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Government of India
विद्युत् मंत्रालय
Ministry of Power
केन्द्रीय विद्युत **प्राधिकरण**
Central Electricity Authority
जल विद्युत अभियांत्रिकी और नवीनीकरण एवं आधुनिकीकरण प्रभाग
Hydro Engineering and R&M Division

जल विद्युत परियोजना का नवीनीकरण एवं आधुनिकीकरण

अवधि 2017-22 व 2022-27 का कार्यक्रम तथा यथास्थिति

Renovation & Modernisation of Hydro Power Stations

Status/ Programme for the period 2017-22 & 2022-27

QUARTERLY PROGRESS REPORT

(January - March, 2022)

(4th Quarter of 2021-22)

C O N T E N T S

Index of Schemes

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

Programme for the period 2017-22, 2022-27 & 2027-32

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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 and XII Plan Period

The R&M works at 104 (21 in Central and 83 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) with an aggregate installed capacity of 20611 MW had been completed by the end of the XII Plan and total benefit of 3636 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 and XII Plans are given at Annex-I, II, III, IV & V respectively.

Programme and Achievements during the period 2017-22

The Renovation & Modernization (R&M), Uprating and Life Extension works at 22 Hydro Electric Plants (HEPs) with an aggregate installed capacity of 4847.8 MW was programmed for completion during 2017-22 with its break-up as 3729.60 MW through R&M at 12 HEPs, 433.2 MW through Life Extension at 7 HEPs and 685 MW through Life Extension & Uprating at 3 HEPs. The 3 HEPs where both Life Extension & Uprating were envisaged, the aggregate installed capacity of 685 MW after completion of R&M works would get uprated to 801.2 MW resulting in additional benefit of installed capacity of 116.2 MW. As such, the revised aggregate capacity of these 22 projects on completion of R&M works would be 4964 MW.

Out of these 22 schemes, fourteen (14) schemes with an aggregate installed capacity of about 2023.20 MW have been completed till March, 2022. The benefits accrued include 334.2 MW (6 schemes) through Life Extension and 171.2 MW (2 schemes) through LE & Uprating. The State-wise list of hydro R&M schemes completed as well as those which were programmed but could not be completed during 2017-22 is given at Annex-VI. Accordingly, completion of eight (8) schemes with an aggregate installed capacity of 2824.60 MW has now been delayed and would get completed during 2022-23, and the details for same is also given at Annex-VI.

For the year 2021-22, it was programmed to complete 14 schemes having aggregate installed capacity of 3509.60 MW under R&M works. On completion of these schemes, there was to be a benefit of 921.2 MW through Life Extension and 102.2 MW through Uprating. Out of these schemes, Six (6) schemes with an aggregate installed capacity of about 685 MW have been completed till March, 2022 and have achieved of 282.2 MW through Life Extension and 12.2 MW through Uprating.

Programme during the period 2022-27

The Renovation, Modernization, Uprating and Life Extension works at 77 Hydro Electric Plants (HEPs) (including the eight schemes which could not be completed during the year 2021-22) with an aggregate installed capacity of 13192.60 MW is programmed for completion during 2022-27 with its break-up as 3218.15 MW through R&M at 15 HEPs, 8183.45 MW through Life Extension at 51 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 77 projects would be 13419.10 MW. The State-wise list of hydro R&M schemes expected for completion during 2022-27 is given at Annex-VII.

Programme during the period 2027-32

The Renovation, Modernization, Uprating and Life Extension works at 5 Hydro Electric Plants (HEPs) with an aggregate installed capacity of 1339.20 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 अवधि के दौरान उपलब्धियां

12वीं योजना के अंत तक 104 (21 केंद्रीय और 83 राज्य क्षेत्र में) जल विद्युत संयंत्रों (आठवीं योजना तक 13, नौवीं योजना में 20, दसवीं योजना में 32, ग्यारहवीं योजना में 18 और बारहवीं योजना में 21) जिनकी कुल स्थापित क्षमता 20611 मेगावाट थी में नवीनीकरण और आधुनिकीकरण का कार्य पूरा किया गया था, जिसके फलस्वरूप जीवन विस्तार, उन्नयन और पुनरुद्धार के माध्यम से 3636 मेगावाट का लाभ हुआ था। आठवीं, नौवीं, दसवीं, ग्यारहवीं और बारहवीं योजनाओं के दौरान पूरी की गई जल विद्युत आरएम एंड यू स्कीमों की राज्यवार सूची क्रमशः अनुलग्नक- I, II, III, IV और V में दी गई है।

2017-22 की अवधि के दौरान कार्यक्रम और उपलब्धियां

2017-22 के दौरान, 4847.8 मेगावाट की कुल क्षमता के साथ 22 जल विद्युत संयंत्रों पर नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार का काम पूरा करने के लिए कार्यक्रम बनाया गया था, जिसमे से 12 जल विद्युत संयंत्रों में 3729.60 मेगावाट की क्षमता नवीनीकरण एंव आधुनिकीकरण के माध्यम से, 7 जल विद्युत संयंत्रों में 433.20 मेगावाट की क्षमता जीवन विस्तार के माध्यम से, 3 जल विद्युत संयंत्रों में 685 मेगावाट की क्षमता के जीवन विस्तार और उन्नयन का कार्य किया जाना था। जिन 3 जल विद्युत संयंत्रों में जीवन विस्तार और उन्नयन दोनों की परिकल्पना की गई थी, उनकी क्षमता की वृद्धि नवीनीकरण एवं आधुनिकीकरण कार्य के पूर्ण होने के बाद 685 मेगावाट से बढ़ कर 801.20 मेगावाट तक हो जानी थी, जिसके परिणामस्वरूप 116.20 मेगावाट अतिरिक्त क्षमता का लाभ होता और जिसके कारण, इन 22 परियोजनाओं के नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार (आरएमयू एंड एलई) कार्यों के बाद संशोधित कुल क्षमता 4964 मेगावाट हो जाती।

इन 22 योजनाओं में से, लगभग 2023.20 मेगावाट की कुल स्थापित क्षमता वाली चौदह (14) योजनाएं मार्च, 2022 तक पूरी हो चुकी हैं। अर्जित लाभों में जीवन विस्तार के माध्यम से 334.2 मेगावाट (6 योजनाएं) और जीवन विस्तार और उन्नयन के माध्यम से 171.2 मेगावाट (2 योजनाएं) शामिल हैं। 2017-22 के दौरान पूर्ण की गई जलविद्युत आर एंड एम योजनाओं की राज्य-वार सूची और साथ ही जो योजनाएं शुरू किए गए थे, लेकिन जिन्हें पूरा नहीं किया जा सका उन्हें अनुलग्नक -VI में दिया गया है। तदनुसार, 2824.60 मेगावाट की कुल स्थापित क्षमता वाली आठ (8) योजनाओं को पूरा करने में अब देरी हो गई है और जिन्हें 2022-23 के दौरान पूरा किया जाएगा, और इसका विवरण भी अनुलग्नक -VI में दिया गया है।

वर्ष 2021-22 के लिए आर एंड एम कार्यों के तहत 3509.60 मेगावाट की स्थापित क्षमता वाली 14 योजनाओं को पूरा करने के लिए योजना बनाया गया था। इन योजनाओं के पूर्ण होने पर जीवन विस्तार के माध्यम से 921.2 मेगावाट और उन्नयन के माध्यम से 102.2 मेगावाट का लाभ होना था। इन योजनाओं में से लगभग 685 मेगावाट की कुल स्थापित क्षमता वाली छह (6) योजनाएं मार्च, 2022 तक पूरी हो चुकी हैं और जिनसे 282.2 मेगावाट का लाभ जीवन विस्तार के माध्यम से और 12.2 मेगावाट का लाभ उन्नयन के माध्यम से हासिल किया गया हैं।

2022-27 की अवधि के दौरान कार्यक्रम

2022-27 के दौरान 13192.60 मेगावाट की कुल स्थापित क्षमता के साथ 77 जल विद्युत संयंत्रों पर नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार का काम पूरा करने के लिए कार्यक्रम बनाया गया है, जिसमे से 15 जल विद्युत संयंत्रों में 3218.15 मेगावाट की क्षमता नवीनीकरण एंव आधुनिकीकरण के माध्यम से, 51 जल विद्युत संयंत्रों में 8183.45 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 77 परियोजनाओं की कुल क्षमता नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार (आरएमयू एंड एलई) के समापन के बाद 13419.10 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।

2027-32 की अवधि के दौरान कार्यक्रम

1339.20 मेगावाट की कुल स्थापित क्षमता वाले 5 जल विद्युत संयंत्रों में नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार कार्य की योजना 2027-32 के लिए बनाई गई है। 2027-32 के दौरान पूरा होने वाली इन संभावित जलविद्युत आर एंड एम योजनाओं की राज्य-वार सूची अनुलग्नक -VIII में दी गई है।

Summary of R&M of Hydro Electric Projects

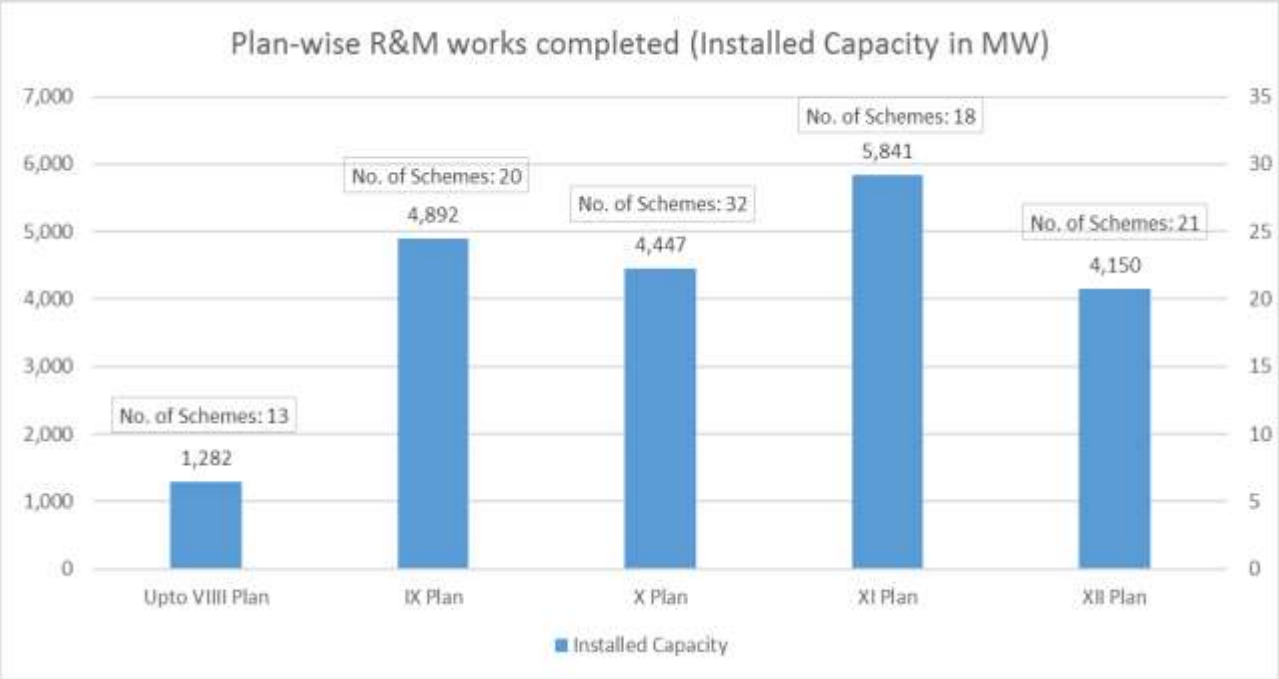
(As on 31.03.2022)

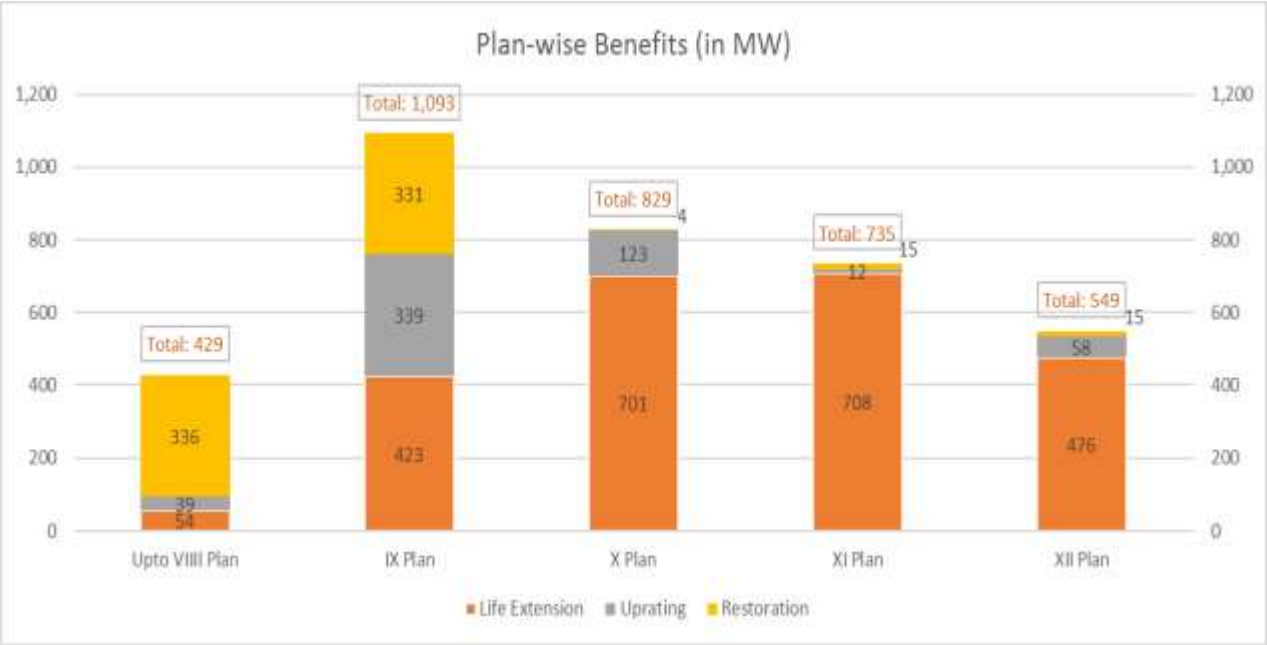
I Hydro R&M schemes completed up to XII Plan

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	829.08 [123.40(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	1115.97	549.40 [58 (U)+ 476.40 (LE)+15(Res.)]
	Total	21	83	104	20611.50	3137.58	3635.51 [571.40 (U)+ 2362.65 (LE)+ 701.46 (Res.)]

Abbreviations:

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





II Programme & Completion of R&M works during 2017-22

Sl. No.	Category	No. of Projects			Capacity covered under RMU&LE (MW)	Estimated Cost (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total			
1.	Programmed	7	15	22	4847.8	1977.62	1234.4 [1118.2(LE) +116.2(U)]
2.	Completed	5	9	14	2023.2	814.37 (Actual Cost)	505.4 [479.2(LE) + 26.2(U)]
3.	Programmed during 2017-22 but delayed and now Programmed during 2022-27	2	6	8	2824.6	833.68	729.0 [639(LE) +90(U)

III 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	69	77	13192.60	10200.95 [9974.45(LE)+226.5(U)]
2.	Under Implementation	3	23	26	5485.15	3047.5 [2868 (LE)+ 179.5(U)]
3.	Under Tendering	1	8	9	956.75	968.75 [956.75LE)+ 12(U)]
4.	Under DPR Preparation/ Finalisation/ Approval	3	8	11	2220.2	1751.2 1745.2(LE)+ 6(U)]
5.	Under RLA Studies	1	30	31	4530.5	4433.5 [4404.5(LE)+ 29(U)]

IV 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	2	5	1339.20	1339.20 [1339.20 (LE)]
2.	Under Implementation	0	0	0	0	0
3.	Under Tendering	0	0	0	0	0
4.	Under DPR Preparation/Finalisation/Approval	0	0	0	0	0
5.	Under RLA Studies	3	2	5	1339.20	1339.20 [1339.20 (LE)]

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

Year-wise & State-wise Summary of Original Completion Schedule of R&M Schemes at Hydro Power Stations
(During 2017-22)

Year-wise & State-wise Summary of Original Completion Schedule of R&M Schemes at Hydro Power Stations During 2017-22

Year 2017-18	Year 2018-19	Year 2019-20	Year 2020-21	Year 2021-22
Himachal Pradesh: i)Ganguwal U2 & Kotla U3, BBMB, (1x24.2+1x24.2) =48.4 MW **(Completed in 2017-18)** ii) Dehar Power House(U-6), BBMB, (1x165)=165 MW **(Completed in 2017-18)**	**Jammu & Kashmir:** i) Ganderbal, J&KSPDC (2x3+2x4.5)=9 MW **(Completed in 2021-22)** ii) Chenani, J&KSPDC (5x4.66)=23.3 MW **(Completed in 2021-22)** **Kerala:** Sholayar, KSEB, (3x18)=54MW **(Completed in 2020-21)** **Tamil Nadu:** Sholayar-I, TANGEDCO (2x35)=70 MW **(Completed in 2019-20)** **Telangana:** i) Nagarjuna Sagar Ph-II*, TSGENCO, (1x110+7x100.8)=815.6 MW (2022-23) ii) Nagarjuna Sagar LCPH*, TSGENCO (2x30.6)=61.2 MW (2022-27) **Karnataka:** i) Bhadra River Bed Units, KPCL, (2x12)=24 MW **(Completed in 2019-20**) ii) Munirabad Dam Power House*, KPCL (2x9 + 1x10) = 28 MW (2022-23)	**Himachal Pradesh:** i) Bhakra LB*, BBMB, (5x108)=540 MW (2022-23) ii)Bhaba Power House*, HPSEB, (3x40)=120 MW (2022-23) iii) Dehar Power House (U-3), BBMB, (1x165)=165 MW **(Completed in 2021-22)** **Uttar Pradesh:** i) Rihand*, UPJVNL (6x50)= 300MW (2022-23) **Kerala:** Idukki 1st Stage, KSEB, (3x130)=390 MW **(Completed in 2020-21)** **Odisha:** Hirakud-I, OHPC, (2x37.5) =75 MW **(Completed in 2021-22)** **Punjab:** i) Mukerin St.I, St.II, St.III & St.IV*, PSPCL, (3x15+3x15+ 3x19.5+3x19.5) = 207 MW (2022-23) ii) Shanan HEP*, PSPCL, (1x50+4x15)= 110 MW, (2022-23)	**Himachal Pradesh:** i)Baira Siul, NHPC, (3x60)=180 MW **(Completed in 2021-22)** ii)Giri*, HPSEB, (2x30)=60 MW (2024-25) **Jammu & Kashmir:** Salal ,NHPC, (5x115) =575 MW **(Completed in 2019-20)** **Punjab:** Ranjit Sagar Dam*, PSPCL, (4x150)=600 MW, (2022-23) **Madhya Pradesh:** Gandhi Sagar*, MPPGCL, (5x23)=115 MW (2026-27) **Odisha** Balimela*, OHPC, (6x60)=360 MW (2023-24)	**Uttarakhand:** i) Chilla Ph B*, UJVNL (4x36)=144 MW (2024-25) ii) Ramganga*, UJVNL (3x66)=198 MW (2022-27) iii) Dhakrani*, UJVNL, (3x11.25)=33.75 MW, (2025-26) iv) Dhalipur* , UJVNL (3x17=51MW) (2022-23) v)Tiloth*, UJVNL (3x30)=90 MW (2022-23) **Uttar Pradesh:** Obra*, UPJVNL (3x33)=99 MW (2021-22) **Madhya Pradesh:** i) Bargi*, MPPGCL, (2x45)=90 MW (2025-26) ii) Pench*, MPPGCL, (2x80)=160 MW, (2024-25 iii) Bansagar Ton-I*, MPPGCL, (3x105)=315 MW (2025-26) **Gujarat:** i) Ukai, GSECL (3x75)=225MW **(Completed in 2021-22)**

Year-wise & State-wise Summary of Original Completion Schedule of R&M Schemes at Hydro Power Stations During 2017-22

	<u>Odisha:</u> Hirakud-II, OHPC, (1x24)=24MW **(Completed in 2019-20**)	iii) UBDC St.I &St.II*, PSPCL, (3x15+3x15.45) =91.35 MW (2022-23) iv) Anandpur Sahib Hydel Project*, PSPCL, (4x33.5) = 134 MW (2022-23)		ii) Kadana PSS*, GSECL (4x60)=240 MW (2021-22) **<u>Kerala:</u>** Kuttiyadi*, KSEB, (3x25)=75 MW (2023-24) **<u>Karnataka:</u>** i) Nagjhari U-1 to U-3*, KPCL, (3x150)=450 MW, (2023-24) ii) Shivasamudram*, KPCL, (6x3+4x6))=42 MW, (2023-24) iii) MGHE*, KPCL, (4x21.6+4x13.2)=139.2 MW (2023-24) iv) Kadra Dam Power House*, KPCL (3x50) =150 MW (2022-23) v) Kodasalli Dam Power House*, KPCL (3x40)=120 MW (2022-23) vi) Supa Dam Power House*, KPCL (2x50)=100 MW (2023-24) vii) Linganamakki Dam Power House*, KPCL (2x27.5) =55 MW (2023-24) viii) Gerusoppa Dam Power House*, KPCL (4x60) =240 MW (2023-24)

Year-wise & State-wise Summary of Original Completion Schedule of R&M Schemes at Hydro Power Stations During 2017-22

				ix) Sharavathy Generating Station*, KPCL 10x103.5)=1035 MW (2023-24) **Jharkhand:** Panchet U-1*, DVC, (1x40)=40 MW (2023-24) **West Bengal:** Maithon U 1& 3*, DVC, (2x20)=40 MW (2024-25) **Meghalaya:** Umium St.III* (Kyrdemkulai), MePGCL, (2x30)=60 MW (2022-27) **Assam:** Khandong Power Station*, NEEPCO (2x25)=50 MW (2024-25)
213.40 MW (2 Schemes)	**1109.10 MW (9 Schemes)**	**2132.35 MW (10 Schemes)**	**1890 MW (6 Schemes)**	**4241.95 MW (25 Schemes)**

* These schemes are shifted to 2022-27.

