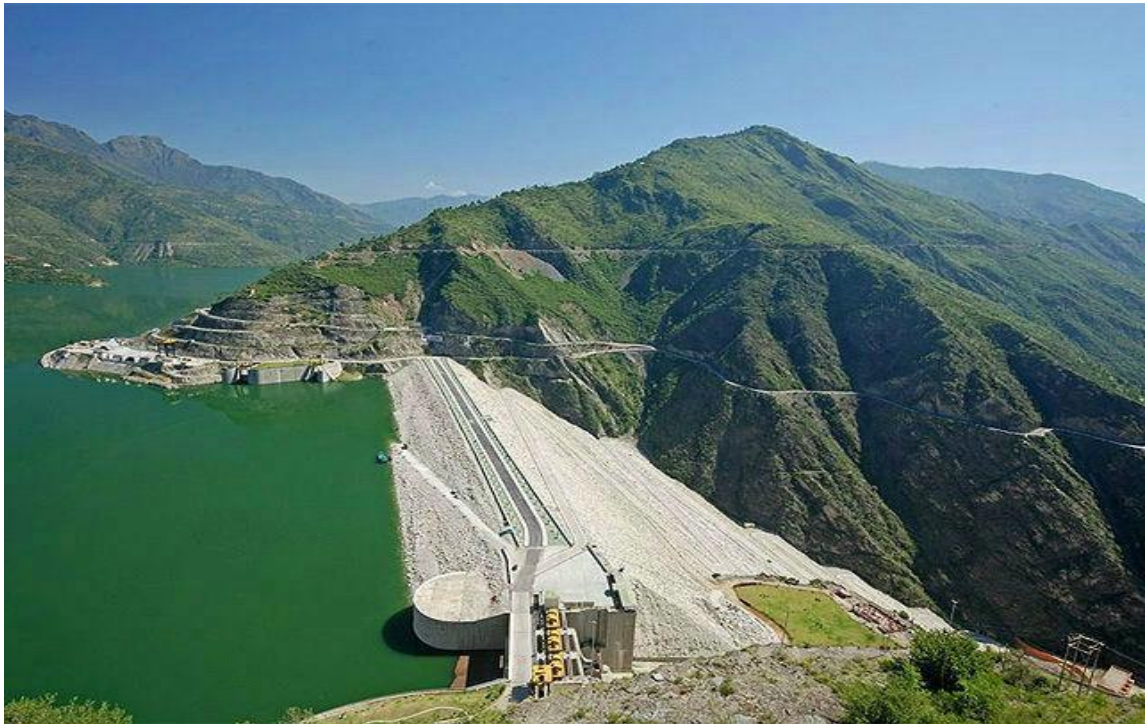




भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
जल विद्युत अभियांत्रिकी और नवीनीकरण एवं आधुनिकीकरण प्रभाग
Hydro Engineering and R&M Division

जल विद्युत परियोजनाओं 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
(JULY-SEPTEMBER, 2020)
(2nd Quarter of 2020-21)

C O N T E N T S

S. No.	Particulars	Page No.(s)
1.	Index of Schemes	I-1 to I-4
2.	Background & Plan-wise Summary	B-1 to B-11
Completion Programmed during 2017-22 and 2022-27		
3.	Year-wise & State-wise Summary of Original & Anticipated Completion Schedule of R&M Schemes at Hydro Power Stations During 2017-22	S-1 to S-2
4.	State-wise Status of R&M Schemes (During 2017-22)	1 to 55
5.	State-wise Status of R&M Schemes (During 2022-27)	56 to 83
ANNEXURES		
I	State-wise List of Hydro RMU&LE Schemes completed upto the VIII Plan	A-1
II	State-wise List of Hydro RMU&LE Schemes completed in the IX Plan	A-2 to A-3
III	State-wise List of Hydro RMU&LE Schemes completed in the X Plan	A-4 to A- 6
IV	State-wise List of Hydro RMU&LE Schemes completed during the XI Plan	A-7 to A-8
V	State-wise List of Hydro RMU&LE Schemes completed during the XII Plan	A-9 to A-10
VI	State-wise List of Hydro RMU&LE Schemes programmed for completion during 2017-22	A-11 to A-14
VII	State-wise List of Hydro RMU&LE Schemes programmed for completion during 2022-27	A-15 to A-17
Abbreviations		A-18

Index of Schemes

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

Programme for the period 2017-22 & 2022-27

INDEX OF SCHEMES

Programmed for completion during 2017-22

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Remarks	Page No.
		Central	State				
Northern Region							
I.	Himachal Pradesh						
1.		Ganguwal & Kotla	-	BBMB	2017-18	Completed	1
2.		Dehar PH	-	BBMB	2017-18	Completed	1
3.		Bhakra LB	-	BBMB	2020-21	Under Implementation	1-4
4.		Bhakra RB	-	BBMB	2021-22	Under Implementation	4-5
5.		Dehar PH	-	BBMB	2020-21	Under Implementation	5
6.		Ganguwal & Kotla	-	BBMB	2020-21	Under Implementation	5
7.		Baira Siul	-	NHPC	2020-21	Under Implementation	5-7
8.		-	Bhabha Power House	HPSEB	2019-20	Under Implementation	7-10
9.		-	Giri	HPSEB	2020-21	Under Tendering	10-11
II.	Jammu & Kashmir						
10.		Salal	-	NHPC	2019-20	Completed	12
11.		-	Chenani	J&KSPDC	2020-21	Under Implementation	12-14
12.		-	Ganderbal	J&KSPDC	2020-21	Under Implementation	14
III.	Punjab						
13.		-	Mukerian HEP	PSPCL	2020-21	Under Implementation	15-18
14.		-	Shanan HEP	PSPCL	2021-22	Under Implementation	18-20
IV.	Uttarakhand						
15.		-	Tiloth	UJVNL	2021-22	Under Implementation	21
16.		-	Dhalipur	UJVNL	2021-22	Under Implementation	21
17.		-	Ramganga	UJVNL	2021-22	Under Tendering	22
18.		-	Dhakrani	UJVNL	2021-22	Under Tendering	22
V.	Uttar Pradesh						
19.		-	Rihand	UPJVNL	2020-21	Under Implementation	23-24
20.		-	Obra	UPJVNL	2021-22	Under Implementation	24-26
Western Region							
VI.	Madhya Pradesh						
21.		-	Bargi	MPPGCL	2020-21	Under Implementation	27
22.		-	Pench	MPPGCL	2021-22	Under Implementation	27-28
23.		-	Bansagar Ton-I	MPPGCL	2021-22	Under Implementation	28-29
VII	Gujarat						
24.		-	Ukai	GSECL	2021-22	Under Implementation	30
25.		-	Kadana PSS	GSECL	2021-22	Under Implementation	31
Southern Region							
VIII.	Telangana						
26.		-	Nagarjuna Sagar Phase-II	TSGENCO	2020-21	Under Implementation	22-33
27.		-	Nagarjuna Sagar Left Canal Power House	TSGENCO	2020-21	Under Implementation	34

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Remarks	Page No.
		Central	State				
IX.	Karnataka						
28.		-	Bhadra River Bed units	KPCL	2019-20	Completed	35
29.		-	Munirabad Dam Power House	KPCL	2020-21	Under Implementation	35-36
30.		-	Nagjhari, U-1 to 3	KPCL	2021-22	Under Implementation	36
31.		-	Shivasamudram	KPCL	2021-22	Under Implementation	37
32.		-	Kadra Dam Power House	KPCL	2021-22	Under Tendering	37-38
33.		-	Kodasalli Dam Power House	KPCL	2021-22	Under Tendering	38-39
34.		-	Linganamakki Dam Power House	KPCL	2021-22	Under Tendering	39-40
35.		-	Gerusoppa Dam Power House	KPCL	2021-22	Under Tendering	40
36.		-	MGHE (Mahatma Gandhi HE)	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	40-41
37.		-	Supa Dam Power House	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	41-42
38.		-	Sharavathy Generating Station	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	43
X.	Kerala						
39.		-	Sholayar	KSEB	2020-21	Under Implementation	44-45
40.		-	Idukki 1 st Stage	KSEB	2020-21	Under Implementation	45-46
41.		-	Kuttiyadi	KSEB	2021-22	Under Implementation	47-48
XI.	Tamil Nadu						
42.		-	Sholayar PH-I	TANGEDCO	2019-20	Completed	49
Eastern Region							
XII.	Jharkhand						
43.		Panchet, U-1	-	DVC	2021-22	Under Tendering	50
XIII.	Odisha						
44		-	Hirakud-I, U5&6	OHPC	2021-22	Under Implementation	51-52
45.		-	Hirakud-II (Chiplima)	OHPC	2020-21	Under Implementation	52
46.		-	Balimela	OHPC	2021-22	Under Implementation	52-53
North Eastern Region							
XV.	Meghalaya						
47.		-	Umiam St.III Kvrdekulai	MePGCL	2021-22	Under Tendering	54-54

Programmed for completion during 2022-27

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Remarks	Page No.
		Central	State				
Northern Region							
I. Himachal Pradesh							
1.		Pong PH	-	BBMB	2022-23	Under Implementation	56
II. Punjab							
2.		-	Ranjit Sagar Dam	PSPCL	2022-23	Under Implementation	57-61
3.		-	UBDC St.I & St.II HEP	PSPCL	2022-23	Under Implementation	61-62
4.		-	Anandpur Sahib Hydel Project,	PSPCL	2022-23	Under Implementation	62-65
III. Jammu&Kashmir							
5.		-	Lower Jehlum HEP	J&KSPDC	2022-27	Under DPR Preparation/ Finalisation/Approval	66
6.		-	USHP – II Kangan	J&KSPDC	2022-27	Under DPR Preparation/ Finalisation/Approval	66
IV. Uttarakhand							
7.		-	Chilla (Ph-B)	UJVNL	2024-25	Under Implementation	67
8.		-	Kulhal	UJVNL	2023-24	Under DPR Preparation/ Finalisation/Approval	67-68
9.		-	Chibro	UJVNL	2025-26	Under DPR Preparation/ Finalisation/Approval	69
10.		-	Khodri	UJVNL	2025-26	Under DPR Preparation/ Finalisation/Approval	69
Western Region							
V. Madhya Pradesh							
11.		-	Gandhi Sagar	MPPGCL	2022-23	Under Implementation	70-72
Southern Region							
VI. Kerala							
12.		-	Idukki 2 nd Stage	KSEB	2022-27	Under RLA Studies	73
VII. Andhra Pradesh							
13.		-	Machkund St.I & St.II	APGENCO	2025-26	Under RLA Studies	74
14.		-	Tungabhadra HE (J) Dam	APGENCO	2025-26	Under RLA Studies	75
15.		-	Hampi Canal PH	APGENCO	2025-26	Under RLA	75

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Remarks	Page No.
		Central	State				
VIII.	Tamil Nadu						
16.		-	Moyar PH	TANGEDCO	2023-24	Under Implementation	76
17.		-	Kodyar PH-I	TANGEDCO	2022-24	Under Implementation	76
18.		-	Kodyar PH-II	TANGEDCO	2025-26	Under DPR Preparation/ Finalisation/Approval	76-77
19.		-	Kundah-I	TANGEDCO	2022-27	Under RLA Studies	77-79
20.		-	Kundah-II				
21.		-	Kundah-III				
22.		-	Kundah-IV				
23.		-	Kundah-V				
24.		-	Mettur Tunnel				
25.		-	Sarkarpathy				
26.		-	Sholayar-II				
27.		-	Suruliyar				
28.		-	Kadamparai PH,				
29.		-	Aliyar				
North Eastern Region							
IX.	Manipur						
30.		Loktak	-	NHPC	2023-24	Under Tendering	80
X.	Assam						
31.		Khandong Power Station	-	NEEPCO	2024-25	Under DPR Preparation/ Finalisation/Approval	81
32		Kopili Power Station		NEEPCO	2023-24	Under DPR Preparation/ Finalisation/Approval	81
XI.	Meghalaya						
33.		-	Umiam-Umtru Stage-IV	MePGCL	2022-27	Under RLA Studies	82
Eastern Region							
XII.	West Bengal						
34.		Maithon, U1&3	-	DVC	2022-23	Under DPR Preparation/ Finalisation/Approval	83

**Background
&
Plan-wise Summary**

RENOVATION, MODERNISATION & UPRATING OF HYDRO ELECTRIC POWER PROJECTS

BACKGROUND

Renovation & Modernisation, Uprating and Life Extension (RMU&LE) of the existing old hydro electric power projects is considered a cost effective option to ensure optimization of resources, efficient operations, better availability and also to augment (uprating) capacity addition in the country.

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 has been incorporated in the National Perspective Plan.

VIII Plan to XII Plan

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 have been completed by the end of the XII Plan, total benefit of 3636 MW through Life Extension, Uprating and Restoration has 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.

During 2017-22

The Renovation, Modernization, Uprating and Life Extension works at 47 Hydro Electric Plants (HEPs) with an aggregate capacity of 9294.25 MW is programmed for completion during 2017-22 with the breakup as 4902.6 MW through R&M at 18 HEPs, 3531.65 MW through Life Extension at 23 HEPs and 860MW through Life Extension & Uprating at 6 HEPs. The 6 HEPs where both Life Extension & Uprating are envisaged the aggregate capacity of 860 MW shall be uprated to 995.7 MW resulting in additional benefit of 135.7 MW. As such, the revised aggregate capacity after RMU&LE works of these 47 projects will be 9429.95 MW.

Out of these 47 schemes, five(5) schemes with an aggregate installed capacity of about 882.4 MW have been completed till September, 2020 which includes 764 MW through R&M, 48.4 MW through Life Extension and 84 MW (70+14MW) through LE & Uprating. The state-wise list of hydro R&M schemes expected for completion during 2017-22 is given at Annex-VI.

During 2022-27

The Renovation, Modernization, Uprating and Life Extension works at 34 Hydro Electric Plants (HEPs) with an aggregate capacity of 4558.35 MW is programmed for completion during 2022-27 with the breakup as 1000.35 MW through R&M at 5 HEPs, 3053 MW through Life Extension at 23 HEPs and 505 MW through Life Extension & Uprating at 6 HEPs. The 6 HEPs where both Life Extension & Uprating are envisaged, the aggregate capacity of 505 MW shall be uprated to 575 MW resulting in additional benefit of 70 MW. As such, the revised aggregate capacity after RMU&LE works of these 34 projects will be 46428.35 MW. The state-wise list of hydro R&M schemes expected for completion during 2022-27 is given at Annex-VII.

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 उपरान्त 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 है।

आठवीं योजना से बारहवीं योजना तक

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 है, जिसके फलस्वरूप जीवन विस्तार, उन्नयन और पुनरुद्धार के माध्यम से 3636 मेगावाट का लाभ हुआ है। आठवीं, नौवीं, दसवीं, ग्यारहवीं और बारहवीं योजनाओं के दौरान पूरी की गई जल विद्युत आरएमयू एंड यू स्कीमों की राज्यवार सूची क्रमशः अनुलग्नक- I, II, III, IV और V में दी गई है।

2017-22 के दौरान

2017-22 के दौरान, 9294.25 मेगावाट की कुल क्षमता के साथ 47 हाइड्रो इलेक्ट्रिक प्लांट्स (HEPs) पर नवीनीकरण, आधुनिकीकरण, उन्नयन और जीवन विस्तार का काम पूरा करने के लिए कार्यक्रम बनाया गया है, जिसमें से 18 हाइड्रो इलेक्ट्रिक प्लांट्स में 4902.6 MW की क्षमता नवीनीकरण एवं आधुनिकीकरण के माध्यम से, 23 हाइड्रो इलेक्ट्रिक प्लांट्स में 3531.65 MW की क्षमता जीवन विस्तार के माध्यम से, 6 हाइड्रो इलेक्ट्रिक प्लांट्स में 860MW की क्षमता के जीवन विस्तार और उन्नयन का कार्य किया जाएगा। जिन 6 हाइड्रो इलेक्ट्रिक प्लांट्स में जीवन विस्तार और उन्नयन दोनों की परिकल्पना की गई है, उनमें 860 MW की कुल क्षमता 995.7 MW तक होगी, जिसके परिणामस्वरूप 135.7 MW अतिरिक्त लाभ होगा। जिसके कारण, इन 47 परियोजनाओं के आरएमयू एंड एलई कार्यों के बाद संशोधित कुल क्षमता 9429.95 मेगावाट होगी।

इन 47 योजनाओं में से, 5 स्कीमों की कुल स्थापित क्षमता 882.4 मेगावाट की है, जो सितंबर, 2020 तक पूरी हो चुकी है, जिसमें आरएंडएम के माध्यम से 764 मेगावाट, जीवन विस्तार के माध्यम से 48.4 मेगावाट और जीवन विस्तार और उन्नयन के माध्यम से 84 मेगावाट (70 + 14MW) शामिल हैं। 2017-22 के दौरान पूरी की जाने वाली जल विद्युत आर एंड एम स्कीमों की राज्यवार सूची अनुलग्नक-VI में दी गई है।

2022-27 के दौरान

2022-27 के दौरान, 4558.35 मेगावाट की कुल क्षमता के साथ 34 हाइड्रो इलेक्ट्रिक प्लांट्स (HEPs) पर नवीनीकरण, आधुनिकीकरण, उत्थान और जीवन विस्तार का काम पूरा करने के लिए कार्यक्रम बनाया गया है, जिसमें से 5 हाइड्रो इलेक्ट्रिक प्लांट्स में 1000.35 MW की क्षमता नवीनीकरण एवं आधुनिकीकरण के माध्यम से, 23 हाइड्रो इलेक्ट्रिक प्लांट्स में 3053 MW की क्षमता जीवन विस्तार के माध्यम से, 6 हाइड्रो इलेक्ट्रिक प्लांट्स 505 MW की क्षमता जीवन विस्तार और उन्नयन के माध्यम से कार्य किया जाएगा। जिन 6 हाइड्रो इलेक्ट्रिक प्लांट्स में जीवन विस्तार और उन्नयन दोनों की परिकल्पना की गई है, उनमें 505 MW की कुल क्षमता 575 MW तक होगी, जिसके परिणामस्वरूप 70 MW अतिरिक्त लाभ होगा। जिसके कारण, इन 34 परियोजनाओं के आरएमयू एंड एलई कार्यों के बाद संशोधित कुल क्षमता 4628.35 मेगावाट होगी। 2022-27 के दौरान पूरी की जाने वाली जल विद्युत आर एंड एम स्कीमों की राज्यवार सूची अनुलग्नक-VII में दी गई है।

Summary of R&M of Hydro Electric Projects

(As on 30.09.2020)

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.)]

