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Government of India
विद्युत् मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
जल विद्युत अभियांत्रिकी व प्रौद्योगिकी विकास प्रभाग
Hydro Engineering and Technology Development Division

जल विद्युत परियोजना 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
(July - September, 2022)
(2nd Quarter of 2022-23)

C O N T E N T S

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

Programme for the period 2022-27 & 2027-32

INDEX OF SCHEMES

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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							
I.	Jammu & Kashmir						
1.		Salal Stage-II	-	NHPC	2027-32	Under RLA Studies	71
II.	Himachal Pradesh						
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14.		-	Sholayar-II				
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16.		-	Kadamparai PH				
17.		-	Aliyar				
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**Background
&
Plan-wise Summary**

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 Period and 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 64 Hydro Electric Plants (HEPs) with an aggregate installed capacity of 11736.60 MW is programmed for completion during the year 2022-27 with its break-up as 2349.15 MW through R&M at 09 HEPs, 7596.45 MW through Life Extension at 44 HEPs and 1791 MW through Life Extension and Uprating at 11 HEPs. The 11 HEPs where both Life Extension & Uprating are envisaged, the aggregate installed capacity of 1791 MW shall get uprated after completion of R&M works to 2017.5 MW resulting in additional benefit of installed capacity of 226.5 MW. As such, the revised aggregate installed capacity after completion of RMU&LE works of these 64 projects would be 11963.10 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, Four (4) Schemes with an aggregate installed capacity of about 538 MW have been completed till September, 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. 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 आरएमयू 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 11736.60 मेगावाट की कुल स्थापित क्षमता के साथ 64 जल विद्युत संयंत्रों पर नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार का काम पूरा करने के लिए कार्यक्रम बनाया गया है, जिसमें से 09 जल विद्युत संयंत्रों में 2349.15 मेगावाट की क्षमता नवीनीकरण एवं आधुनिकीकरण के माध्यम से, 44 जल विद्युत संयंत्रों में 7596.45 मेगावाट की क्षमता जीवन विस्तार के माध्यम से और 11 जल विद्युत संयंत्रों में 1791 मेगावाट की क्षमता जीवन विस्तार और उन्नयन के माध्यम से कार्य किया जाएगा। जिन 11 जल विद्युत संयंत्रों में जीवन विस्तार और उन्नयन दोनों की परिकल्पना की गई है, उनमें 1791 मेगावाट की कुल क्षमता में 2017.5 मेगावाट तक वृद्धि होगी, जिसके परिणामस्वरूप 226.5 मेगावाट स्थापित क्षमता का अतिरिक्त लाभ होगा। अतः, इन 64 परियोजनाओं की कुल क्षमता नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार (आरएमयू एंड एलई) के समापन के बाद 11963.10 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 538 मेगावाट की कुल संस्थापित क्षमता वाली चार (4) योजनाओं को सितंबर, 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 30.09.2022)

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.)]

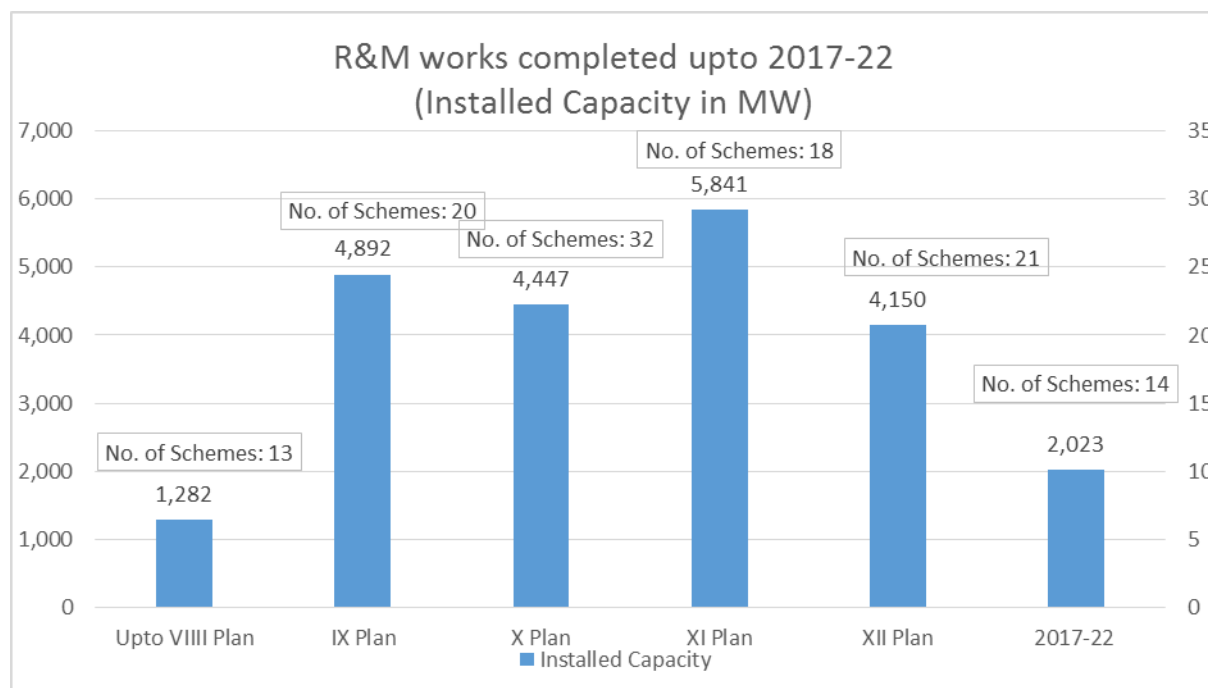
Abbreviations:

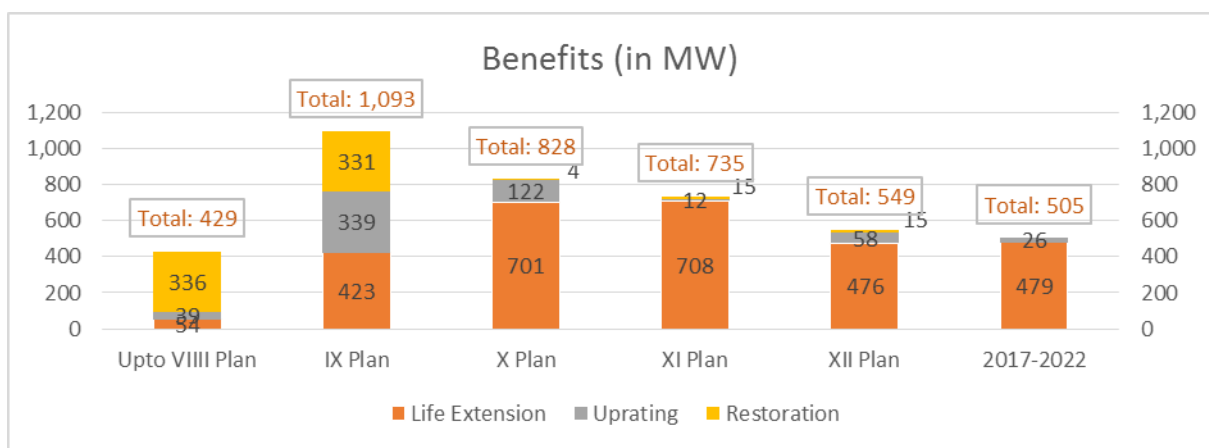
MW – Mega Watt;

Res. – Restoration;

U – Upgrading;

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	56	64	11736.6	9613.95 [9387.45(LE)+226.5(U)]
2.	Completed	0	4	4	538	538 [538 (LE)+ 0(U)]
3.	Under Implementation	4	22	26	4936.9	2739.25 [2587.75 (LE)+ 151.5(U)]
4.	Under Tendering	1	8	9	1163	1169 [1163(LE)+ 6(U)]
5.	Under DPR Preparation/ Finalisation/ Approval	1	6	7	1871	1877 [1871(LE)+ 6(U)]
6.	Under RLA Studies	2	16	18	3227.7	3290.7 [3227.7 (LE)+ 63(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	2879.2 [2879.2(LE)+ 0(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	115 [115(LE)+ 0(U)]
5.	Under RLA Studies	3	17	20	2764.2	2764.2 [2764.2(LE)+ 0(U)]

Abbreviations:

MW – Mega Watt;
LE – Life Extension;

Res. – Restoration; U – Uprating;
RLA- Residual Life Assessment

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

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

<u>Year 2022-23</u>	<u>Year 2023-24</u>	<u>Year 2024-25</u>	<u>Year 2025-26</u>	<u>Year 2026-27</u>
<u>Himachal Pradesh:</u> Bhabha Power House, HPSEB, (3x40) =120 MW (Completed in 2022-23) <u>Uttarakhand:</u> Tiloth, UJVNL (3x30) =90 MW (Completed in 2022-23) <u>Uttar Pradesh:</u> Rihand, UPJVNL (6x50) =300 MW (Completed in 2022-23) <u>Karnataka:</u> Munirabad Dam Power House, KPCL, (2x9 + 1x10) =28 MW, (Completed in 2022-23) <u>Telangana:</u> Nagarjuna Sagar Ph-II, TSGENCO, (1x110+7x100.8) =815.6 MW (2022-23)	<u>Himachal Pradesh:</u> Bhakra LB, BBMB, (5x108) =540 MW (2023-24) <u>Uttar Pradesh:</u> Obra, UPJVNL (3x33) =99 MW (2023-24) <u>Punjab:</u> i) Ranjit Sagar Dam, PSPCL, (4x150) =600 MW (2023-24) ii) Shanan, PSPCL, (1x50+4x15) =110 MW (2023-24) <u>Uttarakhand:</u> Dhalipur, UJVNL (3x17) =51 MW (2023-24) <u>Jharkhand:</u> Panchet U-1, DVC, (1x40) =40 MW (2023-24) <u>Assam:</u> Kopili Power Station, NEEPCO (4x50)=200 MW (2023-24)	<u>Himachal Pradesh:</u> Giri, HPSEB, (2x30) =60 MW (2024-25) <u>Punjab:</u> i) Anandpur Sahib, PSPCL, (4x33.5) =134 MW (2024-25) ii) Mukerian St.I, St.II, St.III & St.IV, PSPCL, (3x15, 3x15, 3x19.5 & 3x19.5) =207 MW (2024-25) iii) UBDC St.I & St.II, PSPCL, (3x15+3x15.45) =91.35 MW (2024-25) <u>Karnataka:</u> i) Shivasamudram, KPCL, (6x3+4x6) =42 MW, (2024-25) ii) Kadra Dam Power House, KPCL (3x50) =150 MW (2024-25) iii) Kodalalli Dam Power House, KPCL (3x40) =120 MW (2024-25) <u>Telangana:</u> Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)=61.2 MW (2024-25)	<u>Uttarakhand:</u> i) Dhakrani, UJVNL, (3x11.25) =33.75 MW, (2025-26) ii) Chilla Ph B, UJVNL (4x36)=144 MW (2025-26) <u>Gujarat:</u> Kadana PSS, GSECL (4x60) =240 MW (2025-26) <u>Madhya Pradesh:</u> i) Bansagar Ton-I, MPPGCL, (3x105)=315 MW (2025-26) ii) Pench, MPPGCL, (2x80) =160 MW, (2025-26) <u>Andhra Pradesh:</u> 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)	<u>Jammu & Kashmir:</u> Salal Stage-I (Unit 1,2 &3) NHPC (3x115)=345 MW (2022-27) <u>Himachal Pradesh:</u> Pong Power House, BBMB, (6x66) =396 MW (2026-27) <u>Uttarakhand:</u> i) Ramganga, UJVNL (3x66)=198 MW (2022-27) ii) Kulhal, UJVNL (3x10)=30 MW (2022-27) <u>Madhya Pradesh:</u> Bargi, MPPGCL, (2x45)=90 MW (2026-27) <u>Maharashtra:</u> i) Vaitarna, MSPGCL (1x60)=60 MW (2022-27) ii) Koyna Dam foot (Right Bank), MSPGCL (2x20)=40 MW (2022-27) iii) Koyna St-3, MSPGCL (4x80)=320 MW (2022-27) iv) Tillari, MSPGCL (1x60)=60 MW (2022-27) v) Bhira Tail race, MSPGCL (2x40)=80 MW (2022-27)

