36 (LE)+ 6 (U)** 67.05 68.35	Planning, design, model testing, engineering, manufacture, procurement/ supply of new components and spares at site, painting including penstock (internal and external), insurance, dismantling, capital repairs, erection, testing and commissioning of 3 nos. hydro generating units including P.G. Test in any one of the units. Associated technological, civil, mechanical, electrical works as required with new TG set from 3x12MW to 3x14 MW and Plant, Equipment & facilities.	The work for conducting RLA study and uprating study on Turbine, Generator and other auxiliaries for Rs. 82.8 lakhs was awarded to M/s MECON, Ranchi on 17.06.2013. MECON submitted final DPR for works on 07.02.15. Administrative approval accorded on 04.06.2016. Techno-commercial Bid opened on 15.02.2019. TANGEDCO Board in its 91st Meeting held on 22.11.2019 for Placing Orders on L1 tenderer M/s. Andritz Hydro Private Limited, New Delhi and Letter of Intent (LOI) has been issued on 28.11.2019. Contract agreement has been executed on 14.01.2020. Unit-2 handed over to M/s. AHPL for Reverse Engineering works on 27.01.2020 & completed on 02.12.2020. Supply of Material for RMU work is initiated. Drawings submitted by M/s AHPL and approved by TANGEDCO. Dispatch clearance issued for items inspected and test certificates approved. All materials for Unit-1 & common items have been supplied by M/s AHPL. Unit-1 has been handed over for RMU works on 28.03.2022 and the work is under progress.

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
39.	**Kodayar PH-I,** 1x60 MW TANGEDCO 1970 T-Vevey Engg. works, Switzerland G-Alstom, France **RMU&LE** **2024-25**	**60 (E)+ 10 (U)** 88.48 Nil	Planning, design, CFD/model testing, engineering with RE, manufacture, procurement/ supply of new components and spares at site, painting-penstock, insurance dismantling, capital repairs, erection, testing and commissioning of P.G. Test. Associated technological, civil, mechanical, electrical works as required with new TG set from 1x60MW to 1x70MW and Plant, Equipment & facilities.	Contract was awarded to M/s MECON Ltd., Ranchi for Rs. 91 lakhs on 22.09.2014 for conducting RLA study and uprating study on Turbine, Generator and other auxiliaries. They have completed the study and furnished the final DPR. Administrative approval accorded on 03.02.2017. Techno-commercial Price-Bid opened on 05.09.2019. The BLTC in its 314th Meeting held on 18.11.2019 approved and recommended the proposal for placing works contract order on the L1 tenderer i.e. BHEL, New Delhi to TANGEDCO Board. The proposal was approved by TANGEDCO board on 26.02.2020. Letter of Intent issued to M/s BHEL on 09.03.2020. Reverse Engineering Works completed on 10.08.2021. Drawings being submitted by M/s BHEL and approval by TANGEDCO is in progress.
B - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/ Approval				
40.	**Kodayar PH-II,** 1x40 MW TANGEDCO 1971 T-Yugoslavia G- Yugoslavia. **RMU&LE** **2026-27**	**40 (LE)+ 6 (U)** - Nil	Replacement of stator core & winding, rotor winding, poles, Excitation system, Governing system, Runner, guide vanes, Cooling water & De-watering systems, Generator Transformers, Generator protection, LT switch gear, lubrication system, 11 KV LAVT, Neutral Grounding Transformer, Annunciation system, power and control cable, UAT, fire-fighting system for generator, yard, cable gallery yard, Refurbishment of turbine inlet valves and Butterfly valves, Air admission system, brake & jack and bearings.	M/s MECON submitted RLA study report in 2006 and proposed to uprate from 40 to 46 MW. TANGEDCO decided to take up RMU works of Kodayar PH-II on completion of RMU works of Kodayar PH-I as the water of PH-I is used for PH-II.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

SOUTHERN REGION

KARNATAKA **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES COMPLETED				
41.	**Munirabad Dam Power House,** 2x9 MW (U-1&2), 10 MW ,(U-3), KPCL 1962(U-1&2) 1965 (U-3) T-Hitachi Ltd, Japan G- U-1&2: Hitachi U-3: Voest Alpine, Austria **RM&LE** **2018-19** **2022-23**	**28 (LE)** 4.60 2.69	Generator protection and DCS based SCADA system for Unit 1, 2&3. 2 nos. 11kV Tee-off cubical of Units 1&2 and 11kV Gescom UAT switchgear cubicle.	PO placed on M/s ABB India Ltd., on 26.03.2018 for Rs. 4.87 crore. Contract agreement was signed on 04.05.2018. Erection and Commissioning work for Unit.1, 2, 3 completed. Supply, erection and commissioning of panel completed by M/s Amar Raja power systems Ltd., Tirupati at a total cost of Rs. 71,19,395.00.
B - SCHEMES ONGOING - Under Implementation				
42.	**Nagjhari, U-1 to 3,** 3x150 MW (uprated from 135 MW) KPCL 1979 (U-1), 1980 (U-2), 1981 (U-3) T&G - BHEL **RM&LE** **2025-26**	**450 (LE)** 266 16.976	R&M of Turbine of Unit-1, 2 & 3. Supply of major components, spares of turbine like Top cover, Pivot ring, labyrinth, MIV seals, guide vanes, aeration valves, runner, guide apparatus, GV servomotor regulating ring, rotary valve, shaft coupling bolt, spare guide vanes, runner & shaft etc. Replacement of Generator gauge panel, Brake & Jack assembly, oil coolers, Thrust collar, unit auxiliary panels, Generator coupling bolts, HS lubrication system, LEB ring. Replacement of 6 nos. of Unit Auxiliary Panels (UAPs) and	• Order placed on M/s BHEL on 24.02.2018 for Rs. 99.25 Crores (Excluding taxes, freight and insurance) for Turbine, MIV, Governor & its accessories for Units 1, 2&3. Ordered materials are being received at site. Unit-2 will be handed over for R&M works, once all the materials of the unit are received at site. • The proposal of implementing new design generator rotor of M/s BHEL for units 1, 2 & 3 is approved. • Additional order dated 14.12.2022 for implementation of split shaft design Generator rotor placed with M/s BHEL. Contract agreement executed on 29.12.2022 and 10% advance amount released on 31.12.2022. The zero date for both Main and additional contracts starts from 31.12.2022. • Order placed on M/s Balaji Electro Controls Pvt. Ltd.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			retrofitting of 4 nos. breakers, replacement of electro-mechanical relays by numerical relays in 5 incomers, bus coupler & 4 nos. outgoing feeders in common auxiliary panel. SCADA System which includes erection & commissioning of Auto sequencer, installation of Dynamic disturbance recorder, online vibration monitoring system planned in phased manner, fire protection system, Commissioning of Thermo signaling devices in addition to RTD's, replacement of hydraulically operated valves by electrically operated Solenoids.	on 19.05.2018 at a total cost of Rs.3,32,14,777.00. • Erection and commissioning works of UAPs for all Units completed. Erection and Commissioning of panels, retrofit of equipment in CAP completed. Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress.
43.	**Shivasamudram Hydro Power Station,** 6x3 MW 4x6 MW KPCL 1920-38 T - Boving, UK (U1 to U6) Escher Wyess, Switzerland (U7 to U10) G - GEC, USA **RM&LE** **2024-25**	**42 (LE)** 169.18 11.35	Model test, design engineering, manufacturing, supply of Turbine & its auxiliaries, Excitation system, Governing system, SCADA system, Controls & protection system, and dismantling, erection, testing & commissioning.	LOA dated 29.11.2018 issued to M/s AHPL for Model test, design engineering, manufacturing supply of Turbine & its auxiliaries, Excitation system, Governing system, SCADA system, Controls & protection System and dismantling, erection testing & commissioning. Contract agreement executed on 31.10.2019. Consultancy services are being availed from IIT, Roorkee, for review of Model test. Model test procedure for 6 MW turbine and CFD analysis procedure for 3 MW unit are approved. Drawings/ Documents are under review. Provisional approval to final model test and CFD reports issued on 28.12.2022. Model test & CFD analysis witness is postponed and is to be rescheduled (by March 2023).
44.	**Kadra Dam Power House,** (3x50MW) KPCL 1997-1999 T&G - BHEL	- 44.47 1.72	• 220 kV Switchyard - Replacement of breakers, protective painting of switch yard structures.	Order issued to M/s APPSIL on 21.05.2021 and entered into agreement on 17.06.2021. Approval for drawings, GTP & QAP of 220kV EMVT is accorded. 13 nos. of 198 kV LA's, 9 sets of 245 kV CB's, 4