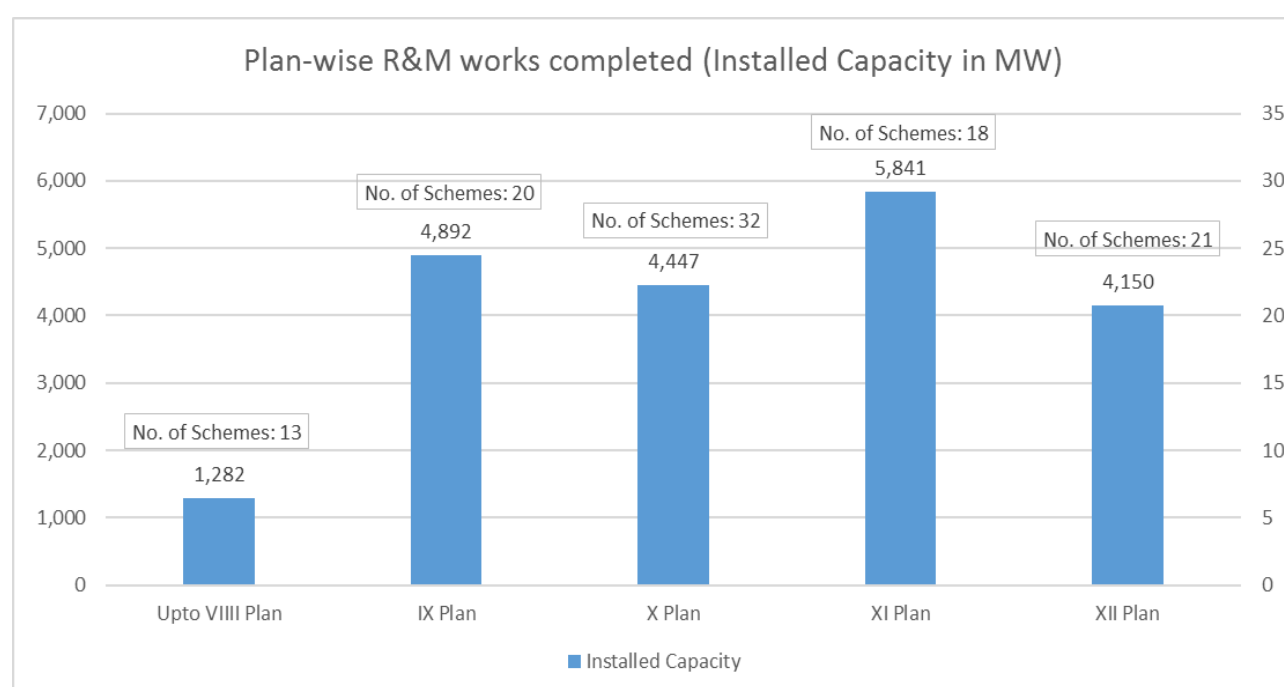
Abbreviations:

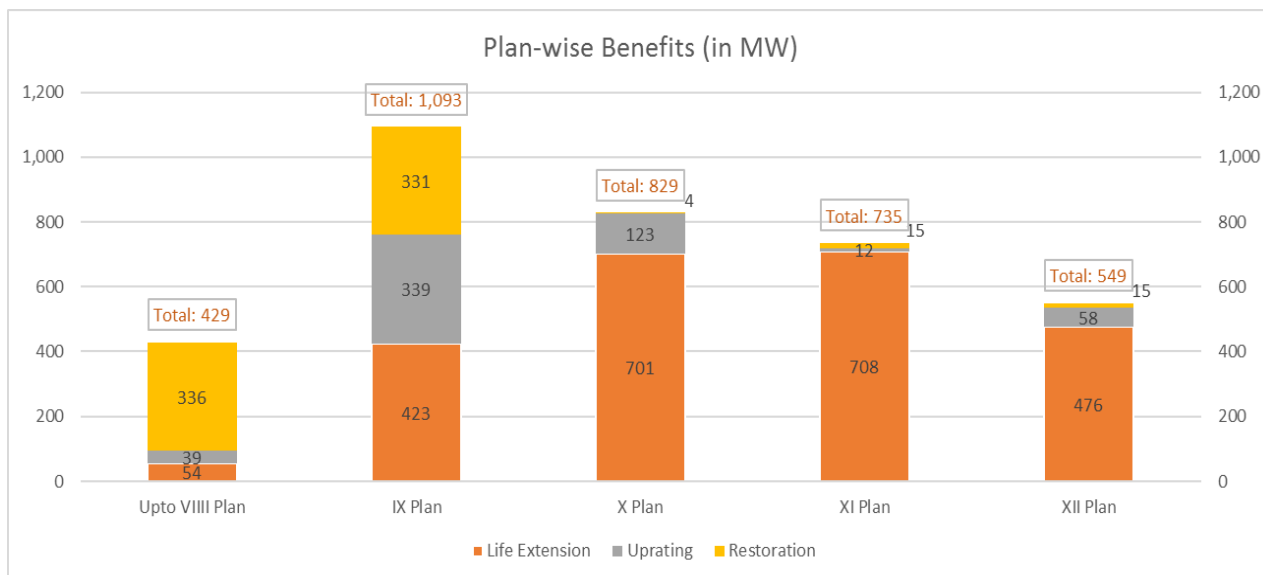
MW – Mega Watt;

Res. – Restoration;

U – Uprating;

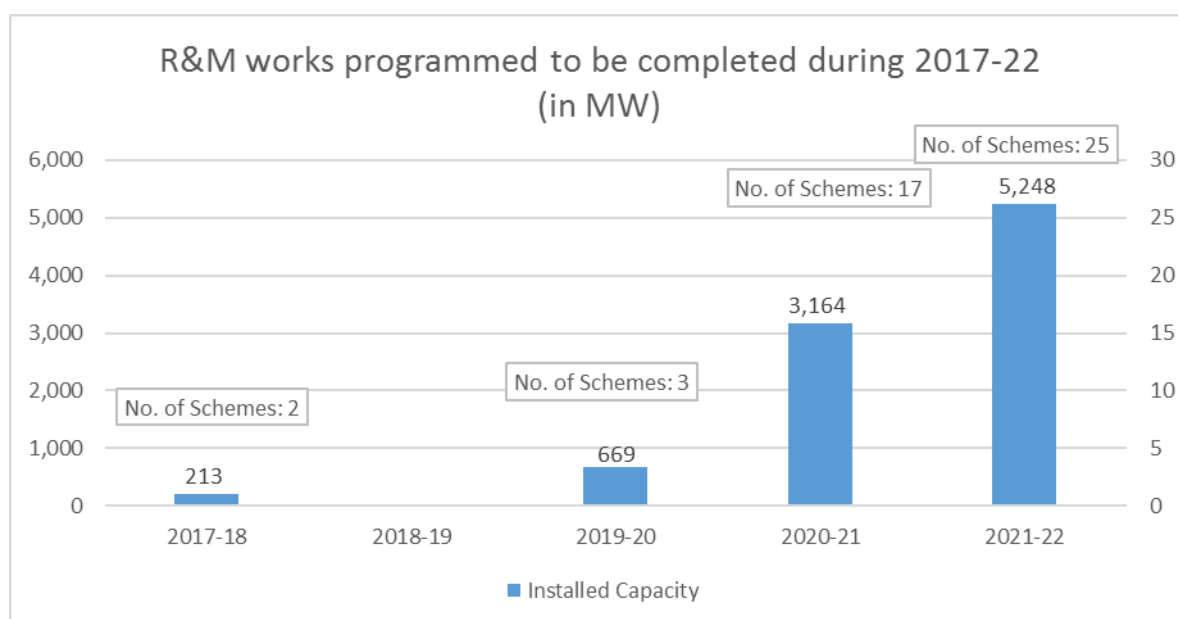
LE – Life Extension;





II Programme 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	9	38	47	9294.25	5852.35	4527.35 [4391.65(LE) +135.7(U)]
2.	Completed	3	2	5	882.40	163.72 (Actual Cost)	132.40 [118.4 (LE)+ 14 (U)]
3.	Under Implementation	5	25	30	6180.90	3904.66	2152 [2042.30(LE) +109.70 (U)]
4.	Under Tendering	1	8	9	956.75	1400.16	968.75 [956.75(LE) +12 (U)]
5.	Under DPR Preparation/ Finalisation/Approval	0	3	3	1274.20	341.47	1274.20 (LE)



RMU&LE schemes likely to be completed during the current year i.e. 2020-21

A. Central Sector

State	Name of Stations	Units & capacity for R&M	Status at the end of previous Quarter	Achievement during the current Quarter	Status at the end of current Quarter	Remarks
Himachal Pradesh	Dehar Power House (U-3)	165 MW (1x165)	Order placed on BHEL and advance payment released.	QAP approved. Dispatch authorization issued for stator frame, stator bars, brake assembly air coolers, stator laminations.	Inspection of wound rotor poles and auto synchronizer conducted. Stator frame assembled and core building in progress.	-
	Bhakra LB	540 MW (5x108)	The stator has been lowered into pit on dated 21.10.2019. The alignment and centering of stator is in progress. The works for matching of rotor magnetic center with respect to stator, lower bracket re-assembly and upper bracket assembly completed.	The work of upper bracket assembly completed on 09.07.2020. The work of rotor lowering completed on 29.07.2020. 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.	U#3 commissioning pending. U#5 runner profile modification delayed. The commencement of works of Unit - 1 shall be based on commissioning of Unit-3	Commissioning of unit-3 delayed due to Covid-19 situation.
	Ganguwal & Kotla Power House	96.8 MW (4x24.2)	Order has been issued to M/s. ABB for Upgradation of existing Governors with Microprocessor based Digital Type Electro Hydraulic Governors with SCADA compatibility	Firm's representative has visited the site for preparation of drawings.	.	
	Baira Siul	180 MW (3x60)	a) Unit#1: Under shut down for R&M w.e.f. 30.12.2019. b) Unit#2: R&M	Civil works and U#1 R&M works under progress.	Civil works Progress- 52%	

State	Name of Stations	Units & capacity for R&M	Status at the end of previous Quarter	Achievement during the current Quarter	Status at the end of current Quarter	Remarks
			completed on 18.12.2019.	Testing of cable connections of various panels of Power House is in progress. Dowelling of upper bracket, erection and welding of Firefighting pipe lines, erection of new SSB-2 panel & new transformer is in progress.		

B. State Sector

State	Name of Stations	Units & capacity for R&M	Status at the end of previous Quarter	Achievement during the current Quarter	Status at the end of current Quarter	Remarks
Jammu & Kashmir	Ganderbal	9 MW (2x4.5)	80% work completed.	Minor works under progress.	85% work completed.	-
	Chenani	23.3MW (5x4.66)	Major works completed.	Work of RCC aqueduct completed.	Final testing of gates to be conducted in present available shutdown.	Commissioning pending due to non-availability of water.
Himachal Pradesh	Bhaba Power House	120 MW (3x40)	Rehabilitation work of Unit-1 completed. Nozzle servomotors of all units commissioned. Pipe line for air release valve installed and pressure testing of pipe line to be completed in lean season. Work for re-routing of pipe for	The tender awarded to L-1 bidder i.e. M/s Voith Hydro Pvt. Ltd. Static excitation panel received at site. Erection to be taken up during lean period.	Works to be taken up during lean season.	

State	Name of Stations	Units & capacity for R&M	Status at the end of previous Quarter	Achievement during the current Quarter	Status at the end of current Quarter	Remarks
			decompression valve shall be completed in lean period.			
	Giri	60 MW (2x30)	Tender documents prepared. Negotiations are going on with PFC for loan.	PFC funded the scheme for 18.05.2020.	Preparation of tender documents under process.	-
Kerala	Idukki 1 st Stage	390 MW (3x130)	Unit # 1 machine spinning conducted and reached upto 150 rpm.	Unit # 1 was synchronized on 14.07.2020	Control room equipment such as GPS Clock server, engineering stations, large screen display erection and commissioning works completed. Erection of 11kV bus duct completed.	-
	Sholayar	3x18 MW	Unit 2 and unit 3 renovation completed. Third machine i.e. Unit 1 renovation under progress	Penstock works of Unit # 1 completed on 26.08.2020 Trial run completed on 19.09.2020.	Overall Progress – 95%	
Telangana	Nagarjuna Sagar LCPH	61.2 MW (2x30.6)	All works completed except: Overhauling of EOT Cranes and Gantry cranes, Procurement of control cables of different sizes for units 1 to 8, common auxiliaries, Switchyard equipments Overhaul of stop log gates, penstock gates and seals replacement for draft tube gates.	Remaining works under progress.	Remaining works under progress.	-
	Nagarjuna Sagar Ph-II	815.6 MW (1x110+)	All works completed except:	Remaining works under progress.	Remaining works under	-

State	Name of Stations	Units & capacity for R&M	Status at the end of previous Quarter	Achievement during the current Quarter	Status at the end of current Quarter	Remarks
		7x100.8)	Unit-2 overhaul. Reconditioning of stop log gates, penstock gates and seals replacement for draft tube gates		progress.	
Odisha	Hirakud-II	24 MW (1x24)	Trial run completed on 01.04.2020. the unit was provisionally taken over w.e.f. 18.05.2020	Performance guarantee test of the unit will be conducted after rectification of defects.	The progress of work is being affected due to impact of Covid-19.	-
Uttar Pradesh	Rihand	300 MW (6x50)	Replacement of stator core under tendering process of unit#3. Some common works are under execution	Order for procurement has been placed for Supply and Commissioning of 132kV Isolators for feeders.	Work stalled due to Covid-19.	
Karnataka	Munirabad	28 MW (2x9+ 1x10)	Supply of DCS Panels, Control, Metering & Protection Panels, Cables, ACDB DCDB is completed. Manufacturing clearance accorded for all field instruments. Erection work to be taken up.	Drawings approved for 2nos. 11kV Tee-off cubical of Units 1&2 and 11kV Gescom UAT switchgear cubicle.	Works under progress.	
Madhya Pradesh	Bargi	90 MW (45x2)	Techno-Commercial bid has been opened for Battery set. Supply, erection, testing and commissioning of 1 No. 250 KVA DG Set, 132/33 kV 20 MVA Transformer, C&R panel under administrative approval	Order has been placed for 1 no 220V 300 Ah Battery. Procurement is under process for one CT, PT & CVT.	Works under progress.	
Punjab	Mukerian St.I, St.II, St. III & St. IV	207 MW (3x15+3x 15+5 3x19.5+3x 19.5)	1 no. 630 kVA 11 kV/415V UAT received at site for replacement. Tender floated for replacement of drainage pumps and 5 nos.11/132kV,20 MVA GTs at MPH-1&2.	2 no. 630 KVA, 11KV/415 Volt UATs offered by the firm for inspection on 09.10.2020.	Fresh Tender floated for 4 nos. 800 KVA, 11KV/415 Volt UATs on 27.05.2020 and due on 09.10.2020	
Total		3163.9 MW (17 Schemes)				

Year-wise programme and achievement of R&M works of Hydro units during 2017-22

	2017-18		2018-19*		2019-20**		2020-21***		2021-22
	Programmed	Achieved	Programmed	Achieved	Programmed	Achieved	Programmed	Achieved	Programmed
Installed Capacity (MW)	593.70	213.40	1409.10	-	3276.45	669	3163.9	-	5248
No. of Schemes	7	2	10	-	19	3	17	-	25

* Five (5) no. of schemes programmed for completion in 2017-18 shifted to 2018-19.

