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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
(OCTOBER-DECEMBER, 2017)
(3rd Quarter of 2017-18)

C O N T E N T S

Sl. No.	Particulars	Page No.(s)
1.	Index of Schemes	I-1 to I-3
2.	Background & Plan-wise Summary	B-1 to B-3
Completion Programmed during 2017-22 and 2022-27		
3.	Year-wise Summary of Completion Programme 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 45
5.	State-wise Status of R&M Schemes (During 2022-27)	46 to 51
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-15
VII	State-wise List of Hydro RMU&LE Schemes programmed for completion during 2022-27	A-16 to A-17
Abbreviations of Agencies		A-18

Index of Schemes

Renovation & Modernisation Schemes of Hydro Power Stations

Status/ 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	Status	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	2018-19	Under Implementation	2-3
4.		Baira Siul	-	NHPC	2020-21	Under Implementation	4
5.		-	Bhaba Power House	HPSEB	2021-22	Under Implementation	4-7
6.		-	Giri	HPSEB	2020-21	Under Tendering	7-8
II.	Jammu & Kashmir						
7.		-	Chenani	J&KSPDC	2017-18	Under Implementation	9
8.		-	Ganderbal	J&KSPDC	2017-18	Under Implementation	10
9.		Salal	-	NHPC	2019-20	Under Implementation	10
III.	Punjab						
10.		-	Mukerin HEP	PSPCL	2019-20	Under Tendering	11-12
11.		-	Ranjit Sagar Dam	PSPCL	2019-20	Under Tendering	13-15
12.		-	Shanan HEP	PSPCL	2019-20	Under Tendering	15-16
13.		-	UBDC St.I & St.II HEP	PSPCL	2019-20	Under Tendering	16-17
IV.	Uttarakhand						
14.		-	Tiloth	UJVNL	2019-20	Under Implementation	18
15.		-	Dhalipur	UJVNL	2020-21	Under Implementation	18
16.		-	Chilla (Ph-B)	UJVNL	2021-22	Under Tendering	18-19
17.		-	Kulhal	UJVNL	2020-21	Under Tendering	19
18.		-	Ramganga	UJVNL	2020-21	Under Tendering	20
19.		-	Dhakrani	UJVNL	2020-21	Under Tendering	20
V.	Uttar Pradesh						
20.		-	Rihand	UPJVNL	2017-18	Under Implementation	21-22
21.		-	Obra	UPJVNL	2018-19	Under Implementation	22-23
Western Region							
VI.	Madhya Pradesh						
22.		-	Gandhi Sagar	MPPGCL	2018-19	Under Implementation	24
23.		-	Bargi	MPPGCL	2021-22	Under Implementation	25
24.		-	Pench	MPPGCL	2021-22	Under Implementation	25
25.		-	Bansagar Ton-I	MPPGCL	2021-22	Under Tendering	25
	Gujarat						
26.		-	Ukai	GSECL	2021-22	Under Implementation	26
27.		-	Kadana PSS	GSECL	2021-22	Under Implementation	26

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Status	Page No.
		Central	State				
Southern Region							
VII.	Telangana						
28.		-	Nagarjuna Sagar Phase-II	TSGENCO	2018-19	Under Implementation	27-28
29.		-	Nagarjuna Sagar Left Canal Power House	TSGENCO	2018-19	Under Implementation	28
VIII.	Karnataka						
30.		-	Bhadra River Bed units	KPCL	2017-18	Under Implementation	29-30
31.		-	Nagjhari, U-1 to 3	KPCL	2021-22	Under Tendering	30
32.		-	Kadra Dam Power House	KPCL	2021-22	Under Tendering	30-31
33.		-	Kodasalli Dam Power House	KPCL	2021-22	Under Tendering	31-32
34.		-	Shivasamudra m	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	32
35.		-	MGHE (Mahatma Gandhi HE)	KPCL	2021-22		32-33
36.		-	Supa Dam Power House	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	33-34
37.		-	Linganamakki Dam Power House	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	34
38.		-	Gerusoppa Dam Power House	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	34
39.		-	Sharavathy Generating Station	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	34-35
IX.	Kerala						
40.		-	Sholayar	KSEB	2018-19	Under Implementation	36
41.		-	Idukki 1 st Stage	KSEB	2019-20	Under Implementation	36-37
42.		-	Kuttiadi	KSEB	2021-22	Under Tendering	37
X.	Tamil Nadu						
43.		-	Sholayar PH-I	TANGEDCO	2018-19	Under Implementation	38
Eastern Region							
XI.	Jharkhand						
44.		Panchet, U-1	-	DVC	2021-22	Under Tendering	39
XII.	Odisha						
45.		-	Hirakud-I, U5&6	OHPC	2019-20	Under Implementation	40
46.		-	Hirakud-II (Chiplima)	OHPC	2018-19	Under Implementation	41
47.		-	Balimela	OHPC	2020-21	Under Implementation	41-42