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	R&M **2024-25**			nos. of 245 kV PT's received at site. Erection of switchyard equipment 13 nos. 245kV CTs under progress.
			• Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented.	Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress. ---do--
45.	**Kodasalli Dam Power House,** (3x40MW) KPCL 1998-1999 T&G - BHEL **R&M** **2024-25**	- 50.60 1.72	• Replacement of UAP, ACDB and CAP.	**LTAC Panels: UAP, ACDB and CAP:** Work order dated 21.12.2020 was placed on M/s Lotus power gear. Supply of Panels to site completed. Erection & commissioning of 5 ACDBs and 3 UAPs completed & CAP is under progress.
			• 220kV Switchyard - Replacement of breakers, protective painting of switch yard structures.	Approval has been accorded for the sanction of grant from PSDF. Detailed order issued to M/s APPSIL on 21.05.2021 and entered into agreement on 17.06.2021. Engineering work is in progress. Approval for drawings, GTP & QAP of 220kV EMVT is accorded. 13 nos. of 198 kV LA's, 8 sets of 245 kV CB's, 4 nos. of 245 kV PT's received at site. Erection of switchyard equipment is under progress.
			• Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented.	Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress. Tendering by Next month.
46.	**Gerusoppa Dam Power House (Sharavathy Tail Race),** (4x60MW) KPCL 2001-2002 T&G - BHEL **R&M** **2023-24**	- 59.66 2.21	Midlife replacement of switchyard equipment's planned	Ordered issued to M/s APPSIL on 21.05.2021. 4 sets 245 kV CB's & 23 nos of 245 kV CTs received at site.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
47.	**Linganamakki Dam Power House (LDPH),** (2x27.5MW) KPCL 1979-1980 T – Electrosilla, USSR G - Electrosilla, Energomach-USSR **R&M** **2023-24**	- 56.20 1.85	Relay and control panels & DCS based SCADA system.	PO placed on M/s ABB for modification of released panels of SGS to suit LPH at a total cost of Rs. 29.02 Lakhs. Modification work was completed. Commissioning of panels completed for U#2 for both lines. LOA is issued to M/s ABB limited at the cost of Rs. 2,45,97,408/- on 23.11.2017. Detailed order issued on 27.12.2017. Erection & commissioning of panels for 1 no. Bus coupler, lines (4 no.) and U#2 is completed. Erection, Testing & commissioning works of DCS & GRP Panels for unit-1 completed on 01.10.2021. Pending work is to be taken by firm.
C - SCHEMES ONGOING - Under Tendering				
48.	**Sharavathy Generating Station,** (10x103.5MW) KPCL 1964-77 T- U:1-8 - Neyrpic, France, U:9-10- BHEL, G- U:1&2-Hitachi, Japan, U:3to8 –GE Co, USA, U:9&10- BHEL, **RM&LE** **2025-26**	**1035 (LE)** 196.56 11.07	**Hydro-mechanical Works:** Overhauling of tunnel Stop log gates, Gates and gantry crane of surge shaft, R&M of BF valves, Civil structure (rails) for movement of gantry crane, cleaning and painting of internal and exterior surfaces of all penstocks, etc. R&M and Automation of BF & By-pass valves at valve house and incorporation of remote operation by extending the SCADA/ DCS System from SGS **Generator and associated components**: General checking and replacement of air coolers/ tubes. R&M of SEE.	Overhauling of U#1 to 3 & 5 BF Valves completed. Measurement of penstock plate thickness of 5 units completed. Minimum wear out observed. Hence remaining 5 units penstock study tendering is in progress. NIT published on 13.10.2021. Technical Bid (Cover-I) opened on 10.02.2022. Price bid opened on 27.04.2022. TAC/TC meeting held on 16.08.2022 and recommended for modification in scope for the works of Renovation of operating system. Discussed with site officials and scope finalized. Preparation of estimate is under progress. GT of Unit-10 commissioned on 28.02.2018 and GT of Unit-9 commissioned on 30.03.2018.
D - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/ Approval				
49.	**Supa Dam Power House,** (2x50MW) KPCL	47.91 1.206	• UAP &CAP	• Order placed on M/s Balaji Electro Controls Pvt. Ltd. on 19.05.2018 at a total cost of Rs. 15529505.00.. Erection &

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	1985 T&G - BHEL **R&M** **2024-25**		• **SCADA -**All instrumentation and field devices of E&M equipment, New annunciation system for units, auto & manual synchronizer and temperature recorder at machine hall, etc.	commissioning of all UAP's and CAP's completed. Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress.
D - SCHEMES ONGOING – Under RLA Studies				
50.	**MGHE (Mahatma Gandhi HE),** 4x13.2 MW (St.I) 4x21.6 MW (St.II) KPCL 1947-52 T - Boving, UK G - BTH, UK(St.I) G - GE, USA(St.II) **RM&LE** **2026-27**	**139.2 (LE)** 97 7.75	**Hydro- Mechanical Works** Refurbishment works of penstock intake gates & trash racks, replacement of stop log gates and refurbishment of penstocks etc. **Generator and its Auxiliaries** Refurbishment of generator components along with air coolers, Fire protection system with non CO_2 gas system (Clean gas based) for generators, replacement of relays with numerical relays etc Replacement of 8 Nos. Generator Transformer.	Proposed for RLA studies of penstocks of all the units. Tendering works are under progress. Work order on M/s CPRI has been placed to conduct RLA studies on Generators. RLA studies on Generator Unit-3 and 7 completed. In the first phase replacement of 1st stage 4x16.5MVA GTs taken up. Contract agreement signed with M/s Toshiba on 22.09.2018. All GT's reached at site. All 1st stage GTs of U-1, 2, 3 & 4 are commissioned. RLA studies conducted for 2nd stage 4-GT's during Dec'2021. Based on the reports & condition of the GT's, replacement of remaining GT's will be taken up in later date.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

SOUTHERN REGION

KERALA **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation				
51.	**Kuttiyadi** 3x25 MW KSEB 1972 T&G-Fuji, Japan **RMU&LE** **2024-25**	**75 (LE)+ 7.5 (U)** 377.41 0.9489	Inspection and rectification of Trash rack. Butterfly valve operation to be made electrically and mechanically with remote. New penstock, MIV replacement with PLC controls. PMG replacement with SSG. Pelton turbine runner's replacement. Replacing Generators, Static excitation with AVR. Replacing Cooling water system. Replacement of DG set. Integrated SCADA, New fire protection system, Store and AC system modification of switchyard. New 11 kV switch gear	1. Work at site is not yet started. 2. Proposal for new penstock is kept in abeyance 3. Work order for new Electro-Mechanical work is awarded to M/s.BHEL 4. Preliminary measurement at site and reverse engineering completed by BHEL 5. Design is almost completed and submission of drawing by BHEL is in progress. 6. So far 137 documents submitted. Out of which, approval for 44 documents are issued and for 11 documents, conditional approval are issued. Rest of the documents are under modification/ discussion/ verification/ 7. Model Test of Turbine completed and payment issued 8. Testing of EHGC Panel completed. 9. Bus Bar Strengthening completed. 10. Work order issued for constructing new 11 kV control room building from CMSD/Kakkayam 11. Dismantling of first unit (Gen. No.3) is rescheduled to January-February 2023 by BHEL. 12. Document approval, material inspection, MDCC issue are in progress.
52.	**Sabarigiri (U#6),** 1x60 MW KSEB 1966 **R&M** **2024-25**	- -	Refurbishment of Stator core, Replacement of stator winding and turbine shaft of Unit#6	Work order for Refurbishment of Stator core of U#6 issued to M/s Coral Rewinding India Pvt. Ltd, Erode, Tamilnadu.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
B - SCHEMES ONGOING - Under RLA Studies				
53.	**Idukki 2nd Stage,** 3x130 MW KSEB **RM&LE** **2022-27**	**390 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Work order for RLA study including uprating study and preparation of DPR for RMU issued to M/s Mecon Limited, Ranchi on 1.09.2022. RLA study Unit No.6 started from 03.12.2022 and completed.
54.	**Idamalayar,** 2x37.5 MW KSEB 1987 **RM&LE** **2022-27**	**75 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Tender notice for RLA studies issued on 03.01.2023 and opening of tender scheduled on 14.03.2023. Works of Unit No. 1 is planned to be executed during October/ November 2023 and for Unit No. 2 during June/ July 2023.
55.	**Sabarigiri, (U1,2,3 & 5)** 4x55 MW KSEB 1966 **RMU&LE** **2022-27**	**220 (LE) + 20(U)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Scope of RLA Study under finalization.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

EASTERN REGION

ODISHA (**Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING –Under Implementation				
56.	**Balimela,** 6x60 MW OHPCL 1973-77 T-LMZ, USSR G-Electrosila, USSR **RM&LE** **2019-20** **2024-25**	**360(LE)** 382.91 109.99	**Replacement of** i) The Turbine & Generator with new ones except the water conductor system. ii) The auxiliaries of the Units including the common auxiliaries. iii) Existing Governors with micro-processor based Digital Governor. iv) Exciter and AVR with Static Excitation System. v) New Thrust bearing pads self-lubricated PTFE Type. vi) C&I system. vii) Protection system by state of the art Numerical Relays. viii) Replacement, 11/220 kV Generator Transformer, Bus Duct system. ix) New Station Auxiliary Transformer. x) Control Power cable with FRLS type cable. xi) Architectural works including interior decoration of Power House. xii) Extension of 1No. 220kV bay in Switchyard. Refurbishment of Intake gates, Draft Tube gates and civil works.	Contract Agreement signed with M/s BHEL on 21.09.2016. M/s BHEL took over the units on 18.12.2017. OHPC engaged M/s WAPCOS Ltd. as consultant. **Works Completed:** - Dismantling work of Unit- 1&2 completed. - Refurbishment work of spiral casing, stay ring & stay vanes including DT gate of Unit-1&2 completed. - Turbine Runner & shaft Assembly, Installation of Guide Apparatus, Servomotor and TGB Housing of both Unit-1&2 completed - Assembly of Stator & Rotor, Installation of Generator lower bracket. Installation of brake jacks and lowering of stator & rotor of Unit 1& 2 completed. - Refurbishment of penstocks of both Unit 1&2 completed. - Concreting Back filling of all foundations of Towers, equipment and station Transformer at 220kV Switchyard Extension bay - Installation of IDV/PRV of Unit 1&2 completed. - Installation of combined Bearing of Unit 2 with Run out checking of Unit is completed. - Erection of 20 MVA Station transformer except PRV. Mounting Arrangement completed. - Installation of SRV & BFV of Unit 1&2 completed - Installation of GT of Unit 1&2 completed. - Installation of 11 kV IPBD of unit 1&2 completed.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				- Installation of cooling water system, drainage system and governing system completed. - Erection of towers, equipment support structure in 220 kV Switchyard completed - 220 kV Switchyard bay extension work completed on 15.06.22. Loading of Station Transformer completed on 15.06.2022. - All mechanical works of Unit-2 completed. The trial mechanical spinning upto rated speed of unit-2 was conducted on 16.04.2021. - Test synchronization of Unit 2 carried out on 31.10.2021. Commercial operation of Unit 2 started from 29.12.2021. - Unit 1 Spinning done on 30.08.2021. - One month trial run of the unit-2 was completed on 20.01.2022. - Commercial operation of Unit 1 started from 15.04.2022. - One month trial run of Unit 1 completed on 11.05.2022 - Provisional takeover of Unit-2 was completed on 28.03.2022 **<u>Works under progress:</u>** **Unit 1&2** - Defect rectification work under progress - Erection of HVAC system in Power House is under Progress. **Unit 3&4** - Handed over to M/s BHEL for R&M work on 16.08.2022 & 10.08.2022 respectively. - Dismantling of TG set Unit 3 &4 completed. - Stator Assembly & Rotor Assembly of Unit 4 under progress. - Installation of cooling water system of Unit-3 &4 is under progress. - Unit 3 is scheduled to be synchronized by 09.11.2023. - Unit 4 is scheduled to be synchronized by 25.11.2023.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				Unit 5&6 - Unit 5 is scheduled to be synchronized 05.12.2025. - Unit 6 is scheduled to be synchronized by 26.02.2025.
B - SCHEMES ONGOING –Under RLA Studies				
57.	**Hirakud-I (Burla),** Unit 7 1x37.5 MW OHPC **RM&LE** **2024-25**	**37.5 (LE)** **0.9** **-**	To conduct RLA and life extension and uprating study on turbine, Generator, Auxiliaries and civil Structure (Excluding Dam and stoplog gate) related to unit and to conduct scientific study at site and Preparation of DPR for R&M or RMU of unit #7	Tender for RLA and uprating study including DPR preparation was published and sale of tender from 29.06.2022 to 16.11.2022. Opening of techno commercial bid is extended upto 23.11.2022 through corrigendum to attract more participation for competitive bidding. Subsequently two No. of bids was received on last date of submission. So the tender was cancelled and the tender document was reviewed for wide participation. The Eligibility Criteria has been modified to attract more participation. Tender document is under review as per Pre bid Queries received from Bidders.
58.	**Rengali,** 5x50 MW OHPC **RM&LE** **2024-25**	**250 (LE)** **2.90** **-**	To conduct RLA and life extension and uprating study on turbine, Generator, Auxiliaries and civil Structure (Excluding Dam) related to unit and to conduct scientific study at site and Preparation of DPR for R&M or RMU of Unit 1 to 5	Tender for RLA and uprating study including DPR preparation was published and sale of tender from 29.06.2022 to 16.11.2022. Opening of techno commercial bid is extended upto 23.11.2022 through corrigendum to attract more participaton for competitive bidding. Subsequently two No. of bids was received on last date of submission. So the tender was cancelled and the tender document was reviewed for wide participation. The Eligibility Criteria has been modified to attract more participation. Tender document is under review as per Pre bid Queries received from Bidders.
59.	**Upper Kolab,** 4x80 MW OHPC **RM&LE** **2024-25**	**320 (LE)** **2.40** **-**	To conduct RLA and life extension study on turbine, Generator, Auxiliaries and civil Structure (Excluding Dam) related to unit and to conduct scientific study at site and Preparation of DPR for R&M of Unit 1 to 4	Tender for RLA and uprating study including DPR preparation was published and sale of tender from 29.06.2022 to 16.11.2022. Opening of techno commercial bid is extended upto 23.11.2022 through corrigendum to attract more participation for competitive