** Ten (10) no. of schemes programmed for completion in 2017-18 shifted to 2019-20.

*** Sixteen (16) no. of schemes programmed for completion in 2019-20 shifted to 2020-21.

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	5	29	34	4558.35	3628 [3558 (LE)+ 70 (U)]
2.	Under Implementation	1	7	8	1576.35	664 [636(LE)+ 28(U)]
3.	Under Tendering	1	0	1	105	105 (LE)
4.	Under DPR Preparation/Finalisation/Approval	3	6	9	930	963 [930 (LE) + 33 (U)]
5.	Under RLA Studies	0	16	16	1947	1896 [1887(LE)+9(U)]

Abbreviations:

MW – Mega Watt;
LE – Life Extension;

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

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

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

<u>Year 2017-18</u>	<u>Year 2018-19</u>	<u>Year 2019-20</u>	<u>Year 2020-21</u>	<u>Year 2021-22</u>
<u>Himachal Pradesh:</u> 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)	<u>Jammu & Kashmir:</u> i) Ganderbal, J&KSPDC (2x3+2x4.5)=9 MW (2020-21) ii) Chenani, J&KSPDC (5x4.66)=23.3 MW (2020-21) <u>Kerala:</u> Sholayar, KSEB, (3x18)=54MW (2020-21) <u>Tamil Nadu:</u> Sholayar-I, TANGEDCO (2x35)=70 MW (Completed in 2019-20) <u>Telangana:</u> i) Nagarjuna Sagar Ph-II, TSGENCO, (1x110+7x100.8)=8 15.6 MW (2020-21) ii) Nagarjuna Sagar LCPH, TSGENCO (2x30.6)=61.2 MW (2020-21) <u>Karnataka:</u> i) Bhadra River Bed Units, KPCL, (2x12)=24 MW (Completed in 2019-20) ii) Munirabad Dam Power House, KPCL (2x9 + 1x10) = 28 MW (2020-21) <u>Odisha:</u> Hirakud-II, OHPC, (1x24)=24MW (2020-21)	<u>Himachal Pradesh:</u> i) Bhakra LB, BBMB, (5x108)=540 MW (2021-22) ii)Bhaba Power House, HPSEB, (3x40)=120 MW (2020-21) iii) Dehar Power House (U-3), BBMB, (1x165)=165 MW (2020-21) <u>Uttar Pradesh:</u> i) Rihand, UPJVNL (6x50)= 300MW (2020-21) <u>Kerala:</u> Idukki 1 st Stage, KSEB, (3x130)=390 MW (2020-21) <u>Odisha:</u> Hirakud-I, OHPC, (2x37.5) =75 MW (2021-22) <u>Punjab:</u> i) Mukerin St.I, St.II, St.III & St.IV, PSPCL, (3x15+3x15+3x19.5+3x19.5) = 207 MW (2020-21) ii) Shanan HEP, PSPCL, (1x50+4x15)= 110 MW, (2021-22) iii) UBDC St.I &St.II, PSPCL, (3x15+3x15.45) =91.35 MW (2022-23)	<u>Himachal Pradesh:</u> i)Baira Siul, NHPC, (3x60)=180 MW (2020-21) ii)Giri, HPSEB, (2x30)=60 MW (2020-21) <u>Jammu & Kashmir:</u> Salal ,NHPC, (5x115) =575 MW (Completed in 2019-20) <u>Punjab:</u> Ranjit Sagar Dam, PSPCL, (4x150)=600 MW, (2022-23) <u>Madhya Pradesh:</u> Gandhi Sagar, MPPGCL, (5x23)=115 MW (2022-23) <u>Odisha</u> Balimela, OHPC, (6x60)=360 MW (2021-22)	<u>Uttarakhand:</u> i) Chilla Ph B, UJVNL (4x36)=144 MW (2024-25) ii) Ramganga, UJVNL (3x66)=198 MW (2021-22) iii) Dhakrani, UJVNL, (3x11.25)=33.75 MW, (2021-22) iv) Dhalipur , UJVNL (3x17=51MW) (2021-22) v)Tiloth, UJVNL (3x30)=90 MW (2021-22) <u>Uttar Pradesh:</u> Obra, UPJVNL (3x33)=99 MW (2021-22) <u>Madhya Pradesh:</u> i) Bargi, MPPGCL, (2x45)=90 MW (2020-21) ii) Pench, MPPGCL, (2x80)=160 MW, (2021-22) iii) Bansagar Ton-I, MPPGCL, (3x105)=315 MW (2021-22) <u>Gujarat:</u> i) Ukai, GSECL (3x75)=225MW (2021-22)

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

		iv) Anandpur Sahib Hydel Project, PSPCL, (4x33.5) = 134 MW (2022-23)		ii) Kadana PSS, GSECL (4x60)=240 MW (2021-22) <u>Kerala:</u> Kuttiadi, KSEB, (3x25)=75 MW (2021-22) <u>Karnataka:</u> i) Nagjhari U-1 to U-3, KPCL, (3x150)=450 MW, (2021-22) ii) Shivasamudram, KPCL, (6x3+4x6))=42 MW, (2021-22) iii) MGHE, KPCL, (4x21.6+4x13.2)=139.2 MW (2021-22) iv) Kadra Dam Power House, KPCL (3x50) =150 MW (2021-22) v) Kodalalli Dam Power House, KPCL (3x40)=120 MW (2021-22) vi) Supa Dam Power House, KPCL (2x50)=100 MW (2021-22) vii) Linganamakki Dam Power House, KPCL (2x27.5) =55 MW (2021-22) viii) Gerusoppa Dam Power House, KPCL (4x60) =240 MW (2021-22)
--	--	--	--	--

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

				ix) Sharavathy Generating Station, KPCL 10x103.5)=1035 MW (2021-22) <u>Jharkhand:</u> Panchet U-1, DVC, (1x40)=40 MW (2021-22) <u>West Bengal:</u> Maithon U 1& 2, DVC, (2x20)=40 MW (2022-23) <u>Meghalaya:</u> Umiam St.III (Kyrdekulai), MePGCL, (2x30)=60 MW (2021-22) <u>Assam:</u> 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)

* Seven (7) no. of schemes namely UBDC St.I &St.II, Anandpur Sahib Hydel Project, Ranjit Sagar Dam, Gandhi Sagar, Chilla Ph B, Maithon U 1& 2 and Khandong Power Station shifted to 2022-27.

* Two (2) no. of schemes namely Bhakra RB and Ganguwal & Kotla Power House added later in 2017-22.

**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

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				
1.	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.	- Ganguwal Power House Unit-2 has been commissioned on 23.11.2017. - Kotla Power House Unit-3 commissioned on 04.12.2017.
2.	Dehar Power House, 1x165 MW BBMB (Unit 6) 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.	Dehar Power House Unit-6 has been commissioned on 01.11.2017.
B - SCHEMES ONGOING – Under Implementation				
3.	Bhakra LB, 5x108 MW BBMB 1985 5x90 MW(Original)) 1960-61 RMU&LE 2016-17 2020-21	540(LE)+ 90(U) 489.77 544.85	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	- 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

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			guide bearings, upper and lower bracket, braking system, generator temp. monitoring panel, excitation system, slip ring, NGT etc. Auxiliaries Control & Protection panels, Generator Transformers, Bus Bars with CTs, PTs etc. LAVT cubicle, switchyard equipments, control cables etc.	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 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. - Modification of runner blade profile through solid piece welding as done in Unit-2 was to be taken up by M/s Hitachi, Japan in April-May 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

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

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				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. The unit was planned to be commissioned by June, 2020, but the commissioning shall be extended due to recent COVID-19 situation. <u>Unit - 1</u> The commencement of works shall be based on commissioning of Unit-3. Works delayed due to covid-19 situation. Works likely to be completed in 2020-21.
4.	Bhakra RB, 5x157 MW BBMB R&M 2021-22	- 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 protocol	NIT Floated on dated 29.5.2019. Part-I opened on 08.11.2019. Clarification asked from firms on 17.12.2019. E-reverse auction carried out on 28.05.2020. Purchase memorandum approved and issued to M/s Voith Hydro. PO issued to M/s GE T&D, Chandigarh on 29.08.2019. The drawings have been approved on 23.07.2020.

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	PO dated 16.06.2020 has been issued to M/s ABB India Ltd.
5.	Dehar Power House, 1x165 MW BBMB (Unit 3) 1979 T&G - BHEL R&M 2020-21	- 23 1.63	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 placed on BHEL, Chandigarh on 04.06.2019. Observations regarding list of sub-vendors for bought out items conveyed to BHEL. Advance payment released. Drawings under examination. QAP approved. Dispatch authorization issued for stator frame, stator bars, brake assembly air coolers, stator laminations. Inspection of wound rotor poles and auto synchronizer conducted. Stator frame assembled and core building in progress at site.
6.	Ganguwal & Kotla Power House BBMB 4x24.2 MW 1955-56 R&M 2020-21	- 9.86 -	Upgradation of existing Governors with Microprocessor based Digital Type Electro Hydraulic Governors with SCADA compatibility for 4x24.2 MW Ganguwal & Kotla Power House.	P.O No. 734/PHD/BH-I/467 dated 16.06.2020 has been issued. Firm's representative has visited the site for preparation of drawings.
7.	Baira Siul, NHPC 3x60 MW 1980-81 RM&LE 2020-21	180 (LE) 341.41 153.89	- 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. - 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.	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. LoA for HM package awarded to "M/s Om Metals Infraprojects 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

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	Systems Pvt. Ltd., New Delhi.” at Rs. 10.79 crores.LoA for Bhalehdh Weir(Civil works) awarded to “M/s Starcon Infra Project(I) Pvt. Ltd., Delhi.” at Rs. 17.72 crores. Status of Works - Complete Shutdown of Power House has been taken w.e.f. 15.10.2018 for a period of 6 months which was further extended upto 15.06.2019 due to hindrances during the scheduled shutdown period.All works suffered due to heavy rainfall and snowfall during Feb-March’2019 leading to landslides, frequent blockage of roads and disruption of power supply etc. During shutdown period works of common auxiliary system and other works of water conductor system completed. - After completion of all essential HM/Civil works required for commissioning of Unit-1&3, filling of HRT was started with Siul wier on 11.06.2019 but had to be stopped due to leakage in BFV’s which was rectified and dry run of Unit-1 started on 29.06.2019. Unit-1&3 synchronized with the grid on 06.07.19 and 07.07.19 respectively after completion of common works. - Unit#2 commissioned on 18.12.2019 and COD declared w.e.f. 00:00 Hrs of 29.12.2019. Civil Works HRT repair, Dam spillway& Pier Repair, Dam Toe wall, Upstream protection of Dam face, TRC work etc. completed. Excavation and concreting of Bhalehdh Feeder tunnel is in progress. (approx. 80% completed). Repair of diversion tunnel is in progress. (approx. 50% completed) HM Works - Erection of HRT intake gate and DT service (except ballast) & emergency gate completed. Rope

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				drum Hoist of spillway Radial gate, 25T capacity gantry crane for spillway stoplog, Rope drum Hoist of existing intake gate TRC gate and knife edge valve at Siul Adit and 7.5 T capacity monorail hoist (except control panel) completed. b) Erection of Sill beam of Radial gate & Stoplog, Erection work of Rope drum hoist of draft tube & PRV gate and Internal work of all Penstocks completed. c) External painting of Penstock and Erection of 2nd stage embedded parts of DT gate service and intake gate of Bhaledh weir is under progress. E&M Works a) Switch Yard: Installation & testing of switchyard equipments completed. b) Unit#2: R&M completed on 18.12.2019 and available for generation. c) Unit#1: Under shut down for R&M w.e.f. 30.12.2019. Erection works of cooling water system, OPU units of MIV & Governor system, top cover, Bottom ring & Turbine shaft completed. Built up of rotor & Stator completed. Cabling work completed. d) Testing of cable connections of various panels of Power House is in progress. Dowelling of upper bracket, erection and welding of Firefighting pipe lines, erection of of new SSB-2 panel & new transformer is in progress. e) Unit#3: (old) is available for generation.
8.	Bhabha Power House, 3x40 MW HPSEBL 1989 T&G - BHEL RM&LE	- 76.03 81.13 (For the works of rehabilitation of damaged/burnt	Replacement of existing 245 kV Gas Insulated Switchgear, Control and Relay Panels, 22 kV Indoor switchgear, 415 Volt LT Panels, 220 kV EHT Cables, 22 kV HT Cables, Control & Power cables and other associated equipment along with	- The power house was under forced shut down since 22.01.2015 due to fire incidence. The repair & rehabilitation works completed by M/s Alstom. - Unit-1 commissioned on 10.07.2016. - Unit-2 commissioned on 21.09.2016. - Unit-3 commissioned on

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	2017-18 2019-20	eqpts.)	“Safe dismantling/ removing from site of the existing plant & equipment including carriage, stacking at Owner’s store/yard and handing over to the Owner” on Single Responsibility Basis. • Providing & installation of 400 kVA, 22/415 kV transformer in place of present 100 kVA, 22/415 kV transformer for emergency supply from Nathpa Sub-Station. • Overhauling and repair of 120/20 Ton EOT Crane, 5 Ton EOT crane in GIS hall, OTIS lift and allied system, Dehydration plant and Vacuum plant and Ventilation & exhaust system. • Providing emergency drainage system for transformer oil in case of fire. • Repair & refurbishment of Fire Fighting System. • Providing 50/31.50 MVA, 220/66/6.6 kV Power Transformer along with allied switch gear for connecting to the 66 kV Bus at Nathpa sub-station for catering to the power requirements of the Kinnaur Valley or evacuating the power from the Kinnaur. • Replacement and providing additional surveillance system (CCTV Camera and allied components such as OFC). <u>Civil Works</u> • Providing false ceiling in control room, LT Panel Room and Battery Charger Room of Power House. • Construction of cable	20.11.2016. • Order for supply, erection, testing & commissioning of 10 MVA, 220/22 kV, Station Transformer, additional 22 kV VCB panel and associated power & control cables placed on M/s GE T&D India Ltd., Noida on 31.01.2019.

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	3x40 MW RM&LE 2020-21	120 (LE) 90.14 30.80	trenches in Pot head yard. - Rehabilitation of Generator of Unit-1. - Replacement of Electro-Hydraulic Transducer (EHT) with handle, Main Distribution Valve (MDV) spool & sleeve assy., Pilot needle & sleeve assy., Duplex filter element only (inner & outer sleeve), Solenoid valve (Size 10) of MIV Hydro Control Panel (HCP), Pilot operating main distributing valve type for MIV HCP, NRV of PP Set, Nozzle Servomotors & Drain Pipe Lines Route of Decompression Valve & Seal Valve of MIV. - Replacement of three (3) nos. Digital governors including oil pumping unit, pressure tank & sump tank, valves & piping to form an individual pressure system for each governor complete in all respects. - Replacement of three (3) nos. Static Excitation and Digital AVR systems complete with accessories, equipment, devices, instruments, cabling and wiring etc. including all services, labour, tools and	- 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 EHT with handle, MDV spool & sleeve assy., Pilot needle & sleeve assembly, Duplex filter element only (inner & outer sleeve). Unit-I&III have been completed except replacement of Solenoid valve (Size 10) of MIV HCP, Pilot operating main distribution valve for MIV HCP and NRV of PP Set and shall be completed in lean period. - The work for re-routing of pipe for decompression valve of the three Units shall be completed by in lean period. - Static excitation panel received at site. Erection to be taken up during lean period (October-March).

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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.	- The work of dismantling & replacement of existing excitation system, Unit Control board, Electro-Hydraulic Governor, Power & Control cables and Providing Control & Monitoring (SCADA) system awarded to M/s GE Power India Ltd. on 19.07.2018. Execution of work under progress. - The tender for the purchase of two nos. forged runners has been awarded on M/s Voith Hydro Pvt. Ltd. On 04.07.2019.

C - SCHEMES ONGOING – Under Tendering

9.	Giri, 2x30 MW HPSEBL 1978 T&G - BHEL RM&LE 2020-21	60(LE) 139.80 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	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 equipments & 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 and the preparation of tender documents for execution of said scheme is under process.
----	---	--	--	---

S. No.	Scheme / Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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. 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 for completion during 2017-22

NORTHERN REGION

JAMMU & KASHMIR

(Amount in Rs. Crores)

[illegible]

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			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 equipments, spares for Generating units etc. Replacement of 2 sets of oil 110 V 200 AH NiCd Battery sets with chargers & DB. Provision of 3 sets of SCADA system including sensors and special cables Auxiliary System Procurement and Re-conditioning of Gate & Gearings, Repairing of CO2 Plants and Trash Rack. Provision of fire Protection system 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.	Change of stator winding insulation with class -F completed for Machine no. 5, 3 &1 and New 125 kVA DG set installed. Commissioning of 12 nos isolators and rewinding of 5 MVA Transformer completed. Replacement of Static excitation system completed. Procurement of spares for excitation system under progress. Retrofitting of numerical relays and protection completed. Replacement of 3 Nos. 132 kV MOCBs with SF6 Breakers completed. Refurbishment of 3 Transformers completed and 3 remaining are to be completed by Dec'19. To be tendered To be tendered Replacement of water and oil coolers, reconditioning of gates, trash racks and repair of CO₂ plant completed. Replacement of 5 nos. air coolers completed. Erection of 2 nos 6.6 kV VCB Panel completed. Procurement of major spares completed. To be tendered. Construction of trash racks and fencing of tail race completed. River channelization works, Nallah retaining works and improvement work of water conductor system completed. It was decided to construct RCC aqueduct instead of wooden flume, thus increasing the price for which contractor was reluctant to execute the works. The work stands 94% completed up to 31.08.2020, as the shutdown has been granted. The work is scheduled to be completed after one

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				month of removal of old wooden flume. Desilting of forebay completed and forebay tank lining completed. All the five nos of machines ready for generation up to optimum level subject to availability of full discharge in forebay.
12.	Ganderbal, 2x3 MW+ 2x4.5 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> <u>2020-21</u>	9 (LE) 31.57 (Revised) 11.33	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 I & II completed to provide generation during execution works of units III & IV. The works awarded to M/s Gogoal Hydro Power Pvt. Ltd. On 02.07.2015. 85% work completed. Almost all the material including main equipments like Generator, Turbine, Spiral Casing, MIV, Control & Protection Panels received. Laying of Power Cables completed. All the Control / Protection Panels installed. Battery Charger & LTAC Panels commissioned. All Civil Works like construction of new cable trench and MS Cable Trays completed. Concreting of Spiral Casing Completed. Switchyard works completed. Alignment of Expansion Joint under progress.