Year-wise & State-wise Summary of Original & Anticipated 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

Year 2022-23	Year 2023-24	Year 2024-25	Year 2025-26	Year 2026-27
Himachal Pradesh: i) Bhabha Power House, HPSEB, (3x40) =120 MW (2022-23) ii) Bhakra LB, BBMB, (5x108) =540 MW (2022-23) **Punjab:** i) Ranjit Sagar Dam, PSPCL, (4x150) =600 MW (2022-23) ii) UBDC St.I & St.II, PSPCL, (3x15+3x15.45) =91.35 MW (2022-23) iii) Anandpur Sahib, PSPCL, (4x33.5) =134 MW (2022-23) iv) Mukerian St.I, St.II, St.III & St.IV, PSPCL, (3x15, 3x15, 3x19.5& 3x19.5) =207 MW (2022-23) v) Shanan, PSPCL, (1x50+4x15) =110 MW (2022-23) **Uttarakhand:** i) Tiloth, UJVNL (3x30) =90 MW (2022-23) ii) Dhalipur, UJVNL	**Karnataka:** i) Nagjhari U-1 to U-3, KPCL, (3x150) =450 MW, (2023-24) ii) Shivasamudram, KPCL, (6x3+4x6) =42 MW, (2023-24) iii) Linganamakki Dam Power House, KPCL (2x27.5) =55 MW (2023-24) iv) Gerusoppa Dam Power House, KPCL (4x60) =240 MW (2023-24) v) MGHE, KPCL, (4x21.6+4x13.2) =139.2 MW (2023-24) vi) Supa Dam Power House, KPCL (2x50) =100 MW (2023-24) vii) Sharavathy Generating Station, KPCL (10x103.5) =1035 MW (2023-24) **Tamil Nadu:** Kodayar PH-I, TANGEDCO (1x60) =60 MW (2023-24) **Kerala:** Kuttiyadi, KSEB, (3x25) =75 MW (2023-24)	**Himachal Pradesh:** Giri, HPSEB, (2x30) =60 MW (2024-25) **Uttarakhand:** Chilla Ph B, UJVNL (4x36)=144 MW (2024-25) **Madhya Pradesh:** Pench, MPPGCL, (2x80) =160 MW, (2024-25) **West Bengal:** Maithon (U 1& 3), DVC, (2x20) =40 MW (2024-25) **Assam:** Khandong Power Station, NEEPCO (2x23)=46 MW (2024-25)	**Uttarakhand:** Dhakrani, UJVNL, (3x11.25) =33.75 MW, (2025-26) **Madhya Pradesh:** i) Bargi, MPPGCL, (2x45)=90 MW (2025-26) ii) Bansagar Ton-I, MPPGCL, (3x105)=315 MW (2025-26) **Andhra Pradesh:** i) Machkund St.I & St.II, APGENCO, (3x17+3x23) =120 MW (2025-27) ii) Tungabhadra Dam, APGENCO, (4x9) =36 MW (2025-26) iii) Hampi Canal PH, APGENCO, (4x9) =36 MW (2025-26) iv) Lower Sileru, APGENCO, (4x115) =460 MW (2025-27) v) Upper Sileru Power House, APGENCO (4x60)=240 MW (2025-27) vi) Nagarjunasagar Right Canal Power House, APGENCO (3x30)=90 MW	**Jammu & Kashmir:** Salal Stage-I (Unit 1,2 &3) NHPC (3x115)=345 MW (2022-27) **Himachal Pradesh:** Pong Power House, BBMB, (6x66) =396 MW (2026-27) **Uttarakhand:** i) Ramganga, UJVNL (3x66)=198 MW (2022-27) ii) Kulhal, UJVNL (3x10)=30 MW (2022-27) **Madhya Pradesh:** Gandhi Sagar, MPPGCL, (5x23)=115 MW (2026-27) **Maharashtra:** 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) **Telangana:** Nagarjuna Sagar

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

(3x17) =51 MW (2022-23) **Uttar Pradesh:** i) Rihand, UPJVNL (6x50) =300 MW (2022-23) ii) Obra, UPJVNL (3x33) =99 MW (2022-23) **Karnataka:** i) Munirabad Dam Power House, KPCL, (2x9 + 1x10) =28 MW, (2022-23) ii) Kadra Dam Power House, KPCL (3x50) =150 MW (2022-23) iii) Kodasalli Dam Power House, KPCL (3x40) =120 MW (2022-23) **Telangana:** Nagarjuna Sagar Ph-II, TSGENCO, (1x110+7x100.8) =815.6 MW (2022-23) **Gujarat:** Kadana PSS, GSECL (4x60) =240 MW (2022-23)	**Odisha:** Balimela, OHPC, (6x60) =360 MW (2023-24) **Manipur:** Loktak, NHPC, (3x35) =105 MW (2023-24) **Jharkhand:** Panchet U-1, DVC, (1x40) =40 MW (2023-24) **Assam:** Kopili Power Station, NEEPCO (4x50)=200 MW (2023-24)		(2025-27)	LCPH, TSGENCO (2x30.6) =61.2 MW (2022-27) **Tamil Nadu:** i) Kundah-I, TANGEDCO (3x20) =60 MW (2022-27) ii) Kundah-II, TANGEDCO (5x35) =175 MW (2022-27) iii) Kundah-III, TANGEDCO (3x60) =180 MW (2022-27) iv) Kundah-IV, TANGEDCO (2x50) =100 MW (2022-27) v) Kundah-V, TANGEDCO (2x20) =40 MW (2022-27) vi) Mettur Tunnel, TANGEDCO (4x50) =200 MW (2022-27) vii) Sarkarpathy, TANGEDCO (1x30) =30 MW (2022-27) viii) Sholayar-II, TANGEDCO (1x25) =25 MW (2022-27) xi) Suruliyar, TANGEDCO

				(1x35) =35 MW (2022-27) x) Kadamparai PH, TANGEDCO (4x100) =400 MW (2022-27) xi) Aliyar, TANGEDCO (1x60) =60 MW (2022-27) xii) Moyar PH, TANGEDCO (3x12) =36 MW (2022-27) xiii) Kodayar PH-II, TANGEDCO (1x40) =40 MW (2026-27) **Kerala:** 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) iv) Porigalkathu, KSEB (4x9)=36 MW (2022-27) **Jharkhand:** Subernrekha, JUUNL, (2x65) =130 MW (2022-27) **Odisha:** i) Hirakud-I (Burla), OHPC,Unit 7 (1x37.5 MW)=37.5 MW (2022-27)

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

				ii) Rengali, OHPC (5x50 MW)=250 MW (2022-27) iii) Upper Kolab, OHPC (4x80 MW)=320 MW (2022-27) **<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)
3695.95 MW (16 Schemes)	**2901.2 MW (13 Schemes)**	**450 MW (5 Schemes)**	**1420.75 MW (9 Schemes)**	**4724.7 MW (34 Schemes)**

Year-wise & State-wise Summary of Original & Anticipated Completion Schedule of R&M Schemes at Hydro Power Stations (During 2027-32)

Year-wise & State-wise Summary of Original & Anticipated Completion Schedule of R&M Schemes at Hydro Power Stations During 2027-32

Year 2027-28	Year 2028-29	Year 2029-30	Year 2030-31	Year 2031-32
				Jammu & Kashmir: i) Tanakpur, NHPC (3x31.4)=94.2 MW ii) Chamera-I, NHPC (3x180)=540 MW iii) Salal Stage-II, (Unit 4,5 &6) NHPC (3x115)=345 MW **Uttarakhand:** i) Chibro, UJVNL (4x60)=240 MW ii) Khodri, UJVNL (4x30)=120 MW
				1339.2 MW (5 Schemes)

State-wise Status of R&M Schemes

(During 2017-22)

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

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 COMPLETED				
1.	**Salal** 6x115 MW NHPC 1987-95 T&G – BHEL **R&M** **2019-20**	- 58.01 51.08	i) Replacement of Runners. ii) Replacement of old Governor with Digital Governor in 6 units. iii) Replacement of AVR with Digital Voltage Regulator (DVR) in 3 units i.e. Unit No. 4, 5 & 6.	i) Order placed on M/s Voith Siemens. Runner installed & commissioned in all units. Unit-6 - 14.04.2017 Unit-4 - 20.01.2018 Unit-5 - 10.03.2018 Unit-3 - 30.01.2019 Unit-2 - 20.02.2019 Unit-1 - 05.04.2019 ii) Order placed on M/s Alstom (GE). Digital Governor has been installed and commissioned in all 6 Units. Unit-1–26.12.2016 Unit-2 –05.04.2016 Unit-3–15.01.2016 Unit-4–22.01.2016 Unit-5–19.02.2017 Unit-6–04.04.2016 iii) Order placed on M/s BHEL.DVR has been installed and commissioned in Unit- 4, 5& 6. Unit-4 – 06.12.2015 Unit-5 – 15.12.2015 Unit-6 – 04.04.2016
2.	**Chenani,** 5x4.66 MW J&KSPDC 1971-75 T&G - Ganz Mavag, Hungary **RM&LE** **2015-16** **2021-22**	**23.3 (LE)** 34.28 (Rev.) 21.84	**Turbine** Procurement of 4 nos. Runners and re-conditioning of spherical valves, replacement of Governors, Overhauling of BF valves, Penstock, Saddle Blocks Replacement of 2 sets of bearing with water cooled thord on bearings. **Generator** Change of Stator Windings with Class F insulation, Generator Cooling system, new 125 KVA DG set. Replacement of existing excitation system with Digital excitation system. **Protection** Replacement of D.C. System, 6.6/ 132 KV switchyard	Erection of all four runners completed by M/s. Andritz Hydro Ltd. RM&LE works of all five units successfully completed. All the five no. of machines ready for generation up to optimum level subject to availability of full discharge in forebay.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			equipment, spares for Generating units etc. **Auxiliary System** Procurement and Re-conditioning of Gate & Gearings, Repairing of CO_2 Plants and Trash Rack. **Civil** Improvement/restoration in water conductor system, construction of retaining walls/breast walls and toe walls of service road, Desilting of Forebay, Channelization of River, Nallah Training Works.	
3.	**Ganderbal (Unit-3)** 1x4.5 MW J&KSPDC 1955 (3 MW m/cs) & 1963 (4.5 MW m/cs) 3 MW m/cs – T&G – Escher Wyss, Switzerland 4.5 MW m/cs – T&G - Ganz Movag, Hungary **RM&LE** **<u>2016-17</u>** **2021-22**	**4.5 (LE)** 18 (Revised) 3.2	Turnkey Package for Dismantling, Supply, Installation, Testing and Commissioning of the 1x4.5MW Unit (Generator and Turbine including Spherical Valve), Generator Control Panels & Control Desks of Unit (4.5MW), Electronic Governor, 6.6 KV Instrumentation Transformers (CTs & PTs), Synchronizing Panel, 1.875MVA Single Phase Power Transformer, 33KV Control & Relay Panels, 33KV Instrumentation Transformers (CTs & PTs), 33kV SF6 Breakers, 33kV Isolators, Marshalling Kiosks, Surge Arrestors, 250kVA 3-Phase Servo Controlled Automatic Voltage Regulator, AC/DC Distribution Boards, Power & Control Cables and allied hardware including reconditioning of Penstock, trash racks necessary civil related works etc. **Civil Works** Improvement in Head Works, remodeling of Ganderbal Power Canal, construction of desilting basin, improvement and remodeling of cross drainage works, construction of catch water drains, breast walls etc.	Repairs of Units 1 & 2 completed to provide generation during execution works of units 3 & 4. The works awarded to M/s. Gogoal Hydro Power Pvt. Ltd. on 02.07.2015. RM&LE works successfully completed.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

NORTHERN REGION

HIMACHAL 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				
4.	**Ganguwal (U-2),** 1x29.25+2x2 4.2 MW BBMB 1962 (U1, 1955 (U2&3) **Kotla (U-3),** 1x29.25+2x2 4.2 MW BBMB 1961 (U1) 1956 (U-2&3) **RM& LE** **2017-18**	**24.2 (LE)** 14.19 9.58 **24.2 (LE)** (Cost included in above)	• Replacement of: Existing damaged propeller type turbine runners, Thrust sleeve & turbine water shaft sleeve (Ganguwal PH only). • Repair/ modification/ painting of turbine components and other allied works.	Unit-2 commissioned on 23.11.2017. Unit-3 commissioned on 04.12.2017.
5.	**Dehar Power House,** 1x165 MW(Unit 6) BBMB 1983 **R&M** **2017-18**	- 19.87 16.00	Replacement of: - Stator (Complete with Frame, Core, Bars and Air Coolers), - Rotor Poles, Pole Keys, Air guides, Temperature Recorders along with other allied items.	Unit-6 has been commissioned on 01.11.2017.
6.	**Dehar Power House,** 1x165 MW(Unit 3) BBMB 1979 T&G - BHEL **R&M** **2021-22**	- 23 18.67	Replacement of existing Stator of Unit-3, Slapper with a new one of latest design complete with Frame, Core, Bars and Air Coolers. Oil coolers, Rotor field pole assemblies, Air guides. Rotor Braking & Jacking system, Temperature Recorders along with other allied items.	Purchase Order issued to BHEL, Chandigarh on 04.06.2018. The unit is under continuous operation since 15.07.2021 i.e. after provisionally handing over to BBMB by M/s BHEL.
7.	**Baira Siul,** 3x60 MW NHPC 1980-81 **RM&LE** **2021-22**	**180 (LE)** 341.41 295.69	• Activities covering main equipment i.e. turbine, generator and C&I equipment and other plant equipment essential for efficient and sustained performance of the units as well as station.	CERC accorded "in-principle approval" on 03.06.2016 for Life Extension. LoA for Main Plant package awarded to M/s BHEL on 16.08.2016 at Rs. 132.74 Cr.

			• Activities having direct impact on improvement of generation, efficiency, machine availability etc. • Activities which yield up rating benefits because of Generator with Class F insulation, runner with improved profile. • HP-HVOF coating on under water parts of turbine. Adoption of closed circuit cooling system, Cu-Ni tubes for coolers etc. • State of the art equipment such as electronic governors, static excitation system, Numerical relays, on line monitoring devices including silt content in water. Augmentation of water conductor system and associated Civil/HM works and infrastructure works.	LoA for HM package awarded to "M/s Om Metals Infra projects Ltd, New Delhi" on 30.11.2016 at Rs. 19.91 crores. LoA for Switchyard Equipment awarded to M/s GE. Related civil works like equipment foundation, trench etc. also awarded. LoA for Civil Package (Dam & HRT) awarded to "M/s Alpha Pacific Systems Pvt. Ltd., New Delhi." at Rs. 10.79 crores. LoA for Bhaledh Weir (Civil works) awarded to "M/s. Starcon Infra Project(I) Pvt. Ltd., Delhi." at Rs. 17.72 crores. Unit#2 commissioned on 18.12.2019 and COD declared w.e.f. 00:00 Hrs of 29.12.2019 after R&M. Unit#1 commissioned on 27.10.2020 and COD declared w.e.f. 00:00 Hrs of 07.11.2020 after R&M. Unit #3 commissioned on 22.08.2021 and COD declared w.e.f. 00:00 Hrs of 31.08.2021 after R&M.
B - SCHEMES ONGOING – Under Implementation				
8.	**Bhakra LB,** 5x108 MW BBMB 1985 5x90 MW (Original) 1960-61 **RMU&LE** **2016-17** **2022-23**	**540(LE)+** **90(U)** 489.77 552.75	**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	- 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 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

			Bars with CTs, PTs etc. LAVT cubicle, switchyard equipments, control cables etc.	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. **<u>Unit 4</u>** 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 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 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. Unit shall be taken for shutdown after the completion of RM&U works of Unit-3. The build-up of stator for Unit-1 has been allowed to site. The work of stator stacking completed on 13.3.2021 and work of stator winding started on 15.03.2021 and is under progress. The unit has been taken on shut down and handed over to consortium for carrying out RM&U works on 15.12.2021 & work is under progress. Keeping in view the current COVID-19 scenario, RM&U works are expected to be completed in 2022-23.
9.	**Bhakra RB,** 5x157 MW BBMB **R&M** **<u>2021-22</u>** **2022-23**	- 20.80 -	Up gradation of existing Russian static excitation system for Unit no. 6, 7&8. Up gradation of existing Russian Generator and Generator T/F protection with Numerical IEC 61850	NIT Floated on dated 29.5.2019. Part-I opened on 08.11.2019. Clarification asked from firms on 17.12.2019. Price Bid opened and E-reverse auction carried out on 28.05.2020. Purchase Order issued to M/s. Voith Hydro on 06.10.2020. The firm has resubmitted the revised drawings and are under approval. PO issued to M/s. GE T&D, Chandigarh on 29.08.2019. The drawings have been approved on 23.07.2020. Inspection through VC

			protocol compliant Protection for unit no. 6 to 10. Up gradation of existing governor with microprocessor based Digital Type Electro Hydraulic Governors with SCADA compatibility for Unit no. 6 to 10.	completed. Firm submitted test and inspection report on 30.06.2021. Material received at site. PO has been issued to M/s. ABB India Ltd. on 16.06.2020. Firms representative has visited the site for preparation of drawing. Drawings have been prepared/ submitted by the firm and are under evaluation. ABB's representative has visited site on 22.03.2021 for finalization of drawings. Hydraulic drawings are yet to be submitted. As intimated by BBMB that R&M works of Bhakra RB has already been completed in 2000-01 and the above works are undertaken in O&M. Hence, the scheme is not considered for R&M.