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				bidding. Subsequently two No. of bids was received on last date of submission. So the tender was cancelled and the tender document was reviewed for wide participation. The Eligibility Criteria has been modified to attract more participation. Tender document is under review as per Pre bid Queries received from Bidders.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

EASTERN REGION

WEST BENGAL (**Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES Ongoing - Under Tendering				
60.	**Maithon U-1&3,** 2x20 MW + 1x23.2 MW DVC 1957-58 T - Neyrpic, France G - Siemens, W.Germany **RM&LE** **2024-25**	**40 (LE)** 109.29 7.76	• Replacement of Turbine & Accessories, Generator & Associated equipment, Protection & Control System, Generator Transformer, Circuit Breaker, Isolator, CTs, PTs, Surge protection equipment, HT bus duct, Unit Auxiliary Board, DC distribution Board etc.. • Implementation of balance Control, Monitoring & Protection system of Power Plant in Existing DCS (ABB Supplied). • Refurbishment of Water conductor system consisting of Penstock, spiral casing, stay vanes, Draft tube etc. • Repair, refurbishment and strengthening etc. of Unit-1 & 3 foundations, Power House Building civil /structural component.	• Work order for RLA study, uprating study, preparation of DPR, specification etc. placed on M/s MECON on 11.04.2019. RLA study of Unit-1 completed in October'19 and of Unit-3 on 06.01.2020. • DPR was submitted for techno-economic clearance. Civil & Electromechanical BOQ and estimated cost has been approved by CEA on 13.09.2022. • Board approval accorded. Administrative approval is in progress. • Preparation of NIT Document is under progress.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

EASTERN REGION

JHARKHAND **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation				
61.	**Panchet U-1,** 2x40 MW DVC 1959 T - NOHAB, Sweden G - AEG, West Germany **RMU&LE** **2023-24**	**40 (LE)** **+6(U)** 121.85 2.19	• Replacement of main Electro-Mechanical Equipment (Design, CFD, Model testing, supply Erection, Testing, commissioning and PG Test) consisting of Vertical Full Kaplan Turbine, Generator, Excitation System & AVR etc. and associated auxiliaries other plant Equipment/ system essential for life extension of the unit as well as station. • Implementation of Control, Monitoring & Protection system of Power Plant such as DCS, Electronic Governors, Static Excitation System, numerical relays, SCADA etc. • Refurbishment of water conducting system consisting of Penstock, spiral casing, stay vanes, Draft tube etc.	• LOA placed on BHEL for RMU work of Unit#1 on 17.01.2022. Completion period is 24 (twenty-four) month from LOA date. • Kick-off meeting held with BHEL on 07.02.2022. • Manufacturing of model completed. Turbine model testing commenced from 30.11.2022 and completed on 09.12.2022.
B- SCHEMES ONGOING - Under RLA Studies				
62.	**Subernrekha,** 2x65 MW JUUNL 1977-80 **RM&LE** **2022-27**	**130(LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies is proposed.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

NORTH EASTERN REGION

MANIPUR **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING – Under Implementation				
63.	**Loktak,** 3x35 MW NHPC USSR 1983 LMZ T-LMZ G-Leningrade, (U-1) T&G – BHEL(U-2&3) **RM&LE** **2025-26**	**105 (LE)** 273.59 42.27	i) Activities covering main equipments i.e. turbine, generator, generator transformers, other plant equipments essential for life extension of the units as well as station. ii) Activities required for ensuring efficient and sustained performance of unit as well as station. iii) Implementation of Control, Monitoring & Protection system of Power Plant such as Electronic Governors, Static Excitation System, numerical relays, SCADA. iv) Refurbishment of water conductor system and associated Civil/HM works including infrastructure works.	Petition filed in CERC on 08.08.2018 at total Estimated Cost of Rs. 273.59 crores including IDC & FC (Price Level: Sep'17). Petition on the appeal filed by respondent state Assam (APDCL) was heard in CERC on 27.02.2019. CERC has approved the proposal of R&M of Loktak Power Station on 24.07.2019. a) **E&M:** Three out of four E&M Packages i.e. EM-2 (Bus Duct), EM-3 (EOT Crane) & EM-4 (DG Set) are awarded. EM-1 (Main) package further subdivided into 13 Nos. out of which LOA for 7 Nos. sub-packages i.e. • EM-1(i) (Main Package-Turbine & Generator)-Awarded. • EM-1(ii)(GSU Transformer & Axuiliary Transformer)-Awarded. • EM-1(v)(DC system) -Awarded. • EM-1(vi)(Illumination system) -Awarded. • EM-1(vii)(HVAC System) -Awarded. • EM-1 (viii)(Firefighting system) -Awarded. • EM-1(xii) (Oil handling system) -Awarded. • EM-1(iii)(132 kV Outdoor Switchyard System)-Under retendering/Award process. • EM-1(iv)(MV & LV Switchgear)-Under retendering/Award process. • EM-1(ix)(PLCC System)-Under tendering. • EM-1(x)(Communication System)-Under pre-tendering stage. • EM-1(xi)(Electrical Workshop) -Under pre-tendering stage. • EM-1(xiii)(Mechincal workshop)-Under retendering. The work under package EM-3 (EOT Crane) has been completed & Work of EM-4 (DG Set) is in progress. b) **Civil:** Three out of five Civil packages i.e. "Restoration of Drainage system & Slope Protection at By-Pass Tunnel Area & Penstock area(C1)", "Construction of vertical bored cast-in-situ pile work at bye pass tunnel area(C2)"and "Civil works of Ithai barrage and power channel(C4)" are awarded. The work under package C1 has been completed and work under package C2 and C4 are in progress. Tendering of remaining two civil packages i.e. "Civil works of power house complex including valve house, surge shaft and tail

				pool(C3)" and "Under water concrete repair and restoration at barrage, intake structures, emergency gate(C5)" is under process. c) **HM:** HM Package has been awarded and work is in progress. **Misc. & Infrastructure works:** LOA for dredging of Khordak channel awarded on 09.06.2021. LOA for hiring of consultancy services for construction of residential and non-residential building has been awarded.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

NORTH EASTERN REGION

ASSAM **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING – Under Implementation				
64.	**Kopili Power Station,** 4x50MW NEEPCO T&G- BHEL 1988 **RM&LE** **2023-24**	**200 (LE)** 1075.19 758.17	i) Activities covering repair/rectification of tunnel, PPV, replacement of both the penstocks along with related civil works, stability study of civil structures, refurbishment of intake gate, dam etc. ii) Activities covering main equipment i.e. Turbine, generator, GTs, other plant equipment for efficient and sustained performance of the units as well as the station. iii) Activities for integration of Control, monitoring and protection system of power plant such as Electronic/digital Governors, SCADA, SAS etc. iv) Renovation of SY equipment along with replacement of instrument transformers of higher accuracy class, PI, LA SST & SAT etc. v) Activities having direct impact on improvement generator/turbine efficiency, machine availability etc. vi) Implementation of AGC in all the units.	i) CEA/CWC has cleared Cost Estimate of renovation and Modernisation for Rs. 824.12 Crs. at Jan 2021 PL excluding IDC and FC. ii) 750 KVA DG set successfully commissioned and in service. iii) Erection, Installation & commissioning of UAB & SSB panels completed. iv) Works related to Rain watering dewatering system and MIV hall flood water dewatering system completed. v) Commissioning of DT drainage & dewatering system completed. vi) Order for Reverse Engineering, Design Engineering, Manufacturing, Supply, Repair/ Refurbishment of Runners at Works, Trial Assembly of Guide Apparatus at Works, Supervision of Erect, Testing & Commissioning of Turbine of Kopili Unit-II, III and IV was awarded to M/s ANDRITZ on 06/01/22 while Unit I was awarded to 07.02.22. vii) Order for supply of 5 Nos. of 65 MVA Generator Transformers awarded to M/s BHEL. Two Nos. of 65 MVA, 11/ 220 kV Generator Transformer received at site. viii) Both BFVs received at site. ix) Order for 3 Nos. of MIV placed to M/s Voith. One No. of refurbished MIV and 3 Nos. of new MIV along with associated items received at site. Erection of MIV under progress. x) Over hauling of 40T EOT at Valve House & 17 T DT crane is completed by M/s BASU & SONS. Over hauling of 150 T EOT Crane is under progress.