**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
B - SCHEMES ONGOING - Under Implementation				
13.	Mukerian HEP, 3x15 MW (Ph.-1), 3x15 MW (Ph.-2), 3x19.5 MW (St.-3) & 3x19.5 MW (Ph.-4) PSPCL 1983 (Ph.-I), 1988-89 (Ph.-II), 1989 (Ph.-III) & (Ph.-IV) T&G - BHEL R&M 2019-20 2020-21	- 136.07 47.46	1. Replacement of existing Governors of all the six Machines of MPH-1&2 with Modern Digital Technology based Governing System. 2. Replacement of existing Excitation System of all twelve Machines of MPH-1, 2, 3&4 with Static Excitation System along with Modern Digital technology based AVR. 3. Replacement of existing Electro-Magnetic Relays with Numerical Relays of all twelve Machines of MPH-1, 2, 3&4. 4. Replacement of existing conventional DPRs, O/Cs & Directional E/F Relays with Numerical relays of Two Nos. 5. Replacement of existing 3 nos. 630 KVA, 11KV/415 Volt UATs with Dry Type Transformers of similar capacity at MPH-1. 6. Replacement of existing 4 nos. 800 KVA, 11KV/415 Volt UATs at MPH-3 & 4.	1. PO dated 28.01.2019 placed on M/s Voith Hydro Pvt. Ltd. Total delivery period is 12 months. 3 no. operationally complete sets received at site Proposal for procurement of Oil for new Governor System issued. Commissioning to be carried out in forth coming lean period. 2. M/s Flovel Energy Pvt. Ltd., Faridabad has commissioned all twelve sets of Static Excitation system. 3. Work order issued to M/s Siemens on 26.02.2018. Commissioned in all units. 4. The case being prepared for approval of the competent authority. 5. Order placed on M/s ABB on 06.12.2017. Firm offered one transformer for inspection but it was rejected as sub vendors of winding and core were not approved vendors as per PO. Again, firm offered for inspection of same on 28.01.2020. 1 no. transformer after short circuit test received at site. 2 no. transformers offered by the firm for inspection on 09.10.2020. 6. Only bid from M/s Shree Abhirami, Chennai received was found technically and commercially unsuitable. Fresh Tender floated on 27.05.2020 and due on 09.10.2020

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			7. Capital overhauling along-with replacement of stator core & stator coils and strengthening of Rotor poles with class F insulation of Machine No. 2, 5, 9 & 10. 8. Replacement of existing 11 KV XLPE Aluminum cables of size 1x500 mm² with XLPE Aluminum 1x800 mm² cables from Generator Bus duct to LV side of Generator Transformers of all units at MPH-1 & 2. 9. Procurement of one no. Trash Rack Cleaning Machine at MPH-1. 10. Procurement of 2 sets of Trash Racks for intake bays of Machine No.2&3 at MPH-1 11. Replacement of existing One No. Drainage and One No. Dewatering VT Pumps with submersible Pumps at each Power House. 12. Replacement of existing one no. Unit and one no. Service	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. Delivery period is 9 months from payment of 10% advance. Proposal under preparation for machine no. 5 & 9. 8. As per desired by PSERC, case has been withheld. 9. Proposal dropped. 10. PO amounting to Rs. 34.08 Lac placed on M/s Pilot Engineering Works, Ludhiana on 03.08.2018. Material received at site and to be commissioned in lean period. 11. PO issued to M/s SK Sales for dewatering Pumps on 28.01.2019. Inspection carried out at manufacturer's works. Administrative approval for procurement of drainage pumps obtained. Tender floated on 26.02.2020 and opened on 17.08.2020. Tenders of following 3 no. bidders have been received and are under technical and commercial evaluation: i) M/s BC Technomation Pvt Ltd., Bhopal ii) M/s Hydraulic Engineering Company, Solan iii) M/s Dronkar and Brothers, Indore 12. Tender floated on 08.07.2020. and due on 22.10.2020

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			Air Compressors at each Power House. 13. Replacement of existing LT panels at MPH-1&2. 14. Replacement of 12 nos. 132 KV Line Circuit Breakers at MPH-1,2,3&4. 15. Replacement of existing 5 Nos. 11/132 KV, 20 MVA Generator Transformers at MPH-1&2. 16. Capital overhauling of one no. Generator Transformer at MPH 3 and one no. Generator Transformer at MPH-4. 17. Replacement of Two nos. of 11KV Vacuum Circuit Breakers at MPH-3 and Four Nos. 11kV VCB at MPH-4. 18. Replacement of oil and Air cooler for Machine 7,8,10 & 11 at MPH 3&4.	13. Proposal under preparation. 14. Order placed on M/s CG Power and Industrial Solutions Ltd, Gurugram on 09.10.2018. All the breakers received at site. 15. GTs commissioned by M/s Bharat Bijli Limited, New Delhi (2 at UBDC and 2 at MHP). Two bids received from M/s BBL, New Delhi and M/s T&R, Gurgaon for 3 nos. 20MVA GTs (2 nos. for MHP and 1 no. for UBDC) dropped due to high rates. Fresh TE floated on 19.05.2020 and opened on 31.08.2020. Tenders of following 3 no. bidders have been received and are under technical and commercial evaluation: i) M/s BBL, Delhi ii) M/s T&R India Ltd. Ahmedabad iii) M/s Nucon. 16. Proposal dropped. 17. 6 Nos. 11kV VCBs received from TS organization of PSPCL. 18. PO placed on M/s Lord Vishavkarma Heat Exchangers, Haridwar for air coolers & M/s Patel Heat Exchangers, Ahmedabad for oil coolers. Drawings submitted by M/s Lord Vishavkarma Heat Exchangers approved. Drawings submitted by M/s Patel Heat Exchangers approved. Material received at site.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			19. Replacement of tubular poles with rail poles of 11KV Auxiliary line. 20. Replacement of existing 3 Nos. 11/132 KV, 20/25 MVA Generator Transformers with 11/132 KV 25 MVA at MPH-3&4. 21. Providing Toilets at all the Bye-Pass gates of all Power Houses of MHP. 22. Renovation of water supply system of residential colony at Unchi Bassi MHP. 23. Treatment of expansion joint of power house building & duct portion at PH-I, Talwara.	19. Proposal dropped. 20. Order for Rs. 9.09 Cr. was placed on M/s BBL, New Delhi for supply of 3 nos. GTs on 28.03.2018. GTs commissioned at site. 21. NIT under preparation 22. Work completed. 23. Fresh NIT has been floated with due date of opening on 22.10.2020.
14.	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> <u>2021-22</u>	- 37.81 20.16	1. Renovation of water cooling bus of 4x15 MW machines. 2. Procurement of one runner for 50 MW machine and two runners for 15 MW machines. 3. Procurement of 07 Nos. 12 MVA GTs for 4x15 MW machine & 4 Nos. 19 MVA GTs for 50 MW machine. 4. Providing CCTV cameras at Shanan PH. 5. Procurement of needles and nozzles of all six machines. 6. Replacement/Retrofitting of 66, 132 KV isolators & L.E with new ones at 132 KV Sub-station . 7. Replacement of 33 KV BOCB with new 66 KV SF6 breaker at 132 KV sub-station.	1. Proposal Under preparation. 2. All runners commissioned by M/s Flovel Energy Pvt. Ltd., Faridabad. 3. All GTs commissioned by M/s BBL. 4. Tender Enquiry floated on 28.08.2019. Tender was opened and it was found unsuitable. New NIT is under process at site office. 5. Needle/Nozzles supplied. 6. Tender Enquiry floated on 16.08.2019. Dropped due to poor response. New NIT under process. 7. Foundation work has been completed. Erection work of 33 kV BOCB with new 66kV SF6 breakers at 132kV sub-station completed and commissioning under progress.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			8. Procurement of 2 nos. SAN Container DC Batteries of 400AH Capacity for the replacement of existing DC Batteries 9. Replacement of insulation of existing spare field coils of rotor of 50 MW machine with 'F' class. 10. Replacement of needle control device, deflector shafts of 4x15 MW machines. 11. Replacement of existing relay and annunciation panels in control room. 12. Clearance of silt of new reservoir. Restoration of Toe wall and grouted stone pitching on U/S of UHL weir at Brot. 13. Painting of Penstocks. 14. Procurement of 1 no fully forged Runner for 50 MW M/c. 15. Replacement of existing DC motors & rotary gear pumps with new DC motors & triple screw pumps for bearings of 4x15 M.W machines. 16. Procurement of 132, 66 & 11 KV CTs/PTs & Erection 17. Procurement of 1 no runner for 50 MW machine along with HVOF coating. 18. Procurement of 2 nos. runner for 15 MW machines along with HVOF coating. 19. Replacement of G40 governor	8. Batteries commissioned. 9. Work order has been placed on M/s BHEL. 10. Proposal is under preparation. 11. Proposal is under preparation. 12. Work of desilting has been completed. 13. Order has been issued to M/s Shalimar Paint Ltd. Parvanu (HP) for procurement of aluminum paint and material received at site. Tender for supply of labour for painting work is under process. 14. Erection under process-Delayed due to Covid-19 Pandemic. 15. TE dated 19.03.2018 was floated which has been dropped due to non-qualification of bidders. Revised TE under process at the site office. 16. Erection pending - delayed due to Covid 19 Pandemic 17. Case under preparation by site office. 18. Case under preparation by site office. 19. Case under preparation by site

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			with new OPU. 20. Replacement of old spherical valve alongwith its servomotor of 1x50 MW machine with new one.	office. 20. 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

UTTARAKHAND

(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.	Tiloth, 3x30 MW UJVN LTD. 1984 T&G – BHEL RM&LE <u>2019-20</u> <u>2021-22</u>	90(LE) 384.66 91.54	-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> Reverse Engineering works of Unit-I completed on 14.07.2017. <u>Works Under Progress</u> Design, Engineering and Manufacturing works are in progress. Unit-I handed over to M/s Andritz on 12.12.2018 for RM&LE works. It has been successfully synchronized with grid at a load of 3 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. 69.5 % work completed.
16.	Dhalipur, 3x17 MW UJVN LTD. 1965-70 T - Litostroj, Yugo. G - Rade Koncar, Yugo RM&LE <u>2020-21</u> <u>2021-22</u>	51 (LE) 152.65 35.11	-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. <u>Work Under Progress</u> Design and Engineering works are in progress. Unit-B handed over on 11.02.2019 after shutdown for RM&LE works. Dismantling and refurbishment under progress. 52 % work completed.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
B - SCHEMES ONGOING - Under Tendering				
17.	Ramganga, 3x66 MW UJVN LTD. 1976 T&G-BHEL RM&LE <u>2017-18</u> <u>2021-22</u>	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.
18.	Dhakrani, 3x11.25MW UJVN LTD. 1965-70 T - Litostroj, Yugoslavia. G - Rade Konkar, Yugoslavia RM&LE <u>2020-21</u> <u>2021-22</u>	33.75 (LE) 137.31 NIL	-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. Bid evaluation work is under progress. • Query on technical bid has been sent to bidder.

**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
I - SCHEMES ONGOING - Under Implementation				
19.	Rihand, 6x50 MW UPJVNL 1962 (U-1to5) 1966 (U-6) T&G - EE, UK RM&LE <u>2017-18</u> <u>2020-21</u>	300 (LE) 132.20 (Revised) 105.65	- Replacement of Stator Core, and Coils insulation with Class F. - Replacement of insulation of field coils with Class F - Replacement of Governors - Replacement of Excitation Equipment, 60 MVA generator transformers by 67.5 MVA Transformers, switchyard equipments, Bus bars and under water parts - New Air Cooler and Ventilation system.	Works of all six units completed by M/s BHEL (Units Commissioned on: U-1: 16.09.2016, U-2: 14.02.2018, U-3: 15.06.2015, U-4: 04.08.2014, U-5: 23.04.2011 and U-6: 31.05.2017). Over hauling of intake gate along with alignment of T-Guide and their hoisting completed in Unit- 2, 3 & 4 and is yet to be taken up in Unit-1, 5 & 6. <u>COMMON WORKS</u> <u>A. WORKS COMPLETED</u> i) Supply of Control Cable for Switchyard equipment. ii) Erection of 132kV CT & PT. iii) Supply of Silicon rubber disc insulator. iv) Supply of Power Cable v) Auxiliary equipment. vi) Supply & Commissioning of 500kVA Unit & Station T/fs (8 no.) vii) DG Set with new L.T. Breaker Panel. viii) Supply & Commissioning of L.T. Panel. ix) Breaker, stringing of copper Conductor for main & reserve bus. x) Commissioning of Draft Tube gates 3 set (6 Nos.). xi) Smoke Detection System. xii) Commissioning of 132kV Isolators for all Units. xiii) Emulsifire pipeline. <u>B. WORKS UNDER EXECUTION</u> 1. Nil. <u>C. WORKS YET TO BE TAKEN UP</u> 1. Supply of delivery pipe (2 sets) for dewatering pump. (Not required). 2. SCADA System including Auto Synchronizer & Auto Sequencer. (Implementation of SCADA has been held back for the time being as the management prioritized the upgradation of the plant in totality)

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				for availing optimum efficiency). 3. Lifts (Retendering to be taken up). 4. Supply and Commissioning of 132kV Isolators for feeders. Order for procurement has been placed.
20.	Obra, 3x33 MW UPJVNL 1970 (U-1&2), 1971 (U-3) T&G - BHEL RM&LE <u>2017-18</u> <u>2021-22</u>	99 (LE) 58.80 37.74	- Replacement of Stator coil, core & rotor pole etc. (Unit#1,2 & 3). - Replacement of rotor spider arm (Unit# 1&3). - Replacement of digital governor (Unit#1,2 & 3). - Supply of Gov. oil pump (Unit#1,2 & 3). - Supply & installation of Static Excitation System (Unit#1,2 & 3). - Supply of Gen. air coolers (Unit#1). - Rehabilitation of Intake gate of Units - Rehabilitation of stop logs, draft tube gates. - Refurbishment of draft tube gate crane. - New earthing of Switchyard - Station battery. - Replacement of 132KV Breakers. - Overhauling of 132KV Isolator (32 Set). - Supply of replacement of 132KV CT&PT. - Replacement of numeric relay panels of Units & Feeders. - Replacement of station battery - Installation of Radio Remote Control of both EOI cranes. - Smoke Fire detection system. - Supply of dewatering pumps, air compressor. - Supply & replacement of Elevator (1 No.). - Supply of 1 No. Electrostatic Liquid Cleaner (ELC) & 1 No. Low Vacuum Dehydration (LVDH) Machine. - SCADA - Other works covered in various packages approved by ETF.	<u>UNIT NO. 1</u> <u>A. WORKS COMPLETED</u> 1. Replacement of oil after overhauling of 11/132KV, 37.5 MVA GT& UAT. 2. Control & Protection of Generator, GT & UAT. 3. Rehabilitation of Intake Gate with new vane type pumps. 4. Replacement of stator core & coil. 5. Re-insulation of rotor pole coils with F class insulation. 6. Replacement of dynamic excitation with Static Excitation System. 7. Replacement of generator coolers. <u>B. WORK UNDER EXECUTION</u> 1. NIL. <u>C. WORKS YET TO BE TAKEN UP</u> 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. The machine is scheduled for works, after completion of works of Unit -2. <u>UNIT NO. 2</u> <u>A. WORKS COMPLETED</u> 1. Replacement of oil after overhauling of GT& UAT. 2. Replacement of stator winding, rotor winding, rotor pole winding, overhang support ring and stator core. 3. Control & Protection of Generator, GT & UAT. 4. Rehabilitation of Intake Gate with new vane type pumps.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				5. Replacement of Dynamic excitation with static Excitation system. 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 -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> Dismantling of machine is completed. Capital O/H of machine is under progress. 1. Replacement of stator core and stator coils. Erection work is in progress. 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

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				vanes, liner of pivot ring etc. Price bid opened on 03.10.2018. LOI issued. Repaired material received at site. Erection work is in progress. 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 CO₂ Fire extinguishing system of generator of all 3 machines (Centralized Unit) completed. B. <u>WORKS UNDER EXECUTION</u> 1. Control and protection system of 2 nos.132KV feeders. Co-ordination has been done with UPRVUNL and work shall commence after shutdown is arranged by UPRVUNL. 2. Supply of C&P panel is completed. Installation is in progress. Procurement process for remaining items is in progress. 3. Provision of station supply from Obra HEP 132 KV Bus. C. <u>WORKS YET TO BE TAKEN UP</u> 1. SCADA system. 2. Supply, Erection and Commissioning of new elevator. (Re-tendering to be taken up)

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

WESTERN REGION

MADHYA 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				
21.	Bargi, 2x45 MW MPPGCL 1988 T&G – BHEL R&M 2020-21	- 7.98 2.42	1. Supply, erection, testing and commissioning of 4 Nos. SF6 Circuit Breakers 2. Procurement, erection & commissioning of DVR for replacement of existing AVR under modernization & up-gradation of excitation system. 3. Procurement, erection & commissioning of one CT, PT and CVT 4. Procurement, erection & commissioning of C&R Panel Duplex type with Numeric Relays for GT, Generator, UAT, ICT, Station transformer & Switch Gear. 5. Supply, Installation, Testing & commissioning of 220V 300 Ah Battery-1 no. 6. Supply, erection, testing and commissioning of 1 No. 250 KVA DG Set. 7. Supply, installation, testing & commissioning of 132/33 kV 20 MVA Transformer – 1 no.	1. Completed. 2. Order placed on M/s BHEL. Material received at site and Commissioned in Unit-1 in May, 2019. In Unit-2 to be commissioned soon. 3. Procurement is under process. 4. Under administrative approval process. 5. Order has been placed. 6. Budgetary offer is awaited. 7. Proposal has been dropped.
22.	Pench, 2x80 MW MPPGCL 1986-87 T&G – BHEL R&M 2021-22	- 13.36 0.36	1. Change in insulation class of stator from Class B to Class F of Unit-2. 2. Procurement, erection, testing & commissioning of 4 Nos.	1. The complete case has been clubbed with RLA and letter for obtaining budgetary for RLA from OEM M/s BHEL has been sent and after reply of the same estimate will be prepared. 2. Completed (M/s. Electro Services, Vadodara).