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

NORTHERN REGION

PUNJAB (**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				
10.	**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** **2019-20** **2022-23**	- 194.29 65.39	1. Replacement of existing Governors of all the six Machines of MPH-1&2 with Modern Digital Technology based Governing System.	1. PO dated 28.01.2019 placed on M/s Voith Hydro Pvt. Ltd. Total delivery period is 12 months. Commissioning of 3 no. sets completed and balance 3 will be commissioned during lean period.
			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.	2. Purchase Order placed to M/s Flovel Energy Pvt. Ltd., Faridabad and all twelve sets of Static Excitation system has commissioned.
			3. Replacement of existing Electro-Mechanical Relays with Numerical Relays of all twelve Machines of MPH-1, 2, 3&4.	3. Work order issued to M/s Siemens and replacement in all units completed.
			4. Replacement of existing conventional DPRs, O/Cs & Directional E/F Relays with Numerical relays of Two Nos.	4. Yet to be initiated by site office.
			5. Replacement of existing 3 nos. 630 KVA, 11KV/415 Volt UATs with Dry Type Transformers of similar capacity at MPH-1.	5. Purchase Order placed on M/s ABB on 06.12.2017. All transformers (3 Nos.) received at site.
			6. Replacement of existing 4 nos. 800 KVA, 11KV/415 Volt UATs at MPH-3 & 4.	6. PO dt. 09.03.2021 placed on M/s Power Star, Solan for 3 no. 630 KVA UATs. Delivery period is within 4 months from the date of PO. Dispatch clearance issued on 20.09.2021. Material received at site.
			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.	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. Proposal under preparation for machine no. 5 & 9 for RMU study.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			8. Replacement of existing 11 KV XLPE Aluminum cables of size 1x500 mm^2 with XLPE Aluminum 1x800 mm^2 cables from Generator Bus duct to LV side of Generator Transformers of all units at MPH-1 & 2.	8. As desired by PSERC, case has been withheld.
			9. Procurement of one no. Trash Rack Cleaning Machine at MPH-1.	9. Proposal dropped.
			10. Procurement of 2 sets of Trash Racks for intake bays of Machine No.2&3 at MPH-1	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. Replacement of existing One No. Drainage and One No. Dewatering VT Pumps with submersible Pumps at each Power House.	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 commissioning is pending.
			12. Replacement of existing one no. Unit and one no. Service Air Compressors at each Power House.	12. PO dated 29.06.2021 issued to M/s General Engg. Co. Ludhiana. Material received at site.
			13. Replacement of existing LT panels at MPH-1&2.	13. Case planned in 2022-23.
			14. Replacement of 12 nos. 132 KV Line Circuit Breakers at MPH-1,2,3&4.	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. Replacement of existing 5 Nos. 11/132 KV, 20 MVA Generator Transformers at MPH-1&2.	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.
			16. Capital overhauling of one no. Generator Transformer at MPH 3 and one no. Generator Transformer at MPH-4.	16. Proposal dropped.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			17. Replacement of Two nos. of 11KV Vacuum Circuit Breakers at MPH-3 and Four Nos. 11kV VCB at MPH-4.	17. Allocation of 6 Nos. 11kV VCBs got done from TS organization of PSPCL.
			18. Replacement of oil and Air cooler for Machine 7,8,10 & 11 at MPH 3&4.	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. Replacement of tubular poles with rail poles of 11KV Auxiliary line.	19. Proposal dropped.
			20. Replacement of existing 2 Nos. 11/132 KV, 20/25 MVA Generator Transformers with 11/132 KV 25 MVA at MPH-3&4.	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. Providing Toilets at all the Bye-Pass gates of all Power Houses of MHP.	21. A&A has been accorded by the WTDs. NIT under approval.
			22. Renovation of water supply system of residential colony at Unchi Bassi MHP.	22. Work completed.
			23. Renovation of different approaching and internal roads of MHP.	23. Yet to be initiated by site office.
			24. Supply of new TGB shell for 15 MW machine no 4 at MHP-2	24. Material available at site, matter being taken up with BHEL to carry out works in the lean period.
			25. Replacement of upper oil pipeline and repair of TB Disc of machine no. 8 at Power House No of MHP	25. WO amounting to Rs. 0.20 Cr placed upon M/s Go Goal Hydro Pvt. Ltd Haridwar. Work completed.
			26. Treatment of expansion joint of power house building & duct portion at PH-I, Talwara.	26. WO Dt 18.03.2021 placed upon M/s SK Sales Co. Jalandhar. Work of expansion joint of 2 nos. Machines (M/c-1&2) has been completed and work of expansion joint of machine No.3 shall be completed during lean period.
			27. Procurement of 4 Nos. Battery charger for PH-3&4 of MHP.	27. PO dt. 03.12.2021 placed on M/s Statcon Energiaa Pvt. Ltd.,

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				Noida amounting to Rs. 22.26 Lac. Drawings submitted by the firm have been approved.
			28. Replacement of existing Governors at PH-3&4 of MHP.	28. Changed to RMU and will be initiated after RMU study.
			29. Capital overhauling of Electric Overhead Traveling (EOT) crane at PH-1, 2, 3&4 of MHP.	29. Work will be carried under revenue head.
			30. Replacement of 3 nos. existing 25MVA GTs of M/c no. 8, 10, &11 of MP.	30. Administrative approval obtained from WTDs. Specification under preparation.
			31. 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	31. Yet to be initiated by site office.
			32. Capital overhauling of Trash Rack Cleaning Machines at PH-1 to 4 of MHP	32. Case is being dealt by RE/ MHP, Talwara under revenue head.
			33. Replacement of existing Cooling Water System at PH-1 to 4 of MHP.	33. Case deferred to MYT 2023-27.
			34. Capital Overhauling of Emulsifier system at PH-1 to 4 of MHP	34. Case deferred to MYT 2023-27.
			35. Capital Overhauling of Radial Byepass Gates at PH-1 to 4 of MHP	35. Yet to be initiated by site office.
			36. Replacement of existing 8/4/4MVA, 132/33/11kV Transformer with 5 MVA, 132/11kV Transformer at PH-4 of MHP	36. Case deferred to MYT 2023-27.
			37. Procurement of 1 Nos. 400 AH Capacity Tubular type Lead Acid DC batteries Banks for PH-1 of MHP	37. Case is being dealt by RE/MHP, Talwara under revenue head.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			38. Procurement of Thermovision Camera for Centralized Protection cell, Talwara.	38. Yet to be initiated by site office.
			39. Installing CCTV at MPH-2,3,4 Talwara.	39. TE no. 276 dt. 18.10.02021 dropped due to in-eligible bids, fresh tender to be floated.
			40. Laying 1:4:8 PCC in the Switchyard of MPH-2 & MPH-4	40. Yet to be initiated by site office.
			41. Replacement of existing conventional central AC Plants at PH-1 & 3 of MHP	41. Case under preparation for administrative approval of WTDs
			42. Procurement of 4 Nos. Battery charger for PH-3&4 of MHP	42. PO no. 96 dt. 03.12.2021 placed on M/s Statcon Energiaa Pvt. Ltd. Noida amounting to Rs. 22.26 Lac. Drawings submitted by the firm have been approved.
11.	**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** **<u>2019-20</u>** **2022-23**	- 164.84 20.21	1. Renovation of water cooling bus of 4x15 MW machines.	1. Case under preparation by site office.
			2. Procurement of one runner for 50 MW machine and two runners for 15 MW machines.	2. All runners commissioned by M/s Flovel Energy Pvt. Ltd., Faridabad.
			3. Procurement of 07 Nos. 12 MVA GTs for 4x15 MW machine & 4 Nos. 19 MVA GTs for 50 MW machine.	3. All GTs commissioned by M/s BBL.
			4. Providing CCTV cameras at Shanan PH.	4. TE no. 284 dt. 04.04.2022 has been floated. Bid submission will start on 07.04.2022 up to 09.05.2022. Bid opening date is 17.05.2022.
			5. Procurement of needles and nozzles of all six machines.	5. Nozzles supplied by BHEL. Work completed.
			6. Replacement/Retrofitting of 66, 132 KV isolators & L.E with new ones at 132 KV Sub-station.	6. WO dated 12.11.2021 issued to M/s Hitachi Energy India Limited and drawings has been vetted.
			7. Replacement of 33 KV BOCB with new 66 KV SF6 breaker at 132 KV sub-station.	7. Work Completed.
			8. Procurement of 2 nos. SAN Container DC Batteries of 400AH Capacity for the	8. Batteries commissioned.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			replacement of existing DC Batteries.	
			9. Re-insulation of existing spare field coils of rotor of 50 MW machine with 'F' class.	9. Work completed.
			10. Replacement of needle control device, deflector shafts of 4x15 MW machines.	10. Case under preparation by site office. Planned for completion during 2020-23
			11. Replacement of existing relay and annunciation panels in control room.	11. Case under preparation by site office. Planned for completion during 2020-23
			12. Clearance of silt of new reservoir. Restoration of Toe wall and grouted stone pitching on U/S of UHL weir at Barot.	12. Work of desilting has been completed.
			13. Painting of Penstocks.	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. Procurement of 2 nos. SAN Container DC Batteries of 400 AH Capacity for the replacement of existing DC Batteries	14. Material has been received and commissioned at site as such work has been completed.
			15. Procurement of 1 no fully forged Runner for 50 MW M/c.	15. Runner has been received and commissioned.
			16. Replacement of existing DC motors & rotary gear pumps with new DC motors & triple screw pumps for bearings of 4x15 M.W machines.	16. TE floated dated 19.03.2018 has been dropped due to non-qualification of bidders. Revised TE under process at the site office.
			17. Procurement of 132, 66 & 11 KV CTs/PTs & Erection	17. Work Completed
			18. Design, manufacture & supply of 01 no. Governor pump without motor for 4x15 MW machines.	18. P.O No.16/RE dt. 04.03.2022 issued to firm. Material received and work completed.
			19. Procurement of hydraulic torque wrench for opening nuts of 15 & 50 MW machine's runners.	19. Approval for procurement has been accorded, case under preparation at site office.
			20. Providing electrical drives for operation of existing five no.	20. Part-III (Price bid of the TE has been opened. Comparative

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			manual decantation chamber drain valves (non-rising spindle type, hand operated) at Barot.	statement has been sent for pre-audit.
			21. Security fencing along intake channel of Barrage gate to head works and from intake barrage to Substation at Barot. (Shanan, HEP), Jogindernagar.	21. PO dt. 23.11.2020 issued to M/s Gold Star Co-op L&C society Ltd.
			22. Providing Real time online discharge measuring system to release 15 % to 20 %water as per NGT order	22. PO dt. 20.01.2022 issued to M/s Alpha Pacific Systems Pvt. Ltd., New Delhi.
			23. Replacement of 4x15 MW machine excitation system	23. NIT floated. Technical and commercial evaluation of the bids is under process.
			24. Procurement of 1 no runner for 50 MW machine along with HVOF coating.	24. Case under preparation by site office.
			25. Procurement of 2 nos. runner for 15 MW machines along with HVOF coating.	25. Budgetary offer called from the firms, the case is under process with RE/ SPH office.
			26. Replacement of Old Neutral Breakers of 4x15 MW Machines with new Neutral Grounding Transformers.	26. Case under preparation by site office.
			27. Replacement of old 11KV/440V LT panels incoming and outgoing feeders at 11 KV Switch House.	27. Case under preparation by site office.
			28. Replacement of old 02 nos. 630KVA, 11/440V station transformers with new one.	28. Case under preparation by site office.
			29. Replacement of G40 governor with new OPU.	29. Case under preparation by site office.
			30. Replacement of old spherical valve alongwith its servomotor of 1x50 MW machine with new one.	30. Case under preparation by site office.
			31. Modernisation & Renovation of 50 MW cooling system.	31. Case under preparation by site office.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			32. Providing new over speed trip protection devices of all machines.	32. Case under preparation by site office.
			33. Renovation & Modernisation of fire fighting system of Power House.	33. Case under preparation by site office.
			34. Procurement of spare sets of bearing pads for 4x15 MW machines.	34. Lowest budgetary rates called but still pending due to unavailablity of budgetary rates. Case under preparation by site office.
			35. Replacement of B- class insulation of stator winding of 1x50MW m/c with F-class.	35. Case under preparation by site office.
			36. Replacement of all LT panels of auxiliary equipments of all machines.	36. Case under preparation by site office.
			37. Replacement of existing spherical valves along with Hydraulic Control Unit of spherical valve of 4x15MW machine.	37. Case under preparation by site office.
			38. Replacement of under water parts of all machines.	38. Case under preparation by site office.
			39. Concreting of Sub Station at Shanan Power House Joginder Nagar.	39. Case under preparation by site office.
			40. Replacement of all air compressors with new ones	40. Case under preparation by site office.
			41. Replacement of stator air coolers, TGB, LGB, UGB and thrust bearing oil coolers of 1x50MW machine with new ones.	41. Case under preparation by site office.
			42. Replacement of all oil coolers of 4x15 MW machine with new ones.	42. Case under preparation by site office.
			43. Renovation & Modernisation of House Generator set.	43. Case under preparation by site office.
			44. Procurement of spare slip ring assemblies for 4x15 MW and 1x50 MW machines.	44. Case under preparation by site office.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	45. Case under preparation by site office. 46. Case under preparation by site office. 47. This work is proposed to be carried out during the year 2022-23 and case will be processed after budgetary offer from firms. Case under preparation by site office.

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

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 ONGOING - Under Implementation				
12.	**Obra,** 3x33 MW UPJVNL 1970 (U-1&2), 1971 (U-3) T&G - BHEL **RM&LE** **2017-18** **2022-23**	**99 (LE)** 58.80 44.87	- 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.	**UNIT No. 1** A. WORKS COMPLETED 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. WORK UNDER EXECUTION 1. NIL. C. WORKS YET TO BE TAKEN UP 1. Capital overhauling along with replacement of vapours 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. Price bid opened on 03.10.2018. LOI issued to firm. This machine is scheduled after completion of similar works of Unit - 3. **UNIT No. 2** A. WORKS COMPLETED 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.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				6. Refurbishment of generator coolers. B. <u>WORK UNDER EXECUTION</u> 1. NIL. C. <u>WORK YET TO BE TAKEN UP</u> Capital overhauling along with replacement of vapours 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. Price bid opened on 03.10.2018. LOI issued to firm. The machine is scheduled for works, after completion of works of Unit 1 & Unit -3. **<u>UNIT No. 3</u>** A. <u>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. B. <u>WORKS UNDER EXECUTION</u> Capital O/H of machine is under progress. 1. Generator stator and rotor works completed. Final testing will be taken up in tandem with the turbine side works. Replacement of Stator core and Stator coils. 2. Capital overhauling along with replacement of vapours 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. Price bid opened on 03.10.2018. LOI issued. Assembly of machine is in final stage. Final testing will commence

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				soon. Unit is at pre-commissioning stage. **COMMON WORKS** A. <u>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 CO_2 Fire extinguishing system of generator of all 3 machines (Centralized Unit) completed. B. <u>WORKS UNDER EXECUTION</u> 1. Supply & installation of C&P panel is completed. Tendering process for Procurement process for remaining items initiated. 2. Provision of station supply from Obra HEP 132 KV Bus. 3. Supply, erection and commissioning of new elevator. C. <u>WORKS YET TO BE TAKEN UP</u> Nil

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

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 COMPLETED				
13.	**Ukai,** (U- 1, 2& 4), 4x75 MW GSECL 1974-76 T&G – BHEL **R&M** **2021-22**	- 7.3 7.3	Replacement, erection, commissioning & testing of New Microprocessor based Digital Governing System with existing Governing System in Unit No. 1,2&4. Work of various testing (RLA) of Generator transformers & Station transformers. Testing of Transformers for Routine, IR-PI, Tan Delta, Step Voltage, SFRA, Turn Ratio, Winding Resistance Magnetizing Current, DIRANA and Oil BDV, DGA & FURAN	Orders placed to BHEL, Vadodara. Works completed. Work completed (M/s. ERDA, Baroda).
B- SCHEMES ONGOING -Under Implementation				
14.	**Kadana PSS,** 4x60 MW GSECL <u>Units 1&2</u> 1989-90 T&G-Skoda <u>Units 3&4</u> 1998-99 T&G-BHEL **R&M** **<u>2021-22</u>** **2022-23**	- 5.44 3.73	Replacement of existing Governing System by microprocessor based digital governing system for 2x60 MW pump turbine unit 1&3 or (any Two units). Installation of vibration monitoring system for Unit no. 3&4. Supply, erection, Commissioning and testing of on-line ultrasonic flow measurement system (SKODA/ BHEL make turbine) for Unit-1&3 (or any two units). Replacement of existing AVR excitation system by DVR excitation system of Unit-2.	Replacement of Governing system of Unit No. 1&2 was completed by M/s Voith Hydro and performance of system found OK. Work completed on 20.02.2017 by M/s Protech Monitoring Pvt. Ltd, New Delhi. Order has been issued to Automation & Maintenance Management System, Coimbatore on 16.05.2018. Erection work of both the flow meters completed in Unit-1&4. Flow meter in Unit-1 commissioned on 19.08.2019. Commissioning of flow meter in Unit No. 4 is pending due to its complete isolation and likely to be completed during 2022-23. Order placed on M/s BHEL on 11.09.2018. Works completed in December 2020.

			Upgradation of existing governing system with new digital governing system for unit 3&4 Refurbishment/ upgrading for successful running in pump mode operation of Unit-3.	Technical bid opened on 20.10.2020. LOI issued to M/s ABB India. Work under planning by M/s ABB. The trial run of Unit No. 3 under reversible pump mode operation at 55MW load was taken on 20.12.2018 in coordination with SLDC, Gujarat. S.E., Irrigation department, Lunavada Central Water and Power Research Station (CWPRS), Khadakwasla Pune. Unit was run in Pump mode for 20 minutes and following parameters were observed during trial run: • Current 2700A &Load 55MW. • Power consumption: 16MWH • Water discharged from downstream to upper reservoir-3.89 Million cubic feet. • High Vibrations were observed. Proper analysis of the vibrations and their effects is to be done. Required maintenance will be done so that Unit can run in pump mode operation. Consultancy assignment is awarded to IIT Roorkee for technical & commercial feasibility as per GERC/CERC regulations of KHEP units on 27.12.21. IIT Roorkee team visited GSECL & Kadana HEP twice for data collection in Jan, 2022 & March, 2022 respectively.