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Status	Page No.
		Central	State				
XII.	West Bengal						
48.		Maithon, U1&3	-	DVC	2021-22	Under DPR Preparation/ Finalisation/Approval	43
North Eastern Region							
XIII.	Meghalaya						
49.		-	Umiam St.III Kyrdemkulai	MePGCL	2021-22	Under DPR Preparation/ Finalisation/Approval	44-45

Programmed for completion during 2022-27

S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Status	Page No.
		Central	State				
Northern Region							
I.	Uttarakhand						
1.		-	Chibro	UJVNL	2023-24	Under DPR Preparation/ Finalisation/Approval	46
2.		-	Khodri	UJVNL	2023-24	Under DPR Preparation/ Finalisation/Approval	
Southern Region							
II.	Kerala						
3.		-	Idukki 2 nd Stage	KSEB	2022-27	Under RLA Studies	47
	Andhra Pradesh						
4.		-	Machkund St.I & St.II	APGENCO	2021-22	Under DPR Preparation/ Finalisation/Approval	48
III.	Tamil Nadu						
5.		-	Moyar PH	TANGEDCO	2022-27	Under Tendering	49
6.		-	Khodyar PH-I	TANGEDCO	2022-27	Under DPR Preparation/ Finalisation/Approval	49
7.		-	Khodyar PH-II	TANGEDCO	2022-27		49
8.		-	Kundah-I	TANGEDCO	2022-27	Under RLA Studies	50
9.		-	Kundah-II				
10.		-	Kundah-III				
11.		-	Kundah-IV				
12.		-	Kundah-V				
13.		-	Mettur Tunnel				
14.		-	Sarkarpathy				
15.		-	Sholayar-II				
16.		-	Suruliyar				
Noth Eastern Region							
IV.	Manipur						
17.		Loktak	-	NHPC	2022-23	Under DPR Preparation/ Finalisation/Approval	51

**Background
&
Plan-wise Summary**

RENOVATION, MODERNISATION & UPRATING OF HYDRO ELECTRIC POWER PROJECTS

BACKGROUND

For optimization of resources and to tide over the shortage of electricity in the country, Renovation & Modernisation, Upgrading and Life Extension (RMU&LE) of the existing old hydro electric power projects is considered a cost effective option to ensure efficiency, better availability and also to augment capacity addition.

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, incorporating the status of various projects/schemes already identified for implementation/completion till the end of XI Plan, i.e. March, 2012.

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 19481 MW have been completed by the end of the XII Plan (i.e. by 31st March 2017), total benefit of 3635 MW through Life Extension, Upgrading 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 the XII Plan, 21 schemes (2 in central sector & 19 in state sector) with an installed capacity of 4150 MW have been completed till March, 2017 and accrued a benefit of 549 MW through Life Extension, Upgrading and Restoration.

During 2017-22

During 2017-22, an aggregate capacity of 9239.80 MW at 49 Hydro Electric Power Station (7 in Central Sector and 42 in State Sector) is programmed for R&M which will accrue benefit of about 4755.35 MW through Life Extension, Upgrading and Restoration. Out of the 49 schemes expected for completion during 2017-22, 2 schemes in Central Sector with an aggregate capacity of about 213.4 MW have been completed till December, 2017 and have accrued a benefit of 48.4 MW through Life Extension. The state - wise list of hydro R&M schemes expected for completion during 2017-22 is given at Annex-VI.

During 2022-27

During 2022-27, an aggregate capacity of 1956 MW at 17 Hydro Electric Power Station (1 in Central Sector and 16 in State Sector) is programmed for R&M which will accrue benefit of 752 MW. The state-wise list of hydro R&M schemes expected for completion beyond 2022 is given at Annex-VII.

Summary of R&M of Hydro Electric Projects
(As on 31.12.2017)

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) + 336.00(Res.) +54.00(LE)]
2.	IX Plan Schemes	8	12	20	4892.10	570.16	1093.03 [339.00(U) + 331.03(Res.) + 423.00(LE)]
3.	X Plan Schemes	5	27	32	4336.60	1029.24	829.08 [123.40(U) + 701.25 (LE) + 4.43(Res.)]
4.	XI Plan Schemes	4	14	18	4821.20	294.84	735 [12 (U) + 15 (Res.) + 708 (LE)]
5.	XII Plan Schemes	2	19	21	4149.6	1115.97	549.40 [58 (U)+ 476.40 (LE)+15(Res.)]