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			132 kV SF6 Circuit Breakers including dismantling of existing old MOCB installed at outgoing 132 KV feeders. 3. Supply & Installation of 2 Nos. Power System stabilizer (PSS). 4. Supply of PC based Control System for 2 Nos. EHG-40 Governors. 5. Supply of 250 KVA DG Set. 6. Supply of 1 Nos. Pressure Reducer Valve. 7. Supply of 1 Nos. Governing Oil Pumps with Control Valve & Motor. 8. Supply of 1 Nos., 300AH 220V Battery Charges. 9. Supply of 24 Nos. 132kV/800 Amps Isolators. 10. Supply of 6 Nos., 800A, 415V MCB.	3. Budgetary offer is waited from BHEL Bhopal. 4. Budgetary offer is waited from BHEL Bhopal. 5. DPR Prepared. 6. DPR Prepared. 7. DPR Prepared. 8. The requirement has already been sent to CE(MM), vide T.O. 448/dated 20.04.2018. hence the case is being processed from O/o CE(MM). MPPGCL, Jabalpur. 9. DPR Prepared. 10. DPR Prepared.
23.	Bansagar Tons-I, 3x105 MW MPPGCL 1991-92 T&G – BHEL R&M 2021-22	- 14.16 3.6	1. Supply, erection, testing and commissioning of 220 kV Feeders – Carrier Protection & Auto re-closure feature and PLCC cabinets for Rewa 1&2 and Kotar 2. Supply, erection, testing and commissioning of RTU for alternate data channel to SLDC. 3. RLA of Unit No. 1,2 & 3.	1. 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. 2. Installation of RTU completed by M/s. Synergy Systems and Solutions. Ltd, Faridabad. Installation of Carrier communication equipments completed by M/s Puncom. 3. DPR prepared for Unit 1,2 & 3. Budgetary offer is awaited for Unit – 3.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			4.Replacement of existing Generator Protection & Transformer Protection Electro-Mechanical with Numerical relays, Sequence Event Recorder, Disturbance Event Recorder & Diagnostic Station 5.Procurement of 7 nos. 220kV wave trap for carrier communication & protection, auto reclosure, alternate data channel etc. 6.Supply. Testing & Commissioning of 1 No. 20MVA 220/33 kV Power Transformer and 1 No.2.5MVA 33/0.4 kV Station Transformer. 7.Procurement of 220kV CVT. 8.Supply, Erection, Testing & Commissioning of 1 No. 500kVA DG set. 9. Supply, Erection, Testing & Commissioning of 220 V, 300 AH Battery and charger.	4. Order has been placed on M/s. Scope T&M Pvt. Ltd, Mumbai in January, 2018.Material received at site on 10.10.2018. Commissioned in all units, station transformer ICT and Bus coupler in June, 2019. 5. 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. Installation completed. 6. Order cancelled. NIT is to be re-issued. 7. Order placed on M/s. Siemens. CVT of feeders have been replaced. Replaced in 220 kV Main Bus I. Shall be installed in Main Bus II in the month of Nov. 2020. 8. Order placed on 26.03.2020. Drawing approval has been given. 9. Order for one battery set has been placed. Proposal submitted for administrative approval & technical sanction for other battery set.

**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 ONGOING - Under Implementation				
24.	Ukai, (U- 1, 2& 4), 4x75 MW GSECL 1974-76 T&G – BHEL R&M 2021-22	- 7.3 4.48	Replacement, erection, commissioning & testing of New Microprocessor based Digital Governing System with existing Governing System in Unit No. 1,2&4.	Orders placed to BHEL, Vadodara. Erection work of Unit-4 completed in June'2018. Erection work of Unit-2 completed in July, 2018. M/s BHEL experts visited from 10.12.2018 to 22.12.2018 for commissioning & testing of both Units. But commissioning was not successful and after that they left due to non-availability of irrigation schedule. On 24.12.2018, Units 2 & 4 started & synchronized. During start-stop, various observations/ defects i.e. load hunting issue, speed control etc. came to notice and the same has been conveyed to BHEL on 29.12.2018. BHEL attended all issues on 03.05.2019 and works of Unit-2&4 completed. R&M work of Unit No. 1 is planned from last week of November, 2020 as at present rain water inflow is given by irrigation department and all the hydro machines are running.

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				
26.	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 <u>2018-19</u> <u>2020-21</u>	- 22.17 14.34	1. Replacing existing AVR's with latest DVRs alongwith thyristor modules for 7 units at NSPH. 2. Replacement of all L.T. Breakers of all units and SABs of NSPH. 3. Retrofitting of Numerical Relays of Generator Protection Schemes of Units 2 to 8. 4. Overhauling of EOT Cranes and Gantry cranes at NSPH. 5. Procurement of control cables of different sizes for units 1 to 8, common auxiliaries, Switchyard equipments and switchyard marshalling boxes and laying of Power Cables and Control Cables for Penstock Inlet Gates from main control room for NSPH. 6. Procurement of 245 KV Section Breaker for BUS-A, BUS-B at NSPH switchyard, Bus Coupler at 220 KVRs and the related Isolators and accessories, erection, repositioning of PTs etc. at NSPH Switchyard. 7. Servicing and reconditioning/ procurement of new Isolators required for motoring mode operation for 89G, 89M, 189S1 and 189S2 for units-1 to 8. 8. Procurement of 245 KV SF6 Circuit Breakers.	1. Completed (BHEL) 2. Completed (ABB Ltd.) 3. Completed (ABB Ltd.) 4. Completed (WMI) 5. Necessary defective cables identified and replaced with new cables 6. Not feasible for Nagarjuna Sagar Power House Switch Yard due to space constraint. 7. Completed (GR Power Switchgear) 8. Completed (CGI, Alstom and Siemens)

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			9. Overhaul of stop log gates, penstock gates and seals replacement for draft tube gates for all units of NSPH including trash rack at tail race. 10. Replacement of switchyard equipment that have completed 25 years of service of 220 KV CVTs (10 Nos.), 132 KV CVTs (17 Nos.), 220 KV PTs (5 Nos.), 132 KV PTs (8 Nos.), 220 KV LAs (13 Nos.) and 132 KV LAS (13 Nos.) for NSHES. 11. Procurement of 220 KV CTs (18 Nos.) for units (silicon rubber composite type).	9. i) Overhauling of stoplog gates: Out of 18 elements reconditioning of one element completed and for remaining 17 elements yet to be taken up. ii) Penstock gates seals replacement will be taken up after overhauling of stoplog gates is completed. iii) Trash rack rectification works at tail race and reservoir side completed. iv) Draft gates seals replacement completed for 8 Nos. gates whereas for other 2 Nos., the seals material was not received due to covid 19 lockdown. 10. Completed (LA's: Lamco & PT's: Toshiba) 11. Completed (Siemens)

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
27.	Nagarjuna Sagar Left Canal Power House (NSLCPH), 2 x 30.6 MW TSGENCO 1992 T-Boving, UK G-General Electric, UK R&M <u>2018-19</u> 2020-21	- 30.99 2.00	1.Replacing existing AVR's with latest DVRs along with thyristor modules for 2 units. 2.Capital overhauls on generator and turbine and its auxiliaries including spares and consumables for all 2 units. 3.Overhauling of EOT Cranes and gantry cranes. 4.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.	1. Yet to be processed. It is proposed to postpone the work of replacing existing AVR's with latest DVRs along with thyristor modules for Unit-2 in to the R&M (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). 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. Approval for estimate sanction is under process.

**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				
28.	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. - Unit-2 commissioned and synchronized on 18.02.2016. - Unit-1&2 taken in to service on 30.01.2019 and 31.01.2019 respectively as per KNNL requirement. - Units 1&2 are under shutdown as per the requirement of Karnataka Niravari Nigama Ltd (KNNL). The units will be taken in to service depending on water availability. Unit-2 synchronised on 10.08.2019 and Unit-1 will be taken in to service after completion of penstock liner works from civil department. R&M works completed and both units commissioned.
B - SCHEMES ONGOING - Under Implementation				
29.	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.	Contract agreement was signed with M/s ABB India Ltd. on 04.05.2018. PO placed on M/s ABB India Ltd., on 26.03.2018 for Rs. 4.87 crore. Supply of DCS Panels, Control, Metering & Protection Panels, Cables, ACDB DCDB is completed. Manufacturing clearance accorded for all field instruments. The firm is

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 2018-19 2020-21		2nos. 11kV Tee-off cubical of Units 1&2 and 11kV Gescom UAT switchgear cubicle.	addressed to take up erection work at site. WO Placed on L1 bidder M/s Amar Raja power systems Ltd., Tirupati at a total cost of Rs. 7119395.00. Drawings approved.
30.	Nagjhari, U-1 to 3, 3x150 MW KPCL 1979 (U-1), 1980 (U-2), 1981 (U-3) T&G - BHEL RM&LE 2021-22	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. Networking of equipments with control room PC is pending. Work will be taken as per DPR after completion of R&M works of Unit-1, 2& 3.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			winding, stator core & frame assembly, tightening of wages, rotor pole assembly, break pad assembly, replacement of UAP, ACDB and CAP. • 220kV Switchyard - Replacement of breakers, protective painting of switch yard structures. • Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented. • Excitation system - Replacement of excitation system, digital voltage regulator.	(UAP-3 Nos, ACDB-5 Nos. and CAP-1 No.) replacement prepared. Head Office approval received for inviting tender in eproc portal of GoK.E-tender floated on 06.09.2019. Estimated cost is Rs. 300 lakhs. Cover-1 opened on 24.12.2019. Single bid received. Tender refloated on 21.03.2020. Techno-commercial bid opened on 20.06.2020. Financial Opinion received for placing WO on L1 bidder. Financial bid for procurement of breaker opened. Waiting for NLDC PSDF approval to place PO on M/s ABB. Preparation of Estimate and technical specification to avail administrative approval to issue NIT is in progress. Contract agreement signed with M/s ABB India Ltd. on 27.06.2018. Erection & commissioning of panels of all units and PSS tuning completed.
33.	Kodasalli Dam Power House, (3x40MW) KPCL 1998-1999 T&G - BHEL RM&LE 2021-22	120 (LE) 50.60 1.47	• 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	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. <u>LTAC Panels: UAP, ACDB and CAP:</u> Estimate & Technical Specification is being prepared, E-Tender floated in E-Portal of GoK in 19.10.2019. Estimated cost is Rs. 294 Lakhs. Single

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			and CAP. • 220kV Switchyard - Replacement of breakers, protective painting of switch yard structures. • Relays and control panels - replacement of numerical relays of control panels, GT panel, auto synchronous panel. • SCADA - New SCADA System is to be implemented. • Excitation system - Replacement of excitation system, digital voltage regulator.	bid received in call-1. Tender refloated on 12.03.2020. Techno-commercial bid opened on 20.06.2020. Financial Opinion received for placing WO on L1 bidder. Financial bid for procurement of breaker opened and FO obtained. TC/ TAC minutes obtained. Waiting for NLDC PSDF approval to place PO on M/s ABB Preparation of estimate & Technical specification to avail administrative approval to issue NIT is under progress. Contract agreement signed with M/s ABB India Ltd. on 18.05.2018. Erection & Commissioning of panels of all units completed except PSS tuning in Unit#3.
34.	Linganamakki Dam Power House (LDPH), (2x27.5MW) KPCL 1979-1980 T – Electrosilla, USSR G - Electrosilla, Energomach-USSR RM&LE 2021-22	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. Contract Agreement signed with M/s ABB Limited for Rs. 2,45,97,408/- on 23.01.2018. Supply of Plant SCADA, DCS for Unit & common auxiliaries,

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				Network & metering panel, Line & Bus coupler C&R Panel, ACDB & DCDB, UPS System, Modular desk, Cables, GPS, LVS, energy meter & EMS etc., completed. Erection & commissioning of panels for Bus coupler & line (4 nos. and U#2) is completed. Unit-1 could not be taken up due to COVID-19. Unit-1 work will be planned based on availability of Unit clearance.
35.	Gerusoppa Dam Power House (Sharavathy Tail Race), (4x60MW) KPCL 2001-2002 T&G - BHEL RM&LE 2021-22	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 equipments. SCADA. Dismantling & buy back of existing Static excitation system, Supply, erection, testing and commissioning of Digital static excitation system.	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. 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 is in progress. Contract agreement signed with M/s ABB India Ltd. on 27.06.2018. Erection and commissioning of panels including PSS tuning is completed for all units.
D - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval				
36.	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	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	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.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	2021-22		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 CO₂ gas system (Clean gas based) for generators, replacement of relays with numerical relays etc. 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. Handover of site for erection works of phase-2 after monsoon period, i.e., from 1st October 2020. In the first phase replacement of 1st stage 4x16.5MVA GTs taken up. Contract agreement signed with M/s Toshiba on 22.11.2018 and supply to be completed by August, 2019. All GT's reached temporary storage area near trolley house of MGHE. Erection and Commissioning of GT-1 & GT-3 completed.
37.	Supa Dam Power House, (2x50MW) KPCL 1985 T&G - BHEL RM&LE	100 (LE) 47.91 1.52	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	KERC accorded approval. Consent of all State distribution companies have been obtained. 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
	2021-22		& Rotor. • UAP & CAP • 110kV Switchyard, Replacement of breakers, Station 11 kV UAT switch gear panels. • 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. • Auxiliary & Colony Power Supply- Providing auxiliary supply for power house and extending power supply to Ganeshgudi colony from Supa Power House. 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.	Order placed on M/s Balaji Electro Controls Pvt. Ltd. on 19.05.2018. Erection & commissioning of all UAP's and CAP's completed. Networking of equipment's with PC at control room is pending. Work is under progress. Work will be taken up in phased manner. 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. Laying of Power & Control cable is under progress. Civil works are under progress.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
38.	Sharavathy Generating Station, (10x103.5MW) KPCL 1964-77 T- U:1-8 - Neyrpic, France, U:9-10- BHEL, G- U:1&2-Hitachi, Japan, U:3to8 –GE Co, USA, U:9&10- BHEL, RM&LE 2021-22	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. Generator and associated components: General checking and replacement of air coolers/ tubes. R&M of SEE. Other works: Up-rating/ redesign of NGT to suit up-rated capacity. Providing 2x115 MVA transformer for Unit-9 & 10. Hydro-mechanical Works: Overhauling of tunnel Stop log gates, Gates and gantry crane of surge shaft, R&M of BF valves, Civil structure (rails) for movement of gantry crane, cleaning and painting of internal and exterior surfaces of all penstocks, etc. Civil Works: Under water scanning, plugging, Drilling, grouting to Talakalale Dam, Improvements and Asphaltting to roads, etc.	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. GT of Unit-10 commissioned on 28.02.2018 and GT of Unit-9 commissioned on 30.03.2018.