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

SOUTHERN REGION

TELANGANA **(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				
15.	**Nagarjuna Sagar Phase II works,** 1x110 + 7x100.8 MW, TSGENCO 1978-85 Unit-1: T&G - BHEL Units 2 to 8: PT - Hitachi, Japan MG - MELCO, Japan **R&M** **2018-19** **2022-23**	- 22.17 14.34	1. Replacing existing AVRs with latest DVRs alongwith thyristor modules for 7 units at NSPH. 2. Replacement of all L.T. Breakers of all units and SABs of NSPH. 3. Retrofitting of Numerical Relays of Generator Protection Schemes of Units 2 to 8. 4. Overhauling of EOT Cranes and Gantry cranes at NSPH. 5. Procurement of control cables of different sizes for units 1 to 8, common auxiliaries, Switchyard equipments and switchyard marshalling boxes and laying of Power Cables and Control Cables for Penstock Inlet Gates from main control room for NSPH. 6. Procurement of 245 KV Section Breaker for BUS-A, BUS-B at NSPH switchyard, Bus Coupler at 220 KVRS and the related Isolators and accessories, erection, repositioning of PTs etc. at NSPH Switchyard. 7. Servicing and reconditioning/ procurement of new Isolators required for motoring mode operation for 89G, 89M, 189S1 and 189S2 for units-1 to 8. 8. Procurement of 245 KV SF6 Circuit Breakers. 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.	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. 7. Completed (GR Power Switchgear) 8. Completed (CGI, Alstom and Siemens) 9. i) Overhauling of stoplog gates: 18 elements are yet to be taken up.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				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. Replacement of switchyard equipment that have completed 25 years of service of 220 KV CVTs (10 Nos.), 132 KV CVTs (17 Nos.), 220 KV PTs (5 Nos.), 132 KV PTs (8 Nos.), 220 KV LAs (13 Nos.) and 132 KV LAS (13 Nos.) for NSHES.	10. Completed (LA's: Lamco & PT's: Toshiba)
			11. Procurement of 220 KV CTs (18 Nos.) for units (silicon rubber composite type).	11. Completed (Siemens)

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

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				
16.	**Bhadra River Bed units,** 2x12 MW KPCL 1963 T- Neyrpic, France G- Hitachi, Japan **R&M** **2019-20**	- 23.55 20.12	**A. Refurbishment of Generator Auxiliaries** 1. Supply and replacement of existing excitation system with SEE. 2. Replacement of governors. 3. Replacement of electromagnetic relays with digital relays. Replacement of 11 kV switchgear, LAVT & NGT/NGR cubicles, 11 kV cables. **B. Replacement/ Refurbishment of Turbine and associated equipments** 1. Replacement of BF valve, TGB, Guide vanes, Rubber hub, Top cover, Vacuum brake valve, Air compressor system, CW Pipelines Gov oil pipes, Brake pads, Rotor lead etc. 2. Refurbishment of Guide vane servo motor, Runner servo motor, Turbine shaft, Runner cross head, pivot ring etc.	Contract agreement signed with M/s Andritz Hydro Pvt. Ltd. on 21.09.2012. R&M works completed and both units commissioned. Unit 1&2 will be taken into service depending on the water availability and as per the requirement of M/s.KNNL.
B- **SCHEMES ONGOING - Under Implementation**				
17.	**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	- 4.60 2.20	Generator protection and DCS based SCADA system for Unit 1,2&3.	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. Supply of all equipments except Energy meter & EMS package is completed. Erection & Commissioning work yet to be taken up.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	U-3: Voest Alpine, Austria **R&M** **<u>2018-19</u>** **2022-23**		2 nos. 11kV Tee-off cubical of Units 1&2 and 11kV Gescom UAT switchgear cubicle.	WO Placed on L1 bidder M/s Amar Raja power systems Ltd., Tirupati at a total cost of Rs. 71,19,395.00. Supply of panels completed. Erection & Commissioning work yet to be taken up.

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

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 COMPLETED				
18.	**Sholayar** 3x18 MW KSEB 1966-68 T-Litostroj, Yugoslavia G-RadeKoncar, Yugoslavia **RM&LE** **2017-18** **2020-21**	**54 (LE)** 199.55 84.26	Replacement of old machine with new machine (Butterfly Valve, Penstock pipes, Turbine & PRV, Governors, Stator & Rotor windings with Class F insulation, Excitation System, Control & Protection, 11 kV panels, LT distribution system, DC Panel, Switchyard equipments and Power Transformers).	**Renovation of Generating Equipments:** Supply Order & work order issued on 30.06.2015 to M/s FEPL-FUYUAN Consortium, China and agreement executed on 06.07.2015. R&M works of Unit-3 completed on 16.03.2019 & in service and taken over on 18.09.2019. R&M works of Unit-2 completed on 29.12.2019 and taken over on 19.01.2020. R&M works of Unit-1 completed on 05.10.2020
19.	**Idukki 1st Stage** 3x130 MW KSEB 1975-76 T - Neyrpic, France G - GE, Canada **R&M** **2018-19** **2020-21**	- 89.9 65.763	Refurbishing the Main Inlet Valves, Procurement of one number MIV, Modernizing the auxiliary systems, replacement of Governing Systems & Excitation Systems with new PLC. control. Renovation work of fire fighting system of Generator and Generator Transformers of 1st and 2nd stage. Introduction of SCADA.	Refurbishing the Main Inlet Valves & Procurement of one number MIV was awarded to M/s HBHC, China. The work of modernizing the auxiliary system, replacement of switchyard equipment's, replacement of Governing system, Excitation system, Introduction of SCADA was awarded to M/s GE Power. **Unit-3** commissioned on 16.03.2019. **Unit-2** commissioned on 27.12.2020. **Unit-1** synchronized on 14.07.2020.

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

SOUTHERN REGION

TAMIL NADU **(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				
20.	**Sholayar PH-1,** 2x35 MW TANGEDCO 1971 T - Litostroj, Yugoslavia G - Rade Koncar, Yugoslavia **RMU&LE** **2019-20**	**70 (LE)+ 14(U)** 90.44 66.94	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 Transformers, 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.	Contract Agreement signed with M/s Andritz Hydro Private Limited (AHPL), Haryana on 21.07.15. Unit-1 completed and commercial operation commenced on 29.10.2018. Unit-2 synchronized with grid on 23.07.2019 and taken over from agency on 03.09.2019.

State-wise Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion during 2017-22

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 COMPLETED				
21.	**Hirakud-I Burla (U5&6),** 2x37.5 MW OHPC Ltd. 1962-63 T&G. - Hitachi, Japan **RMU&LE** **2017-18** **2021-22**	**75 (LE)+ 12.2 (U)** 158.77 101.83	**Replacement of** i) The Turbine & Generator with new ones except the embedded parts. ii) The auxiliaries of the Unit including the common auxiliaries. iii) Existing Governor 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. iii) New 55 MVA, 11/132 kV Generator Transformer. ix) Power and control cable with FRLS type cable. x) Architectural works including interior decoration of Power House. xi) Refurbishment of Intake gates and Draft Tube gates.	The contract agreement signed with M/s Voith Hydro Pvt. Ltd on 16.10.2015. OHPC engaged M/s WAPCOS Ltd. as consultant. **Completed works (Unit 6):** - Refurbishment of Draft Tube gates. - Dismantling of Generator, Turbine and Auxiliaries. - Drainage & Dewatering Pump installation. - HV test on stator winding. - Concreting of Turbine HPU area. - By pass valve replacement. - Bus duct & GT installation. - Sand blasting and painting of intake gate. - Ultrasonic test & DP test on existing stay vanes - Core magnetization. - Stator building completed and stator lowered. - Refurbishment of intake gate. - Refurbishment of spiral case and discharge ring. - Rotor assembly. - Penstock repair works - Tower assembly of Turbine shaft, Runner and inner head cover and lowering of tower assembly - Installation of Guide Vane with lower bush and outer head cover. - Lowering of Generator shaft, thrust block and lower bracket. - Installation of new D&D pumps - Governor System - Excitation system - Protection system - Cooling water System - Compressed air system

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				- Unit 6 was test synchronized and load throw test was carried out on 28.10.21. - Unit was under trial operation with effect from 30.10.21 and defects noticed during trial operation is being rectified by the contractor. - After completion of 72 hour continuous operation, commercial operation of Unit 6 was declared from 02.11.2021. **<u>Completed works (Unit 5):</u>** - Refurbishment of Draft Tube gates. - Refurbishment of intake gate and lowered. - Dismantling of Generator, Turbine and Auxiliaries. - By pass valve replacement. - Sand blasting and painting of intake gate. - Drainage & Dewatering Pumps installation - Bus duct & GT installation. - Ultrasonic test & DP test on existing stay vanes. - Core magnetization. - Stator and rotor Building. - Refurbishment of spiral case, sand blasting and painting of stay ring and turbine pit lines - Combined runout check of the unit - Governor System - Excitation system - Protection system - Cooling water System - Compressed air system - Spinning was carried out on 22.12.21. - Unit was test synchronized to Grid on 31.12.21. - Trial run in full load started on 04.01.2022 and commercial operation started on 09.01.2022. **<u>Works under progress:</u>** - Architectural work of Power House. - Rectification of defects.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
22.	**Hirakud-II (Unit-3) (Chiplima),** 3x24 MW OHPC Ltd. 1964 Unit-1&2 T-JM Voith, Germany G-Hitachi, Japan Unit-3 T-LMZ, USSR G-Electrosila, USSR **RM&LE** **<u>2017-18</u>** **2019-20**	**24(LE)** 65.67 52.04	**Replacement of** i) The Turbine & Generator with new ones except the embedded parts. ii) The auxiliaries of the Unit including the common auxiliaries. iii) Existing Governor 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) New 30 MVA, 11/132 kV Generator Transformer. ix) Power and Control cable with FRLS type cable. x) Architectural works including interior decoration. Refurbishment of Intake gates and Draft Tube gates.	The Contract Agreement was signed with M/s Voith Hydro Pvt. Ltd. on 15.10.2015. OHPC engaged M/s WAPCOS Ltd. as consultant. **<u>Works Completed:</u>** - Erection of Turbine. - Erection of Generator. - Erection of all auxiliaries. - Mechanical spinning of the unit carried out on 18.09.2019. - Unit was test synchronized on 07.11.2019. - COD of Unit 3 declared on 21.01.2020. - Trial run of the unit started on 21.01.2020 and completed on 01.04.2020. The performance of the machine was observed during this period. The Unit was provisionally taken over w.e.f. 18.05.2020 with list of major and minor defects. Performance Guarantee test of the unit was conducted on 05.11.2020. **<u>Works under progress:</u>** - Architectural work. - Rectification of some defects and supply of pending spares.

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
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 ONGOING – Under Implementation**			
2.	**Pong Power House,** 6x66 MW BBMB 1977-83 T&G-BHEL **RMU&LE** **2026-27**	**396 (LE) + 54 (U)** 142.25 -	**Unit-2** – Complete stator – Cooling pipes and coolers – Temp. recorder – New HS lub. system **Unit-3** Replacement of complete wound stator for Unit No. 1, 4, 5 & 6. Replacement of Six Unit Transformers of 67 MVA. Replacement of old Six Analog Governors with new Microprocessor based ones (Unit No. 1, 2, 4, 5&6). Replacement of old Semi-static excitation system of 6 units.	Work Order for replacement of Complete Wound Stator for Unit-2 has been issued to M/s BHEL on 07.09.2018 and Unit handed over to M/s BHEL on 14.02.2019. Works completed in April, 2020. Replacement of Stator of Unit-3 completed Work Committee constituted on 23.10.2019 to study and explore the possibility of uprating of machines alongwith excitation system and transformers has submitted the report. M/s WAPCOS has been asked to furnish the budgetary quotation for carrying out the feasibility study of uprating of Pong unit. Unit Transformers (6nos.) of 67 MVA each replaced by 75 MVA in July, 2016. (Unit-2&5: M/s. Alstom, Unit-1&4: M/s BHEL and Unit-3&6: M/s ABB). The commissioning work of Governor replacement completed. NIT for replacement of Old Semi Static Excitation System published. Technical bid opened on dated 30.07.2019. Existing NIT dropped. Being clubbed with RM&U works of uprating of 1,4,5&6 units. Agenda was approved on 28.4.2021 and NIT for hiring consultant was floated on 23.02.2022. Case shall be processed further.

S. No.	Scheme / Category/ Completion Schedule	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			Upgradation of existing Generator Protection with Latest Numerical IEC 61850 protocol compliant Generator protection for Unit No. 1, 2, 4, 5 & 6.	Material received at site. Erection, Testing & Commissioning of 2 units out of 5 completed by the firm. Work of remaining units will be done as per availability of shut down.
3.	**Bhabha Power House,** 3x40 MW HPSEBL 1989 T&G - BHEL **RM&LE** **2017-18** **2022-23**	**120 (LE)** 90.14 43.01	• Rehabilitation of Generator of Unit-1.	• Unit No.1 was earlier commissioned on 10.07.2016 but due to over speeding, stator winding was damaged & machine again stopped on 25.09.2016. Rehabilitation works completed by M/s BHEL and Unit re-commissioned on 04.12.2017 but tripped on 28.01.2018 due to internal fault. The machine has been re-commissioned on 09.03.2018 after rectification of fault by BHEL. • During execution of the rehabilitation works of Unit-1, it was found by M/s BHEL Engineers that the Nozzle servomotors of all machines need to be replaced and same has been awarded on 28.03.2017. The Nozzle Servomotors of all Units commissioned.
			• Replacement of Electro-Hydraulic Transducer (EHT) with handle, Main Distribution Valve (MDV) spool & sleeve assy., Pilot needle & sleeve assy., Duplex filter element only (inner & outer sleeve), Solenoid valve (Size 10) of MIV Hydro Control Panel (HCP), Pilot operating main distributing valve type for MIV HCP, NRV of PP Set, Nozzle Servomotors & Drain Pipe Lines Route of Decompression Valve & Seal Valve of MIV.	• Works completed.
			• Replacement of three (3) nos. Digital governors including oil pumping unit, pressure tank &sump tank, valves & piping to form an individual pressure system for each governor. • Replacement of three (3) nos. Static Excitation and Digital AVR systems	• The work of dismantling & replacement of existing Electro-Hydraulic Governor, excitation system, Unit Control board, Providing Control & Monitoring (SCADA) system and Power & Control cables awarded to M/s GE Power India Ltd. on

S. No.	Scheme / Category/ Completion Schedule	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	19.07.2018 and has been completed. • The tender has been awarded to M/s Voith Hydro Pvt. Ltd. on 04.07.2019. The runners have been received in Feb., 2021. One runner installed during March, 2021 and second runner kept as spare.
B- SCHEMES ONGOING – Under Tendering				
4.	**Giri,** 2x30 MW HPSEBL 1978 T&G - BHEL **RM&LE** **2022-23** **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, replacement of penstock drainage valves and pipes, 3 Nos. new Francis runner (2+1 spare) with high	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.

S. No.	Scheme / Category/ Completion Schedule	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	

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
SCHEMES ONGOING - Under Implementation				
5.	**Ranjit Sagar Dam,** 4x150 MW PSPCL 2000 T&G – BHEL **R&M** **2022-23**	- 95.48 7.46	1. Installation and commissioning of Electro Hydraulic Governor capable of Restricted Governing Operation Mode (RGMO). Procurement of 2 no. high pressure compressors.	1. PO placed on M/s BHEL on 04.12.2018. Material received at site. Old governors of Unit No. 1, 3 and 4 have been replaced. The work of Unit #2 is pending.
			2. Replacement of existing old Auto Sequencers & AVR with Unit Control System compatible with SCADA application.	2. T.E. dt. 21.12.2021 has been floated online with due date of opening is 20.04.2022.
			3. Procurement of T&P (Digital Insulation Tester).	3. Material has been received and work completed.
			4. Replacement of 220 KV Circuit Breakers of 7 nos. feeders.	4. Case file is under process to prepare tender specifications by site office.
			5. R&M of emulsifier system of Generator Transformer and CO_2 system.	5. T.E has been floated on 03.06.2021 for the work of emulsifier system. Part-1 has been opened on 02.11.2021 and purchase order proposal is under process. For procurement of CO_2 system for Generator, T.E dt. 14.12.2021 has been floated online with date of opening is 22.04.2022.
			6. Capital maintenance of Unit 2.	6. May be deffered to next control period.
			7. Renovation of AC plants.	7. W.O dt. 30.06.2020 has been issued to M/s Jamalpur CO-Op. L&C Society Ltd for dismantling of 3x52 Ton central AC unit UCB-II from GNDTP Bathinda & Re-installation at RSPP. Now the budgetary offer has been taken from M/S Blue star for repair of these AC Units and case file is under process.
			8. Providing additional portable dewatering pump set.	8. Retendering under process.
			9. Capital Maintenance of Unit 3.	9. Rescheduled for 2023-25. Case under preparation by site office.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			10. Up-gradation of HP compressors of condenser mode operation.	10. PO dated 29.06.2021 issued to M/s General Engineering Company. Erection & Commissioning has been completed by the firm.
			11. Replacement of drainage pumps of unit bay side 2.	11. PO dt. 18.03.2021 amounting to Rs.1.195 Cr. issued to M/s Hydraulic Engineering Company, Solan for pumps of RSD, UBDC & MHP. Delivery period is 5 months from the date of PO. Material received at site and Commissioned.
			12. Capital Maintenance of Unit-1. (Replacement of runner disc to be carried out)	12. PO placed on M/s BHEL on 30.07.2019 for runner disc replacement. Work completed, only minor work is pending.
			13. Replacement of flow meters.	13. PO dt. 12.11.2021 has been placed on M/S JPS Engineer Chandigarh. The dispatch instructions were given on dated 29.03.2022.
			14. Replacement of drainage pumps of service bay side-2.	14. Case under preparation.
			15. Construction of Porches over all entry points of Power House Building.	15. Case under preparation.
			16. Providing Detachable scaffolding set for Power Plant Maintenance.	16. Case under preparation.
			17. Procurement of 11/0.415kV, 1250kVA, Dry type Station Service Transformers.	17. PO dt. 20.04.2021 issued to M/s AMES IMPEX GUJARAT, against TE dated 11.10.19. Material received at RSD site.
			18. Procurement of 4 nos. Magnetic Float Level Indicators with switching contacts.	18. Work completed. (BHEL).
			19. Replacement of defective fire alarm panel other accessories (work being executed by site).	19. Work completed.
			20. Replacement of valves of Power House.	20. Case file is under process by site office.
			21. Overhauling of 3 nos. GTs out of 12 nos.	21. The work to be executed departmentally from Grid Construction Division,