				xi) 4 nos. of UAT received at site and placed at designated places. xii) Two number of Control & Relay panel for 33/ 0.415 kV substation reached site on 13.08.2021. xiii) CFD Study of Water Conductor System along with Under Water Parts by M/s Voith completed. xiv) Starter panel for Sump tank (of Oil pressure system) Electrical Control panel (of Control system and instruments for BFV) received at site. xv) Main E/M package of Andritz Hydro has completed 100% Overall design, 100 % Overall Procurement and 90% Overall manufacturing and 40% Overall dispatched from their works. xvi) Order for Procurement/ Refurbishment of Underwater/ Turbine parts of Unit II, III and IV placed with Andritz. Refurbishment of underwater parts of 3 units by AHPL is under progress. xvii) Order for Procurement of Underwater/ Turbine parts of Unit I placed with Voith. Manufacturing under process. xviii) 4 GTs received at site. Spare GT under transit. Erection of 1st two GT under progress. xix) 2 banks of 220 V DC battery bank erected and commissioned along with charger panel. 24 V and 48 V DC battery bank erected and commissioned along with charger panel. xx) Bus duct work order placed with Powergear Ltd. Supply of materials has started. xxi) All Power and Control cables of different specifications received at site. Procurement of additional requirement is under process. xxii) Works related to LP compressed air system is completed. xxiii) ACDB for switchyard & BF valve reached site on

				17.08.2021. Erection & installation pending. xxiv) Works related to Cooling water system completed. xxv) Works related to erection of new store at Umrong Nallah is in progress. xxvi) VAC System erection is in progress. xxvii)Erection of Firefighting system by Sterling and Wilson is under progress xxviii) Switchyard work by M/s Techno are in different stages of drawing approval. Switchyard work is under progress. xxix) Works on illumination system by M/s Delta Engineering is in progress. xxx) Overhauling of Unit 2, 3 and 4 draft tube completed. Overhauling of Unit 1 Draft tube in progress.
B - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/Approval				
65.	**Khandong Power Station,** 2x23 MW NEEPCO T&G- BHEL 1984-85 **RM&LE** **2024-25**	**46 (LE)** 278.63 18.23	i) Activities covering main equipment i.e. Turbine, Generator, GTs and other plant equipment for efficient and sustained performance of the units as well as station. ii) Activities for integration of control, monitoring and protection system of power plant such as Electronic/ Digital Governors, SCADA SAS etc. iii) Renovation of Switchyard with capacity enhancement along with replacement of instrument transformers of higher accuracy class, PI, LA, SST etc. iv) Activities having direct impact on improvement of generator/turbine efficiency, machine availability etc.	• DPR from CPRI, Bangalore received in the month of June'2018. Financial aspects and levelized tariff finalized and submitted to Management for approval. • Some BoP items like DG set, Firefighting system, Penstock Protection BFV, etc. procured and installed under R&M budget. • Petition for R&M proposal has been filed before CERC. • Machine resize and design energy review has been approved by CEA. • CEA has approved Rs. 123.19 Crs. for EM Cost on 05.08.2021 & Rs. 66.62 Crs. for Civil & HM Costs on 02.10.2021 for Renovation and Modernisation. • The plant was inundated in flush flood on 26.03.2022. • A revised estimate for EM package of Rs. 188.42 Crores have been approved by CEA on 18.11.2022. • Tendering process for R&M of Khandong Switchyard has been floated and expected to be finalized by the end of January-2023.

				• Revised cost estimate for Civil and HM works amounting to Rs. 90.21 Crores has been approved by the BoD, NEEPCO. • Tendering for main Turbine-Generator package was floated and under process. • Tender for civil works have already been floated.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2022-27

NORTH EASTERN REGION

MEGHALAYA **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING – Under Tendering				
66.	**Umiam Stage-III,** (Kyredemkulai) 2x30 MW MePGCL 1979 T&G - BHEL **RMU&LE** **2022-27**	**60(LE) +6(U)** 408 6.54	**Mech. Equipments (Turbine & its auxiliaries):** - Replacement of Runners, head cover & bottom ring, facing & wearing rings. Guide vanes, guide vane servomotor & gate operating mechanism. Guide bearings, coolers & bearing housing, turbine shaft, shaft seal & sealing box. Upper draft tube & draft tube liner. Inlet valve along with its servomotor & by-pass valve. Governor and turbine control system, oil pressure supply system, compressed air supply system, cooling water supply, drainage & dewatering system, auxiliary machine control etc. - Refurbishment of spiral case and stay ring, penstock & by-pass valve etc. **Elec. Equipments (Generator & its auxiliaries):** - Replacement of stator cores, stator windings & neutral leads. Rotor spoke & rim, rotor winding & excitation leads & rotor pole, Shaft, thrust & guide collars, thrust runner, coupling bolts & coupling cover. Thrust bearing pads. Segment type upper & lower guide bearings and oil coolers. Brake ring & brake/jack system, air	The feasibility study was conducted and completed by JV of TEPSCO & TEPCO, Japan under JETRO grant and IIT Roorkee submitted head measurement studies. An updated DPR as per CEA's recommendation was prepared by MePGCL and posed the scheme for JICA funding through MoP. The Department of Economic Affairs vide letter dated 20.10.2016 requested to confirm the 20 percent Counterpart Funding of the state and also provide the debt sustainability confirmation/ self-certification in respect of the 10 percent loan component of the external assistance of 80 percent of the project cost. The JICA study team, visited Shillong from 2nd to 7th October, 2017, as part of the ''Preparatory Survey''. After completion of the preparatory study, Minutes of Discussion signed among MePGCL, MoP and JICA. Bids opened on the 28.01.2019. Only two firms submitted their proposal, i.e M/s Tokyo Electric Power Services Co. Ltd. in JV with Nippon Koei Co. Ltd and M/s Integral S.A. in JV with Rodic Consultant Pvt. Ltd. The Technical Evaluation Report was prepared and the same was approved by the Board on 20.03.2019. Contract Agreement was signed on 26.08.2020. Concurrence of Contract Agreement approved by JICA on 08.12.2020 and LOA issued to M/s Integral S.A.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			cooler, current transformers, fire protection system, instruments & relays, terminal boxes on control cubicle, all cables, AC excitation system, digital AVR & excitation cubicle, excitation transformer etc. - Refurbishment of upper & lower bearing brackets, top cover, hood and air housing - Replacement of 11 KV metal enclosed cubicles & unit auxiliary transformers, station battery bank & charger etc. - Replacement of generator transformer & instruments, station service transformers, control and protection boards etc. - Replacement of motorized disconnecting switches, CTs, PTs, conductors & accessories for 132 KV switchyard. - Replacement of 12 KV power cables, 600 V power cables, control cables, paint etc. - Civil & Hydro Mechanical Work - Site Installation - Low Pressure Grouting and lining - Repair of Pressure Tunnel - Steel liner Installation - Recoating of penstock - Repair of trash rack and link tunnel - Repair of intake gate - Repair of trash rack - Repair of radial gate - Investigation and Rehabilitation of Dykes and other related item.	in JV with Rodic Consultant Pvt. Ltd on 11.12.2020. Bid document for E&M package prepared. Concurrence on the Bidding Document for E&M package received from JICA on 22.12.2021. The tender for E&M package was floated on 03.01.2022. The Pre-Bid meeting was held on 17.02.22 and all the queries by the firms was replied on 04.03.2022. The last date for submission of bids was 1st April, 2022. Approval from JICA for opening price bid received on 27.09.2022 and opening of same scheduled on 03.10.2022. Concurrence from JICA received on 23.12.2022 for issue of LOA and signing of Contract Agreement with M/s AHPL the single bidder. LOA issued to M/s Andritz Hydro Pvt. Ltd. Preparation of Bid document for Civil & Hydro mechanical works is in progress.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
B - SCHEMES ONGOING - Under RLA Studies				
67.	**Umiam-Umtru Stage-IV,** 2x30MW MePGCL, 1992 T&G-BHEL **RM&LE** **2022-27**	60 (LE) - -	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	EOI for RLA studies has been approved by Board's of Director on 15.02.2022 & Tender was floated on 23.02.2022 and the last date for submission of EOI is 15:00 hrs of 26.04 2022. Evaluation of REOI has been completed Tender Document for RLA Studies issued to shortlisted firm to submit their budgetary offer.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2027-32

NORTHERN REGION

JAMMU & KASHMIR **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies				
1.	**Salal Stage-II,** (Unit 4, 5 & 6) 3x115 MW NHPC Apr-1995 **RM&LE** **2027-32**	345 (LE) - -	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	The RLA Studies shall be taken up during 2028-29.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2027-32

NORTHERN REGION

HIMACHAL PRADESH **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies				
2.	**Chamera-I,** 3x180 MW NHPC May-1994 **RM&LE** **2027-32**	540 (LE) - -	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	The RLA Studies shall be taken up during 2028-29.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2027-32

NORTHERN REGION

UTTARAKHAND **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies				
3.	**Tanakpur,** 3x31.4 MW NHPC Apr-1993 **RM&LE** **2027-32**	94.2 (LE) - -	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	The RLA Studies shall be taken up during 2028-29.
4.	**Chibro,** 4x60 MW UJVNL 1975 (Unit 1 to 3) 1976 (Unit 4) T&G-BHEL **RM&LE** **2027-32**	240 (LE) 184.88 NIL	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	Proposed to be taken up after RMU works of Dhalipur & Dhakrani HEP.
5.	**Khodri,** 4x30 MW UJVNL 1984 T&G-BHEL **RM&LE** **2027-32**	120 (LE) 169.63 NIL	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	Proposed to be taken up after RMU works of Dhalipur & Dhakrani HEP.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2027-32