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

<u>Year 2022-23</u>	<u>Year 2023-24</u>	<u>Year 2024-25</u>	<u>Year 2025-26</u>	<u>Year 2026-27</u>
		<u>Kerala:</u> Kuttiyadi, KSEB, (3x25) =75 MW (2024-25) <u>Tamil Nadu:</u> i)Kodayar PH-I, TANGEDCO (1x60) =60 MW (2024-25) ii) Moyar PH, TANGEDCO (3x12) =36 MW (2024-25) <u>West Bengal:</u> Maithon (U 1& 3), DVC, (2x20) =40 MW (2024-25) <u>Odisha:</u> 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)	<u>Karnataka:</u> i) Nagjhari U-1 to U-3, KPCL, (3x150) =450 MW, (2025-26) ii) Gerusoppa Dam Power House, KPCL (4x60) =240 MW (2025-26) iii) Linganamakki Dam Power House, KPCL (2x27.5) =55 MW (2025-26) iv) Supa Dam Power House, KPCL (2x50) =100 MW (2025-26) v) Sharavathy Generating Station, KPCL (10x103.5) =1035 MW (2025-26) <u>Manipur:</u> Loktak, NHPC, (3x35) =105 MW (2025-26)	<u>Andhra Pradesh:</u> 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) <u>Kerala:</u> i) Idukki 2nd stage, KSEB, (3x130) =390 MW (2022-27) ii) Sabarigiri, KSEB (Unit-1,2,3, 5 & 6) (4x55+ 2x60)=280 MW (2022-27) iii) Idamalayar, KSEB (2x37.5)=75 MW (2022-27) <u>Karnataka:</u> MGHE, KPCL, (4x21.6+4x13.2) =139.2 MW (2026-27) <u>Tamil Nadu:</u> Kodayar PH-II, TANGEDCO (1x40) =40 MW (2026-27) <u>Jharkhand:</u> Subernrekha, JUUNL, (2x65) =130 MW (2022-27)

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

<u>Year 2022-23</u>	<u>Year 2023-24</u>	<u>Year 2024-25</u>	<u>Year 2025-26</u>	<u>Year 2026-27</u>
		<u>Assam:</u> Khandong Power Station, NEEPCO (2x23)=46 MW (2024-25)		<u>Meghalaya:</u> i) Umium St.III (Kyrdemkulai), MePGCL (2x30)=60 MW (2022-27) ii) Umium-umtru St.IV, MePGCL (2x30)=60 MW (2022-27)
1353.6 MW (5 Schemes)	1640 MW (7 Schemes)	2090.05 MW (17 Schemes)	3039.75 MW (14 Schemes)	3613.2 MW (21 Schemes)

**State-wise Status of R&M Schemes
(During 2022-27)**

**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. - 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. - 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.	- 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. - Works completed. - 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.
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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) 489.77 559.92	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). Unit 2 - Works started from. 26.4.2010, with scheduled completion period of 210 days. The unit was synchronized on 23.06.13. - 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
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				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 <u>Unit 4</u>
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				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. <u>Unit 3</u> Unit taken on shutdown for RM&U works on 01.04. 2019. The dispatch authorization of Runner & turbine component and Generator component has been issued to the consortium. 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. The work of busduct, erection of UCB Panel and static excitation system is in progress. Shaft decoupled from the runner on
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				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. The other allied parts viz. O-ring, head cover etc. have been lowered/ placed and aligned successfully. 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 Impedance and HV testing of Rotor Poles has been completed successfully on dated 26.06.2020. 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. Coupling of generator shaft with turbine shaft is ready and will be done after arrival of Japanese nationals at site. Coupling of generator shaft with turbine shaft is ready. The Japanese Nationals arrived at site on 26.03.2021. Final measurement of runner gap, coupling of turbine shaft with generator shaft alongwith shaft locking were completed 21.04.2021. But due to rapid increase of Covid cases, Japanese officials demobilized to Japan on 30.04.2021. Further, they are taking up work at site via VC and
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				commissioning the turbine part of the unit viz painting of servomotor pipes and draft tube man doors completed on 09.06.2021 and related activities are under progress. UGB cooler pressure and leak test with piping completed on 11.06.2021. Unit has been taken on trial run on 30.09.2021. The unit is likely to be commissioned by mid October, 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> The commencement of RM&U works shall be based on commissioning of Unit-3. 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. Repairing of Rotor spider cracks started on 3.3.2022 and completed on 10.3.2022. Rotor lifting completed on 14.3.22. After dismantling of Stator segments in 3 parts, the same were transported from site to store on 23.3.22. Pit opening successfully completed and handed over to M/s. Hitachi on 24.3.22. Rotor pole dismantling completed on 28.3.22. 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 and final report submitted by the firm on
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				20.5.22. NDT of rotor spider started on 22.4.22 and completed on 27.4.22. Lower Bracket shifted from store to machine hall in the last week of April and its assembly is completed. The erection of auxiliaries viz Bus Duct, Cooling water pipeline, various electrical panels, laying of cable trench etc. are under progress. 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. Various activities related to guide vanes, installation of turbine, instrumentation panel etc. are under progress. The work of repair of cracks on rotor spider has been started on 22.08.2022. Shaft free achieved on 16.09.2022. Keeping in view of the current site activities, R, M&U works are expected to be completed by May, 2023.
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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 measurement for both machines,	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. M/s 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 accorded by HPSEBL on 12.08.2022
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			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.	
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) - -	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.

**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. 2. Replacement of existing old Auto Sequencers & AVR with Unit Control System compatible with SCADA application. 3. Procurement of T&P (Digital Insulation Tester). 4. Replacement of 220 KV Circuit Breakers of 7 nos. feeders. 5. R&M of emulsifier system of Generator Transformer and CO2 system. 6. Capital maintenance of Unit 2. 7. Renovation of AC plants.	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 is still pending. The work of Unit #2 is pending. 2. T.E.no. 281/HPs/ED-II/RSD-104 dt. 21.12.2021 has been opened on 26.05.2022.The technical evaluation is under process. 3. Material has been received and work completed. 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. 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 CO₂ 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 no.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. May be deferred to next control period. 7. W.O dt. 30.06.2020 has been issued to M/s Jamalpur CO-Op. L&C Society Ltd for dismantling of 3x52 Ton central AC unit UCB-II from GNDTP Bathinda & Re-installation at RSPP. Now

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			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. 9. Capital Maintenance of Unit 3. 10. Up-gradation of HP compressors of condenser mode operation. 11. Replacement of drainage pumps of unit bay side 2. 12. Capital Maintenance of Unit-1. (Replacement of runner disc to be carried out) 13. Replacement of flow meters. 14. Replacement of drainage pumps of service bay side-2. 15. Construction of Porches over all entry points of Power House Building. 16. Providing Detachable scaffolding set for Power Plant Maintenance. 17. Procurement of 11/0.415kV, 1250kVA, Dry type Station Service Transformers.	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. Case under preparation by site office. 10. Erection & Commissioning has been completed. 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. PO placed on M/s BHEL on 30.07.2019 for runner disc replacement. Work completed. 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. Case under preparation by site office. 15. Case under preparation by site office. 16. Case under preparation. 17. PO dt. 20.04.2021 issued to M/s AMES IMPEX GUJARAT,

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				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/ $\sqrt{3}$ 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 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.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			27. Supply, Installation, Testing & commissioning of two float cum boost chargers of 220V Battery Bank for 4X150MW Ranjit Sagar Dam Powerhouse, Shahpur Kandi. 28. R&M of LP Compressors Make: ELGI working Pressure: 7 kg/cm2 29. Up-gradation of five HP compressors of condenser mode operation 30. Procurement of transformer oil filtration set 6000 LPH. 31. R&M of two 24 Volts float cum booster battery chargers 32. Overhauling of next three GTs (out of twelve) 33. R&M of two PP sets oil pumps. (Make: Tushako) 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. 35. 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. Case under preparation by site office. 29. Case under preparation by site office. 30. Administrative approval under process. 31. Case under preparation by site office. Administrative approval is under process 32. May be deferred to next control period. 33. Case under preparation by site office. 34. Batteries commissioned successfully by M/s Exide Ltd, Delhi at Rs. 78.321 Lacs. 35. PO No. 95HPs/ED-II/RSD-103 dt. 03.12.2021 issued 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.
7.	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	- 57.77 6.37	1. Capital overhauling of UBDC Power House No.2 Stage I. 2. Replacement of existing Electro-Mechanical Excitation/AVR system with Digital Static Excitation System of UBDC Stage II Power House.	1. TE 235 dt. 30.07.2018 dropped keeping in view study for RMU in 2nd Plan 2020-23. 2. PO issued to M/s ABB on 29.01.2019. Material received and commissioned at site.