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				Amritsar. One GT is taken by PSPCL Grid Construction to crane bay verpaat on 07.01.2021(from RSD) for capital overhauling. Out of 3 No., GT's, One no. GT was received back from crane bay Verpaat RSD after capital overhauling. GT was energized on dated 10.03.2022. Remaining GTs will also be sent to Verpaat for capital overhauling one by one after receipt of GT.
			22. Overhauling of semi gantry crane and EOT Crane.	22. Administrative approval was got accorded from CE/HPs and the technical specifications are under preparation by site office.
			23. Replacement of 2 no. service compressors.	23. Case under preparation by site office.
			24. Design, manufacturing, testing supply, supervision of erection & commissioning of 1 no. 62.5MVA, 13.8/220/√3 kV single phase GT.	24. T.E dt. 21.11.2019 was floated. Price bid of one no. firm i.e BHEL has been opened on dated 24.02.2021. PO placed on 21.09.2021. The supply of material for which order will be completed within 16 months from the date of placement of PO. GA/ Drawings submitted by BHEL.
			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 Period is 3 months from date of issue of PO. Material is received at site.
			26. Replacement of one oil filtration set (Make: Alpha Laval)	26. Case under preparation by site office.
			27. Supply, Installation, Testing & commissioning of two float cum boost chargers of 220V Battery Bank for 4X150MW Ranjit Sagar Dam Powerhouse, Shahpur Kandi.	27. PO dt. 03.12.2021 issued to M/S Statcon Energiaa Noida. The delivery period is 4 months from the date of issue of PO.
			28. R&M of LP Compressors Make: ELGI working Pressure: 7 kg/cm2	28. Case under preparation by site office.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			29. Up-gradation of five HP compressors of condenser mode operation	29. Case under preparation by site office.
			30. Procurement of transformer oil filtration set 6000 LPH.	30. Case under preparation by site office.
			31. R&M of two 24 Volts float cum booster battery chargers	31. Case under preparation by site office.
			32. Overhauling of next three GTs (out of twelve)	32. May be deferred to next control period.
			33. R&M of two PP sets oil pumps. (Make: Tushako)	33. Case under preparation by site office.
			34. Condenser mode of operation of 4 no. units	34. Work order dated 27.08.2014 issued on BHEL. BHEL, Bhopal inspected the machines and opined that the volume of air in the blown down receiver is on the lower side and the pressure being maintained is on the higher side causing excessive drop during synchronous mode operation and water pressure being depressed more than required. As such air mixed with water is being released in the tail race. BHEL suggested that the capacity of air compressors and required volume and pressure applied for water depression is required to be analyzed. BHEL also pointed out that proper nipping/bedding of guide vanes should be ensured which maybe the root cause of water being released to tail race. Further, BHEL Engineers again visited and recommended replacement of magnetic float level indicators. Order placed on M/s BHEL for replacement of Magnetic float level indicators.
			35. Repair of Single phase 13.8 KV/220/√3 KV, 62.5 MVA, Generator Transformer make NGEF, S No. 6800000152, YOM-1996 of unit no.2 (W-phase) damaged at RSD HEP Shahpurkandi.	35. Repaired and yet to be commissioned.
			36. Design, Manufacturing, Testing, Supply, Delivery & Commissioning under firm's	36. Batteries commissioned successfully by M/s Exide Ltd, Delhi at Rs. 78.321 Lacs.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			supervision for 2 nos. Tubular Battery Banks of 220 V, 2000 AH in SAN Containers.	
			37. Procurement and commissioning of numerical Distance Protection Relays (16 nos.).	37. Work completed by M/s. GE T&D India Ltd.
			38. Modernization and Renovation of RSD Elevator/ lift.	38. Work completed by M/s Kone at Rs. 20 Lakhs.
			39. Supply, Installation, Testing & commissioning of two float cum boost chargers of 220V Battery Bank for 4x150MW Ranjit Sagar Dam Powerhouse, Shahpur Kandi.	39. Price bid of one no. firm i.e M/s MOTWANE Manufacturing company Pvt Ltd., Nasik, Maharastra has been opened on dated 10.06.2021 with the approval PPC/HPs Patiala and PO will be issued shortly after approval from competent authority
			40. Installation & Commissioning of 8 Nos Microprocessor based scroll type compressor Water cooled Chilling Machine-AC Plants.	40. Tender dropped due to poor response from the firms. WO issued for dismantling of spare AC Plant at GNDTP Bathinda and reinstallation at RSPP. Work under progress.
6.	**UBDC St.I & St II,** 3x15 MW (St.-I) & 3x15.45 MW (St.-II) PSPCL 1971-73 (St.-I) & 1989-92 (St.-II) St. I T&G-AEI, UK St.-II T&G-BHEL **R&M** **2022-23**	- 57.77 5.72	1. Capital overhauling of UBDC Power House No.2 Stage I.	1. TE 235 dt. 30.07.2018 dropped keeping in view study for RMU in 2nd Plan 2020-23.
			2. Replacement of existing Electro-Mechanical Excitation/AVR system with Digital Static Excitation System of UBDC Stage II Power House.	2. PO issued to M/s ABB on 29.01.2019. Material received and commissioned at site.
			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.	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. Spare Generator Transformer 20 MVA, 11/132 KV.	4. M/s BBL, N.Delhi is L-1 after reverse auction. 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.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			5. Capital overhauling of UBDC Power House No.3 Stage I.	5. Changed to RMU and will be initiated after RMU study in 2nd plan 2022-23.
			6. Replacement of Electro Hydraulic Governors with microprocessor based digital governor of UBDC Stage II Power Houses.	6. PO dated 10.07.2019 amounting to Rs 2.02 Cr. placed on M/s ABB. Material received at site and commissioned.
			7. R&M of dewatering and drainage system of UBDC Stage II Power Houses.	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. Drawings submitted by the firm has been approved. Inspection of 50% material carried out and dispatch clearance issued on 07.09.2021. Material received at site and Commissioned.
			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.	8. Proposal to be processed in 2022-23.
			9. R & M of C&R panels of 132 KV O/G feeders at UBDC Power House No.3 Stage I.	9. Administrative approval obtained from WTDs. Specification under preparation.
			10. Replacement of Governor Pumps of UBDC Stage I Power Houses.	10. TE no. 283 dt.15.03.2022 has been floated, with due date of opening as 25.04.2022.
			11. Replacement of 6 no. 11kV/415 V 300kVA oil type transformers to dry type transformer for Stage-I UBDC Power Houses.	11. PO is being placed on M/s Ames Impex Gujrat against TE dated 09.10.2019 for supply of Dry type transformers for RSD, ASHP & UBDC. Drawings submitted by the firm have been approved. Material received at site.
			12. RLA and RMU Study of UBDC Stage I Power House and preparation of DPR, Technical Specs and commercial Specs	12. UBDC Project office has requested M/S BHEL and AHEC Roorkee to submit budgetary offer for RMU and RLA study. The case shall be processed after receipt of Budgetary offer. Case under

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				preparation for administrative approval of WTDs.
			13. Essential spares (AVR controler, DC breaker, firing circuit, thyristor etc.) for Stage I Digital Excitation and AVR System Make BHEL.	13. Case Planned in 2022-23.
			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	14.Work completed.
			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.	15. Case planned in 2022-23.
			16. R&M of Electrical overhead cranes & all the mechanical auxiliaries including Intake, Draft, Bye pass gates etc.	16.Case planned in 2022-23.
			17. Purchase of T&P Items Viz HV Meggars, Earth Tester, BDV test Kit, Clip On Meters etc.	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. Providing 3 No. spare LT ACB 1000 Amps trolley complete Make English Electric or Equivalent suitable for LT panel stage II Power Houses.	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. Replacement of 3 No. LT ACB 630 Amps complete Make Jyoti or Equivalent suitable for LT panel stage I Power Houses no. 2.	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. Installation of Deep Tubewell for drinking water at Shift Staff Colony No. – 2 of UBDC Project.	20.Tender is being floated by the site office.
7.	**Anandpur Sahib Hydel Project – I&II,** 4x33.5 MW	- 40.37	1. Replacement of existing 4 nos. 220 volts 400 AH batteries of ASHP-I at Ganguwal and ASHP-II at Nakkian.	1. PO issued to M/s Exide on 29.11.2018 for 2 nos. of battery bank. The batteries has been commissioned.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
	PSPCL 1985-86 T&G – BHEL **R&M** **2022-23**	0.88		For remaining 2 battery banks, PO dt. 24.11.2021 has been placed on M/S Exide Industries Kolkata and delivery schedule is 5 months from the date of issue of PO. Material has been received at site.
			2. Procurement of 50 nos. Stator Air Coolers.	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 & opening date is 20.04.2022.
			3. Replacement of existing 4 no. compressor (2 No. at each Power House) with new unit compressors.	3. Case under preparation by site office and the possibility of reuse of spare unit compressor of GNDTP Bathinda is being explored.
			4. Renovation and Modernization (R&M) of BHEL make Generating units of 4x33.5 MW at ASHP along with Manufacturing, Testing, Supply, Erection & Commissioning (Renewal & replacement) of Centralised and decentralized Distributed Control System (DCS) based SCADA system, Microprocessor based Digital Excitation including Digital AVR, Digital Governing System, Digital Numeric Relays conforming to IEC 61850for Nakian & Ganguwal P.H at ASHP.	4. Team of OEM i,e. M/s BHEL visited the site for study and to explore the possibility of uprating of unit capacity. BHEL has submitted its offer on 15.10.19. The draft agenda, for administrative approval for Preparation of DPR including measurement of input energy parameters (head, discharge etc), Scope of work, Technical Specifications & Tender Document for RMU & LE work of 4x33.5 MW Hydro Generating Machines of Anandpur Sahib Hydel Project, has been prepared and concurrence of finance section has been received and final agenda will be put up in forthcoming WTDs meeting for administrative approval. Thereafter T.E will be floated to carry out the work. Anandpur Sahib Hydel Project, has been got accorded from WTDs and prepration of tender enquiry is under process.
			5. Renovation and modernization of emulsifier system of Generator Transformer of Ganguwal & Nakkian of ASHP.	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

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
				MYT 2020-23. Hence, case may be deffered to next MYT Plan.
			6. Renovation and modernization of Existing LT Scheme/panels for Ganguwal & Nakkian of ASHP.	6. Case under preparation
			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.	7. Work Completed.
			8. Replacement of OPU (Oil Pressure Unit) for 4x 33.5 MW machines of ASHP.	8. This work is being processed as a part of R&M of units.
			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.	9. PO issued to M/S AMES IMPEX GUJARAT. The Ordered quantity shall be supplied within 8 months from the date of issue of PO. Material is received at site.
			10. Replacement of existing 4 nos. Service Compressor (2 nos. at each Power House no. I&II) with new Service Compressors.	10. Case is under administrative approval.
			11. Procurement of T&P articles for Ganguwal and Nakkian Power House.	11. Deleted.
			12. Provision of one 200 kVA capacity Diesel Generator (DG) set (Silent type) for Ganguwal Power House Including Room.	12. Case under preparation by site office.
			13. Renewal & Replacement (R&R) of two 220V DC battery charger/set for Ganguwal&Nakkian power Houses.	13. Case under preparation by site office.
			14. Procurement of 1 Spare 20BHP Slip ring induction Motor for Gantry crane.	14. Case under preparation by site office.
			15. Capital overhauling of Electric Overhead Traveling (EOT) crane at PH-1&2 of ASHP.	15. Case file is under process to prepare technical specifications by site office.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			16. Replacement of existing 24 thrust bearing oil coolers along with accessories of Ganguwal & Nakkain Power House.	16. Case under preparation by site office.
			17. Replacement of existing 24 Upper Guide Bearing oil coolers along with accessories of Ganguwal & Nakkian Power House.	17. Administrative approval got accorded from competent authority and case file is under process to prepare technical specifications.
			18. Replacement of existing 24 Lower Guide Bearing oil coolers along with accessories of Ganguwal & Nakkian Power House.	18. Administrative approval got accorded from competent authority and case file is under process to prepare technical specifications.
			19. Procurement of Two Centrifugal Turbine Oil Filtration/Dehydration sets (one for each power house i.e. (Ganguwal&Nakkian).	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 deffered to next MYT Plan.
			20. Procurement of Two Transformer oil filtration sets (one for each power house i.e., Ganguwal&Nakkian) of 3000 ltr/hr capacity.	20. Case is being put up for administrative approval.
			21. Procurement of one Transformer oil BDV Testing set for Anandpur Sahib Hydel Project (0-100kv Range.)	21. Tender Enquiry is under process.
			22. Replacement of 4 oil coolers along with accessories for GT 11/132 KV 40 MVA of Ganguwal & Nakkian Power House.	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.
			23. Replacement of 4 Dewatering pump sets with suitable new pumps at Power House No. 2 Nakkian.	23. Tender Enquiry dt. 21.12.2021 is floated online with due date of opening 31.01.2022. Part-I&II have been opened on dated 04.03.2022. Technical evaluation is under process.

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 ONGOING - Under Implementation				
8.	**Chilla (Ph-B),** 4x36 MW UJVNL 1980(U-1 to 3) 1981(U-4) T&G – BHEL **RMU&LE** **2024-25**	**144 (LE) + 12 (U)** 490.56 NIL	-Replacement of existing Kaplan turbine and their complete auxiliaries, refurbishment of existing generators. Complete replacement of switchyard equipment along with Power Transformer, Replacement of 11 kV system, New Excitation system, New Electronic Governors, new control metering & protection system & SCADA, HM Works and Civil Works. -Uprating from 4x36 MW i.e. 144 MW to 4x39 i.e. 156 MW.	• DPR prepared by M/s SNC Lavlin and approved by the Board. However, GoU cancelled signing of agreement. Revalidation of DPR was done by AHEC, IIT Roorkee and approved by UJVN Board on 26.11.13. Required changes in specifications were done by the committee. • Capital Investment approval accorded by UERC on 29.01.2016. Revised Tender floated. • Tender cancelled after BoD order dated 31.12.2018. • New tender uploaded on 09.01.2019 and Pre-bid meeting held on 11.02.2019. • Techno-commercial Bid opened on 30.05.2019. • Price bid opened on 22.08.2019. • BoD accorded financial approval of Rs. 212 Cr. including insurance, freight and duties & taxes for award of contract. • LOI issued to L-1 bidder M/s BHEL on 30.10.2019 & UJVN Ltd., received acceptance letter from M/s BHEL on 07.11.2019. • Agreement between M/s BHEL and UJVN Ltd signed on 22.01.2020. • Reverse engineering work has been completed. • Design and Engineering works of other E&M and Hydro mechanical components are in progress. • As per Contract Schedule the turbine model test was to be conducted by Nov 2020. However, due to COVID-19 pandemic situation and delay in Govt. approval (Global bidding is not allowed by the Government departments and PSUs for value below Rs. 200 Cr.), same could not be delivered in that period. • M/s BHEL has submitted approval request to Cabinet Secretariat, Govt. of India to allow global tender enquiry

				for placing the order (Value less than 200 Cr) on foreign party. GoI has been granted conditional approval on 30.03.2021. BHEL informed that tender has been floated on 27.07.2021.
9.	**Tiloth,** 3x30 MW UJVN LTD. 1984 T&G – BHEL **RM&LE** **<u>2019-20</u>** **2022-23**	**90(LE)** 384.66 153.21	-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. **<u>Works Completed</u>** **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** • RMU of machine no. 3 (Unit 2) under progress. • Dismantling of MIV of machine No. 2 started on 04.03.2021 and completed on 13.03.2021. • Bulk Head installation completed on 16.03.2021. • Installation of refurbished MIV of machine no. 3 completed on 25.03.2021. • MIV of machine No. 2 transported to M/s AHPL works, Prithla for refurbishment on 13.04.2021. • RMU works of machine no. 3 (2nd unit under RMU) completed and machine boxed up on 18.06.2021. Machine successfully test synchronized with grid on 30.06.2021. • Load Rejection Test, bearing heat run test etc. successfully completed up to 03.07.2021. • Machine no. 3(RMU 2nd Unit) taken over by UJVN Ltd. for commercial operation on 06.07.2021. Machine is capable of running continuously at 34.1 MW. **<u>Works Under Progress</u>** **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. Refurbishment of stay vanes and stay ring is in progress. • 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. • Refurbishment of MIV completed and testing is under progress. 95% work completed.
10.	**Dhalipur,** 3x17 MW UJVNL 1965-70 T - Litostroj, Yugo. G - Rade Konkar,Yugo **RM&LE** **<u>2020-21</u>** **2022-23**	**51 (LE)** 152.65 61.76	-Replacement of turbine, new governors, new sets of guide vanes. Repairing of various gates and gantry cranes. -Refurbishment of generators with new stator core and new class F insulated stator & rotor winding. New SEE, Replacement of 11 kV Switchgear. Installation of numerical type protection system. -Civil works of power channel, power station & Tail race channel.	Order placed on M/s Gogoal Energo Pvt. Limited (GEPL), New Delhi for Rs 78.25 Crs. on 28.12.2016. **<u>Work Completed</u>** Reverse Engineering Works for Unit-B completed on 19.07.2017. Order for optional items and extra items placed on M/s GEPL on 20.06.2018 & 29.09.2018. Computational Fluid Dynamics (CFD) analysis for Turbine has been witnessed and approved. **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 A (2nd Unit) & 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. Physical Progress- 71.5% work completed.
B - SCHEMES ONGOING - Under Tendering				
11.	**Ramganga,** 3x66 MW UJVNL 1976 T&G-BHEL **RM&LE** **2017-18** **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 the Appellant Tribunal, New Delhi. Matter is being heard in the Hon'ble Appellate Tribunal. • Tender for RMU of Ramganga HEP has been scrapped.
12.	**Dhakrani,** 3x11.25MW UJVNL 1965-70 T - Litostroj, Yugoslavia. G - Rade Konkar, Yugoslavia **RM&LE** **2020-21** **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.
C- SCHEMES ONGOING - Under DPR Preparation/Finalisation/Approval				
13.	**Kulhal,** 3x10 MW UJVN LTD. 1975 T&G - BHEL **RM&LE** **2022-27**	**30(LE)** 115.24 NIL	-Replacement of turbine, new governors, new sets of guide vanes. Repairing of various gates and gantry cranes. -Refurbishment of generators with new stator core and new class F insulated stator & rotor windings. New SEE, Replacement of 11 kV Switchgear. Installation of numerical type protection system. -Civil works of barrage, power channel, power station & Tail race channel	• LoI issued to M/s Gogoal-Emeco (Consortium) on 04.03.2014. UERC declined approval vide order dt. 13.03.2015 with the advice that on account of obsolescence of protection equipment, suitable proposal be mooted. UJVNL approached commission with suitable modifications. However, UERC declined Investment approval vide order dated 11.02.2016 due to better availability of the machines. • Appeal has been filed in the Appellant Tribunal New Delhi. • Reply related to Kulhal power house as required by Hon'ble Appellant Tribunal New Delhi submitted on 29.02.2020 • Bank Guarantee has been extended by the firm upto 01.08.2022.

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 ONGOING - Under Implementation				
14.	**Rihand,** 6x50 MW UPJVNL 1962 (U-1to5) 1966 (U-6) T&G - EE, UK **RM&LE** **2017-18** **2022-23**	**300 (LE)** 132.20 (Revised) 112.29	- 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. **COMMON WORKS** A. WORKS COMPLETED 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. B. WORKS UNDER EXECUTION 1. All works executed and Agreement done. Common works will be completed by 07/2022. C. WORKS YET TO BE TAKEN UP Nil.

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
SCHEMES ONGOING - Under DPR Preparation/ Finalisation/Approval				
15.	**Gandhi Sagar,** 5x23 MW MPPGCL 1960-66 Units 1,2&3 T – JM Voith G – Siemens, WG, Units 4&5 T&G – Hitachi, Japan **RM&LE** **2026-27**	**115 (LE)** 329.64 4.97	Revival/ R&M of unit no. 1 to 5	**All the units with associated auxiliary systems submerged on 14.09.2019 due to over flooding of dam in its catchment area.** The RLA studies carried out by M/s WAPCOS in Unit no. 1 & 5. The selection of these units was made due to Unit 1, 2 & 3 of same design and Unit 4 & 5 also being of same design. As per the RLA studies the condition of machines was found good but the revival of the units may not be sustained performance due to prolonged age of more than 50 years therefore WAPCOS recommended for R&M of the units in phased manner i.e. the revival of some unit and R&M of other. As such Unit-5 is synchronized on 10.09.2020 & Unit-1 synchronized on 31.10.2020. The DPR for R&M has been approved. Tender document is being finalized.
			Unit-3 Rewinding of generator with class F insulation from class B.	RLA Study of Unit-3 completed and found that the condition of the components is satisfactory except hot spots detected in core. Electromagnetic Core Imperfection Detection (ELCID) test carried out after repair of hot spots did not indicate substantial improvement. Re-Tender is to be issued soon.
			Common Works: 1. Supply, Testing & Commissioning of 250kVA DG set. 2. Supply, Installation, Testing and commissioning of 220V battery set & its suitable charger including dismantling of existing battery set & charger.	 1. Tender is in process and under Techno commercial evaluation. 2. Order has been placed on M/s Synergy Solutions, Faridabad on 28.06.2019. Material is supplied. Commissioning is pending.