II Hydro R&M schemes Programmed for completion during 2017-22

Sl. No.	Category	No. of Projects			Capacity covered under RMU&LE (MW)	Estimated Cost (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total			
1.	Programmed	7	42	49	9239.8	6415.65	4755.35 [4605.65(LE) +149.7(U)]
2.	Under Implementation	3	21	24	4691.10	3012.80	2111.50 [1995.30 (LE) +116.20 (U)]
3.	Under Tendering	1	14	15	2624.10	2322.28	878.25 [850.75 (LE) +27.5 (U)]
4.	Under DPR Preparation/ Finalisation/Approval	1	7	8	1711.20	1046.51	1717.20 [1711.20 (LE)+6 (U)]
5	Completed	2	0	2	213.4	25.34 (Actual Cost)	48.4 (LE)

Abbreviations:

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

III Hydro R&M schemes Programmed for completion during 2022-27

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	1	16	17	1956	1120.50	752 [721 (LE)+ 31 (U)]
2.	Under Tendering	0	1	1	36	67.05	42 [36 (LE)+ 6 (U)]
3.	Under DPR Preparation/Finalisation/Approval	1	5	6	685	1053.50	710 [685 (LE) + 25 (U)]
4.	Under RLA Studies	-	10	10	1235	-	-

Abbreviations:

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

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

STATE-WISE STATUS OF COMPLETION PROGRAMME OF R&M SCHEMES AT HYDRO POWER STATIONS DURING 2017-22

As on 31.12.2017

State	Year 2017-18	Year 2018-19	Year 2019-20	Year 2020-21	Year 2021-22
Himachal Pradesh	i)Ganguwal U2 & Kotla U3, BBMB, (1x24.2+1x24.2)=48.4 MW (Completed in 2017-18) ii) Dehar Power House, BBMB, (1x165)=165 MW (Completed in 2017-18)		Bhakra LB, BBMB, (5x108)=540 MW	i)Baira Siul, NHPC, (3x60)=180 MW ii)Giri, HPSEB, (2x30)=60 MW	Bhaba Power House, HPSEB, (3x40)=120 MW
Jammu & Kashmir	i) Ganderbal, J&KSPDC (2x3+2x4.5)=15 MW ii) Chenani, J&KSPDC (5x4.66)=23.3 MW	-	Salal ,NHPC, (5x115)=575 MW	-	-
Punjab	-	-	i) Mukerin St.I, St.II, St.III & St.IV, PSPCL, (3x15+3x15+3x19.5+3x19.5)=207 MW, ii) Ranjit Sagar Dam, PSPCL, (4x150)=600 MW, iii) Shanan HEP, PSPCL, (1x50+4x15)=110 MW, iv) UBDC St.I & St.II, PSPCL, (3x15+3x15.45) =91.35 MW	-	-
Uttarakhand	-	-	Tiloth, UJVNL (3x30)=90 MW	i) Kulhal, UJVNL (3x10)=30 MW, ii) Dhakrani, UJVNL, (3x11.25)=33.75 MW, iii) Dhalipur , UJVNL (3x17=51MW)	i) Chilla Ph B, UJVNL (4x36)=144 MW ii) Ramganga, UJVNL (3x66)=198 MW
Uttar Pradesh	Rihand, UPJVNL (6x50)=300 MW	Obra, UPJVNL (3x33)=99 MW	-	-	-
Madhya Pradesh	-	Gandhi Sagar, MPPGCL, (5x23)=115 MW	-	-	i) Bargi, MPPGCL, (2x45)=90 MW ii) Pench, MPPGCL, (2x80)=160 MW, iii) Bansagar Ton-I, MPPGCL, (3x105)=315 MW