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	St.-II T&G-BHEL R&M 2024-25		3. R&M of protection and measurement system by providing new C&R Panels equipped with numerical relays and digital instruments of UBDC Stage I Power House. 4. Spare Generator Transformer 20 MVA, 11/132 KV. 5. Capital overhauling of UBDC Power House No.3 Stage I. 6. Replacement of Electro Hydraulic Governors with microprocessor based digital governor of UBDC Stage II Power Houses. 7. R&M of dewatering and drainage system of UBDC Stage II Power Houses. 8. R&M of Protection and measurement system by Electromagnetic relays and instruments with numerical relays and digital instruments of UBDC Stage II Power Houses. 9. R & M of C&R panels of 132 KV O/G feeders at UBDC Power House No.3 Stage I. 10. Replacement of Governor Pumps of UBDC Stage I Power Houses.	3. PO dated 25.09.2019 amounting to Rs 2.17 Cr. placed on M/s GE T&D India Ltd. Material received at site and commissioned. 4. PO no. 98 dt. 29.03.2022 for 3 Nos. GTs (2 no. for MHP and 1 no. for UBDC) amounting to Rs. 9.14 Cr. placed on M/s BBL, N.Delhi against TE no. 269 dt. 29.03.2021. Delivery period is 9 months from the date of PO. Drawings submitted by the firm have been approved. Stage inspections are being carried out. 5. Changed to RMU and will be initiated after RMU study in 2nd plan 2022-23. 6. PO dated 10.07.2019 amounting to Rs 2.02 Cr. placed on M/s ABB. Material received at site and commissioned. 7. PO dt. 18.03.2021 amounting to Rs.1.195 Cr. issued to M/s Hydraulic Engineering Company, Solan against TE No. 259 dt. 26.02.2020 for pumps of RSD, UBDC & MHP. Delivery period is 5 months from the date of PO. Material received at site and Commissioned. 8. Yet to be initiated by site office. 9. Administrative approval obtained from WTDs. Specification under preparation. TE no. 289 dt 30.06.2022 floated with extended due date of opening as 15.11.2022 10. PO placed on M/s Sapphire Mechtrade (Auth. dealer of Tushako Pumps) against TE no.

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			11. Replacement of 6 no. 11kV/415 V 300kVA oil type transformers to dry type transformer for Stage-I UBDC Power Houses. 12. RLA and RMU Study of UBDC Stage I Power House and preparation of DPR, Technical Specs and commercial Specs 13. Essential spares (AVR controller, DC breaker, firing circuit, thyristor etc.) for Stage I Digital Excitation and AVR System Make BHEL. 14. Strengthening of hydel channel by re-storing eroded inner side slopes, eroded outer section of filling reaches, damaged slabs in lined section, surface drains on both banks of hydel channel & de-silting of hydel channel of various locations 15. Renovation, Modernisation and Up rating of underwater parts and associated equipments UBDC Power House No.2 Stage I 15 MW Unit as per RLA and RMU study. 16. R&M of Electrical overhead cranes & all the mechanical auxiliaries including Intake, Draft, Bye pass gates etc.	283 dt.15.03.2022. Delivery period is 4 months from the date of approval of final drawings/receipt of PO whichever is later. 11.PO is being placed on M/s Ames Impex Gujarat against TE dated 09.10.2019 for supply of Dry type transformers for RSD, ASHP & UBDC. Material received at site. 12.TE 288 dt. 30.06.2022 floated with due date of opening as 10.08.2022. Following 3 No. Tenders received against TE 288 dt. 30.06.2022 opened on 10.08.2022. i. M/s Tata Consulting Engineers Limited., Mumbai ii. M/s Sharp Hydro Engineering Pvt Ltd., Faridabad. iii. M/s WAPCOS Ltd., New Delhi . Tender under technical and commercial evaluation. 13. Yet to be initiated by site office. 14.Work completed. 15. Yet to be initiated by site office. 16.Yet to be initiated by site office.

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			17. Purchase of T&P Items Viz HV Meggars, Earth Tester, BDV test Kit, Clip On Meters etc. 18. Providing 3 No. spare LT ACB 1000 Amps trolley complete Make English Electric or Equivalent suitable for LT panel stage II Power Houses. 19. Replacement of 3 No. LT ACB 630 Amps complete Make Jyoti or Equivalent suitable for LT panel stage I Power Houses no. 2. 20. Installation of Deep Tubewell for drinking water at Shift Staff Colony No. – 2 of UBDC Project.	17. PO no. 1 dt. 12.07.2021 amounting to Rs. 6.18 Lac placed on M/s Jost's Engineering Co. Ltd. Mumbai. Material received at site. 18. PO no. 2 dt. 16.11.2020 amounting to Rs. 4.52 Lac placed on M/s Pushkar and co. LLP, N.Delhi. Material received at site. 19. PO no. 2 dt. 16.11.2020 amounting to Rs. 4.52 Lac placed on M/s Pushkar and co. LLP, N.Delhi. Material received at site. 20. TE has been floated by site office with due date of opening as 05.07.2022. However due to technical problem in opening of tender, TE has to be dropped and fresh tender is to be floated.
8.	Anandpur Sahib Hydel Project – I&II, 4x33.5 MW PSPCL 1985-86 T&G – BHEL R&M 2024-25	- 40.37 1.56	1. Replacement of existing 4 nos. 220 volts 400 AH batteries of ASHP-I at Ganguwal and ASHP-II at Nakkian. 2. Procurement of 50 nos. Stator Air Coolers.	1. PO issued to M/s Exide on 29.11.2018 for 2 nos. of battery bank. The batteries has been commissioned. For remaining 2 battery banks, PO dt. 24.11.2021 has been placed on M/S Exide Industries Kolkata Material has been received at site. 2. 20 no. stator air coolers have been received, installed and commissioned at site. For procurement of remaining 30 coolers, the T.E no. 279 dt. 30.11.2021 has been floated online & has been opened on 20.04.2022. The price bid of 3 no. following firms was opened on dated 07.10.2022:- 1. M/S S K Sales Company Jalandhar 2. M/S Hari OM Enterprises Haridwar 3. M/S Omeel Coil Gujarat. After Reverse auction M/S Hari OM Enterprises become L-1 firm. PO yet to be placed. 3. Case under preparation by site office and the possibility of reuse

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			3. Replacement of existing 4 no. compressor (2 No. at each Power House) with new unit compressors. 4. Renewal and Modernization (R&M) work of BHEL make generating units -4x 33.5MW machines of PH-I (Ganguwal) & PH-II (Nakkian). of Anandpur Sahib Hydel Project. 5. Renovation and modernization of emulsifier system of Generator Transformer of Ganguwal & Nakkian of ASHP. 6. Renovation and modernization of Existing LT Scheme/panels for Ganguwal & Nakkian of ASHP. 7. Renovation and modernization of Existing conventional DPRs, O/C & Directional E/F Relays with Numerical relays of outgoing 2 nos 132KV Circuits at Ganguwal& Incoming 2 nos. and outgoing 3 nos. 132 kV Circuits at Nakkian of ASHP. 8. Replacement of OPU (Oil Pressure Unit) for 4x 33.5 MW machines of ASHP. 9. Replacement of existing 6 nos. 500/ 630 kVA 11/0.4 kV (3 nos. installed at each power house) oil cooled with Dry Type transformers.	of spare unit compressor of GNDTP Bathinda is being explored. 4. Tender Enquiry No. 286/ASHP/ DPR Dated: 30.05.2022 has been floated online with due date of opening is 11.07.2022 and further extended upto 10.08.2022. following 3 no. firms have participated:- i) M/S Central Board of Irrigation & Power, New Delhi ii) M/S MECON (Metallurgical & Engineering Consultants (India) Ltd Ranchi. iii) M/S WAPCOS Ltd. New Delhi Technical evaluation is under process. 5. The same is being studied. Case for Administrative approval shall be initiated accordingly. Work proposed to be replaced with work capital overhauling of M/C- No.-2 which was not included in MYT 2020-23. Hence, case may be deferred to next MYT Plan. 6. Case under preparation by site office. 7. Work Completed. 8. This work is being processed as a part of R&M of units at sr no.5 above. 9. PO issued to M/S AMES IMPEX GUJARAT. Material is received at site.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			10. Replacement of existing 4 nos. Service Compressor (2 nos. at each Power House no. I&II) with new Service Compressors. 11. Procurement of T&P articles for Ganguwal and Nakkian Power House. 12. Provision of one 200 kVA capacity Diesel Generator (DG) set (Silent type) for Ganguwal Power House Including Room. 13. Renewal & Replacement (R&R) of two 220V DC battery charger/set for Ganguwal & Nakkian power Houses. 14. Procurement of 1 Spare 20BHP Slip ring induction Motor for Gantry crane. 15. Capital overhauling of Electric Overhead Traveling (EOT) crane at PH-1&2 of ASHP. 16. Replacement of existing 24 thrust bearing oil coolers along with accessories of Ganguwal & Nakkain Power House. 17. Replacement of existing 24 Upper Guide Bearing oil coolers along with accessories of Ganguwal & Nakkian Power House. 18. Replacement of existing 24 Lower Guide Bearing oil coolers along with accessories of Ganguwal & Nakkian Power House. 19. Procurement of Two Centrifugal Turbine Oil Filtration/Dehydration sets (one for each power house i.e. (Ganguwal&Nakkian)). 20. Procurement of Two Transformer oil filtration sets (one for each power house i.e., Ganguwal&Nakkian) of 3000 ltr/hr capacity.	10. Case is under administrative approval. 11. Deleted. 12. Case under preparation by site office. 13. Case under preparation by site office. 14. Case under preparation by site office. 15. Case file is under process to prepare technical specifications by site office. 16. Case under preparation by site office. 17. Tender Enquiry has been prepared and sent to the office of Dy.CAO/HPs for pre-audit. 18. Tender Enquiry has been prepared and sent to the office of Dy.CAO/HPs for pre-audit 19. Work proposed to be replaced with work capital overhauling of M/C-No.-2 which was not included in MYT 2020-23. Hence, case may be deferred to next MYT Plan. 20. Case is being put up for administrative approval.