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 ONGOING - Under Implementation				
39.	Sholayar, 3x18 MW KSEB 1966-68 T-Litostroj, Yugoslavia G-Rade Koncar, Yugoslavia RM&LE <u>2017-18</u> 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: Order placed on M/s FEPL-FUYUAN on 06.07.2015. Model test of the turbine conducted. Governor system remote control panels erected in control room. 11kV control room completed. Boxing up of Generator completed. Generator & Turbine alignment done. SCADA panels erected. Thrust Upper Guide Bearing (UGB)&Lower Guide Bearing (LGB) setting completed. Field Acceptance test of Control & Relay panel completed. Inspection of one Generator done. Drainage and dewatering system of all machine completed. MIV & Guide Vanes stroking checked. Pre commissioning of Governing system done. Panel loop testing completed. Compressor Airline work completed. Relay testing before mechanical spinning completed. Mechanical spinning done and Balancing completed. Trial run of Unit-3 completed on 16.03.2019 & in service and taken over on 18.09.2019. Unit-2 handed over to Contractor for R&M works on 01.04.2019. Trial run of Unit-2 completed on 29.12.2019 and taken over on 19.01.2020. Unit-1 handed over to Contractor for R&M works on 20.01.2020. Trial run of Unit-1 completed on 19.09.2020. Unit 2 and Unit 3 commissioned after renovation. Unit 1 renovation under progress. Overall Progress – 95% MIV: Erection completed.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				Renovation of Penstock: Penstock and allied works awarded to M/s PES Engineering Pvt. Ltd., Hyderabad on 31.03.2017. Penstock works completed for Unit-3 on 21.12.2018, Unit-2 on 24.10.2019 and Unit-1 on 26.08.2020.
40.	Idukki 1st Stage, 3x130 MW KSEB 1975-76 T - Neyrpic, France G - GE, Canada R&M <u>2018-19</u> 2020-21	- 89.9 44.14	Refurbishing the Main Inlet Valves. Modernizing the auxiliary systems, replacement of Governing Systems & Excitation Systems with new one. Introduction of SCADA control.	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. Control room equipment such as GPS Clock server, engineering stations, large screen display erection and commissioning works completed. Erection of 11kV bus duct completed. Protection panel replacement of LP II completed. Replacement of P7 & P15 panels completed. MCC-A section replacement work completed. Bus bar protection panel, MCC-B section replacement and SCADA integration works are under progress. Unit-3 Handed over to M/s GE Power on 17.06.2017. Mechanical spinning over. Unit-3 commissioned on 16.03.2019. Unit-2 Dismantling completed. Positioning of all the panels completed. Erection of Rotor Poles completed. Governor OPU piping work completed. Stator Cleaning work completed. Generator and Generator Transformer Cooling water testing completed. Inspection of Vibration Panel, Control Panel and Excitation Panel have completed. Unit-2 was commissioned on 20.01.2020. Due to failure of excitation transformer, the machine was again shutdown from 20.01.2020. Work likely to be

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				completed by October, 2020.
				Unit-1 Dismantling completed. Positioning of all the panels completed. Installation of OPU sump tank completed. OPU erection & piping work completed. Pre-commissioning testing of Exciter system completed. Rotor Poles dismantled and inspection of 8 nos. of refurbished rotor poles at sub vendor's works completed. Erection of rotor poles completed. Governor auto test, electrical over speed, SCADA sequence test completed. Machine spinning conducted and reached upto 150 RPM. 1 hour test run completed and found all parameters within limits. MIV opening/ closing time adjustment completed. Insulation test of generator/ bus bar/ transformer completed. 11 kV breaker additional tripping wiring for OC/SC test wiring completed. 220 kV switchyard shorting with Kundah conductor for SC test completed. Protection panel replacement work completed. The unit was synchronized on 14.07.2020 Supply of hollow shaft cooling water pump motor by M/s GEPIL is pending. 220 kV switchyard work is pending. The manufacturing of MIV completed by M/s HBHC, China. Unit –I MIV installation completed.
			Procurement of one no. MIV	
			Installation of new D.G. Set.	Completed (M/s GE Power).
			Renovation work of fire fighting system of Generator and Generator Transformers of 1 st and 2 nd stage.	

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
41.	Kuttiyadi, 3x25 MW KSEB 1972 T&G-Fuji, Japan RMU&LE 2021-22	75 (LE)+ 7.5 (U) 377.41 -	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 minimum generation loss. Verifications of drawings for new platform static excitation equipment's are in

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				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. Drawing and vendor approval is in progress.

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				
42.	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. <u>Works Completed</u> Reverse Engineering works of Machine-2 completed. The machine was synchronized after Reverse Engineering and achieved 33 MW of load on 01.04.16 with satisfactory performance. The works of Unit-I completed and commercial operation commenced on 29.10.2018. Unit-II handed over to M/s. AHPL on 12.11.2018 and works completed. Unit-II 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

JHARKHAND

(Amount in Rs. Crores)

[illegible]

**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 ONGOING –Under Implementation				
44.	Hirakud-I HEP Burla (U5&6), 2x37.5 MW OHPC Ltd. 1962-63 T&G.o - Hitachi, Japan RMU & LE <u>2017-18</u> <u>2021-22</u>	75 (LE)+ 12.2 (U) 158.77 96.10	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. <u>Completed works (Unit 6):</u> - 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 <u>Works under progress (Unit 6):</u> - Facing plate installation and preparatory works for Turbine pre-erection. <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.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
				- Stator Building. <u>Works under progress (Unit 5):</u> - Refurbishment of spiral case, barrel and discharge ring. - Cable tray installation. - Piping work of Cooling water system and compressed air system. - Unit control room works. - Rotor building works The site activities have been affected due to impact of Covid-19.
45.	Hirakud-II (U-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> <u>2020-21</u>	24(LE) 65.67 46.51	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 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. 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. <u>Works under progress:</u> Commissioning of fire fighting system and architecture works of Power House. Performance guarantee test of the unit will be conducted after rectification of defects. The progress of work is being affected due to impact of Covid-19.
46.	Balimela, 6x60 MW OHPC 1973-77 T-LMZ, USSR	360(LE) 382.91 68.27	Replacement of i) The Turbine & Generator with new ones except the water conductor system. ii) The auxiliaries of the Units	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.

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	G- Electrosila, USSR RM&LE 2019-20 2021-22		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.	Works Completed: - Dismantling of Unit-1&2 completed. - Refurbishment work of spiral casing, stay ring and stay vanes of Unit 1&2. - Refurbishment of Draft Tube gate of Unit 1& 2. - Guide Apparatus assembly of Unit-1& 2. - Generator Rotor Building of Unit-2 - Generator Stator Assembly of Unit 2. - Refurbishment work of Safety Relief Valve - Turbine Runner & Shaft Assembly, Installation of Guide Apparatus, Servomotors and TGB Housing, Assembly and Positioning of SRV of both unit 1&2 completed. - Installation of generator lower bracket and brake jacks. Lowering of stator & rotor of Unit-2 completed. Concreting of all foundations towers equipment and station transformer at 220kV extension bay switchyard. Works under progress: - Refurbishment work of Main Inlet Valve MIV and Butterfly Valve (BFV) of Unit 1&2. - Installation/trial assembly of pivot ring (bottom ring) of Unit 1&2. - Refurbishment of penstocks of Unit-1&2. - Civil work of 220kV Extension bay of Switch yard. - Generator Rotor Building of Unit-1. - Generator Stator Assembly of Unit1. - Installation IDV/PRV of Unit-2 under progress Installation of SRV Control panel of Unit-1 under Progress. - Installation of 11kV bus duct and GT of Unit 1&2 is in progress. - Installation of Cooling water system. D&D system. - Elevation setting and alignment work (cranking/ balancing) of Unit-2. The progress of work is being affected due to impact of Covid-19.

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

NORTH EASTERN REGION

MEGHALAYA

(Amount in Rs. Crores)

S. No.	Scheme/ Category/ Completion Schedule (Original/ Anticipated)	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
C – SCHEMES ONGOING – Under Tendering				
47.	Umiam Stage-III, (Kyredemkulai) 2x30 MW MePGCL 1979 T&G - BHEL RMU & LE 2021-22	60(LE) +6(U) 408 -	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. 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 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 and the report was sent to the JICA India office on 08.04.2019 for their concurrence.

				Tendering for engagement of Consultancy is in progress. The Final Price evaluation has been completed. The contract for services was awarded to M/s Integral S.A/ Columbia in joint venture with Rodic Consultant Pvt. Ltd. A signed contract agreement was sent to JICA for review and concurrence as per guidelines. Approval is awaited.
			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. - 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.	

**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

HIMACHAL PRADESH

(Amount in Rs. Crores)

S. No.	Scheme / Category/ Completion Schedule	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
SCHEMES ONGOING – Under Implementation				
1.	Pong Power House, BBMB 6x66 MW 1977-83 T&G-BHEL RM&LE 2022-23	396 (LE) 142.25 -	Unit-2 Replacement of complete wound Stator issued to M/s. BHEL on dated 07.09.2018 and unit handed over to M/s. BHEL on dated 14.02.2019. Scope :- – Complete stator – Cooling pipes and coolers – Temp. recorder – New HS lub. system 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. Upgradation of existing Generator Protection with Latest Numerical IEC 61850 protocol compliant Generator protection for Unit No. 1, 2, 4, 5 & 6.	Work completed Replacement of Stator of Unit-3 completed and 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. Work completed in April, 2020. 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. BHEL proposal for uprating examined and asked to give detailed technical offer. Unit Transformers (6nos.) of 67 MVA each replaced by 75 MVA in July, 2016. (Unit-2&5: M/s. Alstom, Unit-1&4: Ms/ BHEL and Unit-3&6: Ms/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. Material received at site. Erection, Testing & Commissioning is in progress.

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				
2.	Ranjit Sagar Dam, 4x150 MW PSPCL 2000 T&G – BHEL R&M 2022-23	- 82.16 0.93	1. Installation and commissioning of Digital Electro Hydraulic Governor capable of Restricted Governing Operation Mode (RGM). Procurement of 2 no. high pressure compressors. 2. Replacement of existing old Auto Sequencers & AVR with Unit Control System compatible with SCADA. 3. Replacement of 220 KV Circuit Breakers of 7 nos. feeders. 4. R&M of emulsifier system of Generator Transformer and CO₂ system. 5. Capital maintenance of Unit no 2. 6. Installation & Commissioning of 8 Nos Microprocessor based scroll type compressor Water cooled Chilling Machine-AC Plants. 7. Providing additional portable dewatering pump set. 8. Capital Maintenance of Unit no 3. 9. Up-gradation of HP compressors of condenser mode operation.	1. PO placed on M/s BHEL on 04.12.2018. Material received at site. Partial material supplied by BHEL Bhopal. The combined inspection report of received material was carried out on 12.06.2020 and units are available for handover to M/S BHEL one by one starting by the month of October. 2. Case is under consideration of techno-economic appraisal committee for recommendation for administrative approval. 3. Case under preparation. 4. Case under preparation. 5. Case under preparation. 6. Tender dropped due to poor response from the firms. The possibility of reuse of spare AC Plant of GNDTP Bathinda is being explored. 7. Due date of Tender Enquiry extended upto 18.12.2019 due to poor response. No bids received. Retendering under process. 8. Rescheduled for 2023-25. 9. Administrative approval of Rs. 18.83 Lakhs accorded on 24.12.2018 for procurement of 6 nos. Bare Head Compressors without motors for HP Compressors air system for synchronous condenser mode. Tender dated 30.05.2019

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			10. Replacement of drainage pumps of unit bay and service bay side-2 nos. each. 11. Capital Maintenance of Unit-1. (Replacement of runner disc to be carried out) 12. Replacement of flow meters. 13. Replacement of defective fire alarm panel other accessories (work being executed by site). 14. Construction of Porches over	dropped. New T.E dated 08.07.2020 has been issued. The due date of opening of T.E has been extended to 22.10.2020. 10. WTDs in its meeting dated 31.7.19 accorded administrative approval to the tune of Rs 39.24 Lakhs, Tender dated 11.02.2020 floated and opened on 17.08.2020. following 4 no. firms have participated in T.E:- i). M/S Hydraulic Engineering Company, Solan. ii) M/S Rockwell Pumps & Motors Pvt. Ltd Ghaziabad. iii)M/S B C Technomation Pvt. Ltd Bhopal iv) M/S Dronkar & Brothers Indore. Technical evaluation is under process. 11. PO placed on M/s BHEL on 30.07.2019 for runner disc replacement. Work is under process. 12. Bids received from following firms are under evaluation: - i) M/s BHEL, ii) M/s Interface Devices, Chandigarh and iii)M/s Brainchild Projects, Faridabad. The requisite documents submitted by the firms were not in line with NIT. Fresh Tender enquiry will be floated with revised specifications and T&C. 13. Bids received from following firms are under evaluation: - i) Modern Agencies, Chandigarh ii) Fire Envo Safety Engineers, Chandigarh iii) Ceasefire Ludhiana. PO issued to M/s Modern Agencies, Chandigarh in 07.02.2019. Work completed. 14. Case under preparation.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			all entry points of Power House Building. 15. Providing Detachable scaffolding set for Power Plant Maintenance. 16. Condenser mode of operation of 4 no. units 17. Repair of Single phase 13.8 KV/220/$\sqrt{3}$ KV, 62.5 MVA, Generator Transformer make NGEF, S No. 6800000152, YOM-1996 of unit no.2 (W-phase) damaged at RSD HEP Shahpurkandi. 18. Procurement of 11/0.415kV, 1250kVA, Dry type Station Service Transformers.	15. Case under preparation. 16. 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 may be 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. 17. Repaired and yet to be commissioned. 18. Part-I & Part-II of the single bid submitted by BHEL opened on 18.12.2018. Officer has been deputed to carry out Work appraisal of BHEL Jhansi manufacturing unit. 1. Part-III (Price-Bid) opened on 30.05.2019. Quoted rate found to be very high so case dropped.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			19. Replacement of valves of Power House. 20. Design, Manufacturing, Testing, Supply, Delivery & Commissioning under firm's supervision for 2 nos. Tubular Battery Banks of 220 V, 2000 AH in SAN Containers. 21. Procurement and commissioning of numerical Distance Protection Relays (16 nos.). 22. Procurement of 4 nos Magnetic Float Level Indicators with switching contacts. 23. Modernization and Renovation of RSD Elevator/ lift. 24. Replacement of existing old Auto Sequencers & AVR with Unit control system compatible to SCADA application	Fresh Tender Enquiry floated on 11.10.2019 was opened on 10.06.2020. 2 nos. bids from following firms have been received: i) M/s BHEL ii) M/s Ames Impex Gujrat. Part-II of the T.E was opened on dated 18.06.2020 and technical evaluation is under process. 19. Tender Enquiry with due date of opening 16.04.2019 extended up to 24.07.2019. Tender Enquiry dropped as Bids received without EMD. Fresh Tender Enquiry floated with date of opening 07.11.2019. Tender opened on 24.12.2019. 3 no. of firms participated in tender. i) M/s SK Sales Jalandhar ii) M/s Leader Valves Jalandhar iii) M/s Industrial Agencies T.E has been dropped on 31.08.2020 20. Batteries commissioned successfully by M/s Exide Ltd, Delhi at Rs. 78.321 Lacs. 21. Work completed by M/s. GE T&D India Ltd. 22. Order placed on BHEL on 21.06.2019 on Single Tender basis. Material has been received at site. Erection & Commissioning is pending. 23. Work completed by M/s Kone at Rs. 20 Lakhs. 24. Case for administrative approval under process.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			25. Overhauling of 3 nos. GTs out of 12 nos. 26. Overhauling of semi gentry crane and EOT Crane. 27. Design, manufacturing, testing supply, supervision of erection & commissioning of 1 no. 62.5MVA, 13.8/220/3 kV single phase GT.	25. The work to be executed departmentally from grid. Construction Division, Amritsar. Agenda will be put up in next meeting for administrative approval. 26. Rescheduled to 2020-23. 27. Open E-Tender dated 21.11.2019 was floated. The due date of opening of Tender Enquiry has been extended upto 28.07.2020. Single bid of M/S BHEL has been opened on 17.08.2020.
3.	UBDC St.I & St II HEP, 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	- 23.55 1.6	1. Replacement of existing Electro-Mechanical Excitation/AVR system with Digital Static Excitation System of UBDC Stage II Power House. 2. 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. Spare Generator Transformer 20 MVA 11/132 KV. 4. Capital overhauling of UBDC Power House No.3 Stage I. 5. Replacement of Electro	1. PO issued to M/s ABB on 29.01.2019. Material received and commissioned at site. 2. PO dated 25.09.2019 amounting to Rs 2.17 Cr. placed on M/s GE T&D India Ltd. Delivery period is within 6 months from the date of issue of PO. Inspection carried out online and dispatch instructions issued on 30.09.2020. 3. 2 nos. bids received from M/s BBL, New.Delhi and M/s T&R, Gurgaon for 3 nos. 20MVA GTs (2 nos. for MHP and 1 no. for UBDC) dropped due to high rates, Fresh Tender dated 19.05.2020 floated and opened on 31.08.2020. Tenders of following 3 no. bidders have been received and are under technical and commercial evaluation: i) M/s BBL, Delhi ii) M/s T&R India Ltd. Ahmedabad iii) M/s Nucon 4. Changed to RMU and will be initiated after RMU study in 2nd plan 2020-23. 5. PO dated 10.07.2019 amounting

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			Hydraulic Governors with microprocessor based digital governor of UBDC Stage II Power Houses. 6. R&M of dewatering and drainage system of UBDC Stage II Power Houses. 7. 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. R & M of C&R panels of 132 KV O/G feeders at UBDC Power House No.3 Stage I. 9. Replacement of Governor Pumps of UBDC Stage I Power Houses. 10. Replacement of 6 no. 11Kv/415v 300kva oil type transformers to dry type transformer for Stage-I UBDC Power Houses.	to Rs 2.02 Cr. placed on M/s ABB. Delivery period is within 8 months from the date of issue of PO. Material received at site and commissioning will be done in forthcoming lean period. 6. Tender Enquiry dropped on 25.09.2019 due to necessity of change in technical specification. Fresh Tender dated 26.02.2020 floated and opened on 17.08.2020. Tenders of following 3 no. bidders have been received and are under technical and commercial evaluation: i) M/s BC Technomation Pvt Ltd., Bhopal ii) M/s Hydraulic Engineering Company, Solan iii) M/s Dronkar and Brothers, Indore 7. Proposal to be processed in 2020-23. 8. Proposal to be processed in 2020-23. 9. Case under preparation. 10. Tender Enquiry dated 09.10.2019 opened on 18.06.2020. 2nos. bids from following firms have been received: i) M/s BHEL ii) M/s Ames Impex Gujarat. Tender under technical and commercial evaluation.
4.	Anandpur Sahib Hydel Project – I&II, 4x33.5 MW PSPCL	- 31.65 0.85	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. For remaining 2 battery banks, Techno-