State	Year 2017-18	Year 2018-19	Year 2019-20	Year 2020-21	Year 2021-22
Gujarat	-	-	-	-	i) Ukai, GSECL (3x75)=225MW ii) Kadana PSS, GSECL (4x60)=240 MW
Kerela	-	Sholayar, KSEB, (3x18)=54MW	Idukki 1 st Stage, KSEB, (3x130)=390 MW	-	Kuttiadi, KSEB, (3x25)=75 MW
Tamil Nadu	-	Sholayar-I, TANGEDCO (2x35)=70 MW	-	-	-
Andhra Pradesh	-	-	-	-	
Telangana	-	i) Nagarjuna Sagar Ph-II, TSGENCO, (1x110+7x100.8)=815.6 MW ii) Nagarjuna Sagar LCPH, TSGENCO (2x30)=60 MW	-	-	-
Karnataka	Bhadra River Bed Units, KPCL, (2x12)=24 MW	-	-	-	i) Nagjhari U-1 to U-3, KPCL, (3x150)=450 MW, ii) Shivasamudram, KPCL, (6x3+4x6))=42 MW, iii) MGHE, KPCL, (4x21.6+4x13.2)=139.2 MW iv) Kadra Dam Power House, KPCL (3x50) =150 MW v) Kodasalli Dam Power House, KPCL (3x40)=120 MW vi) Supa Dam Power House, KPCL (2x50)=100 MW vii) Linganamakki Dam Power House, KPCL (2x27) =55 MW viii) Gerusoppa Dam Power House, KPCL (4x60) =240 MW ix) Sharavathy Generating Station, KPCL (10x103.5)=1035 MW
Jharkhand	-	-	-	-	Panchet U-1, DVC, (1x40)=40 MW
Odisha	-	Hirakud-II, OHPC, (1x24)=24MW	Hirakud-I, OHPC, (2x37.5) =75 MW	Balimela, OHPC, (6x60)=360 MW	-
West Bengal	-	-	-	-	Maithon U 1& 2, DVC, (2x20)=40 MW
Meghalaya	-	-	-	-	Umium St.III (Kyrdekmlai), MePGCL, (2x30)=60 MW
Total = 9239.8 MW (49 Schemes)	580.50 MW (6 Schemes)	1237.60 MW (7 Schemes)	2678.35 MW (9 Schemes)	714.75 MW (6 Schemes)	4038.20 MW (21 Schemes)