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			21. Procurement of one Transformer oil BDV Testing set for Anandpur Sahib Hydel Project (0-100kv Range.) 22. Replacement of 4 oil coolers along with accessories for GT 11/132 KV 40 MVA of Ganguwal & Nakkian Power House. 23. Replacement of 4 Dewatering pump sets with suitable new pumps at Power House No. 2 Nakkian.	21. Tender Enquiry is under process. 22. PO cum Contract Agreement Dt. 04.01.2022 placed on M/S Laxmi Engineering Bhopal & Delivery period is 5 months from the date of issue of PO. Drawing submitted by the firm is under process for approval. 23. PO cum Contract Agreement No. 101 /HPs/ED-II/ASHP-118 Dt. 01.09.2022.has been issued to M/S S K Sales Company Jalandhar. Firm has submitted drawings for approval. Approval of drawings is under process.
9.	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 R&M <u>2019-20</u> <u>2024-25</u>	- 194.29 29.08	1. Replacement of existing Governors of all the six Machines of MPH-1&2 with Modern Digital Technology based Governing System. 2. Replacement of existing Excitation System of all twelve Machines of MPH-1, 2, 3&4 with Static Excitation System along with Modern Digital technology based AVR. 3. Replacement of existing Electro-Mechanical Relays with Numerical Relays of all twelve Machines of MPH-1, 2, 3&4. 4. Replacement of existing conventional DPRs, O/Cs & Directional E/F Relays with Numerical relays of Two Nos. 5. Replacement of existing 3 nos. 630 KVA, 11KV/415 Volt UATs with Dry Type Transformers of similar capacity at MPH-1. 6. Replacement of existing 4 nos. 800 KVA, 11KV/415 Volt UATs at MPH-3 & 4.	1. PO dated 28.01.2019 placed on M/s Voith Hydro Pvt. Ltd. Total delivery period is 12 months. Commissioning of 6 no. sets completed. 2. Purchase Order placed to M/s Flovel Energy Pvt. Ltd., Faridabad and all twelve sets of Static Excitation system has commissioned. 3. Work order issued to M/s Siemens and replacement in all units completed. 4. Yet to be initiated by site office. 5. Purchase Order placed on M/s ABB on 06.12.2017. All transformers (3 Nos.) received at site. 6. PO dt. 09.03.2021 placed on M/s Power Star, Solan for 3 no. 630

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			7. Capital overhauling along-with replacement of stator core & stator coils and strengthening of Rotor poles with class F insulation of Machine No. 2, 5, 9 & 10. 8. Replacement of existing 11 KV XLPE Aluminum cables of size 1x500 mm² with XLPE Aluminum 1x800 mm² cables from Generator Bus duct to LV side of Generator Transformers of all units at MPH-1 & 2. 9. Procurement of one no. Trash Rack Cleaning Machine at MPH-1. 10. Procurement of 2 sets of Trash Racks for intake bays of Machine No.2&3 at MPH-1 11. Replacement of existing One No. Drainage and One No. Dewatering VT Pumps with submersible Pumps at each Power House. 12. Replacement of existing one no. Unit and one no. Service Air Compressors at each Power House. 13. Replacement of existing LT panels at MPH-1&2.	KVA UATs. Material received at site. 7. Works of Machine no. 10 completed by M/s BHEL. PO amounting to Rs 20.94 cr placed on M/s BHEL for Machine no. 2. Works completed. For M/c no. 5 & 9 case will be initiated after RMU study. Administrative approval to carry out RMU study has been accorded by WTDs. Specification is under preparation. 8. As desired by PSERC, case has been withheld. 9. Proposal dropped. 10. PO amounting to Rs. 34.08 Lakh placed on M/s Pilot Engineering Works, Ludhiana on 03.08.2018. Material received and commissioned at site. 11. PO issued to M/s SK Sales for dewatering Pumps on 28.01.2019. Material received at site. PO dt. 18.03.2021 issued to M/s Hydraulic Engineering Company, Solan for pumps of RSD, UBDC & MHP. Material received at site and commissioned at site but some commissioning issues are pending. 12. PO dated 29.06.2021 issued to M/s General Engg. Co. Ludhiana. Material received at site. 13. Yet to be initiated by site office.

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			14. Replacement of 12 nos. 132 KV Line Circuit Breakers at MPH-1,2,3&4. 15. Replacement of existing 5 Nos. 11/132 KV, 20 MVA Generator Transformers at MPH-1&2. 16. Capital overhauling of one no. Generator Transformer at MPH 3 and one no. Generator Transformer at MPH-4. 17. Replacement of Two nos. of 11KV Vacuum Circuit Breakers at MPH-3 and Four Nos. 11kV VCB at MPH-4. 18. Replacement of oil and Air cooler for Machine 7,8,10 & 11 at MPH 3&4. 19. Replacement of tubular poles with rail poles of 11KV Auxiliary line. 20. Replacement of existing 2 Nos. 11/132 KV, 20/25 MVA Generator Transformers with 11/132 KV 25 MVA at MPH-3&4. 21. Renovation of water supply system of residential colony at Unchi Bassi MHP. 22. Renovation of different approaching and internal roads of MHP. 23. Supply of new TGB shell for 15 MW machine no 4 at MHP-2	14. Order placed on M/s CG Power and Industrial Solutions Ltd, Gurugram on 09.10.2018. All the breakers received at site and commissioned. 15. PO no. 98 dt. 29.03.2022 for 3 Nos. GTs (2 no. for MHP and 1 no. for UBDC) amounting to Rs. 9.14 Cr. placed on M/s BBL, New Delhi. Delivery period is 9 months from the date of PO. Drawings submitted by the firm have been approved. 16. Proposal dropped. 17. Allocation of 6 Nos. 11kV VCBs got done from TS organization of PSPCL. 18. PO placed on M/s Lord Vishvakarma Heat Exchangers, Haridwar for air coolers & M/s Patel Heat Exchangers, Ahmedabad for oil coolers. Material received at site. 19. Proposal dropped. 20. Order for Rs. 9.09 Cr. was placed on M/s BBL, New Delhi for supply of 3 nos. GTs on 28.03.2018. GTs commissioned at site. 21. Work completed. 22. Yet to be initiated by site office. 23. Material available at site, matter being taken up with BHEL to carry out works in the lean period.

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			24. Replacement of upper oil pipeline and repair of TB Disc of machine no. 8 at Power House No of MHP 25. Treatment of expansion joint of power house building & duct portion at PH-I, Talwara. 26. Laying 1:4:8 PCC in the Switchyard of MPH-2 & MPH-4 27. Replacement of existing conventional central AC Plants at PH-1 & 3 of MHP 28. Procurement of 4 Nos. Battery charger for PH-3&4 of MHP. 29. Replacement of existing Governors at PH-3&4 of MHP. 30. Capital overhauling of Electric Overhead Traveling (EOT) crane at PH-1, 2, 3&4 of MHP. 31. Replacement of 3 nos. existing 25MVA GTs of M/c no. 8, 10, &11 of MP. 32. Replacement of existing one no. Vertical turbine Dewatering pump with submersible pump at each PH-1,2&4 and replacement of existing one no. drainage pump with submersible pumps at each PH-1,2,3&4 of MHP	24. WO amounting to Rs. 0.20 Cr placed upon M/s Go Goal Hydro Pvt. Ltd Haridwar. Work completed. 25. WO Dt 18.03.2021 placed upon M/s SK Sales Co. Jalandhar. Work completed. 26. Yet to be initiated by site office. 27. TE No. 291 floated on 12.09.2022 with due date of opening as 18.10.2022. 28. PO dt. 03.12.2021 placed on M/s Statcon Energiaa Pvt. Ltd., Noida amounting to Rs. 22.26 Lac. Material received at site. 29. Administrative approval to carry out RMU study has been accorded by WTDs and specification is under preparation. 30. Work will be carried under revenue head. 31. Tender Enquiry no. 285 issued on 18.04.2022. Extended due date of opening is 21.07.2022. 2 nos. tenders were received from M/s BBL and M/s T&R. Price bids of both the firms were opened on 29.09.2022. Purchase proposal in favour of L-1 firm M/s BBL is being prepared 32. Yet to be initiated by site office.

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			33. Capital overhauling of Trash Rack Cleaning Machines at PH-1 to 4 of MHP 34. Capital Overhauling of Emulsifier system at PH-1 to 4 of MHP 35. Capital Overhauling of Radial Bypass Gates at PH-1 to 4 of MHP 36. Replacement of existing 8/4/4MVA, 132/33/11kV Transformer with 5 MVA, 132/11kV Transformer at PH-4 of MHP 37. Procurement of 1 Nos. 400 AH Capacity Tubular type Lead Acid DC batteries Banks for PH-1 of MHP 38. Procurement of Thermovision Camera for Centralized Protection cell, Talwara. 39. Installing CCTV at MPH-2,3,4 Talwara.	33. Case is being dealt by RE/ MHP, Talwara under revenue head. 34. Case deferred to MYT 2023-27. 35. Yet to be initiated by site office. 36. Case deferred to MYT 2023-27. 37. Case is being dealt by RE/MHP, Talwara under revenue head. 38. Yet to be initiated by site office. 39. TE with due date of opening as 30.08.2022. Following 5 No. tenders were opened on due date i) M/s Megastar Electronics, Chandigarh ii) M/s Bristo Security System, Nabha iii) M/s Qi Network Enterprise Pvt. Ltd, Delhi iv) M/s S Harbans Singh and Company, Bathinda v) M/s Shree Balaji Communications, Bathinda Tender under technical and commercial evaluation.
10.	Shanan HEP, 4x15 MW+1x50 MW PSPCL 1932(U1 to U4) T - Ganz Mavag, Hungary G – BTH, UK 1982 (U5-extn) T&G - BHEL R&M 2019-20	- 164.84 23.77	1. Renovation of water cooling bus of 4x15 MW machines. 2. Procurement of one runner for 50 MW machine and two runners for 15 MW machines. 3. Procurement of 07 Nos. 12 MVA GTs for 4x15 MW machine & 4 Nos. 19 MVA GTs for 50 MW machine. 4. Providing CCTV cameras at Shanan PH.	1. Case under preparation by site office. 2. All runners commissioned by M/s Flovel Energy Pvt. Ltd., Faridabad. 3. All GTs commissioned by M/s BBL. 4. TE no. 284 dt. 04.04.2022 has been floated. Tender opened for

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	2023-24		5. Procurement of needles and nozzles of all six machines. 6. Replacement/Retrofitting of 66, 132 KV isolators & L.E with new ones at 132 KV Sub-station. 7. Replacement of 33 KV BOCB with new 66 KV SF6 breaker at 132 KV sub-station. 8. Procurement of 2 nos. SAN Container DC Batteries of 400AH Capacity for the replacement of existing DC Batteries. 9. Re-insulation of existing spare field coils of rotor of 50 MW machine with 'F' class. 10. Replacement of needle control device, deflector shafts of 4x15 MW machines. 11. Replacement of existing relay and annunciation panels in control room. 12. Clearance of silt of new reservoir. Restoration of Toe wall and grouted stone pitching on U/S of UHL weir at Barot. 13. Painting of Penstocks. 14. Procurement of 2 nos. SAN Container DC Batteries of 400 AH Capacity for the replacement of existing DC Batteries 15. Procurement of 1 no fully forged Runner for 50 MW M/c. 16. Replacement of existing DC motors & rotary gear pumps	two number firms and evaluation of documents is in progress. 5. Nozzles supplied by BHEL. Work completed. 6. WO dated 12.11.2021 issued to M/s Hitachi Energy India Limited and drawings has been vetted. Material received at Shanan store. 7. Work Completed. 8. Batteries commissioned. 9. Work completed. 10. Case under preparation by site office. 11. Case under preparation by site office. 12. Work of desilting has been completed. 13. Work Order No. 08/Sr. Xen/Civil dated 08.12.2020 was issued to M/s The Bararowal Co-Op L& C Society Ltd. Work was completed in March-2021. 14. Material has been received and commissioned at site as such work has been completed. 15. Runner has been received and commissioned. 16. TE floated dated 19.03.2018 has been dropped due to non-