WESTERN REGION

MADHYA PRADESH **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/Approval				
6.	**Gandhi Sagar,** 5x23 MW MPPGCL 1960-66 Units 1,2&3 T – JM Voith G – Siemens, WG, Units 4&5 T&G – Hitachi, Japan **RM&LE** **2027-28**	**115 (LE)** **+** **10.83 (U)** 328.40 4.17	Under Finalization	**All the units with associated auxiliary systems submerged on 14.09.2019 due to over flooding of dam in its catchment area.** Gandhi Sagar HPS was commissioned between 1960-66. All the units with associated auxiliaries system submerged on 14.09.2019 due to over flooding of Dam The RLA studies had been carried out by M/s WAPCOS. Also three units out of five (i.e. unit 1,4&5) have been revived with the help of M/s WAPCOS. As units have already served their useful life. Hence it decided to go for comprehensive R&M of the units. Services of M/s WAPCOS have been availed as consultant. RLA Study has been completed. DPR of R&M was approved by Board of MPPGCL. However after discussion held with CEA on 07.09.2022 scope of work has been revised. Revised DPR for R&M and Uprating is under approval. Tender Document is under finalization. Consent from Rajasthan regarding equally sharing the expenditure to be incurred during R&M is awaited.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2027-32

SOUTHERN REGION

Tamil Nadu **(Amount in Rs. Crores)**

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies				
7.	**Kundah-I,** 3x20 MW TANGEDCO 1960-64 **RM&LE** **2027-32**	**60 (LE)** - Nil	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
8.	**Kundah-II,** 5x35 MW TANGEDCO 1960-65 **RM&LE** **2027-32**	**175 (LE)** - Nil	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
9.	**Kundah-III,** 3x60 MW TANGEDCO 1965-78 **RM&LE** **2027-32**	**180 (LE)** - Nil	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
10.	**Kundah-IV,** 2x50 MW TANGEDCO 1966-78 **RM&LE** **2027-32**	**100 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
11.	**Kundah-V,** 2x20 MW TANGEDCO 1964-88 **RM&LE** **2027-32**	**40 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
12.	**Mettur Tunnel,** 4x50 MW TANGEDCO 1965-66 **RM&LE** **2027-32**	**200 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
13.	**Sarkarpathy,** 1x30 MW TANGEDCO 1966 **RM&LE** **2027-32**	**30 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
14.	**Sholayar-II,** 1x25 MW TANGEDCO 1971 **RM&LE** **2027-32**	**25 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
15.	**Suruliyar,** 1x35 MW TANGEDCO 1978 **RM&LE** **2027-32**	**35 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
16.	**Kadamparai PH,** 4x100 MW TANGEDCO 1987-89 **RM&LE** **2027-32**	**400 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
17.	**Aliyar** 1x60 MW TANGEDCO 1970 **RM&LE 2027-32**	**60 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
18.	**Lower Mettur-I** 2x15 MW TANGEDCO 1988 **RM&LE 2027-32**	**30 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Due to stringent financial status of TENGEDCO, RLA/ RMU work will be taken later in a phased manner during 2027-32
19.	**Lower Mettur-II** 2x15 MW TANGEDCO 1988 **RM&LE 2027-32**	**30 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Due to stringent financial status of TENGEDCO, RLA/ RMU work will be taken later in a phased manner during 2027-32
20.	**Lower Mettur-III** 2x15 MW TANGEDCO 1988 **RM&LE 2027-32**	**30 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Due to stringent financial status of TENGEDCO, RLA/ RMU work will be taken later in a phased manner during 2027-32
21.	**Lower Mettur-IV** 2x15 MW TANGEDCO 1988-89 **RM&LE 2027-32**	**30 (LE)** - NIL	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	Due to stringent financial status of TENGEDCO, RLA/ RMU work will be taken later in a phased manner during 2027-32

Annex- I

State-wise List of Hydro RMU&LE schemes completed upto the VIII Plan

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Category	Year of Completion
Himachal Pradesh								
1	Bairasiul, NHPC	CS	3x60	25.98	25.98	18 (U)	RM&U	1991-92
2	Giri, HPSEB	SS	2x30	9.85	7.90	6 (U)	RM&U	1995-96
Punjab								
3	UBDC-I, PSPCL	SS	3x15	11.00	8.00	11 (Res)	R&M+Res.	1991-92
Uttar Pradesh								
4	Rihand, UPJVNL	SS	6x50	1.43	1.43	100(Res.)	R&M+Res.	1995-96
Karnataka								
5	Nagjhari, U-2, KPCL	SS	1x135	11.97	11.32	15 (U)	RM&U	1995-96
6	Shivasamudram, VVNL	SS	6x3 + 4x6	8.00	8.00	18 (LE)	RM&LE	N.A.
Kerala								
7	Sholayar, KSEB	SS	3x18	7.58	7.58	-	R&M	1996-97
Tamil Nadu								
8	Kadamparai (Units 3&4), TANGEDCO	SS	2x100	23.17	33.69	200(Res.)	R&M+Res.	1993-95
9	Kundah III (Units 1&2), TANGEDCO	SS	2x60	5.45	3.20	-	R&M	1991-92
10	Moyar, TANGEDCO	SS	3x12	1.62	1.30	36.00 (LE)	RM&LE	1990-91
11	Sholayar-I, TANGEDCO	SS	2x35	1.40	0.85	-	R&M	1994-95
Meghalaya								
12	Khandong, U-1, NEEPCO	CS	1x25	0.62	0.62	25 (Res)	R&M+Res.	1991-92
Tripura								
13	Gumti, TPGL	SS	3x5	17.50	17.50	-	R&M	1994-95
Total			**1282**	**125.57**	**127.37**	**429 [39 (U) + 54(LE) + 336(Res)]**		

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension; Res – Restoration; MW – Mega Watt; CS-Central Sector: SS- State Sector

Annex-II
(Sheet 1/2)

State-wise List of Hydro RMU&LE schemes completed in the IX Plan

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Category	Year of Completion
Himachal Pradesh								
1	Bhakra RB BBMB	CS	5x132	88.45	90.68	125.00 (U)	RM&U	2000-01
2	Dehar U-2 BBMB	CS	1x165	10.74	10.74	25.00 (Res.)	R&M+Res.	1998-99
3	Bairasiul, NHPC	CS	3x66	18.45	18.45	-	R&M	2000-01
4	Bassi, HPSEB	SS	4x15	5.35	4.34	-	R&M	2000-01
Jammu & Kashmir								
5	Salal St.I, NHPC	CS	3x115	51.50	51.50	-	R&M	2000-01
6	Chenani, J&KSPDC	SS	5x4.66	11.00	11.00	0.93 (Res)	R&M+Res.	2000-01
Punjab								
7	Ganguwal, U-2 BBMB	CS	1x24.2	18.90	15.00	22.00 (LE)+ 2.20 (Res)	RM&LE+Res	1997-98
8	Kotla, U-3, BBMB	CS	1x24.2	18.90	16.90	22.00 (LE)+ 2.20 (Res)	RM&LE+Res	1998-99
9	Ganguwal U-3, BBMB	CS	1x24.2	25.00	43.40	22.00 (LE)+ 2.20 (Res)	RM&LE+Res	2000-01
10	Kotla U-2, BBMB	CS	1x24.2	25.00		22.00 (LE)+ 2.20 (Res)	RM&LE+Res	2001-02
Uttarakhand								
11	Chilla U-1, 3& 4, UJVNL	SS	3x36	4.25	4.11	-	R&M	1998-99
12	Tiloth, UJVNL	SS	3x30	8.02	5.51	6.00 (U)	RM&U	1998-99
Andhra Pradesh								
13	Lower Sileru, APGENCO	SS	4x115	13.35	9.30	24.00 (Res)	R&M+Res.	2001-02
14	Srisailam RB, APGENCO	SS	7x110	16.32	11.40	-	R&M	2001-02
Karnataka								
15	Sharavathy, U-1 to 8, KPCL	SS	8x89.1	65.00	63.49	115.20 (U) +178.20 (Res)	RM&U+Res	1997-98
16	Sharavathy, U-9&10, KPCL	SS	2x89.1	17.96	14.68	28.80(U) +19.10 (Res)	RM&U+Res	1997-98

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Orissa								
17	Hirakud-I, U1&2, OHPC	SS	2x37.5	95.10	95.10	24.00(U) +75.00(LE)	RMU&LE	1997-98
Gujarat								
18	Ukai,U-1&3, GSECL	SS	2x75	24.99	24.99	75.00 (Res.)	R&M+Res.	1997-98
Maharashtra								
19	Koyna I&II, MSPGCL	SS	4x65+ 4x75	74.91	74.91	40.00(U) + 260.00(LE)	RM&U of St-I & II & LE of St-I	1999-2000
20	Koyna III, U-10, 11 &12, MSPGCL	SS	3x80	4.65	4.65	-	R&M	1997-98
Total			**4892.10**	**597.84**	**570.16**	**1093.03 [339.0(U) + 423.0(LE) + 331.03(Res.)]**		

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension;
Res – Restoration; MW – Mega Watt; CS-Central Sector: SS- State Sector

Annex- III
(Sheet 1/ 3)

State-wise List of Hydro RMU&LE schemes completed in the X Plan

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Category	Year of Completion
Himachal Pradesh								
1	Pong, BBMB	CS	6x60	17.70	17.79	36.00(U)	RM&U	2003-04
Punjab								
2	Ganguwal,U-1, BBMB	CS	1x29.25	51.28	81.99	25.89 (LE) +2.10	RM&LE+Res.	2006-07
2	Kotla, U-1, BBMB	CS	1x29.25	51.28		2.33 (Res.)	RM&LE+Res.	2006-07
4	Shanan Ph.A, PSPCL	SS	4x15+ 1x50	11.35	10.93	-	R&M	2003-04
5	Shanan, Ph.B, PSPCL	SS	4x15+ 1x50 $	35.95	13.34	60.00(LE)	RM&LE(LE for 15 MW units+R&M for 50 MW unit	2006-07
6	Anandpur Sahib, PSPCL	SS	4x33.5	3.68	1.04	-	R&M	2006-07
7	UBDC I&II, PSPCL	SS	3x15+ 3x15.45	7.89	2.44	45.00 (LE)	RM&LE(LE for 3x15MW&R &M for 3x15.45 MW	2006-07
8	Mukerian St.I, PSPCL	SS	3x15	6.04	4.38	-	R&M	2006-07
Uttarakhand								
9	Chibro, UJVNL	SS	4x60	10.45	10.52	-	R&M	2006-07
Karnataka								
10	Nagjhari, U-1&3,KPCL	SS	2x135	26.12	21.62	30 (U)	RM&U	2002-03
11	Supa PH, KPCL	SS	2x50	2.64	2.47	-	R&M	2002-03
12	Mahatma Gandhi, VVNL	SS	4x12+ 4x18	44.66	43.13	19.20 (U) +120.00 (LE)	RMU&LE	2002-03
13	Munirabad, VVNL	SS	2x9+ 1x10.3	3.64	3.53	28.30 (LE)	RM&LE	2002-03