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
	1985-86 T&G – BHEL R&M 2022-23		2. 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. 3. Procurement of 50 nos. Stator Air Coolers. 4. Design, Manufacturing, Testing, Supply, Erection & Commissioning of control system SCADA, Microprocessor based Digital Excitation, Digital Governing System, Digital Numeric Relays	Economic Appraisal Committee/ hydel Projects decided to process the case under revenue head. Case sent to the o/o Company Secretary for administrative approval. 2. Administrative approval accorded on 27.11.2018. Tender Enquiry dated 11.10.2019 floated and Part-I opened on 10.06.2020. Two no. firms have participated in the Tender Enquiry: - i) M/s BHEL ii) M/s M/s Ames Impex Gujarat. Part-II of the Tender Enquiry has been opened on 18.06.2020. Technical Evaluation is under process. 3. LoI issued to M/s S.K Sales Company, Jalandhar for 4 nos. and M/s Hari Om Enterprises, Haridwar for 16 nos, on 07.01.2018. 20 no. stator air coolers have been received, installed and commissioned at site. Tender Enquiry dated 26.02.2020 was opened on dated 30.06.2020. 5 no. firms have participated in Tender Enquiry:- i) M/s Hari Om Enterprises Hardwar. ii) M/s Kelvion India Pvt. Ltd. iii) M/s Lord Vishwakarma Heat Exchangers Pvt. Ltd. Hardwar. iv) M/s S.K. Sales Company Jalandhar. v) M/s Laxmi Engineering Industries Bhopal Pvt. Ltd. and Technical Evaluation is under process and price bid will be opened shortly. 4. Team of OEM i.e. M/s BHEL visited the site for study of site and explore the possibility of uprating of unit capacity, BHEL has submitted its offer on 15.10.2019. The discussions with BHEL team

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			for Ganguwal & Nakkian P.H at ASHP.	had been held on 22.10.2019 & 24.12.2019. BHEL has been asked to submit the revised offer. Case for administrative approval shall be initiated accordingly.
			5. Renovation and Modernization (R&M) of BHEL make Generating units of 33.5 MW at ASHP.	5. 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 same is being studied. Case for Administrative approval shall be initiated accordingly.
			6. Replacement of existing 4 no. compressor (2 No. at each Power House) with new unit compressors.	6. Case under preparation by site office and The possibility of reuse of spare unit compressor of GNDTP Bathinda is being explored.
			7. Renovation and modernization of emulsifier system of Generator Transformer of Ganguwal & Nakkian of ASHP.	7. Case under preparation
			8. Renovation and modernization of Existing LT Scheme/panels for Ganguwal & Nakkian of ASHP.	8. Case under preparation
			9. 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.	9. DPRs installed by procuring from PSTCL. Case for administrative approval of DPRs & O/C & Directional E/F is under Process.
			10. Replacement of OPU (Oil Pressure Unit) for 4x 33.5 MW machines of ASHP.	10. Case is under preparation.
			11. Replacement of existing 4 nos. Service Compressor (2 nos. at each Power House no. I&II) with new Service Compressors.	11. Case is under preparation.
			12. Procurement of T&P articles for Ganguwal and Nakkian	12. Deleted.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW) / Estimated Cost/ Expenditure	Scope of work	Present Status
			Power House. 13. Capital overhauling of Electric Overhead Traveling (EOT) crane at PH-1&2 of ASHP. 14. Replacement of existing 24 thrust bearing oil coolers along with accessories of Ganguwal & Nakkain Power House. 15. Procurement of Two Centrifugal Turbine Oil Filtration/Dehydration sets (one for each power house i.e. (Ganguwal & Nakkian). 16. Procurement of Two Transformer oil filtration sets (one for each power house i.e., Ganguwal & Nakkian) of 3000 ltr/hr capacity. 17. Provision of one 200 kVA capacity Diesel Generator (DG) set (Silent type) for Ganguwal Power House Including Room. 18. Renewal & Replacement (R&R) of two 220V DC battery charger/set for Ganguwal& Nakkian power Houses.	13. Case under preparation by site office. 14. Case under preparation by site office. 15. Case under preparation by site office. 16. Case under preparation by site office. 17. Case under preparation by site office. 18. Case under preparation by site office.

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 Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
SCHEMES ONGOING - Under DPR Preparation/Finalisation/Approval				
5.	Lower Jehlum HEP, 3x35 MW J&KSPDC 1978-1979 T&G – BHEL RMU&LE 2022-27	105(LE) + 27(U) - NIL	Detailed scope of work will be arrived after Preparation of DPR.	DPR to be prepared in due course.
6.	USHP – II Kangan, 3x35 MW J&KSPDC 2000-2002 T&G – BHEL RM&LE 2022-27	105(LE) - NIL	Detailed scope of work will be arrived after Preparation of DPR.	

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				
7.	Chilla (Ph-B), 4x36 MW UJVN LTD. 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. -Upgrading 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 works has been started from 01.02.2020 & completed.
B- SCHEMES ONGOING - Under DPR Preparation/Finalisation/Approval				
8.	Kulhal, 3x10 MW UJVN LTD. 1975 T&G - BHEL RM&LE 2023-24	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	• LoI issued to M/s Gogoal-Emico (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

			numerical type protection system. -Civil works of barrage, power channel, power station & Tail race channel	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
--	--	--	---	--

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
SCHEMES ONGOING - Under DPR Preparation/Finalisation/Approval				
9.	Chibro, 4x60 MW UJVN LTD. 1975 (U-1 to 3) 1976 (U-4) T&G – BHEL RM&LE 2025-26	240(LE) 184.88 NIL	- Refurbishment of Turbine, four nos. new runners & one spare runner, new sets of guide vanes. - Repairing of various gates and gantry cranes. - Major overhauling of EOT crane. - Replacement of trash rack & provision of trash cleaning mechanism. - Refurbishment of generators with new F class insulated stator and rotor winding. Replacement of 220 kV oil filled cable by XLPE cable. Replacement of ageing parts of 220 kV & 33 kV Switchyard, 220 kV ABCBs by SF6 Circuit Breakers, 11 kV Switchgear. Installation of numerical type protection system. - Civil works of Dam, HRT, Surge tank, Power Station	• Board accorded approval for cancellation of KfW funding. • DPR to be revised based on present price level and specifications are to be reframed. • These two projects are proposed to be taken up for RM&LE after completion of RM&LE works of Dhakrani HEP and Chilla HEP.
10.	Khodri (PH-B), 4x30 MW UJVN LTD. 1984 T&G – BHEL RM&LE 2025-26	120(LE) 169.63 NIL	- Refurbishment of turbine, four nos. new runners & one spare runner, new sets of guide vanes. - Repairing of various gates and gantry cranes. - Refurbishment of generators with new F class insulated stator & rotor winding. - Replacement of ABCBs by SF6 breakers, 11 kV Switchgear. Installation of numerical type protection system. - Civil works of power station, HRT, TRC & surge shaft.	

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 Implementation				
11.	Gandhi Sagar, 5x23 MW MPPGCL 1960-66 <u>Units 1,2&3</u> T – JM Voith G – Siemens, WG, <u>Units 4&5</u> T&G – Hitachi, Japan R&M 2022-23	- 200 4.97	Unit-3 Rewinding of generator with class F insulation from class B. Common Works: 1. Supply, Testing & Commissioning of 250kVA DG set. Operation of DG set in Auto Mode so that DG set starts automatically. 2. Procurement, erection & commissioning of 6 nos.	All the units with associated auxiliaries' system submerged on 14.09.2019 due to over flooding 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 & drying out of unit no. 1 is in progress and shall be synchronized soon. The DPR & tender document preparation etc. for the R&M works is being taken up soon. 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. 1. Tender has been dropped and under re-estimation. 2. Commissioned in June'18.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			each of numerical type distance protection relays & 6 Nos. Directional protection relays for 132 KV outgoing feeders. 3. Procurement, erection, testing & commissioning of 9 Nos. Gang operated 132 KV SF6 Circuit Breakers including dismantling of existing old MOCB installed at outgoing 132 KV feeders. 4. Replacement of existing Electromagnetic relays of Generator and Generator Transformer with Numerical relays. 5. Replacement of existing Electromagnetic relays of Station Transformer of 20 MVA with Numerical relays. 6. Supply, Installation, Testing & Commissioning of cast iron dry type transformer of 11/0.4kV for UAT's. 7. Supply, Installation, Testing & commissioning of 0.2s accuracy class, 33kV 400/200/1-1-1A CT's including dismantling of existing CT's for generators, GTs & feeders. 8. Supply, erection testing & commissioning of 132 kV Isolator. 9. Supply, Installation, Testing and commissioning of 220V battery set & its suitable charger including dismantling of existing battery set & charger. 10. Supply, Installation & commissioning of 12 no. PLCC cabinet & 1 No. Level meter. 11. Supply, Installation, Testing	3. Order has been placed on M/s. Electro Services, Vadodara on 13.04.2016. All breakers commissioned. 4. Procurement is under process 5. Procurement is under process 6. Price bid is opened. Under correspondence 7. Under estimation. 8. Under estimation. 9. Order has been placed on M/s Synergy Solutions, Faridabad on 28.06.2019. Drawing is under approval. Material supplied. 10. Under estimation. 11. Under estimation.

S. No.	Scheme/ Category/ Completion Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
			& commissioning of 0.2s accuracy class, 132Kv 400/20/1-1-A CTs including dismantling of existing CT's for GT's & feeders. 12. Supply, Installation Testing & commissioning of 132/33 kV 20MVA Transformer-1 no. 13. Microprocessor based digital static excitation system for unit 1 to 5.	12. Under estimation 13. Shall be covered in the R&M of the units.

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 Target	Expected Benefit(MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
SCHEMES ONGOING - Under RLA Studies				
12.	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.

**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
SCHEMES ONGOING - Under RLA Studies				
13.	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 2025-26	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.	The Govt. of AP & Govt. of Odisha mutually agreed for carrying out RM&U by sharing the costs & benefits in the ratio of 50:50. Draft modified agreement copy submitted to GoAP for approval towards signing of agreement by both The Govt. of AP & Govt. of Odisha. Also, the transfer of assets of Machkund HES from Govt. of AP to APGENCO is under progress to enable to take up RM&U by APGENCO. M/s Voith Hydro Pvt. Ltd. inspected the Units from 12.11.2018 to 14.11.2018 and submitted their budgetary offer along with detailed scope of works. Offer submitted by M/s Voith was found to be on higher side. Revised offer received from M/s Voith. The DPR was prepared with the revised offer of M/s Voith Hydro and submitted to APGENCO management for getting approval from OHPC/ Odisha Government. APGENCO Management exploring the necessity to carry out the RLA studies for assessment of condition of main equipment including concrete structures after signing of modified agreement. 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.

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
14.	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 workson 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.
15.	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 -		

**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				
16.	Moyar PH, 3x12 MW TANGEDCO 1952-53 T – Boving,UK G -Metropolitan Vickers,UK RMU&LE 2023-24	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 91 st Meeting held on 22.11.2019 for Placing Orders on L1 tenderer M/s. Andritz Hydro Private Limited, New Delhi and Letter of Intent (LOI) has been issued on 28.11.2019. Contract agreement has been executed on 14.01.2020. Unit-2 handed over to M/s. AHPL for Reverse Engineering on 27.01.2020 and same is under process.
17.	Kodayar PH-I, 1x60 MW TANGEDCO 1970 T-Vevey Engg. works, Switzerland G-Alstom, France RMU&LE 2022-24	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 314 th Meeting held on 18.11.2019 approved and recommended the proposal for placing works contract order on the L1 tenderer i.e. BHEL, New Delhi to TANGEDCO Board. The proposal was approved by TANGEDCO board on 26.02.2020. Letter of Intent issued to M/s BHEL on 09.03.2020. Agreement to be executed.
B - SCHEMES ONGOING – Under DPR Preparation/ Finalisation/ Approval				
18.	Kodayar PH-II, 1x40 MW TANGEDCO 1971 T- Litostroj, Yugoslavi a	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,	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.

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
	G-Rade Koncar, Yugoslavia. RMU&LE 2025-26		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.	

C – SCHEMES ONGOING – Under RLA Studies

19.	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.
20.	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.
21.	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.
22.	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.

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
23.	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.
24.	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.
25.	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.
26.	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.
27.	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.
28.	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.

S. No.	Scheme/ Category Completion Target	Expected Benefit (MW)/ Estimated Cost/ Expenditure	Scope of work	Present Status
29.	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**

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 Tendering				
30.	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 -	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. Two out of four E&M Packages i.e. Bus Duct and DG Set are awarded. Remaining two E&M packages i.e. Main Package and EOT Crane are under tender evaluation. HM Packages are under tender evaluation. Two out of five Civil packages i.e. “Restoration of Drainage system & Slope Protection at By-Pass Tunnel Area & Penstock area” and “Construction of vertical bored cast-in-situ pile work at bye pass tunnel area” are awarded. Remaining three civil packages i.e. “Civil works of ithai barrage and power channel”, “Civil works of power house complex including valve house, surge shaft and tail pool” and “Under water concrete repair and restoration at barrage, intake structures, emergency gate” are under evaluation.

**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				
31.	Khandong Power Station, 2x25MW NEEPCO T&G- BHEL 1984-85 2024-25 RM&LE	50 (LE) 207 21.43	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 states. 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.	1. DPR from CPRI, Bangalore received in the month of June'2018. Financial aspects and levelized tariff finalized and submitted to Management for approval. 2. 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. 3. Procurement of some BoP items like DG set, Firefighting system, Penstock Protection BFV, etc. procured and installed under R&M budget. 4. Detail engineering on the finalized scope of the works is in progress. 5. DPR has been submitted to CEA. 6. Petition to CERC submitted in the month of August 2020 for obtaining approval for R&M proposal. Scheme is rescheduled for completion in 2024-25 considering the purpose for extension of normative life of hydro to 40 years.
32.	Kopili Power Station, 4x50MW NEEPCO T&G- BHEL 1988 2023-24 RM&LE	200 (LE) 870.40 -	Yet to be finalized.	DPR under preparation.

R&M – Renovation & Modernisation, RM&U – Renovation Modernisation & Upgrading, RM&LE – Renovation, Modernisation & Life Extension, RMU&LE – Renovation, Modernisation, Upgrading & Life Extension, Res. – Restoration

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
SCHEMES ONGOING - Under RLA Studies				
33.	Umiam-Umtru Stage-IV, 2x30MW MePGCL, 1992 T&G-BHEL R&M 2022-27	- - -	Detailed scope of works will be arrived after finalization of specifications based on RLA study report.	RLA studies to be taken up after 30 years of useful operation.

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				
34.	Maithon U-1&3, 2x20 MW + 1x23.2 MW DVC 1957-58 T - Neyrpic, France G - Siemens, W.Germany RM&LE 2022-23	40 (LE) 56.034 7.76	1. Scope to be prepared based on DPR. 2. Replacement/ refurbishment of the Governing System & Unit control cum protection system of Units- 1,2&3. 3. Renovation work of 132/33 kV Switchyard.	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. Work order placed on M/s ABB India Ltd. On 08.08.2019. Work is planned to be taken up during lean season and expected to be completed by June'20. DVC has completed the work of renovation of Maithon switchyard at a cost of Rs 6.98 Crs.