16.	**Pench** 2x80 MW MPPGCL 1986-87 T&G – BHEL **R&M** **2024-25**	- 13.36 0.36	1. Change in insulation class of stator from Class B to Class F of Unit-2.	1. The complete case has been clubbed with RLA and letter for obtaining budgetary offer for RLA from OEM M/s BHEL has been sent and after reply of the same estimate will be prepared.
			2.Procurement, erection, testing & commissioning of 4 Nos. 132 kV SF6 Circuit Breakers including dismantling of existing old MOCB installed at outgoing 132 KV feeders.	2. Completed by M/s. Electro Services, Vadodara.
			3. Supply & Installation of 2 Nos. Power System stabilizer (PSS).	3. Budgetary offer is awaited from BHEL, Bhopal.
			4.Supply of PC based Control System for 2 Nos. EHG-40 Governors.	4. Budgetary offer is awaited from BHEL, Bhopal.
			5. Supply of 250 KVA DG Set.	5. DPR Prepared.
			6. Supply of 1 Nos. Pressure Reducer Valve.	6. DPR Prepared.
			7. Supply of 1 Nos. Governing Oil Pumps with Control Valve & Motor.	7. DPR Prepared.
			8. Supply& installation of 1 No., 300AH 220V Battery Set.	8. Work completed.
			9.Supply& installation of 1 Nos., 300AH 220V Battery Charger.	9. Case is under process.
			10. Supply of 24 Nos. 132kV/800 Amps Isolators.	10. DPR Prepared.
			11. Supply of 6 Nos., 800A, 415V MCB.	11. DPR Prepared.
			12. Supply of 27 Nos. 132KV/ 0.2s AC Current Transformers.	12. Case has been sent for Approval to Jabalpur (Head Quarter). Tender under process.
			13. Supply of 1 No. Drainage/ Submersible Water Pumps with Control Panels.	13. Enquiry vide no. 68-2020/976 dated 25.09.2020 issued. Submersible water pump has been supplied.
			14. Replacement of Existing Co2 Fire protection.	14. Tender floated. Price bid opened now at ordering stage. Order has been placed.
			15. Supply & Installation 48V, 200AH Battery Set.	15. Work completed.
			16. Supply of 1 Nos. Dewatering Pumps with Control Panels.	16. DPR Prepared.

			17. Supply of 12 Nos. Numerical Protection Relay for 800 A, 415V MCB. 18. Supply of 1 No. Thermo vision Camera. 19. Comprehensive R&M of Pench HPS	17. DPR Prepared. 18. DPR Prepared. 19. RLA study has been completed by M/s WAPCOS. Budgetary offers are being called for DPR & Tender document preparation.
17.	**Bansagar Tons-I,** 3x105 MW MPPGCL 1991-92 T&G – BHEL **R&M** **<u>2021-22</u>** **2025-26**	- 92.95 10.34	1.Procurement of 220kV CVT. 2.Procurement of 7 nos. 220kV wave trap for carrier communication & protection, auto reclosure, alternate data channel etc. 3.RLA of Unit No. 1,2 & 3. 4.Supply, Erection, Testing & Commissioning of 220 V, 300 AH Battery and charger-2 Nos. 5.Supply, erection, Testing & Commissioning of 1 No. 20MVA 220/33 kV Power Transformer and 1 No.2.5MVA 33/0.4 kV Station Transformer. 6.Replacement of existing Generator Protection & Transformer Protection Electro-Mechanical with Numerical relays, Sequence Event Recorder, Disturbance Event Recorder & Diagnostic Station. 7. Supply, Erection, Testing & Commissioning of 1 No. 500kVA DG set. 8. Supply, erection, testing and commissioning of 220 kV Feeders – Carrier Protection & Auto re-closure feature and PLCC cabinets for Rewa 1&2 and Kotar.	1. Order placed on M/s. Siemens. CVT of feeders and Main Bus I& II have been replaced. Completed. 2. Order has been placed on M/s. GE (T&D) India Ltd, Mumbai on 21.05.2018 for an amount of Rs. 19.82 Lakhs. Works Completed. 3. DPR prepared for Unit 1,2 & 3. Budgetary offer is awaited for Unit – 3. 4. One set of 220 V battery set commissioned. Order for battery charger has been placed and under drawing approval stage. 5. Order has been placed for Power Transformer. Commissioning of station transformer completed on 11.09.2021. 6. Order has been placed on M/s. Scope T&M Pvt. Ltd, Mumbai in January, 2018. Works completed. 7. Order placed on 26.03.2020. Drawing approved. Works completed. 8. Installation of C&R panel with numerical relays was completed by M/s. Scope T&M Pvt. Ltd, Mumbai. Installation of Carrier communication equipments completed by M/s Puncom.
SCHEMES ONGOING - Under RLA Studies				

18.	**Bargi,** 2x45 MW MPPGCL 1988 T&G – BHEL **R&M** **<u>2020-21</u>** **2025-26**	- 7.55 2.42	1. R&M of Unit-1 & Unit-2 2. Supply, erection, testing and commissioning of 4 Nos. SF6 Circuit Breakers 3. Procurement, erection & commissioning of DVR for replacement of existing AVR under modernization & up-gradation of excitation system. 4. Procurement, erection & commissioning of Digital Governors with RGMO facility &replacement of existing Governors. 5. Supply, erection, testing and commissioning of 1 No. 250 KVA DG Set. 6. Supply, erection, testing& commissioning of C&R Panel Duplex type with Numeric Relays for GT, Generator, UAT, ICT, Station transformer & Switch Gear. 7. Supply, Installation, Testing & commissioning of 220V 300 Ah Battery-1 no. 8. Supply, installation, testing & commissioning of 132/33 kV 20 MVA Transformer – 1 no. 9. Procurement, erection & commissioning of one CT, PT and CVT. 10. Supply, Erection & Commissioning of 132 kV 0.2s Current transformers - 24 Nos.	1. Tender for RLA studies has been issued 2. Completed. 3. Order placed on M/s BHEL and Commissioned in Unit-1 in May, 2019. In Unit-2 to be commissioned soon. 4. Completed. 5. DPR is prepared. 6. Tender has been issued. 7. Completed. 8. Proposal has been dropped. Fresh proposal is to be initiated for 40 MVA transformer. 9. Procurement is under process. 10. NIT to be issued.

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
SCHEMES ONGOING - Under RLA Studies				
19.	**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.	RLA Study to be taken up.
20.	**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.
21.	**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.
22.	**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.
23.	**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				
24.	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** **2025-27**	- - -	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 & Supply Erection, Testing & Commissioning of Vibration Monitoring System for 4x60 MW Units of Upper Sileru Power House.	1. Purchase order was placed on M/s. Andritz Hydro Pvt. Ltd. 2. Supply of material by firm is completed, Erection, testing & commissioning is to be carried out. Tendering is in progress.
25.	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** **2025-27**	- - -	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. 2. Supply of material by firm is completed. Erection, testing & commissioning is to be carried out. Tendering is in progress. 1. Replacement of Penstock Intake gate No. 2 is completed. 2. Tender for Replacement of Penstock Intake gate No. 1 is in progress.

B. SCHEMES ONGOING - Under RLA Studies				
26.	**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: T - J.M.Voith, W. Germany G - Westing House, USA **RMU&LE** **2025-27**	**120 (LE)+ 9 (St.-I) (U)** 500 (approx.) -	Replacement of entire equipment except concrete embedded parts of Hydro system and water conductor system. **Note:** Three units of Stage-I each rated at 17 MW are proposed to be uprated to 20 MW. Residual Life Assessment studies (RLA) on Civil structures, penstocks, Hydro Mechanical and all Electrical & Mechanical equipment of all six units.	The Govt. of AP (APGENCO)& Govt. of Odisha(OHPC) mutually agreed for carrying out RM&U by sharing the costs & benefits in the ratio of 50:50. Modified agreement was entered on 23.10.2020 by both APGENCO and OHPC officials. The Project Administration Committee (PAC) consists of Chairman and Directors of OHPC and APGENCO shall have full powers in both administrative and 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. 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 of Unit-6 is under progress. RLA studies on remaining units will be taken up in a phased manner.

27.	**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)** 175 -	Replacement of entire equipment except concrete embedded parts of Hydro system and water conductor system.	Tender floated for carrying out RLA Study on one Unit of TB Dam Power House & one Unit of Hampi power house. M/s Andritz Hydro Pvt. Ltd. inspected units from 22.11.2018 to 23.11.2018 for assessment of scope of works and submitted budgetary offer along with detailed scope of works on 27.03.2019. DPR will be prepared after obtaining budget Sanction from TB Board. The expenditure will be measured in the ratio of 80:20 equity amount between AP and Karnataka. The letter was addressed to Principal Sectary to Government. AP vide 10.11.2019 for the consent towards meeting 80% share of R&M expenditure of TBHES. The letter was addressed to M/s KPTCL also vide dated: 18.11.2019 for arranging consent from Karnataka for their concurrence towards meeting 20% share of R&M expenditure of TBHES. A letter dated 28.01.2021 was sent to the Energy Department, Govt. of Andhra Pradesh for arranging the required budget of Rs. 35 Crores in phased manner for replacement of worn out, outdated & sluggish critical equipment like governor, excitation system etc. and for capital overhaul works on all units at TBHES and Hampi Canal PH. Consent from the Energy Department, Government of Andhra Pradesh is to be received. As and when required funds are sanctioned, R, M & U works will be taken up.
28.	**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)** 175 -		
29.	**Lower Sileru,** (4x115 MW**)** APGENCO **RM&LE** **2025-27**	**460 (LE)** 350 -	Residual Life assessment (RLA) studies/ Life Extension study on civil structures, penstocks, Hydro Mechanical, Control & Protection equipment of all four units (4x115 MW) of LSHEP and preparation of detailed Project Report (DPR) for Renovation, Modernisation & Uprating of all four units of LSHEP.	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 Unit 3 & 4 completed while for Unit 1 is under progress & Unit 2 is to be commenced.

State-wise Programme/ Status of Renovation and Modernisation Schemes of Hydro Power Stations for completion 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				
30.	**Nagarjuna Sagar Left Canal Power House (NSLCPH),** 2x30.6 MW TSGENCO 1992 T-Boving, UK G-General Electric, UK **R&M** **2018-19** **2022-27**	- 30.99 2.00	1. Replacing existing AVRs 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. Modification in design of runner for both the units at Nagarjuna Sagar Left Canal Power House (NSLCPH) 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. 9. Overhaul of stop log gates at NSLCPH and trash rack rectification including gantry crane. 10. Replacement of Unit Auxiliary boards of units 1 to 8 and station auxiliary boards of 1 to 4, Reserve board. 11. Procurement of 220 KV/11 KV station transformer, 2 no.'s 220 KV triple pole double break isolator complete assembly, 3 no.s current transformers for SFC system. 12. Replacement of Analog Governors to Digital Governors for the units 2 to 8.	1. Yet to be processed. It is proposed to postpone the work of replacing existing AVRs with latest DVRs along with thyristor modules for Unit-2 in to the R&M (2022-27) 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 and EOT cranes work is yet to be completed. 4. Not feasible. 5. Completed (Siemens) 6. Completed (ABB) 7. Completed (BHEL) 8. Completed. 9. Trash rack rectification works completed. Gantry crane works and reconditioning of stop log gates is yet to be taken up. Administrative approval is under progress. 10. DPR preparation is under progress. 11. Proposal/ DPR preparation is under progress. 12. As the spares are not available in the market, M/s Hitachi has recommended during the capital works & as per the OEM recommendations.

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				
31.	**Moyar PH,** 3x12 MW TANGEDCO 1952-53 T – Boving,UK G -Metropolitan Vickers,UK **RMU&LE** **2022-27**	**36 (LE)+ 6 (U)** 67.05 Nil	Planning, design, model testing, engineering, manufacture, procurement/ supply of new components and spares at site, painting including penstock (internal and external), insurance, dismantling, capital repairs, erection, testing and commissioning of 3 nos. hydro generating units including P.G. Test in any one of the units. Associated technological, civil, mechanical, electrical works as required with new TG set from 3x12MW to 3x14 MW and Plant, Equipment & facilities.	The work for conducting RLA study and uprating study on Turbine, Generator and other auxiliaries for Rs. 82.8 lakhs was awarded to M/s MECON, Ranchi on 17.06.2013. MECON submitted final DPR for works on 07.02.15. Administrative approval accorded on 04.06.2016. Techno-commercial Bid opened on 15.02.2019. TANGEDCO Board in its 91st Meeting held on 22.11.2019 for Placing Orders on L1 tenderer M/s. Andritz Hydro Private Limited, New Delhi and Letter of Intent (LOI) has been issued on 28.11.2019. Contract agreement has been executed on 14.01.2020. Unit-2 handed over to M/s. AHPL for Reverse Engineering works on 27.01.2020 & completed on 02.12.2020. Supply of Material for RMU work is initiated.80% drawing 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.

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
32.	**Kodayar PH-I,** 1x60 MW TANGEDCO 1970 T-Vevey Engg. works, Switzerland G-Alstom, France **RMU&LE** **2023-24**	**60 (LE)+ 10 (U)** 88.48 Nil	Planning, design, CFD/model testing, engineering with RE, manufacture, procurement/ supply of new components and spares at site, painting-penstock, insurance dismantling, capital repairs, erection, testing and commissioning of P.G. Test. Associated technological, civil, mechanical, electrical works as required with new TG set from 1x60MW to 1x70MW and Plant, Equipment & facilities.	Contract was awarded to M/s MECON Ltd., Ranchi for Rs. 91 lakhs on 22.09.2014 for conducting RLA study and uprating study on Turbine, Generator and other auxiliaries. They have completed the study and furnished the final DPR. Administrative approval accorded on 03.02.2017. Techno-commercial Price-Bid opened on 05.09.2019. The BLTC in its 314th Meeting held on 18.11.2019 approved and recommended the proposal for placing works contract order on the L1 tenderer i.e. BHEL, New Delhi to TANGEDCO Board. The proposal was approved by TANGEDCO board on 26.02.2020. Letter of Intent issued to M/s BHEL on 09.03.2020. Agreement has been executed on 22.10.2020. 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				
33.	**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. It is proposed 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.
C – SCHEMES ONGOING – Under RLA Studies				
34.	**Kundah-I,** 3x20 MW TANGEDCO 1960-64 **RM&LE** **2022-27**	**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
35.	**Kundah-II,** 5x35 MW TANGEDCO 1960-65 **RM&LE** **2022-27**	**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.
36.	**Kundah-III,** 3x60 MW TANGEDCO 1965-78 **RM&LE** **2022-27**	**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.
37.	**Kundah-IV,** 2x50 MW TANGEDCO 1966-78 **RM&LE** **2022-27**	**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.
38.	**Kundah-V,** 2x20 MW TANGEDCO 1964-88 **RM&LE** **2022-27**	**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.
39.	**Mettur Tunnel,** 4x50 MW TANGEDCO 1965-66 **RM&LE** **2022-27**	**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.
40.	**Sarkarpathy,** 1x30 MW TANGEDCO 1966 **RM&LE** **2022-27**	**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.

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
41.	**Sholayar-II,** 1x25 MW TANGEDCO 1971 **RM&LE** **2022-27**	**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.
42.	**Suruliyar,** 1x35 MW TANGEDCO 1978 **RM&LE** **2022-27**	**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.
43.	**Kadamparai PH,** 4x100 MW TANGEDCO 1987-89 **RM&LE** **2022-27**	**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.
44.	**Aliyar** 1x60 MW TANGEDCO 1970 **RM&LE** **2022-27**	**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.

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 ONGOING - Under Implementation				
45.	**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** **2023-24**	**450 (LE)** 222 13.108	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 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.	• 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. Part material 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. • Erection and commissioning works of UAPs for all Units completed. Erection and Commissioning of panels, retrofit of equipment's in CAP completed. • Firm has extended the PSBG up to 30.05.2022. Work will be taken as per DPR after completion of R&M works of Unit-1, 2& 3.
46.	**Shivasamudram Hydro Power Station,** 6x3 MW 4x6 MW	**42 (LE)** 169.18 14.01	R&M of Turbines, Governor & Excitation system, improvements in water conducting system, Control and relay panels and SCADA.	LOA dated 29.11.2018 issued to M/s AHPL for Model test, design engineering, manufacturing supply of Turbine & its auxiliaries,

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	KPCL 1920-38 T - Boving, UK (U1 to U6) Escher Wyess, Switzerland (U7 to U10) G - GEC, USA **RM&LE** **2023-24**		Design, detailed engineering, supply, retrofit, erection, testing and commissioning of 66kV switchyard equipments, materials and spares for strengthening of 66kV switchyard. (Generator related works carried out in earlier R&M)	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 area approved. Model test & CFD analysis witness is postponed and is to be rescheduled. The Drawings/ Documents are under review. Order placed on M/s GE T&D India LTD. for Rs. 2,66,15,960/- on 23.02.2018. Work completed. SDBG released.
B- SCHEMES ONGOING - Under Tendering				
47.	**Kadra Dam Power House,** (3x50MW) KPCL 1997-1999 T&G - BHEL **RM&LE** **2022-23**	**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. • 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.	KERC accorded approval. Consent of all State distribution companies have been obtained. M/s BHEL furnished Techno-commercial offer for Turbine and Generator works. Presently, works were deferred as the units are running smoothly with regular routine preventive & annual maintenance works. As proposed by site, R&M works will be taken up at a later date. 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.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			• 220 kV Switchyard - Replacement of breakers, protective painting of switch yard structures.	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
			• Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented.	Preparation of Estimate and technical specification completed. Availing administrative approval to issue NIT is in progress.
			• Excitation system - Replacement of excitation system, digital voltage regulator.	Contract agreement signed with M/s ABB India Ltd. on 27.06.2018. Erection & commissioning of panels of all units and PSS tuning completed.
48.	**Kodasalli Dam Power House,** (3x40MW) KPCL 1998-1999 T&G - BHEL **RM&LE** **2022-23**	**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. Consent of all State distribution companies have been obtained. Presently, works were deferred as the units are running smoothly with regular routine preventive & annual maintenance works. As proposed by site, R&M works will be taken up at a later date.
			• 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.	LTAC Panels: UAP, ACDB and CAP: Work order dated 21.12.2020 is placed on L1 bidder M/s Lotus power gear. Revised drawings of 3nos 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.
			• 220kV Switchyard - Replacement of breakers,	Financial bid for procurement of breaker opened and FO

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			protective painting of switch yard structures.	obtained. 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
			• Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented.	Preparation of estimate & Technical specification is completed. Availing administrative approval to issue NIT is in progress.
			• Excitation system - Replacement of excitation system, digital voltage regulator.	Contract agreement signed with M/s ABB India Ltd. on 18.05.2018. Erection & Commissioning of panels of along with PSS tuning.
49.	**Gerusoppa Dam Power House (Sharavathy Tail Race),** (4x60MW) KPCL 2001-2002 T&G - BHEL **RM&LE** **2023-24**	**240 (LE)** 59.66 2.21	Refurbishment of Turbine and associated parts, generator. Replacement of relays with numerical relays meters proposed. Midlife replacement of switchyard equipment.	KERC accorded approval. Techno commercial offer furnished by M/s BHEL is under scrutiny/ review. Tan-delta & capacitance test on stator to ensure insulation condition. Reports are received & reviewing under progress.
			SCADA	NIT for SCADA issued on 01.10.2018 but Tender recalled. Availing administrative approval for modification in scope by deleting Energy meter, & EMS from present scope, PQR & other terms & conditions to issue NIT for revised scope of works. Preparation of revised technical specification hold up. As per HO directions, subject is dropped.
			Dismantling & buy back of existing Static excitation system, Supply, erection, testing and commissioning of Digital static excitation system.	Contract agreement signed with M/s ABB India Ltd. on 27.06.2018. Erection and commissioning of panels including PSS tuning completed for all units.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
50.	**Linganamakki Dam Power House (LDPH),** (2x27.5MW) KPCL 1979-1980 T – Electrosilla, USSR G - Electrosilla, Energomach-USSR **RM&LE** **2023-24**	**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. • Replacement of relays with numerical relays meters proposed. 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. Presently, works were deferred, as Turbine & Generator parts & accessories are in good condition. Requested for Execution of some of the works & procurement of spares from site itself. As proposed by site, R&M works will be taken up at a later date. Contract Agreement signed with M/s ABB Limited for Rs. 2,45,97,408/- on 23.01.2018. Erection & commissioning of panels for Bus coupler & line (4 nos.) and U#2 is completed. Erection & wiring of new panel for U#1 is completed on 23.08.2021. Testing and commissioning works of DCS & GRP Panels for Unit-1 completed on 01.10.2021. Plant SCADA & EMS works in progress.
C - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/ Approval				
51.	**Supa Dam Power House,** (2x50MW) KPCL 1985 T&G - BHEL **RM&LE** **2023-24**	**100 (LE)** 47.91 2.2	**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 • **110kV Switchyard**, Replacement of breakers, Station 11 kV UAT switch gear panels.	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. Erection & commissioning of all UAP's and CAP's completed. Firm has extended the PSBG up to 30.05.2022.