Annex- III
(Sheet 2/3)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
14	Mani Dam, KPCL	SS	2x4.5	1.00	1.00	-	R&M	2002-03
15	Shivasamudram, VVNL	SS	6x3+ 4x6	68.38	73.17	42.00 (LE)	RM&LE	2004-05
16	Bhadra, Ph.II, KPCL	SS	1x2	3.30	2.51	2.00 (LE)	RM&LE	2005-06
17	Varahi, KPCL	SS	2x115	2.57	2.66	-	R&M	2006-07
18	Sharavathy, Ph.A, KPCL	SS	10x103.5	5.22	3.52	-	R&M	2006-07
Kerala								
19	Neriamanga-lam KSEB	SS	3x15	58.00	53.05	7.65 (U) +45.00(LE)	RMU&LE	2006-07
20	Pallivasal, KSEB	SS	3x5+ 3x7.5	94.00	371.71	37.50 (LE)	RM&LE	2002-03
21	Sengulam, KSEB	SS	4x12	114.00		48.00 (LE)	RM&LE	2002-03
22	Panniar, KSEB	SS	2x15	62.00		30.00 (LE)	RM&LE	2002-03
Tamilnadu								
23	Pykara, TANGEDCO	SS	3x6.65+ 1x11+2x	26.06	20.147	58.95(LE)	RM&LE	2004-05
24	Papanasam, TANGEDCO	SS	4x7	27.05	22.61	4.00 (U) + 28.00 (LE)	RMU&LE	2005-06
Orissa								
25	Hirakud-I (Sw.yard), OHPC	SS		9.85	15.88	-	R&M	2006-07
26	Hirakud-I,U-3&4, OHPC	SS	2x24	126.14	108.86	16.00(U)+ 48.00(LE)	RMU&LE	2005-06
West Bengal								
27	Maithon, U-2, DVC	CS	1x20	42.08	36.94	3.20(U)+ 20.00(LE)	RMU&LE	2004-05
Maharastra								
28	Bhira Tail Race, MSPGCL	SS	2x40	1.60	0.70	-	R&M	2003-04
29	Tillari, MSPGCL	SS	1x60	4.50	4.24	6.0 (U)	RM&U	2004-05

Annex- III

(Sheet 3/3)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
30	Koyna Gen. Complex, MSPGCL	SS	4x70+4x80+4x80	12.00	11.50	-	R&M	2004-05
Meghalaya								
31	Umium St.I, MePGCL	SS	4x9	81.88	84.21	36(LE)	RM&LE	2002-03
32	Khandong, NEEPCO	CS	2x25	4.00	3.35	-	R&M	2003-04
Total			**4446.60**	**1016.31**	**1029.24**	**827.73 [122.05(U) +701.25(LE) + 4.43(Res.)]**		

$ - Installed Capacity of Shanan, Ph.B, at Sl. No. 5 not included in the total, as the same has been accounted for at Sl. No. 4.

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension; Res – Restoration; MW – Mega Watt; CS-Central Sector: SS- State Sector

Annex- IV
(Sheets 1 of 2)

State-wise List of Hydro RMU&LE schemes completed in the XI Plan

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs . in crs)	Actual Exp (Rs . in crs)	Benefits (MW)	Category	Year of Completion
Himachal Pradesh								
1	Dehar Ph. A BBMB	CS	6x165	11.00	6.94	-	R&M	2010-11
2	Dehar Ph. B BBMB	CS	6x165	49.00	24.45	330(LE)	RM&LE	2009-10
Uttarakhand								
3	Tanakpur, NHPC	CS	3x31.4	10.77	11.95	-	R&M	2007-08
4	Khodri Ph.A, UJVNL	SS	4x30	5.25	6.39	-	R&M	2008-09
5	Chilla Ph.A, UJVNL	SS	4x36	23.55	21.24	-	R&M	2008-09
Andhra Pradesh								
6	Upper Sileru, APGENCO	SS	4x60	4.20	3.34	-	R&M	2009-10
Karnataka								
7	Nagjhari, U1 to 6, KPCL	SS	5x150 + 1x135	14.75	15.31	-	R&M	2009-10
8	Sharavathy Ph.B, KPCL	SS	10x103.5	20.50	11.14	-	R&M	2009-10
9	Supa, KPCL	SS	2x50	3.45	4.90	-	R&M	2009-10
10	Bhadra, KPCL	SS	2x12	1.44	0.85	-	R&M	2009-10
11	Lingnamakki, KPCL	SS	2x27.5	3.81	2.62	-	R&M	2010-11
Tamil Nadu								
12	Mettur Dam, TANGEDCO	SS	4x10	30.17	24.16	10 (U) + 40 (LE)	RMU&LE	2007-08
Maharashtra								
13	Koyna St.I&II, MSPGCL	SS	4x70 + 4x80	87.50	81.82	-	R&M	2008-09

Annex- IV

(Sheets 2 of 2)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs . in crs)				
14	Vaitarna, MSPGCL	SS	1x60	16.00	0.14	-	R&M	2009-10
15	Koyna Dam PH, MSPGCL	SS	2x18	5.78	0.25	-	R&M	2009-10
16	Koyna St.III, MSPGCL	SS	4x80	16.65	5.79	320 (LE)	RM&LE	2011-12
Manipur								
17	Loktak, NHPC	CS	3x30 derated	18.55	17.88	15.00 (Res.)	R&M + Res.	2011-12
Meghalaya								
18	Umium St.II, MePGCL	SS	2x9	90.46	55.67	2(U)+18.00(LE)	RMU&LE	2011-12
Total			**5841.2**	**412.83**	**294.84**	**735 [12.00(U) +708.00 (LE)+15.00 (Res)]**		

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension;
Res – Restoration; MW – Mega Watt; CS-Central Sector: SS- State Sector

State-wise list of Hydro RMU&LE schemes completed in the XII Plan

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (No.x.MW)	Est. Cost	Actual Exp	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion
				(Rs . in Crs)					
Himachal Pradesh									
1	Bassi, HPSEB	SS	4x15	124.25	158.26	6.0(U)+ 60(LE)	66	RMU&LE	2013-14
Jammu & Kashmir									
2	Lower Jhelum, J&KSPDC	SS	3x35	101.3	96.10	15.00(Res)	105	R&M+ Res.	2014-15
3	Sumbal Sindh, J&KSPDC	SS	2x11.3	25.00	24.59	-	22.6	R&M	2016-17
Uttarakhand									
4	Pathri, UJVNL	SS	3x6.8	113.25	108.3	20.40(LE)	20.4	RM&LE	2014-15
5	Khatima, UJVNL	SS	3x13.8	256.77	148.88	41.40 (LE)	41.4	RM&LE	2016-17
Uttar Pradesh									
6	Matatila, UPJVNL	SS	3x10.2	10.29	7.21	30.6 (LE)	30.6	RM&LE	2015-16
Andhra Pradesh									
7	Lower Sileru, APGENCO	SS	4x115	8.75	6.77	-	460	R&M	2013-14
8	Srisailam RB, APGENCO	SS	7x110	16.70	17.60	-	770	R&M	2015-16
Telangana									
9	Nagarjuna Sagar Ph-I works, TSGENCO	SS	1x110+ 7x100.8	33.35	13.90	-	815.6	R&M	2012-13
Karnataka									
10	Supa, KPCL	SS	2x50	3.45	3.88	-	100	R&M	2014-15
11	Nagjhari,U-1 to 6, KPCL	SS	1x135 (U-6)	69.21	64.49	15 (U)	150	RM&U	2015-16
12	Sharavathy Genarating Station (Ph B), KPCL	SS	10x103.5	20.00	29.27	-	1035	R&M	2016-17
Kerala									
13	Idamalayar, KSEB	SS	2x37.5	14.50	13.22	-	75	R&M	2012-13

Annex- V

(Sheet 2 of 2)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (No.x.MW)	Est. Cost	Actual Exp	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs . in Crs)					
14	Sabarigiri, U-4 KSEB	SS	1x55	52.20	50.41	5(U)	60	RM&U	2014-15
15	Poringalkuthu, KSEB	SS	4x8	88.63	51.90	4 (U)+ 32.00 (LE)	36	RMU&LE	2015-16
Tamil Nadu									
16	Periyar, TANGEDCO	SS	4x35	161.18	133.68	28.00(U)+ 140(LE)	168	RMU&LE	2015-16
Odisha									
17	Rengali Unit-1 OHPC	SS	1x50	47.50	36.76	50(LE)	50	RM&LE	2012-13
18	Rengali Unit-2 OHPC	SS	1x50	25.20	20.73	50(LE)	50	RM&LE	2013-14
West Bengal									
19	Jaldhaka St.I, WBSEDCL	SS	3x9	88.62	79.97	27 (LE)	27	RM&LE	2016-17
Assam									
20	Khandong, NEEPCO	CS	1x25	25.05	29.18	25(LE)	25	RM&LE	2014-15
21	Kopili, NEEPCO	CS	2x50	50.22	50.92	-	100	R&M	2014-15
Total			**4149.60**	**1335.42**	**1146.02**	**549.40 [58(U)+ 476.40 (LE) + 15 (Res)]**	**4207.6**		

Annex- VI
(Sheet 1 of 1)