**State-wise Status of R&M Schemes
(During 2017-22)**

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

HIMACHAL PRADESH

NORTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES COMPLETED – CENTRAL SECTOR (BBMB)									
1.	Ganguwal (Unit-2) BBMB (1x29.25+2x24.2) MW (Original) 1962 (U1, 1955 (U2&3) <u>Unit-1</u> T&G-Hitachi Unit-2&3 T- Baldwin G- Westinghouse, USA (Original) T&G- BHEL (after R&M) Kotla (Unit-3) BBMB 1x29.25+2x24.2 MW (Original) 1961 (U1) 1956 (U-2&3) <u>Unit-1</u> T&G- Hitachi Unit-2&3 T-Baldwin G-Westinghouse, USA (Original) T&G- BHEL (after R&M)	14.19	RM& LE	48.4 (LE)	2017-18	9.34	BBMB	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.	Runner at Ganguwal Power House has been commissioned on 23.11.2017 and at Kotla Power House on 04.12.2017.
2.	Dehar Power House, BBMB (Unit 6) 1x165 MW 1983 T&G - BHEL	19.87	R&M	-	2017-18	16.00	BBMB	Replacement of existing Stator (Complete with Frame, Core, Bars and Air Coolers), Rotor Poles, Pole Keys, Air guides, Temperature Recorders along with other allied items and Erection, Testing & Commissioning.	Unit was put on bar w.e.f 10.07.2017. Taking over certificate issued to the firm on 01.11.2017.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
B - SCHEMES ONGOING – Under Implementation - CENTRAL SECTOR (BBMB)									
3.	Bhakra LB, BBMB 5x108 MW (Uprated) 1985 5x90 MW (Original) 1960-61 T - Hitachi, Japan G - Metropolitan Vickers, UK	489.77	RMU&LE	540(LE) + 90(U)	2012-13 (Contract ual) 2019-20(Anticipated)	342.03 cr. (as on 30.11.17)	Agency: REC: For Punjab(PB), HAR, HP PFC: for RAJ Sanctioned Loan: RAJ:73.74 PB-245.43 HAR-177.84 HP:9.498 Disb.:(till 31.03.2016) PB-126.08 HAR-84.85 HP-6.84 (Till 31.03.2014) Raj- 35.55	Turbine Replacement of runners, guide vanes, guide vane operating mechanism, GV pads, turbine shaft sleeve and coupling cover, head cover, shaft sealing box. Governor oil pr. Motor pump, aeration pipe, instrument panel etc. Generator Replacement of stator winding, stator core and frame assembly, rotor pole assembly, thrust collar, air coolers, thrust bearing pads, upper and lower guide bearings, upper and lower bracket, braking system, generator temp. monitoring panel, excitation system, slip ring, NGT etc. Auxiliaries Control & Protection panels, Generator Transformers, Bus Bars with CTs, PTs etc. LAVT cubicle, switchyard equipments, control cables etc.	- The Notification of Award for RM&U works was issued in favour of 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 for RM&U works (Uprating of generating units from 108 MW to 126 MW) were signed on 02.11.2007 at a total cost of Rs. 489.77 Crores. This cost also includes Rs. 29.57 Crores towards the cost for replacement of turbine & generator shafts. - The effective date of contract agreement/Zero Date is 02.01.2008. The RM&U works for all the five units were to be completed in 59 months i.e. by 02.12.2012. <u>First Unit (Unit 2)</u> - RM&U works on first unit (Unit 2) started from. 26.4.2010, with scheduled completion period of 210 days i.e. upto 21st November, 2010. The unit after R&M was synchronized on 23.06.13 against schedule of commissioning in January, 2013. - Regarding localized cavitation, the modification of runner blade profile through solid piece welding carried out at the site by 10th June, 2016. - Unit-2 was taken on shutdown on 20.11.17 for the joint inspection of modified runner. Machine had run for 2203 hours during high head range and completed 9187.15 hours after modification of runner. The joint team of M/s Hitachi and BBMB carried out the inspection on 21.11.17 and “No cavitation” has been observed on the modified portion at the leading edge of crown side of all the 17 nos blades, which was observed before modification. Only some minor roughness is observed on the leading edge (suction side) of the blade. The rough area is about 200 mm lower than the area where cavitation had occurred on the unmodified runner. The weight loss in this rough area is negligible and beyond reasonable accuracy of measurement. The modification carried out on the runner of Unit No. 2 has been found to be successful. The proposal for acceptance of modified runner of Unit-2 after modification of runner profile through solid piece welding during R, M&U works of Bhakra Left Bank Power House as per MOM dated 13.01.2016 and 02.03.2016 held between BBMB and Consortium members is being put up in the agenda note for the 228th meeting of full Board of BBMB, which is going to be held in the third week of January, 2018 at Chandigarh. <u>Second Unit (Unit 5)</u> - The RM&U works on 2nd Unit commenced on 11.4.2011 with scheduled completion by 6th November, 2011. Mechanical run was successfully carried out on 28.08.13 and Unit was synchronized on 07.09.2013 and taken over on 0210.2013. - Based on CPRI report, it has been decided that spare new Generator Shaft shall be used on Power House Unit no. 5.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
									- Purchase Order dated 14.10.2016 placed on M/s Andritz Hydro GmbH, Austria for replacement of existing spider, rim and other related parts with supply of new components along with replacement of existing generator shaft with new Generator Shaft for Unit No. 5 of Bhakra Left Bank Power House. Completion period for the entire work shifted upto 15.05.2018 due to delay in shipment of shaft from Italy to Mumbai Port. The Unit is presently under shutdown. - Dispatch instruction was issued to M/s Andritz Hydro on dated 01.09.2017 for shifting the shaft from Italy to Bhakhra. Rotor shaft has reached at Mumbai Port and expected to reach at Bhakra by 1st week of January, 2018. - The works of dismantlement of rotor is completed. The material/ components required for the reassembly of new rotor viz Rotor punching, rim end plates, rotor core pressing bolts, rotor rim keys and turbine and generator shaft coupling bolts have been received at site. The Dispatch Authorization of rotor spider and modified thrust head has been issued on 07.12.17 and received at site on 19.12.17. <u>Third Unit (Unit 4)</u> The Unit was taken on RM&U works on 22.11.2013 and taken over for operational run on 05.08.2015 and is presently running with output of 126 MW. The modification of runner