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			with new DC motors & triple screw pumps for bearings of 4x15 M.W machines. 17. Procurement of 132, 66 & 11 KV CTs/PTs & Erection 18. Design, manufacture & supply of 01 no. Governor pump without motor for 4x15 MW machines. 19. Procurement of hydraulic torque wrench for opening nuts of 15 & 50 MW machine's runners. 20. Providing electrical drives for operation of existing five no. manual decantation chamber drain valves (non-rising spindle type, hand operated) at Barot. 21. Security fencing along intake channel of Barrage gate to head works and from intake barrage to Substation at Barot. (Shanan, HEP), Jogindernagar. 22. Providing Real time online discharge measuring system to release 15 % to 20 %water as per NGT order 23. Replacement of 4x15 MW machine excitation system 24. Procurement of 1 no runner for 50 MW machine along with HVOF coating. 25. Procurement of 2 nos. runner for 15 MW machines along with HVOF coating. 26. Replacement of Old Neutral Breakers of 4x15 MW	qualification of bidders. Revised TE under process at the site office. 17. Material received at site and the erection work of 33 & 11 KV CT/PTs is completed. 18. P.O No.16/RE dt. 04.03.2022 issued to firm. Material received and work completed. 19. Approval for procurement is accorded ,case under preparation at site office. 20. PO and WO dt. 25.05.2022 has been issued to the firm M/s JPS Engineers India Ltd. Chandigarh. Material received at site. 21. Case under preparation by site office. 22. Work Completed. 23. NIT floated. Technical and commercial evaluation of the bids is under process. L-1 firm is ABB after Reverse Auction . Purchase proposal agenda sent to Dir/G for approval for further submitting to WTDs 24. Case under preparation by site office. 25. Case under preparation by site office. 26. Case under preparation by site office.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			Machines with new Neutral Grounding Transformers. 27. Replacement of old 11KV/440V LT panels incoming and outgoing feeders at 11 KV Switch House. 28. Replacement of old 02 nos. 630KVA, 11/440V station transformers with new one. 29. Replacement of G40 governor with new OPU. 30. Replacement of old spherical valve alongwith its servomotor of 1x50 MW machine with new one. 31. Modernisation & Renovation of 50 MW cooling system. 32. Providing new over speed trip protection devices of all machines. 33. Renovation & Modernisation of fire fighting system of Power House. 34. Procurement of spare sets of bearing pads for 4x15 MW machines. 35. Replacement of B- class insulation of stator winding of 1x50MW m/c with F-class. 36. Replacement of all LT panels of auxiliary equipment of all machines. 37. Replacement of existing spherical valves along with Hydraulic Control Unit of spherical valve of 4x15MW machine. 38. Replacement of under water parts of all machines. 39. Concreting of Sub Station at Shanan Power House Joginder Nagar.	27. Case under preparation by site office. 28. Case under preparation by site office. 29. Case under preparation by site office. 30. Approval accorded by WTDs. DNIT preparation is under progress. 31. Case under preparation by site office. 32. Case under preparation by site office. 33. Case under preparation by site office. 34. Case under preparation by site office. 35. Case under preparation by site office. 36. Case under preparation by site office. 37. Case under preparation by site office. 38. Case under preparation by site office. 39. Case under preparation by site office.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			40. Replacement of all air compressors with new ones 41. Replacement of stator air coolers, TGB, LGB, UGB and thrust bearing oil coolers of 1x50MW machine with new ones. 42. Replacement of all oil coolers of 4x15 MW machine with new ones. 43. Renovation & Modernisation of House Generator set. 44. Procurement of spare slip ring assemblies for 4x15 MW and 1x50 MW machines. 45. Procurement of spare labyrinth rings for 1x50 MW assemblies. 46. Procurement of spare sets of needles & nozzles for all machines. 47. Procurement of 1no. New Hydraulic Butterfly Valve (PPV) along with Erection, Testing & Commissioning for 50MW Unit of Shanan Power House, PSPCL Joginder Nagar.	40. Case under preparation by site office. 41. Case under preparation by site office. 42. Case under preparation by site office. 43. Case under preparation by site office. 44. Case under preparation by site office. 45. Case under preparation by site office. 46. Case under preparation by site office. 47. Approval accorded by WTDs. DNIT preparation is under progress..

**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 <u>2019-20</u> <u>2022-23</u>	90(LE) 384.66 165.89	-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 2 nd 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.
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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. -Up-rating 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.
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				• 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 & UJVNL Ltd., received acceptance letter from M/s BHEL on 07.11.2019. • Agreement between M/s BHEL and UJVNL 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 will be completed by IIT Roorkee by Jan 23.
13.	Dhalipur, 3x17 MW UJVNL 1965-70 T - Litostroj, Yugo. G - Rade Konkar, Yugo RM&LE 2020-21 2023-24	51 (LE) 152.65 71.72	-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 Gogol 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. Unit-B Design and Engineering works are in progress. 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 <u>Work Under Progress</u> Unit-A&C LOI for additional essential items for Unit A & C placed on 17.12.2021. Supply related to Unit C (3rd Unit) are under progress. Unit A is handed over for RMU on 07.12.2021. Dismantling of Unit A has been completed. RMU of Unit A is under progress. Physical Progress- 83.25%.
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 4.91	-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 FEPL on 19.04.2022. Restoration works of Unit A has been completed on dated 09.08.2022 • Design related activities are under progress.
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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.
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C - SCHEMES ONGOING - Under DPR Preparation/Finalisation/Approval

16.	Kulhal, 3x10 MW UJVNL 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.
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**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 <u>2017-18</u> <u>2022-23</u>	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). Over hauling of intake gate along with alignment of T-Guide and their hoisting completed in Unit- 2, 3 & 4 and is yet to be taken up in Unit-1, 5 & 6. <u>COMMON WORKS</u> <u>A. WORKS COMPLETED</u> 1. Supply of Control Cable for Switchyard equipment. 2. Erection of 132kV CT & PT. 3. Supply of Silicon rubber disc insulator. 4. Supply of Power Cable for Auxiliary equipment. 5. Supply & Commissioning of 500kVA Unit& Station T/fs (8 no.) 6. DG Set with new L.T. Breaker Panel. 7. Supply & Commissioning of L.T. Panel. 8. Breaker, stringing of copper Conductor for main & reserve bus. 9. Commissioning of Draft Tube gates 3 set (6 Nos.). 10. Smoke Detection System. 11. Commissioning of 132kV Isolators for all Units. 12. Mulsifire pipeline.

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> <u>2023-24</u>	99 (LE) 58.80 45.78	- 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> A. <u>WORKS COMPLETED</u> 1. Replacement of oil after overhauling of 11/132KV, 37.5 MVA GT& UAT. 2. Control & Protection of Generator, GT& UAT. 3. Rehabilitation of Intake Gate with new vane type pumps. 4. Replacement of stator core & coil. 5. Re-insulation of rotor pole coils with F class insulation. 6. Replacement of dynamic excitation with Static Excitation System. 7. Replacement of generator coolers. B. <u>WORK UNDER EXECUTION</u> 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> A. <u>WORKS COMPLETED</u> 1. Replacement of oil after overhauling of GT& UAT. 2. Replacement of stator winding, rotor winding, rotor pole winding, overhang support ring and stator core. 3. Control & Protection of Generator, GT & UAT. 4. Rehabilitation of Intake Gate with new vane type pumps. 5. Replacement of Dynamic excitation with static Excitation system. 6. Refurbishment of generator coolers. B. <u>WORK YET TO BE TAKEN UP</u> 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,

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				runner chamber, GV & Stay vanes, liner of pivot ring etc. Price bid opened on 03.10.2018. LOI issued to firm. The R&M Works of this unit 2 will be taken up after completion of works of Unit 1. <u>UNIT No. 3</u> <u>A. WORKS COMPLETED</u> 1. Replacement of oil after overhauling of GT & UAT. 2. Control & Protection of Generator, GT & UAT. 3. Rehabilitation of intake Gate. 4. Replacement of Vane type pump of Intake Gate with new one. 5. Replacement of dynamic excitation with Static Excitation system. 6. Generator stator and rotor works completed. All works completed <u>COMMON WORKS</u> <u>A. WORKS COMPLETED</u> 1. Replacement of cable of tainter Gate & dam Top Gantry Crane-II ckt. 2. Supply & Replacement of Lightning Arrestors. 3. Erection of 132kV CTs & PTs by 0.2 accuracy class CTs & PTs. 4. Supply & replacement of 11/0.4kV 400 kVA Station Transformer. 5. Control & Protection of 6 Nos. 132 kV feeders & 2 Nos. Station. Tr. 6. Supply & replacement of deluge valves and NRV's of mulsifier system. 7. Supply & replacement of metering/ measuring instruments. 8. Refurbishment of Intake gate crane 125/25 T(order placed). 9. Renovation of CO₂ Fire extinguishing system of generator of all 3 machines (Centralized Unit) completed. 10. Supply & installation of C&P panel is completed 11. Supply, erection and commissioning of new elevator. 12. C&P Panel is completed. <u>B. WORKS UNDER EXECUTION</u> 1. Provision of station supply from Obra HEP 132 KV Bus.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				2. Supply and installation of C&P Panel is completed. Procurement of remaining items under Progress 3. SCADA.

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				
19.	Pench 2x80 MW MPPGCL 1986-87 T&G – BHEL RM&LE 2025-26	- 13.24 0.0	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				
20.	Bansagar Tons-I, 3x105 MW MPPGCL 1991-92 T&G – BHEL R&M <u>2021-22</u> 2025-26	- 84.85 3.5	1. RLA study of Unit No. 1, 2 & 3.	1. COH of unit 3 with stator replacement was done and unit synchronized on 13.07.2022. 2. COH of unit 1 is expected to be completed by Feb 2023. 3. COH of unit 2 will be taken after COH of Unit #1.
21.	Bargi, 2x45 MW MPPGCL 1988 T&G – BHEL R&M <u>2020-21</u> 2026-27	- 6.59 0.0	1. RLA Study of Unit-1 & Unit-2	1. Order for RLA Study of units has been placed on M/s MECON Ltd., Ranchi.