State-wise list of Hydro RMU&LE schemes completed during 2017-22

Sl. No	Name of Project, Agency, Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion
A. COMPLETED SCHEMES IN 2017-22									
Jammu & Kashmir (UT)									
1	Salal, NHPC (6x115)	CS	5x115	58.01	51.08	-	575	R&M	Completed in 2019-20
2	Chenani, J&KSPDC (5x4.66)	SS	5x4.66	34.28	21.84	23.30 (LE)	23.3	RM&LE	Completed in 2021-22
3	Ganderbal, (Unit-3) J&KSPDC (2x3+2x4.5)	SS	1x4.5	18.00	3.26	4.5 (LE)	4.5	RM&LE	Completed in 2021-22
Himachal Pradesh									
4	Ganguwal, BBMB (1x29.25+2x24.2) & Kotla, BBMB (1x29.25+2x24.2)	CS	1x24.2 (U-2) 1x24.2 (U-3)	14.19	9.58	48.4 (LE)	48.4	RM&LE	Completed in 2017-18
5	Dehar Power House (Unit-6), BBMB (6x165)	CS	1x165	19.87	16.00	-	165	R&M	Completed in 2017-18
6	Dehar Power House (Unit-3), BBMB (6x165)	CS	1x165	23.00	18.67	-	165	R&M	Completed in 2021-22
7	Baira Siul, NHPC (3x60)	CS	3x60	341.41	330	180 (LE)	180	RM&LE	Completed in 2021-22
Gujarat									
8	Ukai, GSECL (4x75)	SS	3x75 (U-1,2,&4)	7.30	7.30	-	225	R&M	Completed in 2021-22
Karnataka									
9	Bhadra River Bed units, KPCL (2x12)	SS	2x12	23.55	20.12	-	24	R&M	Completed in 2019-20
Tamil Nadu									
10	Sholayar-I, TANGEDCO (2x35)	SS	2x35	90.44	66.94	70 (LE) + 14(U)	84	RMU&LE	Completed in 2019-20
Kerala									
11	Sholayar, KSEB (3x18)	SS	3x18	199.55	84.26	54 (LE)	54	RM&LE	Completed in 2020-21
12	Idukki 1st stage, KSEB (3x130)	SS	3x130	89.90	65.76	-	390	R&M	Completed in 2020-21
Odisha									
13	Hirakud-I OHPCL (2x37.5)	SS	2x37.5 (U5&6)	158.77	101.83	75.00 (LE) + 12.2 (U)	87.2	RMU&LE	Completed in 2021-22
14	Hirakud-II (Chiplima), OHPCL (3x24)	SS	1x24 (U-3)	65.67	52.04	24.00 (LE)	24	RM&LE	Completed in 2019-20
Sub Total (A)			**2023.20**	**1143.94**	**848.68**	**505.4 [479.2(LE) + 26.2(U)**	**2049.40**		

@ This cost includes Scheme I only i.e. Rehabilitation of damaged/burnt equipments.

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension; Res – Restoration;

MW – Mega Watt; CS-Central Sector: SS- State Sector

State-wise List of Hydro RMU&LE schemes programmed for completion during 2022-27

Sl. No	Name of Project, Agency Inst. Cap. (No.x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
A. Completed Schemes									
Himachal Pradesh									
1	Bhabha Power House, HPSEB (3x40)	SS	3x40	90.14	43.01	120 (LE)	120	RM&LE	Completed in 2022-23
Uttar Pradesh									
2	Rihand, UPJVNL (6x50)	SS	6x50	132.20	127.6	300 (LE)	300	RM&LE	Completed in 2022-23
Uttarakhand									
3	Tiloth (Maneri Bhali - I), UJVNL (3x30)	SS	3x30	384.66	171.27	90 (LE)	90	RM&LE	Completed in 2022-23
Telangana									
4	Nagarjuna Sagar Ph-II works, TSGENCO (1x110+7x100.8)	SS	1x110+7x100.8	22.17	14.34	-	815.6	R&M	Completed in 2022-23
5	Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)	SS	2x30.6	29.74	1.50	-	61.2	R&M	Completed in 2022-23
Karnataka									
6	Munirabad Dam Power House, KPCL (2x9 + 1x10)	SS	2x9 + 1x10	4.60	2.69	28 (LE)	28	RM&LE	Completed in 2022-23
Sub Total(A)			**1414.80**	**663.51**	**360.41**	**538 [538(LE)+ 0(U)]**	**1414.80**		
B. Ongoing Schemes – Under Implementation									
Himachal Pradesh									
7	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	570.38	540.00(LE)+ 90.00 (U)	630	RMU&LE	2023-24
Punjab									
8	Ranjit Sagar Dam, PSPCL (4x150)	SS	4x150	95.48	8.52	-	600	R&M	2023-24
Uttarakhand									
9	Chilla Ph B, UJVNL (4x36)	SS	4x36	490.56	-	144(LE)+ 12(U)	156	RMU&LE	2025-26
10	Dhalipur, UJVNL (3x17)	SS	3x17	152.65	79.66	51 (LE)	51	RM&LE	2023-24
11	Dhakrani, UJVNL (3x11.25)	SS	3x11.25	137.31	6.64	33.75 (LE)	33.75	RM&LE	2025-26
Uttar Pradesh									
12	Obra, UPJVNL (3x33)	SS	3x33	58.8	46.4	99 (LE)	99	RM&LE	2023-24
Telangana									
13	Pochampad HPS Stage -1, TSGENCO (3x9)	SS	3x9	9.655	-	-	27	R&M	2026-27
Andhra Pradesh									
14	Upper Sileru Power House, APGENCO (4x60)	SS	4x60	-	-	-	240	R&M	2026-27
15	Nagarjunasagar Right Canal Power House, APGENCO (3x30)	SS	3x30	-	-	-	90	R&M	2025-26
16	Tungabhadra Dam, APGENCO (4x9)	SS	4x9	-	-	36 (LE)	36	RM&LE	2025-26
17	Hampi Canal PH, APGENCO (4x9)	SS	4x9	-	-	36 (LE)	36	RM&LE	2025-26
Karnataka									
18	Nagjhari (Unit-1 to 3) KPCL (6x150)	SS	3x150 (U-1 to 3)	266.00	16.97	450 (LE)	450	RM&LE	2025-26
19	Shivasamudram, KPCL (6x3+4x6)	SS	6x3+4x6	169.18	11.35	42 (LE)	42	RM&LE	2024-25
20	Kadra Dam Power House, KPCL(3x50)	SS	3x50	44.47	1.72	-	150	R&M	2024-25
21	Kodasalli Dam Power House, KPCL (3x40)	SS	3x40	50.60	1.72	-	120	R&M	2024-25
22	Gerusoppa Dam Power House (Sharavathy Tail Race), KPCL (4x60)	SS	4x60	59.66	2.21	-	240	R&M	2023-24
23	Linganamakki Dam Power House, KPCL (2x27.5)	SS	2x27.5	56.20	1.85	-	55	R&M	2023-24

Sl. No	Name of Project, Agency Inst. Cap. (No.x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
Jharkhand									
24	Panchet U-1, DVC (2x40)	CS	1x40 (U-1)	121.85	2.19	40(LE) + 6(U)	46	RMU&LE	2023-24
Tamil Nadu									
25	Moyar PH, TANGEDCO (3x12)	SS	3x12	67.05	68.32	36 (LE)+ 6(U)	42	RMU&LE	2024-25
26	Kodayar PH-I, TANGEDCO (1x60)	SS	1x60	88.48	-	60 (LE)+ 10 (U)	70	RMU&LE	2024-25
Kerala									
27	Kuttiyadi, KSEB (3x25)	SS	3x25	377.41	0.9489	75.00 (LE) + 7.5 (U)	82.5	RMU&LE	2024-25
28	Sabarigiri (Unit- 6), KSEB (4x55+2x60)	SS	1x60	-	-	-	60	R&M	2024-25
Odisha									
29	Balimela, OHPCL (6x60)	SS	6x60	382.91	109.99	360(LE)	360	RM&LE	2024-25
Assam									
30	Kopili Power Station, NEEPCO (4x50)	CS	4x50	1075.19	758.17	200(LE)	200	RM&LE	2023-24
Manipur									
31	Loktak, NHPC (3x35)	CS	3x35	273.59	42.27	105 (LE)	105	RM&LE	2025-26
Sub Total (B)			**3889.75**	**4466.82**	**1729.31**	**2439.25 [2307.75(LE)+ 131.5(U)]**	**4021.25**		
C. Ongoing Schemes – Under Tendering									
Himachal Pradesh									
32	Giri, HPSEB (2x30)	SS	2x30	440.12	-	60.00 (LE)	60	RM&LE	2024-25
Uttarakhand									
33	Ramganaga, UJVNL (3x66)	SS	3x66	455.20	-	198 (LE)	198	RM&LE	2022-27
Gujarat									
34	Kadana PSS, GSECL (4x60)	SS	4x60	750.25	-	240 (LE) + 20 (U)	260	RMU&LE	2025-26
Karnataka									
35	Sharavathy Generating Station, KPCL (10x103.5)	SS	10x103.5	196.56	11.07	1035 (LE)	1035	RM&LE	2025-26
West Bengal									
36	Maithon, DVC (2x20+1x23-U#2)	CS	2x20 (U-1&3)	109.29	7.76	40.00 (LE)	40	RM&LE	2024-25
Meghalaya									
37	Umium St.III, (Kyrdemkulai) MePGCL (2x30)	SS	2x30	408.00	6.54	60(LE) + 6(U)	66	RMU&LE	2022-27
Sub Total (C)			**1633**	**2359.42**	**25.37**	**1659 [1633(LE)+ 26(U)]**	**1659.00**		