blade profile through solid piece welding will be carried out only after ensuring the successful performance of Unit No. 2 in full Board. <u>Fourth Unit (Unit No. 3)</u> Unit can be taken on shutdown for RM&U works subject to consideration of below mentioned points: - Only after lowering of rotor for Unit No. 5 by Andritz (by 25th February.2018) - Successful operation of runner of Unit No. 2 as per the said MOM and its approval by Board. - Work of Stator Assembly of Unit No. 3 has to commence at site 3-4 months prior to taking Unit on shutdown for RM&U works. Unit-3 will be taken on shutdown after commissioning of Unit-5 by 15th May, 2018. Unit No. 3 is likely to be commissioned by January, 2019. <u>Fifth Unit (Unit No. 1)</u> The commencement of RM&U works shall be based on commissioning of fourth unit. In case of shutdown schedule in February, 2019, Unit No.1 shall be commissioned by October, 2019. RM&U works on all the units are likely to be completed in 2019-20.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
4.	Baira Siul 3x60 MW NHPC 1980-81 T&G - BHEL	341.41(including IDC & Financing charges of 68.35 Cr.)	RM&LE	180 (LE)	2020-21	-	-	- 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. 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.	Design Energy (708.59MU) and E&M (Rs. 201Cr.) cost has been vetted by CEA and CEA submitted report to CERC in Feb 2016. Final hearing in CERC has been conducted on 23.02.2016. CERC in its order dated 03.06.2016 has accorded “in-principle approval” to the R&M proposal at a total cost of Rs. 341.41 cr. <u>Work Completed</u> Price Bid opened for Main Plant package and LOA awarded to M/s BHEL on 16.08.2016 at Rs. 132.74 Cr. Model test of runner has been completed. LOA for HM package awarded to “M/s Om Metals Infraprojects Ltd, New Delhi” on 30.11.2016 at Rs. 19.91 crores. <u>Work Under Progress</u> Price Bid for Civil package opened and is under evaluation.
5.	Bhaba Power House 3x40 MW HPSEBL 1989 T&G - BHEL	76.03 (For the works of rehabilitation of damaged/ burnt eqpts.)	RMU&LE	120 (LE)	2018-19 (for works of rehabilitation of damaged burnt eqpts.)	(State plan= 8.56 Cr. PFC Loan= 67.44Cr.) Total=76 Cr.	PFC Loan sanctioned Loan=Rs.68.42 Cr. Equity=Rs.7.61 Cr.	- 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 “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, 22/0 415 kV transformer in place of	- The power house was under forced shut down since 22.01.2015 due to fire incidence. NOA was issued to M/s Alstom T&D India Ltd. on 09.06.2015 for the Design, Manufacture, Supply of 245 kV Gas Insulated Switchgear, Control and Relay Panels, 22 kV Indoor Switchgear, 415 V LT Panels, 220 kV EHT Cables, 22 kV HT Cables, Control & Power cables. The repair & rehabilitation works have been completed. - Unit-1 has been commissioned on 10.07.2016. - Unit -2 has been commissioned on 21.09.2016. - Unit -3 has been commissioned on 20.11.2016. - The tender for supply, erection, testing & commissioning of 10 MVA, 220/22 kV, Station Transformer, additional 22 kV VCB panel and associated power and control cables has been floated and due for opening on 19.01.2018.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								present 100 kVA, 22/0415 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). Civil Works - Providing false ceiling in control room, LT Panel Room and Battery Charger Room of Power House. - Construction of cable trenches in Pot Head yard.	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
		90.14	RM&LE		2019-20	Nil	PFC Loan sanctioned Loan=Rs.81.13 Cr. Equity=Rs.9.01 Cr.	- 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 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.	- Unit No.1 had earlier been commissioned on 10.07.2016 but due to over speeding, stator winding was damaged & machine again stopped on 25.09.2016. NOA was issued to BHEL on 07.12.2016 for rehabilitation of Unit-1 and Unit-1 has been re-commissioned on 04.12.2017. - But during execution of the rehabilitation works of Unit-1, it has been found by BHEL Engineers that the Nozzle servomotors of all machines need to be replaced and NOA for same has been issued on 28.03. 2017. The replacement of Nozzle servomotors of all the three units is expected to be completed by mid-April, 2018. - The techno-commercial part of the tender for the work of dismantling & replacement of existing excitation system, Unit Control board, Electro-Hydraulic Governor, Power & Control cables and Control & Monitoring (SCADA) system for Bhaba Power House has been opened. The award is likely to be placed by end of March, 2018. - The tender document for procurement of two nos. Forged Fabricated Pelton Runners is under preparation and expected to be floated by mid-March, 2018.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								- Supply, laying, termination of all associated power and control cables for the above systems. - Supply of 2 nos. Forged Fabricated Pelton Runners (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.	
C - SCHEMES ONGOING – Under Tendering - STATE SECTOR (HPSEB)									
6.	Giri, 2x30 MW HPSEBL 1978 T&G - BHEL	139.80 (Revised Cost)	RM&LE	60(LE)	2020-21	Nil	Agency: PFC Rs.38.78 Cr.	Brief description of work proposed to be undertaken are as given below: - 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. Mechanical works: Replacement of Guide vanes with stainless steel guide vanes of Unit -1, Overhauling of MIV, Add. Penstock gate in Surge Shaft, Replacement of Governors with modern digital governors, Revamping of Cooling water system, Provision of online discharge measurement and head measurement for both machines. Electrical works: Replacement of 11 KV PILC cable with bus duct, Overhauling of 2x40 MVA,	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. Scheme submitted to the Board and approved by the HPSEBL vide letter dated 30.12.2015. HPERC has accorded in principle approval for R&M proposal for Giri Power House on 23.05.2017. The scheme has been posed for funding to M/s PFC by the Chief Engineer (System Planning), HPSEBL, Shimla.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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 equipment, 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