**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				
22.	Kadana PSS, 4x60 MW GSECL Units 1&2 1989-90 T&G-Skoda Units 3&4 1998-99 T&G-BHEL R&M 2021-22 2025-26	- 750 -	Plant Design, Engineering, Manufacture, Shop testing, Supply, Transportation, Storage, Erection, Testing, Commissioning and PG Test for Renovation, Modernization & Uprating of 4x60 MW	International Competitive Bidding tender invites for Procurement of Plant Design, Engineering, Manufacture, Shop testing, Supply, Transportation, Storage, Erection, Testing, Commissioning and PG Test for Renovation, Modernization & Uprating of 4x60 MW by replacement of E&M equipment on EPC Single Point Responsibility Basis floated on 18.10.2022

**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				
23.	Vaitarna, (1x60) MSPGCL, 1976 RM&LE 2022-27	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.
24.	Koyna Dam foot (Right Bank), (2x20) MSPGCL, 1980-81 RM&LE 2022-27	40 (LE) - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study to be taken up.
25.	Koyna St-3, (4x80) MSPGCL, 1975-78 RM&LE 2022-27	320 (LE) - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study to be taken up.
26.	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.
27.	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				
28.	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 Governors were replaced with New Micro Processor based RGMO Governor during 2018-21. 3. Old AVR excitation system replaced with new DVR Tender for SCADA floated and Evaluation is under progress.
29.	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 & 3 is in progress.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
30.	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) - -	The proposed 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. The replacement of Governor, Excitation equipment for Stage-1 (unit.No.1&2) of Dam PH with latest art of new technology is also programmed during this F.Y.
31.	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.	

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
B - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/Approval				
32.	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. 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				
33.	Machkund, 3x17 MW (St.-I) & 3x23 MW (St.-II) APGENCO 1955-56 (St.-I) & 1959 (St.-II) St.-I: T - M.Smith, USA G - W.House,USA St.-II:	120 (LE)+ 9 (St.-I) (U) 500 (approx.) -	Note: Three units of Stage-I each rated at 17 MW are proposed to be uprated to 20 MW.	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. The Project Administration Committee (PAC) consists of Chairman and Directors of OHPC and APGENCO shall have full powers in both administrative and

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	T - J.M.Voith, W. Germany G - Westing House, USA RMU&LE 2026-27		Residual Life Assessment studies (RLA) on Civil structures, penstocks, Hydro Mechanical and all Electrical & Mechanical equipment of all six units.	financial matters with regard to R&M of the project. APGENCO Management exploring the necessity to carry out the RLA studies for assessment of condition of main equipment including concrete structures or only concrete structures in view of complete replacement of turbine generator units. 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. New Agreement with mutual consensus for initiating R&M activities was signed by the Signatories of both governments of AP & Odisha. 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 ONGOING - Under Implementation				
34.	Nagarjuna Sagar Phase II works, 1x110 + 7x100.8 MW, TSGENCO 1978-85 <u>Unit-1:</u> T&G - BHEL <u>Units 2 to 8:</u> PT - Hitachi, Japan MG - MELCO, Japan R&M <u>2018-19</u> <u>2022-23</u>	- 22.17 14.34	1. Replacing existing AVR's with latest DVR's 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. 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. 11. Procurement of 220 KV CTs (18 Nos.) for units (silicon rubber composite type).	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 whereas for other 2 Nos., the seals material was not received. 10. Completed (LA's: Lamco & PT's: Toshiba) 11. Completed (Siemens)
35.	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> <u>2024-25</u>	- 29.74 1.5	1. Replacing existing AVR's with latest DVRs along with thyristor modules for 2 units. 2. Capital overhauls on generator and turbine and its auxiliaries including spares and consumables for all 2 units. 3. Overhauling of EOT Cranes and gantry cranes. 4. Dification in design of runner for both the units for operating at lower heads. 5. Procurement of 132KV SF6 Circuit Breakers for both units and its feeders. 6. Implementation of SCADA. 7. Providing of latest version of EHG System for 1 Unit. 8. Cooling water line erections.	1. It is proposed to postpone the work of replacing existing AVR's with latest DVRs along with thyristor modules for Unit-2 in to the R&M works. 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. Work order issued (LOI). Gantry cranes overhauling has been completed. All work completed. 4. Not feasible and hence the proposal is dropped. 5. Completed (Siemens) 6. Completed (ABB) 7. Completed (BHEL) 8. Completed.

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				
36.	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 35.32	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 91 st 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
37.	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 314 th 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

38.	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. TENGEDCO 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.
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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				
39.	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 <u>2018-19</u> <u>2022-23</u>	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				
40.	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) 222 13.62	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 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	- 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 under review. - Order placed on M/s Balaji Electro Controls Pvt. Ltd. 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. - PSBG returned to the firm.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress.
41.	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 and Kickoff meeting was held on 27.02.2019. 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. Model test & CFD analysis witness is postponed and is to be rescheduled. Drawings/ Documents are under review.
C - SCHEMES ONGOING - Under Tendering				
42.	Kadra Dam Power House, (3x50MW) KPCL 1997-1999 T&G - BHEL RM&LE 2024-25	150 (LE) 44.47 1.72	Turbine - Replacement of runner cones, guide vane servo motor, pressure oil supply valves, cooling water supply valves, refurbishment of top/bottom surface of pivot rings, turbine top cover, runner blades, blade seals, runner chamber, draft tube, turbine guide bearing. Cleaning & painting of inside surfaces of underwater parts.	KERC accorded approval. Consent of all State distribution companies have been obtained. M/s BHEL furnished Techno-commercial offer for Turbine and Generator works. Based on AOH reports and in-house studies and condition of the equipments, R&M works will be taken up at later date based on the performance of the units.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			• Generator - Replacement of air coolers, cleaning of stator winding, stator core & frame assembly, tightening of wages, rotor pole assembly, break pad assembly, replacement of UAP, ACDB and CAP. • 220 kV Switchyard - Replacement of breakers, protective painting of switch yard structures. • Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented.	LTAC Panels (UAP-3 Nos., ACDB-5 Nos. and CAP-1 No.) WO dated 21.12.2020 placed on L1 bidder M/s Lotus Power Gear. Revised drawings of 3 Nos. UAP, CAPs & 5 Nos. ACDBs are approved. BOM of spares approved. Inspection of the same has been carried out at M/s Lotus Power Gear, Harohalli. Supply of Panels to site completed. Erection of ACDB and two unit auxiliary panels completed. Erection of UAP-1 is under progress. Financial bid for procurement of breaker opened. 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, 9 sets of 245 kV CB's, 4 nos. of 245 kV PT's received at site. Erection of switchyard equipment 13 nos. 245kV CTs under progress. Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress.
43.	Kodasalli Dam Power House, (3x40MW) KPCL 1998-1999 T&G - BHEL RM&LE 2024-25	120 (LE) 50.60 1.72	• Turbine - Replacement of runner cones, guide vane servo motor, pressure oil supply valves, cooling water supply valves, refurbishment of top/bottom surface of pivot rings, turbine top cover, runner blades, blade seals, runner chamber, draft tube, turbine guide bearing. Cleaning & painting of inside surfaces of underwater parts.	KERC accorded approval. M/s BHEL furnished Techno-commercial offer for Turbine and Generator works. Based on AOH reports and in-house studies and condition of the equipments, R&M works will be taken up at later date based on the performance of the units.

S. No.	Scheme/ Category/ Completion Schedule (Original/Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.
45.	Linganamakki Dam Power House (LDPH), (2x27.5MW) KPCL 1979-1980 T – Electrosilla, USSR G - Electrosilla, Energomach-USSR RM&LE 2025-26	55 (LE) 56.20 1.85	• Inspection of seals of penstock gates proposed and replacement as per requirement. • Refurbishment of turbine and associated equipment's. • Refurbishment of generator along with replacement of air coolers. Relay and control panels & DCS based SCADA system.	KERC accorded approval. Out of proposed major civil works, drilling and grouting in the masonry portion of Linganamakki dam which includes shotcreting, plugging of suction points completed. Techno-commercial offer furnished by M/s Voith & M/s GE for Turbine and generator works were reviewed. As per IIT Roorkee reports and Based on AOH reports and in-house studies and condition of the equipments, R&M works will be taken up at later date based on the performance of the units. 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.
D - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/ Approval				
46.	Supa Dam Power House, (2x50MW) KPCL 1985 T&G - BHEL RM&LE 2025-26	100 (LE) 47.91 1.206	Electro-mechanical Works: Turbine - Refurbishment of underwater turbine components. Generator and its auxiliaries - Replacement of air coolers, flow meters for cooling water system. Inspection of Stator & Rotor. • UAP & CAP	KERC accorded approval. Consent of all State distribution companies have been obtained. Electro-mechanical works will be taken up later. • Order placed on M/s Balaji Electro Controls Pvt. Ltd. on 19.05.2018 at a total cost of

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			• 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.	Rs. 15529505.00.. Erection & commissioning of all UAP's and CAP's completed..PSBG returned to the firm Proposal has been revised and preparation of technical specification and obtaining site feedback is under progress.
47.	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	Electro-mechanical works: Overhauling of all spherical valves. NDT tests on turbine components and R&M works. Replacement of instruments compatible to SCADA, etc. 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. Other works: Uprating/ redesign of NGT to suit uprated capacity.	KERC accorded approval. Consent of all state distribution companies have been obtained. Order was placed for overhauling of Spherical valves for Unit-4, 7 & 8. Other electro-mechanical works will be taken up later. 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. Discussion with site officials and finalisation of scope are under process. GT of Unit-10 commissioned on 28.02.2018 and GT of Unit-9 commissioned on 30.03.2018.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			Providing 2x115 MVA transformer for Unit-9 & 10.	
D - SCHEMES ONGOING – Under RLA Studies				
48.	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. Turbine and Inlet valve Refurbishment of butterfly valves, over velocity devices installed on penstocks, procurement of spare bearing shells, capital overhauling of turbine components along with the replacement of damaged parts 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. Based on AOH reports and in-house studies and condition of the equipments, R&M works will be taken up at later date based on the performance of the units. Work order on M/s CPRI has been placed to conduct RLA studies on Generators. In the first phase replacement of 1 st stage 4x16.5MVA GTs taken up. Contract agreement signed with M/s Toshiba on 22.09.2018. All GT's reached at site. All 1 st 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				
49.	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
50.	Sabarigiri, 4x55+2x60 MW KSEB 1966 RMU&LE 2022-27	280 (LE) + 20(U) 155.9 -	Replacement of stator core, stator winding and turbine shaft of Unit#1, #2, #3 & U#5 & Replacement of stator winding and turbine shaft of Unit#6	The Units were commissioned during 1966. Only Partial renovations of the units were conducted in 2005-2009 period. The stator core, stator winding and shaft were not included in the renovation work of U#1, U#2, U#3 & U#5. Now the stator core has buckling and the condition of stator winding insulation is also not good. The unit #6 was commissioned during 1967. A rebuilding/ re-commissioning work were done in U#6 on 13-12-1979, Besides this, Partial renovation done on 01.07.2005. Now the condition of

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			Rehabilitation of the RC beams in the Tailrace Channel of the Sabarigiri Hydro Electric Station.	stator winding insulation is not good and shaft need replacement. Work order for Replacement of Generator Turbine Shaft of U#2 issued to M/s Voith Hydro Work order for Refurbishment of Stator core of U#6 issued to M/s Coral Rewinding India Pvt. Ltd, Erode, Tamilnadu The station was commissioned during 1966 and the civil structures for the generator transformers were built over the Tail Race Channel. Now, the civil structure needs rehabilitation work.
B - SCHEMES ONGOING - Under RLA Studies				
51.	Idukki 2 nd 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.
52.	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.	Tendering for RLA study is under process and it has been scheduled to carryout RLA study proposed during Annual Maintenance 2023.