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. • **Other systems**: New smoke detectors & MVWS system for cable ducts, new battery charger with battery bank, overhaul/Reconditioning GT(spare), Renovation of emulsifier system of Unit 1 & 2, etc.	Work will be taken up in phased manner.
			• **Auxiliary & Colony Power Supply**- Providing auxiliary supply for power house and extending power supply to Ganeshgudi colony from Supa Power House.	Order placed on M/s RR Durafabs Pvt Ltd., Hyderabad, at a cost of Rs. 3.15 crores. Drawings approval, Inspection of equipments & issue of dispatch clearance is in progress. 5MVA, 110/11kV Power Transformer received at site. Control and Power cable laying is completed. Retrofit of relays, panel meters, energy meters, indicating lamps and control switches in C&R panel completed. CEI, GoK accorded approval for charging of transformer bay. Transformer bay test charged on 10.03.2021 and load tested on 26.03.2021.
			Civil works: • Protection to upstream reservoir left and right banks (Left bank), Improvement to eroded portion below gabions at left and right bank downstream, providing shotcrete to hillock portion at Left bank upstream side of Supa Dam, etc.	Civil works are under progress.
52.	**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,	**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	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.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	U:9&10- BHEL, **RM&LE** **2023-24**		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. Providing 2x115 MVA transformer for Unit-9 & 10. **Civil Works:** Under water scanning, plugging, Drilling, grouting to Talakalale Dam, Improvements and Asphalting to roads, etc.	NIT published on 13.10.2021. Technical Bid (Cover-I) opened on 10.02.2022. Techno-commercial offers of the firms reviewed and clarifications sought from all firms on Techno-commercial deviations. Firms reply awaited. GT of Unit-10 commissioned on 28.02.2018 and GT of Unit-9 commissioned on 30.03.2018.
53.	**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** **2023-24**	**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.	DPR sent to KERC & all ESCOM's on 24.12.2018. KERC accorded approval. Consent of all State distribution companies have been obtained. Electro mechanical works will be taken up at a later date. Work order on M/s CPRI has been placed to conduct RLA studies on Generators.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			110kV switchyard Complete renovation of outdoor with all line and unit bays. R&M of trolley system for PH approach along with civil and electrical works. The transformer oil draining system along with draining sump, power house safety and firefighting equipments, lighting system. Replacement of 8 Nos. Generator Transformer.	Order placed on M/s GE T&D India LTD. at a cost of Rs. 8.63 crores towards supply portion, Rs. 2.77 crores towards erection & Commissioning, Rs, 87,40,00/- towards Civil works. At Stage-I, major materials inspected and dispatch clearance issued. Dismantling works completed. Civil tower foundation works completed and erection of structures is completed for phase 1. Erection, Testing and commissioning of switchyard equipments completed for phase-1. Supply of switchyard equipment's for phase-2 completed. Dismantling of switchyard structures and equipments of phase-2 completed. Civil works for tower foundation completed. Erection of structures and all switch gear equipments completed. Bus-1 charged on 30.03.2021. Linking of phase 1&2 110kV Bus was completed and charged on 01.04.2021. In the first phase replacement of 1st stage 4x16.5MVA GTs taken up. Contract agreement signed with M/s Toshiba on 22.11.2018. All GT's reached at site. GT-1, 3 & 4 are commissioned.

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				
54.	**Kuttiyadi** 3x25 MW KSEB 1972 T&G-Fuji, Japan **RMU&LE** **2023-24**	**75 (LE)+ 7.5 (U)** 377.41 0.625	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	The Board decided to entrust M/s. AHEC, IIT Roorkee for conducting RLA study on the generating unit. RLA report submitted in October 2013 didn't mention about the uprating of the existing units. Further RLA study was conducted to explore the possibility of uprating the units and final report submitted to KSEB. DPR approved on 14.06.2017. E&M works were retendered with Provisional Acceptance Certificate (PAC) of Rs. 156.20 Crore on 27.11.2018. Pre-qualification bids were opened on 08.04.2019 and financial bids of the prequalified bidders were opened on 09.07.2019. LoA issued to L1 bidder i.e. M/s BHEL on 07.09.2019 with a contract amount of Rs. 89,82,39,005/-. Detailed Work order issued on 10.12.2019. Agreement executed on 13.12.2019. Kick off meeting conducted on 14.01.2020. BHEL officials and KSEBL Engineer started verification of old drawings, actual dimensions of the machine that has to be uprated. KSEBL insisted for model testing of turbines and letter sent to M/s BHEL. BHEL officials started taking measurements of essential parts of machines. They insist that the measurements of nozzle and distributor joint, Thread pitch of M35 bolts, Turbine guide bearing, Nozzle servomotor and distributor joint, deflector rod, MIV outlet joint and outlet pipe etc. can be done only after dismantling the machine (Unit#1). This matter is discussed with Chief Engineer (Generation and PED) and decided to discuss in power poison meeting how to achieve the same with

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				minimum generation loss. Verifications of drawings for new platform static excitation equipment's are in progress. Data collection works from field for input of closed storage is under progress. Verification of documents send by M/s. BHEL for assurance plan and Generator package are under progress. Verification of documents of QAP for water based fire protection system is in progress. Verification of drawing for loading and foundation under progress. Verifications of drawings sectional arrangements of generator, control panel boards of RTU for butterfly valve house, foundation details are under progress. Verification of design memorandum of generator design and station lighting system are under progress. Data collected from field for runner dismantling is almost completed. Verification of Main single line diagram, CT PT calculation for unit protection and metering core are under progress. Model test procedure approved. Plate material approved with suitable modification suggested, levelling of area for closed store shed and open store shed completed. Located the concrete blocks got buried under debris & soil for doing the load test on EOT crane are arranged. Measurements for reverse engineering has taken from Unit#3 machine after availing shutdown. Model test on runner completed during 27th October to 31st October,2020. Reverse Engineering completed. Vendor list approved. Model test reports approved on 29.03.2021. Engineering drawings/ design calculation documents submitted by BHEL. So far, 21 documents have been approved while 27 documents approved subject to comments. Comments issued/ pending with BHEL for 14 documents and 20 documents are under discussion/ review with KSEBL. During online meeting

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				held on 22.03.2022, BHEL informed that they will be starting the implementation of RMU project at site by end of June, 2022. Work of new penstock is kept in abeyance.
B - SCHEMES ONGOING - Under RLA Studies				
55.	**Idukki 2nd Stage,** 3x130 MW KSEB **RM&LE** **2022-27**	**390 (LE)** - -	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA studies is proposed. During first bidding, only one qualified bid received. RLA study and preparation of DPR was Re-tendered.
56.	**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. Rehabilitation of the RC beams in the Tailrace Channel of the Sabarigiri Hydro Electric Station.	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 stator winding insulation is not good and shaft need replacement. 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.
57.	**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.	RLA study proposed in 22-23 and Estimate submitted for sanction.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
58.	**Porigalkathu,** 4x9 MW KSEB 1957 **R&M** **2022-27**	- - -	RLA Study proposed for Penstock.	The project was commissioned in 1957 and generating units renovated during 2016-2020. Only some strengthening works done for penstock during this period.

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				
59.	**Balimela,** 6x60 MW OHPCL 1973-77 T-LMZ, USSR G-Electrosila, USSR **RM&LE** **2019-20** **2023-24**	**360(LE)** 382.91 86.27	**Replacement of** i) The Turbine & Generator with new ones except the water conductor system. ii) The auxiliaries of the Units including the common auxiliaries. iii) Existing Governors with micro-processor based Digital Governor. iv) Exciter and AVR with Static Excitation System. v) New Thrust bearing pads self-lubricated PTFE Type. vi) C&I system. vii) Protection system by state of the art Numerical Relays. viii) Replacement, 11/220 kV Generator Transformer, Bus Duct system. ix) New Station Auxiliary Transformer. x) Control Power cable with FRLS type cable. xi) Architectural works including interior decoration of Power House. xii) Extension of 1No. 220kV bay in Switchyard. Refurbishment of Intake gates, Draft Tube gates and civil works.	Contract Agreement signed with M/s BHEL on 21.09.2016. M/s BHEL took over the units on 18.12.2017. OHPC engaged M/s WAPCOS Ltd. as consultant. **Works Completed:** - Dismantling work of Unit- 1&2 completed. - Refurbishment work of spiral casing, stay ring & stay vanes including DT gate of Unit-1&2 completed. - Turbine Runner & shaft Assembly, Installation of Guide Apparatus, Servomotor and TGB Housing of both Unit-1&2 completed - Assembly of Stator & Rotor, Installation of Generator lower bracket. Installation of brake jacks and lowering of stator & rotor of Unit 1& 2 completed. - Refurbishment of penstocks of both Unit 1&2 completed. - Concreting Back filling of all foundations of Towers, equipment and station Transformer at 220kV Switchyard Extension bay - Installation of IDV/PRV of Unit 1&2 completed. - Installation of combined Bearing of Unit 2 with Run out checking of Unit is completed. - Erection of 20 MVA Station transformer except PRV. Mounting Arrangement completed. - Installation of SRV & BFV of Unit 1&2 completed - Installation of GT of Unit 1&2 completed. - Installation of 11 kV IPBD of unit 1&2 completed.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				- Installation of cooling water system, drainage system and governing system completed. - Erection of towers, equipment support structure in 220 kV Switchyard completed - 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. **<u>Works under progress:</u>** - Erection of Compressed air system - Installation of dewatering system - Installation of cable tray inside switchyard - Generator fire fighting 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. - Unit 3 is scheduled to be synchronized by 31.10.2022. - Unit 4 is scheduled to be synchronized by 31.12.2022.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				- Unit 5 is scheduled to be synchronized by 31.10.2023. - Unit 6 is scheduled to be synchronized by 31.12.2023. - Erection of HVAC system in Power House is under Progress. - The work of 220 kV Switchyard Bay extension has been delayed due to non submission of project/ EHT license of BHEL's sub contractor.
B - SCHEMES ONGOING –Under RLA Studies				
60.	**Hirakud-I (Burla),** Unit 7 1x37.5 MW OHPC **RM&LE** **2022-27**	**37.5 (LE)** **-** **-**	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study will be carried out.
61.	**Rengali,** 5x50 MW OHPC **RM&LE** **2022-27**	**250 (LE)** **-** **-**	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study will be carried out.
62.	**Upper Kolab,** 4x80 MW OHPC **RM&LE** **2022-27**	**320 (LE)** **-** **-**	Detailed scope of work will be arrived after finalization of specification based on RLA study report.	RLA Study will be carried out.

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
SCHEMES Ongoing - Under DPR Preparation/ Finalisation/ Approval				
63.	**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	1. Scope to be prepared based on DPR.	• 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. Study of Power Potential for R&M/ RM&U work completed. • Cost Estimate for Civil Works and E&M works have been approved. • Phasing plan of Civil Cost & E&M cost have been approved • Presently, Approval for IDC calculations is under process.

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 RLA Studies				
64.	**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.
B - SCHEMES ONGOING - Under Tendering				
65.	**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.	**UNIT-1** Order for RLA study including uprating, preparation of DPR and specifications placed on M/s Mecon on 11.05.2018. Walk down survey done. Non-Destructive Testing (NDT)completed on 25.08.2018. Revised RLA study submitted on 27.12.2018. Final DPR submitted on 21.05.2019. M/s. Mecon submitted technical specifications. Technical acceptance awarded by CEA. • NIT for RM&U issued on 23.02.2021. • Three bids received from M/s. BHEL, M/s. Andritz and M/s. Voith.. • Techno-commercial bid opened on 07.09.2021. • Price bid opened on 23.11.2021 followed by reverse auction. • 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.

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
SCHEMES ONGOING – Under Implementation				
66.	**Loktak,** 3x35 MW NHPC USSR 1983 LMZ T-LMZ G-Leningrade, (U-1) T&G – BHEL(U-2&3) **RM&LE** **2023-24**	**105 (LE)** 273.59 30.77	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) 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
SCHEMES ONGOING – Under DPR Preparation/ Finalisation/Approval				
67.	**Khandong Power Station,** 2x23 MW NEEPCO T&G- BHEL 1984-85 **RM&LE** **2024-25**	**46 (LE)** 189.81 35.173	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. Scheme is rescheduled for completion in 2024-25 considering the purpose for extension of normative life of hydro to 40 years.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
68.	**Kopili Power Station,** 4x50MW NEEPCO T&G-BHEL 1988 **RM&LE** **2023-24**	**200 (LE)** 1117.07 436.46	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.

				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. Works in hand: xx) ACDB for switchyard & BF valve reached site on 17.08.2021. Erection & installation pending. xxi) Works related to Cooling water system is in progress. xxii) Works related to erection of new store at Umrong Nallah is in progress. xxiii) VAC System erection is in progress. xxiv) Firefighting system by Sterling and Wilson drawings has been approved and part supply has reached site xxv) Switchyard work by M/s Techno are in different stages of drawing approval. Switchyard work by M/S Techno has started. xxvi) Works on illumination system by M/s Delta Engineering is in progress. xxvii) Cutting, concrete chipping and removal of existing damaged steel liners of draft tubes by M/S PES is in progress. Cleaning & surface preparation of Draft tube is in progress, scanning of surface done, drawing has been received. Profile and plate making is being carried out at Hyderabad. Petition to CERC submitted in the month of August, 2020 for obtaining approval of the Reconstruction, R & M proposal.

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
C – SCHEMES ONGOING – Under Tendering				
69.	**Umiam Stage-III,** (Kyredemkulai) 2x30 MW MePGCL 1979 T&G - BHEL **RMU&LE** **2022-27**	**60(LE) +6(U)** 408 1.20	**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 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.	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. 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.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			- 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.	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 by 1st April, 2022. Preparation of Bid document for Civil & Hydro mechanical works is in progress.
SCHEMES ONGOING - Under RLA Studies				
70.	**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.

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
SCHEMES ONGOING - Under RLA Studies				
1.	**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.
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.
3.	**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

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

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
SCHEMES ONGOING - Under RLA Studies				
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.

ANNEXURES

Annex- I

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

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

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

Annex-II
(Sheet 1/2)

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

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

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

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

Annex- III
(Sheet 1/ 3)

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

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

Annex- III
(Sheet 2/3)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs. in Crs.)	Actual Exp (Rs. in Crs.)	Benefits (MW)	Category	Year of Completion
14	Mani Dam, KPCL	SS	2x4.5	1.00	1.00	-	R&M	2002-03
15	Shivasamudram, VVNL	SS	6x3+ 4x6	68.38	73.17	42.00 (LE)	RM&LE	2004-05
16	Bhadra, Ph.II, KPCL	SS	1x2	3.30	2.51	2.00 (LE)	RM&LE	2005-06
17	Varahi, KPCL	SS	2x115	2.57	2.66	-	R&M	2006-07
18	Sharavathy, Ph.A, KPCL	SS	10x103.5	5.22	3.52	-	R&M	2006-07
Kerala								
19	Neriamanga-lam KSEB	SS	3x15	58.00	53.05	9.00 (U) +45.00(LE)	RMU&LE	2006-07
20	Pallivasal, KSEB	SS	3x5+ 3x7.5	94.00	371.71	37.50 (LE)	RM&LE	2002-03
21	Sengulam, KSEB	SS	4x12	114.00		48.00 (LE)	RM&LE	2002-03
22	Panniar, KSEB	SS	2x15	62.00		30.00 (LE)	RM&LE	2002-03
Tamilnadu								
23	Pykara, TANGEDCO	SS	3x6.65+ 1x11+2x	26.06	20.147	58.95(LE)	RM&LE	2004-05
24	Papanasam, TANGEDCO	SS	4x7	27.05	22.61	4.00 (U) + 28.00 (LE)	RMU&LE	2005-06
Orissa								
25	Hirakud-I (Sw.yard), OHPC	SS		9.85	15.88	-	R&M	2006-07
26	Hirakud-I,U-3&4, OHPC	SS	2x24	126.14	108.86	16.00(U)+ 48.00(LE)	RMU&LE	2005-06
West Bengal								
27	Maithon, U-2, DVC	CS	1x20	42.08	36.94	3.20(U)+ 20.00(LE)	RMU&LE	2004-05
Maharastra								
28	Bhira Tail Race, MSPGCL	SS	2x40	1.60	0.70	-	R&M	2003-04
29	Tillari, MSPGCL	SS	1x60	4.50	4.24	6.0 (U)	RM&U	2004-05

Annex- III
(Sheet 3/3)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs. in Crs.)	Actual Exp (Rs. in Crs.)	Benefits (MW)	Category	Year of Completion
30	Koyna Gen. Complex, MSPGCL	SS	4x70+4x 80+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**	**829.08 [123.40(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 (Rs . in crs)	Actual Exp. (Rs . in crs)	Benefits (MW)	Category	Year of Completion
Himachal Pradesh								
1	Dehar Ph. A BBMB	CS	6x165	11.00	6.94	-	R&M	2010-11
2	Dehar Ph. B BBMB	CS	6x165	49.00	24.45	330(LE)	RM&LE	2009-10
Uttarakhand								
3	Tanakpur, NHPC	CS	3x31.4	10.77	11.95	-	R&M	2007-08
4	Khodri Ph.A, UJVNL	SS	4x30	5.25	6.39	-	R&M	2008-09
5	Chilla Ph.A, UJVNL	SS	4x36	23.55	21.24	-	R&M	2008-09
Andhra Pradesh								
6	Upper Sileru, APGENCO	SS	4x60	4.20	3.34	-	R&M	2009-10
Karnataka								
7	Nagjhari, U1 to 6, KPCL	SS	5x150 + 1x135	14.75	15.31	-	R&M	2009-10
8	Sharavathy Ph.B, KPCL	SS	10x103.5	20.50	11.14	-	R&M	2009-10
9	Supa, KPCL	SS	2x50	3.45	4.90	-	R&M	2009-10
10	Bhadra, KPCL	SS	2x12	1.44	0.85	-	R&M	2009-10
11	Lingnamakki, KPCL	SS	2x27.5	3.81	2.62	-	R&M	2010-11
Tamil Nadu								
12	Mettur Dam, TANGEDCO	SS	4x10	30.17	24.16	10 (U) + 40 (LE)	RMU&LE	2007-08
Maharashtra								
13	Koyna St.I&II, MSPGCL	SS	4x70 + 4x80	87.50	81.82	-	R&M	2008-09