JAMMU & KASHMIR

NORTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
7.	Chenani 5x4.66 MW J&KSPDC 1971-75 T&G - Ganz Mavag, Hungary	39.30 (Rev.)	RMU & LE	23.3 (LE)	2017-18	14.66	Agency: PFC / NRE & State equity	Turbine Procurement of 4 nos. Runners and re-conditioning of spherical valves, replacement of Governors, Overhauling of BF valves, Penstock, Saddle Blocks 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. Auxiliary System Procurement and Re-conditioning of Gate & Gearings, Repairing of CO2 Plants and Trash Rack. Civil Improvement/restoration in water conductor system, construction of retaining walls/breast walls and toe walls of service road, Desilting of Forebay, Channelization of River, Nallah Training Works.	Work of replacement of Runners and governors awarded to Ms. Andritz Hydro Ltd. 4 no. runners received and coating with High Velocity Oxy Fluid completed. Erection of all 4 runners completed. Reconditioning of spherical valve for all machines completed. Overhauling of the Penstock Protection Valve (PPV) / Butterfly valve (BFV) was left incomplete by M/s BOOM System Pvt Ltd. Different firms were approached to take up and complete the left over works but nothing came out. Decision to be taken up by the higher authorities for further action. Work on EHG installation in process. Change of stator winding insulation with class -F completed for M/c No. 5, 3 &1 and New 125 kVA DG set installed., erection of 12 no. isolators and erection, testing & commissioning after rewinding of 5 MVA Transformer completed. Static excitation system completed for 2 nos machines for balance 3 nos machines under progress. Retrofitting of numerical relays and protection completed for 3 units and balance 2 units under progress. Tender for refurbishment of six nos transformers under preparation. Replacement of 3 Nos. 132 kV MOCBs with SF6 Breakers completed. Replacement of water and oil coolers, reconditioning of gates, trash racks, repair of CO₂ plant completed. Replacement of 5 Nos. air coolers completed. Supply of 2 Nos. 6.6 kV VCB Panel completed & erection of one Panel completed and 2nd Panel under progress. Replacement of speed governors completed. Work order has been allotted for major spares and supply is under progress, is expected to be completed by February, 2018. Construction of trash racks and fencing of tail race completed. River channelization works, Nallah retaining works completed. 25% of improvement work of water conductor system completed. Alternate proposals in place of replacement of damaged wooden flume members are being worked out. Desilting of forebay completed and forebay tank lining completed. Approval of the drawings for motorization of the gates is awaited. All the five nos of machines ready for generation up to optimum level subject to availability of full discharge in forebay.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
8.	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 Mavag, Hungary	39.30 (Revised)	RM&LE	9 (LE)	2017-18	14.66	Agency: MNRE	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 of RM&U works of units III & IV. Works Completed: The work awarded to M/s Gogoal Hydro Power Pvt. Ltd. On 02.07.2015. Work started and dismantling of unit has been completed. RLA/LE Testing of Penstock has been carried out. CR Panels, Auxiliary Transformer, SF6 Breaker, LAVT Panels & NGT Panel and Surge Arrestors also delivered at site. LTAC & Battery Charger commissioned. Dispatch instructions in respect of OPU and Synchronous Generator has been issued. Inspection of various item like Power Transformer, Turbine Parts, Governor system, NGT, CTs PTs and different Panels has been carried out at manufacturers/ sub-vendor sites and delivered at site. Works under progress: Vendor approvals for manufacturer of major equipments like Sync. Generator, Power Transformer, Excitation System, and Control & Power Cables, LT switch Gear, Relay and Control Panels etc. has been accorded and the manufacturing works are under progress.
9.	Salal 5x115 MW NHPC 1987-95 T&G - BHEL	58.01	R&M	-	2019-20	-	-	i) Replacement of runner. ii) Replacement of old governor with digital governor in 6 units. iii) Replacement of AVR with Digital Voltage Regulator (DVR) in 3 units i.e. Unit No. 4, 5 & 6.	i) Order placed on M/s Voith Siemens. Model test of runner completed. Drawing for modified Runner approved. Commissioning schedule of Runners are: 1st Runner : Installed & Commissioned in Unit-6 on 14.04.2017. 2nd Runner : 2017-18. 3rd & 4th Runner: 2018-19. 5th & 6th Runner: 2019-20. However, efforts are being made to install & commission 2nd & 3rd runner in Unit-4 & Unit-5 respectively, during 2017-18. ii) Digital Governor has been installed and commissioned in all 6 Units. iii) DVR has been installed & commissioned in Unit- 4,5 & 6.