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				
53.	Balimela, 6x60 MW OHPCL 1973-77 T-LMZ, USSR G- Electrosila, USSR RM&LE <u>2019-20</u> 2024-25	360(LE) 382.91 98.90	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. <u>Works Completed:</u> - 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 - 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. Trial run of Unit 2 started from 21.12.2021. - Commercial operation of Unit 2 started from 29.12.21. - Unit 1 Spinning done on 30.08.2021. - One month trial run of the unit was completed on 20.01.2022. - Commercial operation of Unit 1 started from 15.04.2022. - 220 kV Switchyard bay extension work completed on 15.06.22. loading of Station Transformer completed on 15.06.2022. <u>Works under progress:</u> - Erection of Compressed air system - Installation of dewatering system - Installation of cable tray inside switchyard - Generator firefighting pipe line works of unit 1& 2 - Installation of equipment viz. CT, PT, CB, LA etc. under progress - Inspection of Generator Transformer is being carried out at Manufactures shop in order to replace the faulty R-phase Generator Transformer. - Minor & Major defects noticed in the Unit 2 is being rectified by the contractor. - During OCC test of Unit 1, R phase of GT failed & its replacement is under progress. Mean while, a new single phase GT as a replacement measure dispatched on 25.01.2022 from BHEL and received at site. Installation & commissioning work of GT is under progress.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				- Unit 3 is scheduled to be synchronized by 26.09.2023. - Unit 4 is scheduled to be synchronized by 26.11.2023. - Unit 5 is scheduled to be synchronized 23.11.2024. - Unit 6 is scheduled to be synchronized by 01.02.2025. - 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 Unit 3 &4 under progress
B - SCHEMES ONGOING –Under RLA Studies				
54.	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 scheduled on 16.11.2022
55.	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 scheduled on 16.11.2022
56.	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 scheduled on 16.11.2022

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				
57.	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. • DPR has been approved by CEA on 13.09.2022. • Preparation of Technical specification by Mecon, DVC's consultant 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				
58.	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 started on 13.06.2022. - Manufacturing of model completed. Assembly is in progress.
B- SCHEMES ONGOING - Under RLA Studies				
59.	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				
60.	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 38.01	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. DG Set, EOT Crane and Bus Duct are awarded. DG set received at power station. However, tender of EM-1 (Main) Package got cancelled on 08.12.2020 due to abnormally high price quoted by L-1 bidder. Thereafter, EM-1 (Main) package is further subdivided into 13 Nos. packages out of which LOA for 05 Nos. sub packages already placed, 03 Nos. sub packages are under retendering process and 05 No. sub packages are under tendering stage of award. Work/ Supply of EM-3 (EOT Crane) is completed and EM-4 (DG Set) is in progress and work of EM-2 (Bus Duct) package shall be taken alongwith work of EM-1 (Main) package during shutdown of generating units. 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				
61.	Kopili Power Station, 4x50MW NEEPCO T&G- BHEL 1988 RM&LE 2023-24	200 (LE) 878.09 525.44	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) 1st 750 KVA supplied DG set successfully commissioned and in service. iii) Erection, Installation & commissioning of UAB & SSB panels completed. iv) RLA studies of underwater parts completed v) Integrity test of embedded & exposed parts of spiral casing completed. vi) Works related to Rain watering dewatering system and MIV hall flood water dewatering system completed. vii) Commissioning of DT drainage & dewatering system completed. viii) Pernel from M/s Jaladhara Hydro reached site on 26.07.2021 for service related to essential input for refurbishment of underwater parts. Preliminary design reports also submitted by the firm. ix) 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. x) 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. xi) Order for supply of 2 Nos. of Butterfly Valves awarded to M/s BHEL. xii) Order for 03 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. xiii) Works related to improvement of earthing system of 33/ 0.415 kV substation completed.
B - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/Approval				
62.	Khandong Power Station, 2x23 MW NEEPCO T&G- BHEL 1984-85 RM&LE 2024-25	46 (LE) 189.81 15	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. • Communications are being made to beneficiary states of the Power Station to obtain their consent for RM&LE proposal. Already four beneficiary states consented for the proposal. • Some BoP items like DG set, Firefighting system, Penstock Protection BFV, etc. procured and installed under R&M budget. • Detail engineering on the finalized scope of the works is in progress. • DPR has been submitted to CEA. • Petition for R&M proposal has been filed before CERC. • Consent on DPR & proposed Tariff of Khandong R&M obtained from all the beneficiary states of NER. • Machine resize and design energy review has been approved by CEA. • CEA has approved Rs. 123.19 Crs. for EM Cost & Rs. 66.62 Crs. for Civil & HM Costs for Renovation and Modernisation. • Preparation of specifications for tendering is in final stage. • The plant was inundated in flush flood on 26.03.2022. Condition Assessment is going on. • Debris got deposited inside and surroundings of the 2x 25 MW Khandong Power House building including the Tail pool and Tail race in large volume. All the

				equipment and control panels of 1 x25 MW Khandong Stage -II (erstwhile Kopili Stage - I1) Power Station were inundated • CEA vide letter dated 05/08/2021&02/10/2021 has approved Rs. 189.81 Crores for RM&LE of Khandong Power Station. However, assessment of the assets which are damaged due to the disaster will be done after removal of debris from the power station and the additional scope shall be added and costs shall be intimated to CEA. • A revised estimate for EM package of Rs. 191 Crores have been prepared and approved by BoD NEEPCO. • Tendering process for R&M of Khandong Switch Yard has been initiated. • Civil and HM works under process approval by NEEPCO management.
				xiv) Over hauling of 40T EOT at valve House & 17 T DT crane is in completed by M/s BASU & SONS. xv) Order for supply of UAT placed. xvi) Two number of Control & Relay panel for 33/0.415 kV substation reached site on 13.08.2021. xvii) Power & Control Cable connection & termination to all instruments & protection panel concerned to 33 KV Substation completed. xviii) CFD Study of Water Conductor System along with Under Water Parts by M/s Voith completed. xix) Starter panel for Sump tank (Of Oil pressure system) Electrical Control panel (of Control system and instruments for BFV) received at site. xx) Main E/M package of Andritz Hydro has completed 97% Overall design, 86 % Overall Procurement and 43% Overall manufacturing at their works. xxi) Order for Procurement/ Refurbishment of Underwater/ Turbine parts of Unit II, III and

				IV placed with Andritz. Andritz has started refurbishment works in Unit IV from 27.06.2022 at site. xxii) Two nos. of GTs received at site on 10/03/2022. 3rd GT testing completed and would be dispatched soon. 4th GT ready for testing. xxiii) 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. xxiv) Bus duct work order placed with Powergear Ltd. Works in hand: i) ACDB for switchyard & BF valve reached site on 17.08.2021. Erection & installation pending. ii) Works related to Cooling water system is in progress. iii) Works related to erection of new store at Umrong Nallah is in progress. iv) VAC System erection is in progress. v) Firefighting system by Sterling and Wilson drawings has been approved and part supply has reached site. Erection of pipes for Firefighting system by Sterling and Wilson has started. vi) Switchyard work by M/s Techno are in different stages of drawing approval. Switchyard work by M/S Techno has started. vii) Works on illumination system by M/s Delta Engineering is in progress. viii) Cutting, concrete chipping and removal of existing damaged steel liners of draft tubes completed. Cleaning & surface preparation of Draft tube is in progress, scanning of surface done, drawing has been received. Profile and pressed plate for all units received. Fixing of plates at Unit 3 completed and welding is in
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				progress. Fixing of plates in Unit IV is under progress Petition to CERC submitted in the month of August, 2020 for obtaining approval of the Reconstruction, R & M proposal.
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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				
63.	Umiam Stage-III, (Kyredemkulai) 2x30 MW MePGCL 1979 T&G - BHEL RMU&LE 2022-27	60(LE) +6(U) 408 4.12	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. 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				
64.	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 Bid document for RLA is being prepared.