ANNEXURES

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

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

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

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

Sl. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Himachal Pradesh								
1	Bhakra RB BBMB	CS	5x132	88.45	90.68	125.00 (U)	RM&U	2000-01
2	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	Srisaillam RB, APGENCO	SS	7x110	16.32	11.40	-	R&M	2001-02
Karnataka								
15	Sharavathy, U-1 to 8, KPCL	SS	8x89.1	65.00	63.49	115.20 (U) +178.20 (Res)	RM&U+Res	1997-98
16	Sharavathy, U-9&10, KPCL	SS	2x89.1	17.96	14.68	28.80(U) +19.10 (Res)	RM&U+Res	1997-98

Annex-II
(Sheet 2/ 2)

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

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

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

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

Annex- III
(Sheet 2/3)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
14	Mani Dam, KPCL	SS	2x4.5	1.00	1.00	-	R&M	2002-03
15	Shivasamudram , VVNL	SS	6x3+ 4x6	68.38	73.17	42.00 (LE)	RM&LE	2004-05
16	Bhadra, Ph.II, KPCL	SS	1x2	3.30	2.51	2.00 (LE)	RM&LE	2005-06
17	Varahi, KPCL	SS	2x115	2.57	2.66	-	R&M	2006-07
18	Sharavathy, Ph.A, KPCL	SS	10x103.5	5.22	3.52	-	R&M	2006-07
Kerala								
19	Neriamangalam KSEB	SS	3x15	58.00	53.05	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
Maharashtra								
28	Bhira Tail Race, MSPGCL	SS	2x40	1.60	0.70	-	R&M	2003-04
29	Tillari, MSPGCL	SS	1x60	4.50	4.24	6.0 (U)	RM&U	2004-05

Annex- III
(Sheet 3/3)

(Sheet 5/5)								
Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
30	Koyna Gen. Complex, MSPGCL	SS	4x70+4x80+4x80	12.00	11.50	-	R&M	2004-05
Meghalaya								
31	Umium St.I, MePGCL	SS	4x9	81.88	84.21	36(LE)	RM&LE	2002-03
32	Khandong, NEEPCO	CS	2x25	4.00	3.35	-	R&M	2003-04
Total			4446.60	1016.31	1029.24	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	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs . in crs)				
Himachal Pradesh								
1	Dehar Ph. A BBMB	CS	6x165	11.00	6.94	-	R&M	2010-11
2	Dehar Ph. B BBMB	CS	6x165	49.00	24.45	330(LE)	RM&LE	2009-10
Uttarakhand								
3	Tanakpur, NHPC	CS	3x31.4	10.77	11.95	-	R&M	2007-08
4	Khodri Ph.A, UJVNL	SS	4x30	5.25	6.39	-	R&M	2008-09
5	Chilla Ph.A, UJVNL	SS	4x36	23.55	21.24	-	R&M	2008-09
Andhra Pradesh								
6	Upper Sileru, APGENCO	SS	4x60	4.20	3.34	-	R&M	2009-10
Karnataka								
7	Nagjhari, U1 to 6, KPCL	SS	5x150 + 1x135	14.75	15.31	-	RM&U	2009-10
8	Sharavathy Ph.B, KPCL	SS	10x103.5	20.50	11.14	-	R&M	2009-10
9	Supa, KPCL	SS	2x50	3.45	4.90	-	R&M	2009-10
10	Bhadra, KPCL	SS	2x12	1.44	0.85	-	R&M	2009-10
11	Lingnamakki, KPCL	SS	2x27.5	3.81	2.62	-	R&M	2010-11
Tamil Nadu								
12	Mettur Dam, TANGEDCO	SS	4x10	30.17	24.16	10 (U) + 40 (LE)	RMU&LE	2007-08
Maharashtra								
13	Koyna St.I&II, MSPGCL	SS	4x70 + 4x80	87.50	81.82	-	R&M	2008-09

Annex- IV
(Sheets 2 of 2)

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

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

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

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

Annex- V
(Sheet 2 of 2)

Sheet 2 of 2

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

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

Sl. No	Name of Project, Agency Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
				(Rs. in Crs.)					Original	Anticipated
A. Completed Schemes										
Himachal Pradesh										
1	Ganguwal (1x29.25+2x24.2) & Kotla (1x29.25+2x24.2), BBMB	CS	1x24.2 (U-2) 1x24.2 (U-3)	14.19	9.58	48.4 (LE)	48.4	RM&LE	Completed in 2017-18	
2	Dehar Power House (Unit-6), BBMB (6x165)	CS	1x165	19.87	16.00	-	165	R&M	Completed in 2017-18	
3	Salal, NHPC (6x115)	CS	5x115	58.01	51.08	-	575	R&M	Completed in 2019-20	
Tamil Nadu										
4	Sholayar-I, TANGEDCO (2x35)	SS	2x35	90.44	66.94	70 (LE) + 14(U)	84	RMU&LE	Completed in 2019-20	
Karnataka										
5	Bhadra River Bed units, KPCL (2x12)	SS	2x12	23.55	20.12	-	24	R&M	Completed in 2019-20	
Sub Total (A)			882.40	206.06	163.72	132.40 [118.40(LE) + 14(U)]	896.40			
B. Ongoing Schemes – Under Implementation										
Himachal Pradesh										
6	Ganguwal & Kotla Power House, BBMB (4x24.2)	CS	4x24.2	9.86	-	-	96.8	R&M	2020-21	2020-21
7	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	544.85	540.00(LE)+ 90.00 (U)	630	RMU&LE	2016-17	2020-21
8	Bhakra RB, BBMB (5x1157)	CS	5x157	20.8	-	-	785	R&M	2021-22	2021-22
9	Baira Siul, NHPC (3x60)	CS	3x60	341.41	153.89	180 (LE)	180	RM&LE	2020-21	2020-21
10	Bhabha Power House, HPSEB (3x40)	SS	3x40	166.17	111.80	120 (LE)	120	RM&LE	2017-18	2020-21
11	Dehar Power House (Unit-3), BBMB (1x165)	CS	1x165	23.00	1.63	-	165	R&M	2019-20	2020-21
Jammu & Kashmir										
12	Chenani, J&KSPDC (5x4.66)	SS	5x4.66	39.60	26.22	23.30 (LE)	23.3	RM&LE	2015-16	2020-21
13	Ganderbal, J&KSPDC (2x3+2x4.5)	SS	2x4.5	31.57	11.33	9.00 (LE)	9	RM&LE	2016-17	2020-21
Punjab										
14	Mukerian St.I, St.II, St.III & St.IV, PSPCL (3x15, 3x15, 3x19.5&3x19.5)	SS	3x15, 3x15, 3x19.5& 3x19.5	136.07	47.46	-	207	R&M	2019-20	2020-21
15	Shanan HEP, PSPCL (1x50+4x15)	SS	1x50+ 4x15	37.81	20.16	-	110	R&M	2019-20	2021-22
Uttarakhand										
16	Tiloth, UJVNL (3x30)	SS	3x30	384.66	91.54	90 (LE)	90	RM&LE	2019-20	2021-22

Annex- VI

(Sheet 2 of 4)

Sl. No	Name of Project, Agency Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
				(Rs. in Crs.)					Original	Anticipated
17	Dhalipur, UJVNL (3x17)	SS	3x17	152.65	35.11	51 (LE)	51	RM&LE	2020-21	2021-22
Uttar Pradesh										
18	Rihand, UPJVNL (6x50)	SS	6x50	132.20	105.65	300 (LE)	300	RM&LE	2017-18	2020-21
19	Obra, UPJVNL (3x33)	SS	3x33	58.80	37.74	99 (LE)	99	RM&LE	2017-18	2021-22
Gujarat										
20	Ukai, GSECL (4x75)	SS	3x75 (U-1,2,&4)	7.30	4.48	-	225	R&M	2021-22	2021-22
21	Kadana PSS, GSECL (4x60)	SS	4x60	114.37	6.18	-	240	R&M	2021-22	2021-22
Telangana										
22	Nagarjuna Sagar Ph-II works, TSGENCO (1x110+7x100.8)	SS	1x110+7x100.8	22.17	14.34	-	815.6	R&M	2018-19	2020-21
23	Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)	SS	2x30.6	30.99	2.00	-	61.2	R&M	2018-19	2020-21
Karnataka										
24	Munirabad Dam Power House, KPCL (2x9 + 1x10)	SS	2x9 + 1x10	4.60	2.2	-	28	R&M	2018-19	2020-21
25	Nagjhari KPCL (3x150)	SS	3x150 (U-1 to 3)	222.00	13.11	-	450	R&M	2021-22	2021-22
26	Shivasamudram, KPCL (6x3+4x6)	SS	6x3+4x6	169.18	14.01	42 (LE)	42	RM&LE	2021-22	2021-22
Kerala										
27	Sholayar, KSEB (3x18)	SS	3x18	199.55	84.26	54 (LE)	54	RM&LE	2017-18	2020-21
28	Idukki 1 st stage, KSEB (3x130)	SS	3x130	89.90	44.14	-	390	R&M	2018-19	2020-21
29	Kuttiyadi, KSEB (3x25)	SS	3x25	377.41	-	75.00 (LE) + 7.5 (U)	82.5	RMU&LE	2021-22	2021-22
Madhya Pradesh										
30	Bargi, MPPGCL (2x45)	SS	2x45	7.98	2.42	-	90	R&M	2020-21	2020-21
31	Pench, MPPGCL (2x80)	SS	2x80	13.36	0.36	-	160	R&M	2021-22	2021-22
32	Bansagar Ton-I, MPPGCL (3x105)	SS	3x105	14.13	3.6	-	315	R&M	2021-22	2021-22

Sl. No	Name of Project, Agency Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
				(Rs. in Crs.)					Original	Anticipated
Odisha										
33	Hirakud-I OHPC (2x37.5)	SS	2x37.5 (U5&6)	158.77	96.1	75.00 (LE) + 12.2 (U)	87.2	RMU&LE	2017-18	2021-22
34	Hirakud-II (Chiplima), OHPC (3x24)	SS	1x24 (U-3)	65.67	46.51	24.00 (LE)	24	RM&LE	2017-18	2020-21
35	Balimela, OHPC (6x60)	SS	6x60	382.91	116.52	360(LE)	360	RM&LE	2019-20	2021-22
Sub Total (B)			6180.90	3904.66	1637.61	2152 [2042.30(LE) + 109.70(U)]	6290.60			
C. Ongoing Schemes – Under Tendering										
Himachal Pradesh										
36	Giri, HPSEB (2x30)	SS	2x30	139.80	-	60.00 (LE)	60	RM&LE	2020-21	2020-21
Uttarakhand										
37	Ramganaga, UJVNL (3x66)	SS	3x66	455.20	-	198(LE)	198	RM&LE	2017-18	2021-22
38	Dhakrani, UJVNL (3x11.25)	SS	3x11.25	137.31	-	33.75 (LE)	33.75	RM&LE	2020-21	2021-22
Karnataka										
39	Kadra Dam Power House, KPCL (3x50)	SS	3x50	44.47	1.72	150 (LE)	150	RM&LE	2021-22	2021-22
40	Kodasalli Dam Power House, KPCL (3x40)	SS	3x40	50.60	1.47	120 (LE)	120	RM&LE	2021-22	2021-22
41	Linganamakki Dam Power House, KPCL (2x27.5)	SS	2x27.5	56.20	1.85	55 (LE)	55	RM&LE	2021-22	2021-22
42	Gerusoppa Dam Power House (Sharavathy Tail Race), KPCL (4x60)	SS	4x60	59.66	2.21	240 (LE)	240	RM&LE	2021-22	2021-22

SL No	Name of Project, Agency Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE (MW)	Category	Year of Completion	
				(Rs. in Crs.)					Original	Anticipated
Jharkhand										
43	Panchet, DVC (2x40)	CS	1x40 (U-1)	48.92	2.19	40(LE)+ 6(U)	46	RMU&LE	2021-22	2021-22
Meghalaya										
44	Umium St.III, (Kyrdekmlai) MePGCL (2x30)	SS	2x30	408.00	-	60(LE) + 6(U)	66	RMU&LE	2021-22	2021-22
Sub Total (C)			956.75	1400.16	9.44	968.75 [956.75(LE) + 12(U)]	968.75			
D. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval										
Karnataka										
45	MGHE, KPCL (4x21.6+4x13.2)	SS	4x21.6+ 4x13.2	97.00	7.75	139.2 (LE)	139.2	RM&LE	2021-22	2021-22
46	Supa Dam Power House, KPCL (2x50)	SS	2x50	47.91	1.52	100 (LE)	100	RM&LE	2021-22	2021-22
47	Sharavathy Generating Station, KPCL (10x103.5)	SS	10x103.5	196.56	11.07	1035 (LE)	1035	RM&LE	2021-22	2021-22
Sub Total (D)			1274.20	341.47	20.34	1274.20 (LE)	1274.20			
Total (A+B+C+D)			9294.25	5852.35	1831.11	4527.35 [4391.65(LE) +135.7(U)]	9429.95			

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

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

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	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
A. Ongoing Schemes – Under Implementation									
Himachal Pradesh									
1	Pong Power House, BBMB (6x66)	CS	6x66	142.25	-	396 (LE)	396	RM&LE	2022-23
Madhya Pradesh									
2	Gandhi Sagar, MPPGCL (5x23)	SS	5x23	200	4.97	-	115	R&M	2022-23
Punjab									
3	Ranjit Sagar Dam, PSPCL	SS	4x150	82.16	1.60	-	600	R&M	2022-23
4	UBDC St.I & St.II, PSPCL (3x15+3x15.45)	SS	3x15+ 3x15.45	23.55	-	-	91.35	R&M	2022-23
5	Anandpur Sahib Hydel Project, PSPCL (4x33.5)	SS	4x33.5	31.65	0.85	-	134	R&M	2022-23
Uttarakhand									
6	Chilla Ph B UJVNL (4x36)	SS	4x36	490.56	-	144(LE)+ 12(U)	156	RMU&LE	2024-25
Tamil Nadu									
7	Moyar PH, TANGEDCO (3x12)	SS	3x12	67.05	-	36(LE)+ 6(U)	42	RMU&LE	2023-24
8	Kodayar PH-I, TANGEDCO (1x60)	SS	1x60	88.48	-	60 (LE)+ 10 (U)	70	RMU&LE	2022-24
Sub Total(A)			1576.35	1125.70	7.42	664 [636(LE)+28(U)]	1604.35		
B. Ongoing Schemes – Under Tendering									
Manipur									
9	Loktak, NHPC (3x35)	CS	3x35	236.07	-	105 (LE)	105	RM&LE	2023-24
Sub Total(B)			105	236.07	-	105(LE)	105.00		
C. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval									
Jammu & Kashmir									
10	Lower Jehlum HEP, J&KSPDC (3x35)	SS	3x35	-	-	105 (LE)+ 27 (U)	132	RMU&LE	2022-27
11	USHP-II Kangan, J&KSPDC (3x35)	SS	3x35	-	-	105 (LE)	105	RM&LE	2022-27

(Sheet 2 of 3)									
Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
Uttarakhand									
12	Chibro, UJVNL (4x60)	SS	4x60	184.88	-	240(LE)	240	RM&LE	2025-26
13	Khodri PH-II UJVNL (4x30)	SS	4x30	169.63	-	120(LE)	120	RM&LE	2025-26
14	Kulhal, UJVNL (3x10)	SS	3x10	115.24	-	30(LE)	30	RM&LE	2023-24
Tamil Nadu									
15	Kodayar PH-II, TANGEDCO (1x40)	SS	1x40	-	-	40.0(LE)+ 6(U)	46	RMU&LE	2025-26
West Bengal									
16	Maithon, DVC (2x20+1x23.2)	CS	2x20 (U-1&3)	56.03	7.76	40.00 (LE)	40	RM&LE	2022-23
Assam									
17	Khandong Power Station, NEEPCO (2x25)	CS	2x25	220.21	12.71	50 (LE)	50	RM&LE	2024-25
18	Kopili Power Station, NEEPCO (4x50)	CS	4x50	870.40	-	200(LE)	200	RM&LE	2023-24
Sub Total(C)			930.00	1616.39	20.47	963 [930(LE)+33(U)]	963.00		
D. Ongoing Schemes – Under RLA Studies									
Tamil Nadu									
19	Kundah-I, TANGEDCO (3x20)	SS	3x20	-	-	60 (LE)	60	RM&LE	2022-27
20	Kundah-II, TANGEDCO (5x35)	SS	5x35	-	-	175 (LE)	175	RM&LE	2022-27
21	Kundah-III, TANGEDCO (3x60)	SS	3x60	-	-	180 (LE)	180	RM&LE	2022-27
22	Kundah-IV, TANGEDCO (2x50)	SS	2x50	-	-	100 (LE)	100	RM&LE	2022-27
23	Kundah-V, TANGEDCO (2x20)	SS	2x20	-	-	40 (LE)	40	RM&LE	2022-27
24	Mettur Tunnel, TANGEDCO (4x50)	SS	4x50	-	-	200 (LE)	200	RM&LE	2022-27

(Sheet 3 of 3)									
Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
				(Rs. in Crs.)					
25	Sarkarpathy, TANGEDCO (1x30)	SS	1x30	-	-	30 (LE)	30	RM&LE	2022-27
26	Sholayar-II, TANGEDCO (1x25)	SS	1x25	-	-	25 (LE)	25	RM&LE	2022-27
27	Suruliyar, TANGEDCO (1x35)	SS	1x35	-	-	35 (LE)	35	RM&LE	2022-27
28	Kadamparai, PH TANGEDCO (4x100)	SS	4x100	-	-	400 (LE)	400	RM&LE	2022-27
29	Aliyar, TANGEDCO (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
Kerala									
30	Idukki 2 nd stage, KSEB (3x130)	SS	3x130	-	-	390 (LE)	390	RM&LE	2022-27
Andhra Pradesh									
31	Tungabhadra Dam, APGENCO (4x9)	SS	4x9	175.00	-	36 (LE)	36	RM&LE	2025-26
32	Hampi Canal PH, APGENCO (4x9)	SS	4x9	175.00	-	36 (LE)	36	RM&LE	2025-26
33	Machkund St.I & St.II, APGENCO (3x17+3x23)	SS	3x17+ 3x23	500.00	-	120 (LE) +9 (U)	129	RMU&LE	2025-26
Meghalaya									
34	Umiyam-umtru Stage-IV, MePGCL (2x30)	SS	2x30	-	-	-	60	R&M	2022-27
Sub Total(D)			1947.00	850.00	0.00	1896 [1887(LE)+9(U)]	1956.00		
Total (A+B+C+D)			4558.35	3828.16	27.89	3628 [3558(LE)+70(U)]	4628.35		

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

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

Abbreviations

1	APGENCO	Andhra Pradesh Generation Corporation
2	BBMB	Bhakra Beas Management Board
3	DVC	Damodar Valley Corporation
4	GSECL	Gujarat State Electricity Corporation Ltd.
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 Ltd.
9	KSEB	Kerala State Electricity Board
10	MSPGCL	Maharashtra State Power Generation Corporation Ltd.
11	MePGCL	Meghalaya Power Generation Corporation Ltd.
12	MPPGCL	Madhya Pradesh Power Generation Corporation Ltd.
13	NEEPCO	North-East Electric Power Corporation
14	OHPC	Odisha Hydro Power Corporation
15	PSPCL	Punjab State Power Corporation Ltd.
16	RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam Ltd.
17	TANGEDCO	Tamil Nadu Generation and Distribution Corporation Ltd.
18	TSGENCO	Telangana State Power Generation Corporation
19	UPJVNL	Uttar Pradesh Jal Vidyut Nigam Ltd.
20	UJVNL	Uttarakhand Jal Vidyut Nigam Ltd.
21	VVNL	Vishwesharayya Vidyut Nigam Ltd.
22	WBSEDCL	West Bengal State Electricity & Distribution Company Ltd.
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