Annex- IV
(Sheets 2 of 2)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Rs . in crs)	Actual Exp. (Rs . in crs)	Benefits (MW)	Category	Year of Completion
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 (Rs . in Crs)	Actual Exp (Rs . in Crs)	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion
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,	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	118.83	41.40 (LE)	41.4	RM&LE	2016-17
Uttar Pradesh									
6	Matatila, UPJVNL	SS	3x10.2	10.29	7.21	30.6 (LE)	30.6	RM&LE	2015-16
Andhra Pradesh									
7	Lower Sileru, APGENCO	SS	4x115	8.75	6.77	-	460	R&M	2013-14
8	Srisailam RB, APGENCO	SS	7x110	16.70	17.60	-	770	R&M	2015-16
Telangana									
9	Nagarjuna Sagar Ph-I works, TSGENCO	SS	1x110+ 7x100.8	33.35	13.90	-	815.6	R&M	2012-13
Karnataka									
10	Supa, KPCL	SS	2x50	3.45	3.88	-	100	R&M	2014-15
11	Nagjhari,U-1 to 6, KPCL	SS	1x135 (U-6)	69.21	64.49	15 (U)	150	RM&U	2015-16
12	Sharavathy Genarating Station (Ph B), KPCL	SS	10x103.5	20.00	29.27	-	1035	R&M	2016-17
Kerala									
13	Idamalayar, KSEB	SS	2x37.5	14.50	13.22	-	75	R&M	2012-13

Annex- V
(Sheet 2 of 2)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (No.x.MW)	Est. Cost	Actual Exp	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs . in Crs)					
14	Sabarigiri, U-4 KSEB	SS	1x55	52.20	50.41	5(U)	60	RM&U	2014-15
15	Poringalkuthu, KSEB	SS	4x8	88.63	51.90	4 (U)+ 32.00 (LE)	36	RMU&LE	2015-16
Tamil Nadu									
16	Periyar, TANGEDCO	SS	4x35	161.18	133.68	28.00(U)+ 140(LE)	168	RMU&LE	2015-16
Odisha									
17	Rengali Unit-1 OHPC	SS	1x50	47.50	36.76	50(LE)	50	RM&LE	2012-13
18	Rengali Unit-2 OHPC	SS	1x50	25.20	20.73	50(LE)	50	RM&LE	2013-14
West Bengal									
19	Jaldhaka St.I, WBSEDCL	SS	3x9	88.62	79.97	27 (LE)	27	RM&LE	2016-17
Assam									
20	Khandong, NEEPCO	CS	1x25	25.05	29.18	25(LE)	25	RM&LE	2014-15
21	Kopili, NEEPCO	CS	2x50	50.22	50.92	-	100	R&M	2014-15
Total			**4149.60**	**1335.42**	**1115.97**	**549.40 [58(U)+ 476.40 (LE) + 15 (Res)]**	**4207.6**		

State-wise list of Hydro RMU&LE schemes programmed for completion and achievement during 2017-22

Sl. No	Name of Project, Agency, Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
									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	295.69	180 (LE)	180	RM&LE	Completed in 2021-22	
Gujarat										
8	Ukai, GSECL (4x75)	SS	3x75 (U-1,2,&4)	7.30	7.30	-	225	R&M	Completed in 2021-22	
Karnataka										
9	Bhadra River Bed units, KPCL (2x12)	SS	2x12	23.55	20.12	-	24	R&M	Completed in 2019-20	
Tamil Nadu										
10	Sholayar-I, TANGEDCO (2x35)	SS	2x35	90.44	66.94	70 (LE) + 14(U)	84	RMU&LE	Completed in 2019-20	
Kerala										
11	Sholayar, KSEB (3x18)	SS	3x18	199.55	84.26	54 (LE)	54	RM&LE	Completed in 2020-21	
12	Idukki 1st stage, KSEB (3x130)	SS	3x130	89.90	65.76	-	390	R&M	Completed in 2020-21	
Odisha										
13	Hirakud-I OHPCL (2x37.5)	SS	2x37.5 (U5&6)	158.77	101.83	75.00 (LE) + 12.2 (U)	87.2	RMU&LE	Completed in 2021-22	
14	Hirakud-II (Chiplima), OHPCL (3x24)	SS	1x24 (U-3)	65.67	52.04	24.00 (LE)	24	RM&LE	Completed in 2019-20	
Sub Total (A)			**2023.20**	**1143.94**	**814.37**	**505.4 [479.2(LE) + 26.2(U)**	**2049.40**			

Sl. No	Name of Project, Agency Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
									Original	Anticipated
B. PROGRAMMED FOR COMPLETION DURING 2017-22 BUT DELAYED AND NOW PROGRAMMED FOR COMPLETION DURING 2022-27										
Himachal Pradesh										
15	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	552.75	540.00(LE)+ 90.00 (U)	630	RMU&LE	2016-17	2021-22
16	Bhakra RB, BBMB (5x157)	CS	5x157	20.80	-	-	785	R&M	2021-22	2021-22
Punjab										
17	Mukerian St.I, St.II, St.III & St.IV, PSPCL (3x15, 3x15, 3x19.5&3x19.5)	SS	3x15, 3x15, 3x19.5& 3x19.5	194.29	63.67	-	207	R&M	2019-20	2021-22
18	Shanan HEP, PSPCL (1x50+4x15)	SS	1x50+ 4x15	37.81	20.21	-	110	R&M	2019-20	2021-22
Uttar Pradesh										
19	Obra, UPJVNL (3x33)	SS	3x33	58.80	44.87	99 (LE)	99	RM&LE	2017-18	2021-22
Gujarat										
20	Kadana PSS, GSECL (4x60)	SS	4x60	5.44	3.73	-	240	R&M	2021-22	2021-22
Telangana										
21	Nagarjuna Sagar Ph-II works, TSGENCO (1x110+7x100.8)	SS	1x110+7x100 .8	22.17	14.34	-	815.6	R&M	2018-19	2021-22
Karnataka										
22	Munirabad Dam Power House, KPCL (2x9 + 1x10)	SS	2x9 + 1x10	4.60	2.20	-	28	R&M	2018-19	2021-22
Sub Total (B)			**2824.60**	**833.68**	**701.77**	**729.0 [639(LE) +90(U)**	**2914.60**			
Total (A+B)			**4847.80**	**1977.62**	**1516.14**	**1234.4 [1118.2(LE) +116.2(U)]**	**4964.00**			

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

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

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

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Completion Target
A. Ongoing Schemes – Under Implementation									
Himachal Pradesh									
1	Pong Power House, BBMB (6x66)	CS	6x66	142.25	-	396 (LE) + 54 (U)	450	RMU&LE	2026-27
2	Bhabha Power House, HPSEB	SS	3x40	90.14	43.01	120 (LE)	120	RM&LE	2022-23
3	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	552.75	540.00(LE)+ 90.00 (U)	630	RMU&LE	2022-23
Punjab									
4	Ranjit Sagar Dam, PSPCL (4x150)	SS	4x150	82.16	7.45	-	600	R&M	2022-23
5	UBDC St.I & St.II, PSPCL (3x15+3x15.45)	SS	3x15+ 3x15.45	23.55	5.66	-	91.35	R&M	2022-23
6	Anandpur Sahib Hydel Project, PSPCL (4x33.5)	SS	4x33.5	31.65	0.88	-	134	R&M	2022-23
7	Mukerian St.I, St.II, St.III & St.IV, PSPCL (3x15, 3x15, 3x19.5&3x19.5)	SS	3x15, 3x15, 3x19.5& 3x19.5	194.29	63.67	-	207	R&M	2022-23
8	Shanan HEP, PSPCL (1x50+4x15)	SS	1x50+ 4x15	37.81	20.21	-	110	R&M	2022-23
Uttarakhand									
9	Chilla Ph B UJVNL (4x36)	SS	4x36	490.56	-	144(LE)+ 12(U)	156	RMU&LE	2024-25
10	Tiloth, UJVNL (3x30)	SS	3x30	384.66	153.21	90 (LE)	90	RM&LE	2022-23
11	Dhalipur, UJVNL (3x17)	SS	3x17	152.65	61.76	51 (LE)	51	RM&LE	2022-23
Uttar Pradesh									
12	Rihand, UPJVNL (6x50)	SS	6x50	132.20	109.17	300 (LE)	300	RM&LE	2022-23
13	Obra, UPJVNL (3x33)	SS	3x33	58.8	44.87	99 (LE)	99	RM&LE	2022-23
Gujarat									
14	Kadana PSS, GSECL (4x60)	SS	4x60	5.44	3.73	-	240	R&M	2022-23
Telangana									
15	Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)	SS	2x30.6	30.99	2.00	-	61.2	R&M	2022-27
16	Nagarjuna Sagar Ph-II works, TSGENCO (1x110+7x100.8)	SS	1x110+7x100.8	22.17	14.34	-	815.6	R&M	2022-23
Andhra Pradesh									
17	Upper Sileru Power House, APGENCO (4x60)	SS	4x60	-	-	-	240	R&M	2025-27
18	Nagarjunasagar Right Canal Power House, APGENCO (3x30)	SS	3x30	-	-	-	90	R&M	2025-27
Karnataka									
19	Nagjhari (Unit-1 to 3) KPCL (3x150)	SS	3x150 (U-1 to 3)	222.00	13.108	450 (LE)	450	RM&LE	2023-24
20	Shivasamudram, KPCL (6x3+4x6)	SS	6x3+4x6	169.18	14.01	42 (LE)	42	RM&LE	2023-24
21	Munirabad Dam Power House, KPCL (2x9 + 1x10)	SS	2x9 + 1x10	4.60	2.20	-	28	R&M	2022-23

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
Tamil Nadu									
22	Moyar PH, TANGEDCO (3x12)	SS	3x12	67.05	-	36(LE)+ 6(U)	42	RMU&LE	2022-27
23	Kodayar PH-I, TANGEDCO	SS	1x60	88.48	-	60 (LE)+ 10 (U)	70	RMU&LE	2023-24
Kerala									
24	Kuttiyadi, KSEB (3x25)	SS	3x25	377.41	0.625	75.00 (LE) + 7.5 (U)	82.5	RMU&LE	2023-24
Odisha									
25	Balimela, OHPCL (6x60)	SS	6x60	382.91	86.27	360(LE)	360	RM&LE	2023-24
Manipur									
26	Loktak, NHPC (3x35)	CS	3x35	273.59	30.77	105 (LE)	105	RM&LE	2023-24
Sub Total(A)			**5485.15**	**3954.31**	**1229.69**	**3047.5**	**5664.65**		
B. Ongoing Schemes – Under Tendering									
Himachal Pradesh									
27	Giri, HPSEB (2x30)	SS	2x30	139.80	-	60.00 (LE)	60	RM&LE	2024-25
Uttarakhand									
28	Ramganaga, UJVNL (3x66)	SS	3x66	455.20	-	198(LE)	198	RM&LE	2022-27
29	Dhakrani, UJVNL (3x11.25)	SS	3x11.25	137.31	4.91	33.75 (LE)	33.75	RM&LE	2025-26
Karnataka									
30	Kadra Dam Power House, KPCL (3x50)	SS	3x50	44.47	1.72	150 (LE)	150	RM&LE	2022-23
31	Kodasalli Dam Power House, KPCL	SS	3x40	50.60	1.72	120 (LE)	120	RM&LE	2022-23
32	Gerusoppa Dam Power House (Sharavathy Tail Race), KPCL (4x60)	SS	4x60	59.66	2.21	240 (LE)	240	RM&LE	2023-24
33	Linganamakki Dam Power House, KPCL (2x27.5)	SS	2x27.5	56.20	1.85	55 (LE)	55	RM&LE	2023-24
Jharkhand									
34	Panchet U-1, DVC (2x40)	CS	1x40 (U-1)	121.85	2.19	40(LE) + 6(U)	46	RMU&LE	2023-24
Meghalaya									
35	Umium St.III, (Kyrdemkulai) MePGCL (2x30)	SS	2x30	408.00	1.20	60(LE) + 6(U)	66	RMU&LE	2022-27
Sub Total(B)			**956.75**	**1473.09**	**15.80**	**968.75 [956.75 (LE)+ 12(U)]**	**968.75**		
C. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval									
Uttarakhand									
36	Kulhal, UJVNL (3x10)	SS	3x10	115.24	-	30(LE)	30	RM&LE	2022-27
Madhya Pradesh									
37	Gandhi Sagar, MPPGCL	SS	5x23	329.64	4.97	115 (LE)	115	RM&LE	2026-27
38	Pench, MPPGCL (2x80)	SS	2x80	13.36	0.36	-	160	R&M	2024-25
39	Bansagar Ton-I, MPPGCL (3x105)	SS	3x105	92.95	10.34	-	315	R&M	2025-26
Karnataka									
40	Supa Dam Power House, KPCL (2x50)	SS	2x50	47.91	2.2	100 (LE)	100	RM&LE	2023-24
41	Sharavathy Generating	SS	10x103.5	196.56	11.07	1035 (LE)	1035	RM&LE	2023-24
42	MGHE, KPCL (4x21.6+4x13.2)	SS	4x21.6+ 4x13.2	97.00	7.75	139.2 (LE)	139.2	RM&LE	2023-24

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
Tamil Nadu									
43	Kodayar PH-II, TANGEDCO (1x40)	SS	1x40	-	-	40.0(LE)+ 6(U)	46	RMU&LE	2026-27
West Bengal									
44	Maithon, DVC (2x20+1x23.2)	CS	2x20 (U-1&3)	109.29	7.76	40.00 (LE)	40	RM&LE	2024-25
Assam									
45	Khandong Power Station,	CS	2x23	189.81	8.03	46 (LE)	46	RM&LE	2024-25
46	Kopili Power Station, NEEPCO (4x50)	CS	4x50	1117.07	436.46	200(LE)	200	RM&LE	2023-24
Sub Total(C)			**2220.20**	**2308.83**	**488.94**	**1751.2 1745.2(LE)+ 6(U)]**	**2226.20**		
D. Ongoing Schemes – Under RLA Studies									
Jammu & Kashmir (UT)									
47	Salal Stage-I, (Unit 1,2 &3) NHPC (6x115)	CS	3x115	-	-	345 (LE)	345	RM&LE	2022-27
Madhya Pradesh									
48	Bargi, MPPGCL (2x45)	SS	2x45	21.63	2.42	-	90	R&M	2025-26
Maharashtra									
49	Vaitarna, MSPGCL (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
50	Koyna Dam foot (Right Bank), MSPGCL (2x20)	SS	2x20	-	-	40 (LE)	40	RM&LE	2022-27
51	Koyna St-3, MSPGCL (4x80)	SS	4x80	-	-	320 (LE)	320	RM&LE	2022-27
52	Tillari, MSPGCL (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
53	Bhira Tail race, MSPGCL (2x40)	SS	2x40	-	-	80 (LE)	80	RM&LE	2022-27
Andhra Pradesh									
54	Machkund St.I & St.II,	SS	3x17+ 3x23	500.00	-	120 (LE) +9 (U)	129	RMU&LE	2025-27
55	Tungabhadra Dam, APGENCO	SS	4x9	175.00	-	36 (LE)	36	RM&LE	2025-26
56	Hampi Canal PH, APGENCO	SS	4x9	175.00	-	36 (LE)	36	RM&LE	2025-26
57	Lower Sileru, APGENCO	SS	4x115	350.00	1.80	460(LE)	460	RM&LE	2025-27
Tamil Nadu									
58	Kundah-I, TANGEDCO (3x20)	SS	3x20	-	-	60 (LE)	60	RM&LE	2022-27
59	Kundah-II, TANGEDCO (5x35)	SS	5x35	-	-	175 (LE)	175	RM&LE	2022-27
60	Kundah-III, TANGEDCO (3x60)	SS	3x60	-	-	180 (LE)	180	RM&LE	2022-27
61	Kundah-IV, TANGEDCO (2x50)	SS	2x50	-	-	100 (LE)	100	RM&LE	2022-27
62	Kundah-V, TANGEDCO (2x20)	SS	2x20	-	-	40 (LE)	40	RM&LE	2022-27
63	Mettur Tunnel, TANGEDCO (4x50)	SS	4x50	-	-	200 (LE)	200	RM&LE	2022-27
64	Sarkarpathy, TANGEDCO (1x30)	SS	1x30	-	-	30 (LE)	30	RM&LE	2022-27
65	Sholayar-II, TANGEDCO (1x25)	SS	1x25	-	-	25 (LE)	25	RM&LE	2022-27
66	Suruliyar, TANGEDCO (1x35)	SS	1x35	-	-	35 (LE)	35	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 (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
67	Kadamparai, PH TANGEDCO (4x100)	SS	4x100	-	-	400 (LE)	400	RM&LE	2022-27
68	Aliyar, TANGEDCO (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
Kerala									
69	Idukki 2nd stage, KSEB	SS	3x130	-	-	390 (LE)	390	RM&LE	2022-27
70	Sabarigiri, KSEB (Unit-1,2,3, 5 & 6) (4x55+	SS	4x55+ 1x60	155.9	-	280 (LE) + 20 (U)	300	RMU&LE	2022-27
71	Idamalayar, KSEB (2x37.5)	SS	2x37.5	-	-	75 (LE)	75	RM&LE	2022-27
72	Porigalkathu, KSEB (4x9)	SS	4x9	-	-	-	36	R&M	2022-27
Odisha									
73	Hirakud-I (Burla), OHPC Unit 7 (1x37.5	SS	1x37.5	-	-	37.5 (LE)	37.5	RM&LE	2022-27
74	Rengali, OHPC	SS	5x50	-	-	250 (LE)	250	RM&LE	2022-27
75	Upper Kolab, OHPC (4x80)	SS	4x80	-	-	320 (LE)	320	RM&LE	2022-27
Jharkhand									
76	Subernrekha, JUUNL	SS	2x65	-	-	130(LE)	130	RM&LE	2022-27
Meghalaya									
77	Umiam-umtru Stage-IV,	SS	2x30	-	-	60(LE)	60	RM&LE	2022-27
Sub Total(D)			**4530.50**	**1355.90**	**1.80**	**4433.5 [4404.5(LE)+ 29(U)]**	**4559.50**		
Total (A+B+C+D)			**13192.60**	**9092.13**	**1736.23**	**10200.95 [9974.45(LE)+ 226.5(U)]**	**13419.10**		

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

Annex- VIII
(Sheet 1 of 1)

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

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Completion Target
A. Ongoing Schemes – Under RLA Studies									
Jammu & Kashmir (UT)									
1	Tanakpur, NHPC 3x31.4 MW	CS	3x31.4	-	-	94.2 (LE)	94.2	RM&LE	2027-32
2	Chamera-I, NHPC 3x180 MW	CS	3x180	-	-	540 (LE)	540	RM&LE	2027-32
3	Salal Stage-II, (Unit 4,5 &6) NHPC (6x115)	CS	3x115	-	-	345 (LE)	345	RM&LE	2027-32
Uttarakhand									
4	Chibro, UJVNL (4x60)	SS	4x60	184.88	-	240 (LE)	240	RM&LE	2027-32
5	Khodri, UJVNL (4x30)	SS	4x30	169.63	-	120 (LE)	120	RM&LE	2027-32
Total (A)			**1339.20**	**354.51**	**0.00**	**1339.2 [1339.2(LE)+ 0(U)]**	**1339.20**		

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

Abbreviations

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