**State-wise Status of R&M Schemes
(During 2027-32)**

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 2, (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 <u>Units 1,2&3</u> T – JM Voith G – Siemens, WG, <u>Units 4&5</u> T&G – Hitachi, Japan RM&LE 2027-28	115 (LE) 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. Preparation of Revised DPR for R&M and Uprating is under progress. 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

ANNEXURES

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

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
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

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

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
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	Srisaillam 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

Annex-II
(Sheet 2/ 2)

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

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

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
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)**

(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	Neriamangalam 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)	RMU&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)

(Sheet 3 of 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

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

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs . in crs)				
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	Srisaillam 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)

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		

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	Actual Exp.	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
				(Rs. in Crs.)					Original	Anticipated
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 1 st 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 – Upgrading; 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

State-wise List of Hydropower 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	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
A. Completed Schemes									
Himachal Pradesh									
1	Bhabha Power House, HPSEB	SS	3x40	90.14	43.01	120 (LE)	120	RM&LE	Completed in 2022-23
Uttar Pradesh									
2	Rihand, UPJVNL	SS	6x50	132.20	127.6	300 (LE)	300	RM&LE	Completed in 2022-23
Uttarakhand									
3	Tiloth (Maneri Bhali - I), UJVNL	SS	3x30	384.66	165.89	90 (LE)	90	RM&LE	Completed in 2022-23
Karnataka									
4	Munirabad Dam Power House, KPCL	SS	2x9 + 1x10	4.60	2.69	28 (LE)	28	RM&LE	Completed in 2022-23
Sub Total(A)			538.00	611.60	339.19	538 [538(LE)+ 0(U)]	538.00		
B. Ongoing Schemes – Under Implementation									
Himachal Pradesh									
5	Bhakra LB, BBMB	CS	5x108	489.77	559.92	540.00(LE)+ 90.00 (U)	630	RMU&LE	2023-24
Punjab									
6	Ranjit Sagar Dam, PSPCL	SS	4x150	95.48	8.52	-	600	R&M	2023-24
7	UBDC St.I & St.II, PSPCL	SS	3x15+ 3x15.45	57.77	6.37	-	91.35	R&M	2024-25
8	Anandpur Sahib Hydel Project, PSPCL	SS	4x33.5	40.37	1.56	-	134	R&M	2024-25
9	Mukerian St.I, St.II, St.III & St.IV, PSPCL	SS	3x15, 3x15, 3x19.5& 3x19.5	194.29	29.08	-	207	R&M	2024-25
10	Shanan HEP, PSPCL	SS	1x50+ 4x15	164.84	23.77	-	110	R&M	2023-24
Uttarakhand									
11	Chilla Ph B UJVNL	SS	4x36	490.56	-	144(LE)+ 12(U)	156	RMU&LE	2025-26
12	Dhakrani, UJVNL	SS	3x11.25	137.31	4.91	33.75 (LE)	33.75	RM&LE	2025-26
13	Dhalipur, UJVNL	SS	3x17	152.65	71.72	51 (LE)	51	RM&LE	2023-24
Uttar Pradesh									
14	Obra, UPJVNL	SS	3x33	58.8	45.68	99 (LE)	99	RM&LE	2023-24
Telangana									
15	Nagarjuna Sagar Left Canal Power House, TSGENCO	SS	2x30.6	29.74	1.50	-	61.2	R&M	2024-25
16	Nagarjuna Sagar Ph-II works, TSGENCO	SS	1x110+7x100. 8	22.17	14.34	-	815.6	R&M	2022-23

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
Andhra Pradesh									
17	Upper Sileru Power House, APGENCO	SS	4x60	-	-	-	240	R&M	2026-27
18	Nagarjunasagar Right Canal Power House, APGENCO	SS	3x30	-	-	-	90	R&M	2025-26
19	Tungabhadra Dam, APGENCO	SS	4x9	-	-	36 (LE)	36	RM&LE	2025-26
20	Hampi Canal PH, APGENCO	SS	4x9	-	-	36 (LE)	36	RM&LE	2025-26
Karnataka									
21	Naghari (Unit-1 to 3) KPCL	SS	3x150 (U-1 to 3)	222.00	13.62	450 (LE)	450	RM&LE	2025-26
22	Shivasamudram, KPCL	SS	6x3+4x6	169.18	11.35	42 (LE)	42	RM&LE	2024-25
Jharkhand									
23	Panchet U-1, DVC	CS	1x40 (U-1)	121.85	2.19	40(LE) + 6(U)	46	RMU&LE	2023-24
Tamil Nadu									
24	Moyar PH, TANGEDCO	SS	3x12	67.05	35.32	36 (LE)+ 6(U)	42	RMU&LE	2024-25
25	Kodayar PH-I, TANGEDCO	SS	1x60	88.48	-	60 (LE)+ 10 (U)	70	RMU&LE	2024-25
Kerala									
26	Kuttiyadi, KSEB	SS	3x25	377.41	0.9489	75.00 (LE) + 7.5 (U)	82.5	RMU&LE	2024-25
27	Sabarigiri, KSEB (Unit-1,2,3, 5 & 6)	SS	4x55+ 1x60	155.9	-	280 (LE) + 20 (U)	300	RMU&LE	2022-27
Odisha									
28	Balimela, OHPCL	SS	6x60	382.91	98.90	360(LE)	360	RM&LE	2024-25
Assam									
29	Kopili Power Station, NEEPCO	CS	4x50	878.09	525.44	200(LE)	200	RM&LE	2023-24
Manipur									
30	Loktak, NHPC	CS	3x35	273.59	38.01	105 (LE)	105	RM&LE	2025-26
Sub Total (B)			4936.90	4670.21	1493.15	2739.25 [2587.75(LE)+ 151.5(U)]	5088.40		
C. Ongoing Schemes – Under Tendering									
Himachal Pradesh									
31	Giri, HPSEB	SS	2x30	440.12	-	60.00 (LE)	60	RM&LE	2024-25
Uttarakhand									
32	Ramganaga, UJVNL	SS	3x66	455.20	-	198 (LE)	198	RM&LE	2022-27
Gujarat									
33	Kadana PSS, GSECL	SS	4x60	750	-	240 (LE)	240	RM&LE	2025-26
Karnataka									
34	Kadra Dam Power House, KPCL	SS	3x50	44.47	1.72	150 (LE)	150	RM&LE	2024-25
35	Kodasalli Dam Power House, KPCL	SS	3x40	50.60	1.72	120 (LE)	120	RM&LE	2024-25
36	Gerusoppa Dam Power House (Sharavathy Tail Race), KPCL	SS	4x60	59.66	2.21	240 (LE)	240	RM&LE	2025-26
37	Linganamakki Dam Power House, KPCL	SS	2x27.5	56.20	1.85	55 (LE)	55	RM&LE	2025-26
West Bengal									
38	Maithon, DVC	CS	2x20 (U- 1&3)	109.29	7.76	40.00 (LE)	40	RM&LE	2024-25
Meghalaya									
39	Umiam St.III, (Kyrdemkulai) MePGCL	SS	2x30	408.00	4.12	60(LE) + 6(U)	66	RMU&LE	2022-27
Sub Total (C)			1163	2373.54	19.38	1169 [1163(LE)+ 6(U)]	1169.00		

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
D. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval									
Uttarakhand									
40	Kulhal, UJVNL	SS	3x10	115.24	-	30(LE)	30	RM&LE	2022-27
Madhya Pradesh									
41	Pench, MPPGCL (2x80)	SS	2x80	13.24	0	160 (LE)	160	RM&LE	2025-26
Karnataka									
42	Supa Dam Power House, KPCL	SS	2x50	47.91	1.206	100 (LE)	100	RM&LE	2025-26
43	Sharavathy Generating Station, KPCL	SS	10x103.5	196.56	11.07	1035 (LE)	1035	RM&LE	2025-26
Tamil Nadu									
44	Kodayar PH-II, TANGEDCO	SS	1x40	-	-	40.0(LE)+ 6(U)	46	RMU&LE	2026-27
Andhra Pradesh									
45	Lower Sileru, APGENCO	SS	4x115	350.00	1.8	460(LE)	460	RM&LE	2026-27
Assam									
46	Khandong Power Station, NEEPCO	CS	2x23	189.81	15	46 (LE)	46	RM&LE	2024-25
Sub Total (D)			1871.00	912.76	29.08	1877 1871(LE)+ 6(U)]	1877.00		
E. Ongoing Schemes – Under RLA Studies									
Jammu & Kashmir (UT)									
47	Salal Stage-I, (Unit 1,2 &3) NHPC	CS	3x115	-	-	345 (LE)	345	RM&LE	2022-27
Himachal Pradesh									
48	Pong Power House, BBMB	CS	6x66	142.25	-	396 (LE) + 54 (U)	450	RMU&LE	2026-27
Madhya Pradesh									
49	Bansagar Ton-I, MPPGCL	SS	3x105	84.85	3.5	315 (LE)	315	RM&LE	2025-26
50	Bargi, MPPGCL	SS	2x45	6.59	-	90 (LE)	90	RM&LE	2026-27
Karnataka									
51	MGHE, KPCL	SS	4x21.6+ 4x13.2	97.00	7.75	139.2 (LE)	139.2	RM&LE	2026-27
Maharashtra									
52	Vaitarna, MSPGCL	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
53	Koyna Dam foot (Right Bank), MSPGCL	SS	2x20	-	-	40 (LE)	40	RM&LE	2022-27
54	Koyna St-3, MSPGCL	SS	4x80	-	-	320 (LE)	320	RM&LE	2022-27
55	Tillari, MSPGCL	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
56	Bhira Tail race, MSPGCL	SS	2x40	-	-	80 (LE)	80	RM&LE	2022-27
Andhra Pradesh									
57	Machkund St.I & St.II, APGENCO	SS	3x17+ 3x23	500.00	-	120 (LE) +9 (U)	129	RMU&LE	2026-27
Kerala									
58	Idukki 2 nd stage, KSEB	SS	3x130	-	-	390 (LE)	390	RM&LE	2022-27
59	Idamalayar, KSEB	SS	2x37.5	-	-	75 (LE)	75	RM&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									
60	Hirakud-I (Burla), OHPC Unit 7	SS	1x37.5	0.9	-	37.5 (LE)	37.5	RM&LE	2024-25
61	Rengali, OHPC	SS	5x50	2.9	-	250 (LE)	250	RM&LE	2024-25
62	Upper Kolab, OHPC	SS	4x80	2.4	-	320 (LE)	320	RM&LE	2024-25
Jharkhand									
63	Subernrekha, JUUNL	SS	2x65	-	-	130(LE)	130	RM&LE	2022-27
Meghalaya									
64	Umiyam-umtru Stage-IV, MePGCL	SS	2x30	-	-	60(LE)	60	RM&LE	2022-27
Sub Total (E)			3227.70	836.89	11.25	3290.7 [3227.7(LE)+ 63(U)]	3290.70		
Total (A+B+C+D+E)			11736.60	9405.00	1892.04	9613.95 [9387.45(LE)+ 226.5(U)]	11963.10		

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

State-wise List of Hydro RMU&LE schemes programmed for completion during 2017-32										
Sl. No	Name of Project, Agency Cap. (No.X MW)	Inst.	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		SS	5x23	328.4	4.17	115 (LE)	115	RM&LE	2027-28
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 MW		CS	3x180	-	-	540 (LE)	540	RM&LE	2027-32
Uttarakhand										
4	Tanakpur, NHPC 3x31.4 MW		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		SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
19	Lower Mettur-II, TANGEDCO		SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
20	Lower Mettur-III, TANGEDCO		SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
21	Lower Mettur-IV, TANGEDCO		SS	2x15	-	-	30 (LE)	30	RM&LE	2027-32
Total				2879.20	682.91	4.17	2879.2 (2879.2(LE)+ 0(U))	2879.20		

Abbreviations: R&M – Renovation & Modernisation; U – Up-rating; 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