Sl. No	Name of Project, Agency Inst. Cap. (No.x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
D. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval									
Uttarakhand									
38	Kulhal, UJVNL (3x10)	SS	3x10	115.24	-	30(LE)	30	RM&LE	2022-27
Madhya Pradesh									
39	Pench, MPPGCL (2x80)	SS	2x80	-	-	160 (LE)	160	RM&LE	2025-26
Karnataka									
40	Supa Dam Power House, KPCL (2x50)	SS	2x50	47.91	1.206	-	100	R&M	2024-25
Tamil Nadu									
41	Kodayar PH-II, TANGEDCO (1x40)	SS	1x40	-	-	40.0(LE)+ 6(U)	46	RMU&LE	2026-27
Andhra Pradesh									
42	Lower Sileru, APGENCO (4x115)	SS	4x115	350.00	1.8	460(LE)	460	RM&LE	2026-27
Assam									
43	Khandong Power Station, NEEPCO (2x23)	CS	2x23	278.63	18.23	46 (LE)	46	RM&LE	2024-25
Sub Total (D)			**836.00**	**791.78**	**21.24**	**742 736(LE)+ 6(U)]**	**842.00**		
E. Ongoing Schemes – Under RLA Studies									
Jammu & Kashmir (UT)									
44	Salal Stage-I, (Unit 1,2 &3) NHPC (3x115)	CS	3x115	-	-	345 (LE)	345	RM&LE	2022-27
Himachal Pradesh									
45	Pong Power House, BBMB (6x66)	CS	6x66	402.00	-	396 (LE) + 54 (U)	450	RMU&LE	2026-27
Punjab									
46	Anandpur Sahib Hydel Project, PSPCL (4x33.5)	SS	4x33.5	-	-	134 (LE)	134	RM&LE	2022-27
47	Mukerian St.I, St.II, St.III & St.IV, PSPCL (3x15, 3x15, 3x19.5& 3x19.5)	SS	3x15, 3x15, 3x19.5& 3x19.5	2.5	-	207 (LE)	207	RM&LE	2022-27
48	Shanan HEP, PSPCL (1x50+ 4x15)	SS	1x50+ 4x15	8.02	-	110 (LE)	110	RM&LE	2022-27
49	UBDC St.I & St.II, PSPCL (3x15+ 3x15.45)	SS	3x15+ 3x15.45	1.71	-	91.35 (LE)	91.35	RM&LE	2022-27
Rajasthan									
50	Rana Pratap Sagar RRVUNL (4x43)	SS	4x43	-	-	172 (LE)	172	RM&LE	2026-27
Madhya Pradesh									
51	Bansagar Ton-I, MPPGCL (3x105)	SS	3x105	-	-	315 (LE)	315	RM&LE	2026-27
52	Bargi, MPPGCL (2x45)	SS	2x45	-	-	90 (LE)	90	RM&LE	2026-27
Karnataka									
53	MGHE, KPCL (4x21.6+ 4x13.2)	SS	4x21.6+ 4x13.2	97.00	7.75	139.2 (LE)	139.2	RM&LE	2026-27
Maharashtra									
54	Vaitarna, MSPGCL (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2026-27
55	Koyna Dam foot (Right Bank), MSPGCL (2x20)	SS	2x20	-	-	40 (LE)	40	RM&LE	2026-27
56	Koyna St-3, MSPGCL (4x80)	SS	4x80	-	-	320 (LE)	320	RM&LE	2026-27
57	Tillari, MSPGCL (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
58	Bhira Tail Race, MSPGCL (2x40)	SS	2x40	-	-	80 (LE)	80	RM&LE	2022-27
Andhra Pradesh									
59	Machkund St.I & St.II, APGENCO (3x17+ 3x23)	SS	3x17+ 3x23	500.00	-	120 (LE) +9 (U)	129	RMU&LE	2026-27
Kerala									
60	Idukki 2nd stage, KSEB (3x130)	SS	3x130	-	-	390 (LE)	390	RM&LE	2022-27
61	Idamalayar, KSEB (2x37.5)	SS	2x37.5	-	-	75 (LE)	75	RM&LE	2022-27
62	Sabarigiri, (Unit-1,2,3, & 5) KSEB (4x55+2x60)	SS	4x55 (Unit-1,2,3, & 5)	-	-	220(LE) + 20 (U)	240	RMU&LE	2022-27

Sl. No	Name of Project, Agency Inst. Cap. (No.x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
Odisha									
63	Hirakud-I (Burla), OHPC Unit # 1, 2 - 49.5 MW (After RM &U) Unit# 3, 4 - 32 MW (After RM & U) Unit#5, 6 - 43.65 MW (After RM & U) Unit#7 - 37.5 MW	SS	1x37.5 (Unit 7)	0.9	-	37.5 (LE)	37.5	RM&LE	2024-25
64	Rengali, OHPC (5x50)	SS	5x50	2.9	-	250 (LE)	250	RM&LE	2024-25
65	Upper Kolab, OHPC (4x80)	SS	4x80	2.4	-	320 (LE)	320	RM&LE	2024-25
Jharkhand									
66	Subernrekha, JUUNL (2x65)	SS	2x65	-	-	130(LE)	130	RM&LE	2022-27
Meghalaya									
67	Umiam-umtru Stage-IV, MePGCL (2x30)	SS	2x30	-	-	60(LE)	60	RM&LE	2022-27
Sub Total (E)			**4162.05**	**1017.43**	**7.75**	**4245.05 [4162.05(LE)+ 83(U)]**	**4245.05**		
Total (A+B+C+D+E)			**11935.60**	**9298.96**	**2144.07**	**9623.30 [9376.80(LE)+ 246.5(U)]**	**12182.10**		

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension; Res – Restoration; MW – Mega Watt; CS-Central Sector: SS- State Sector

State-wise List of Hydro RMU&LE schemes programmed for completion during 2027-32

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Completion Target
				(Rs. in Crs.)					
A.Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval									
1	Gandhi Sagar, MPPGCL (5x23)	SS	5x23	328.4	4.17	115 (LE) + 10.83 (U)	125.83	RMU&LE	2027-28
Sub Total(A)			**115**	**328.4**	**4.17**	**125.83 115 (LE) + 10.83 (U)**	**125.83**		
B. Ongoing Schemes – Under RLA Studies									
Jammu & Kashmir (UT)									
2	Salal Stage-II, (Unit 4,5 &6) NHPC (6x115)	CS	3x115	-	-	345 (LE)	345	RM&LE	2027-32
Himachal Pradesh									
3	Chamera-I, NHPC (3x180)	CS	3x180	-	-	540 (LE)	540	RM&LE	2027-32
Uttarakhand									
4	Tanakpur, NHPC (3x31.4)	CS	3x31.4	-	-	94.2 (LE)	94.2	RM&LE	2027-32
5	Chibro, UJVNL (4x60)	SS	4x60	184.88	-	240 (LE)	240	RM&LE	2027-32
6	Khodri, UJVNL (4x30)	SS	4x30	169.63	-	120 (LE)	120	RM&LE	2027-32
Tamil Nadu									
7	Kundah-I, TANGEDCO (3x20)	SS	3x20	-	-	60 (LE)	60	RM&LE	2027-32
8	Kundah-II, TANGEDCO (5x35)	SS	5x35	-	-	175 (LE)	175	RM&LE	2027-32
9	Kundah-III, TANGEDCO (3x60)	SS	3x60	-	-	180 (LE)	180	RM&LE	2027-32
10	Kundah-IV, TANGEDCO (2x50)	SS	2x50	-	-	100 (LE)	100	RM&LE	2027-32
11	Kundah-V, TANGEDCO (2x20)	SS	2x20	-	-	40 (LE)	40	RM&LE	2027-32
12	Mettur Tunnel, TANGEDCO (4x50)	SS	4x50	-	-	200 (LE)	200	RM&LE	2027-32
13	Sarkarpathy, TANGEDCO (1x30)	SS	1x30	-	-	30 (LE)	30	RM&LE	2027-32
14	Sholayar-II, TANGEDCO (1x25)	SS	1x25	-	-	25 (LE)	25	RM&LE	2027-32
15	Suruliyar, TANGEDCO (1x35)	SS	1x35	-	-	35 (LE)	35	RM&LE	2027-32
16	Kadamparai PH, TANGEDCO (4x100)	SS	4x100	-	-	400 (LE)	400	RM&LE	2027-32
17	Aliyar, TANGEDCO (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2027-32
18	Lower Mettur-I , TANGEDCO (2x15)	SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
19	Lower Mettur-II , TANGEDCO (2x15)	SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
20	Lower Mettur-III , TANGEDCO (2x15)	SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
21	Lower Mettur-IV , TANGEDCO (2x15)	SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
Sub Total (B)			**2764.20**	**354.51**	**0.00**	**2764.20 [2764.20 (LE)+ 0(U)]**	**2764.20**		
Total (A+B)			**2879.20**	**682.91**	**4.17**	**2890.03 [2879.20 (LE)+ 10.83(U)]**	**2890.03**		

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension; Res – Restoration;
MW – Mega Watt; CS-Central Sector: SS- State Sector

Abbreviations

1	APGENCO	Andhra Pradesh Generation Corporation Limited
2	BBMB	Bhakra Beas Management Board
3	DVC	Damodar Valley Corporation
4	GSECL	Gujarat State Electricity Corporation Limited
5	HPSEB	Himachal Pradesh State Electricity Board
6	J&KSPDC	Jammu & Kashmir State Power Development Corpn.
7	JSEB	Jharkhand State Electricity Board.
8	KPCL	Karnataka Power Corporation Limited
9	KSEB	Kerala State Electricity Board
10	MSPGCL	Maharashtra State Power Generation Corporation Limited
11	MePGCL	Meghalaya Power Generation Corporation Limited
12	MPPGCL	Madhya Pradesh Power Generation Corporation Limited
13	NEEPCO	North-East Electric Power Corporation Limited
14	OHPC	Odisha Hydro Power Corporation Limited
15	PSPCL	Punjab State Power Corporation Limited
16	RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam Limited
17	TANGEDCO	Tamil Nadu Generation and Distribution Corporation Limited
18	TSGENCO	Telangana State Power Generation Corporation Limited
19	UPJVNL	Uttar Pradesh Jal Vidyut Nigam Limited
20	UJVNL	Uttarakhand Jal Vidyut Nigam Limited
21	VVNL	Vishwesharayya Vidyut Nigam Limited
22	WBSEDCL	West Bengal State Electricity & Distribution Company Limited
23	AVR	Automatic Voltage Regulator
24	BOQ	Bill of Quantity
25	CERC	Central Electricity Regulatory Commission
26	CPRI	Central Power Research Institute
27	DPR	Detailed Project Report
28	DVR	Digital Voltage Regulator
29	JICA	Japan International Co-operation Agency
30	LOA	Letter of Award
31	RLA	Residual Life Assessment