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

PUNJAB				NORTHERN REGION			(Amount in Rs. Crores)		
S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
B - SCHEMES ONGOING - Under Tendering STATE SECTOR (PSPCL)									
10.	Mukerian HEP, 3x15 MW (St.-1), 3x15 MW (St.-2), 3x19.5 MW (St.-3) & 3x19.5 MW (St.-4) PSPCL 1983 (St.-I), 1988-89 (St.-II), 1989 (St.-III) & (St.-IV) T&G - BHEL	132.47	R&M	-	2019-20	NIL	Funds will be arranged after getting approval of PSERC	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. 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	1. Tendering Enquiry dated 26.10.2017 floated. As per pre-bid meeting, corrigendum under consideration. 2. PO dated 07.12.2016 placed on M/s Flovel Energy Pvt. Ltd., Faridabad. The firm has commissioned one set of Static Excitation system for machine no.10 (19.5MW). The remaining sets will be commissioning during forthcoming lean periods. 3. Price bid opened on 28.12.2017. Purchase proposal under consideration by competent authority. 4. The case being prepared for approval of the competent authority. 5. PO dated 06.12.2017 placed on M/s ABB. 6. The case being prepared for approval of the competent authority. 7. WO/PO for placed on M/s BHEL for Machine no.10 and work completed. NIT under preparation for machine no. 2. Case under preparation by site office for machine no. 5 & 9. 8. The case being prepared for approval of the competent authority. 9. The case being prepared for approval of the competent authority. 10. Tendering Enquiry dated 19.12.2017 floated.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								11. Replacement of existing One No. Drainage and One No. Dewatering VT Pumps with submersible Pumps at each Power House. 12. Replacement of existing LT panels at MPH-1&2. 13. Replacement of 12 nos. 132 KV Line Circuit Breakers at MPH-1,2,3&4. 14. Replacement of existing 5 Nos. 11/132 KV Generator Transformers at MPH-1&2. 15. Capital overhauling of one no. Generator Transformer at MPH 3 and one no. Generator Transformer at MPH-4. 16. Replacement of existing Two Nos. 11/132 KV, 20/25 MVA Generator Transformers with 11/132 KV 25 MVA at MPH-3&4. 17. Replacement of Two nos. of 11KV Vacuum Circuit Breakers at MPH-4. 18. Replacement of oil and Air cooler for Machine 7,8,10 & 11 at MPH 3&4. 19. Replacement of tubular poles with rail poles of 11KV Auxiliary line. 20. Providing Toilets at all the Bye-Pass gates of all Power Houses of MHP. 21. Renovation of water supply system of residential colony at Unchi Bassi MHP.	11. NIT under preparation for replacement of existing Dewatering Vertical Turbine Pumps with Submersible pumps for PH 1,2&3 of MHP. 12. The case under preparation by site office. 13. Fresh Tendering Enquiry dated 21.12.2017 floated. 14. PO dated.11.01.2017 issued to M/s Bharat Bijli Limited, New Delhi for supply of 4 nos, GTs (2 for UBDC and 2 for MHP). GTs received at site. 2 nos GTs commissioned at UBDC. 15. Case under preparation by site office. 16. Agenda for approval of Purchase Proposal against Tendering Enquiry submitted to board. 17. Case Under preparation by site office. 18. Case Under preparation by site office. 19. Case Under preparation by site office. 20. Case Under preparation by site office. 21. Work execution has been completed.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
11.	Ranjit Sagar Dam, 4x150 MW PSPCL 2000 T&G - BHEL	42.08	R&M	-	2020-21	Nil	Funds will be arranged after getting approval of PSERC	1. Installation and commissioning of Digital Electro Hydraulic Governor Capable of Restricted Governing Operation Mode (RGM0). 2. Procurement of spares of Auto Sequencers. 3. Procurement of spares of AVR 4. Procurement of T&P 5. Replacement of 220 KV Circuit Breakers of 7 nos feeders. 6. Renovation of emulsifier system of Generator Transformer. 7. Capital maintenance of Unit no 2. 8. Renovation of AC Plants. 9. Providing additional submersible pump for dewatering. 10. Capital Maintenance of Unit no 3. 11. Up gradation of HP compressors of condenser mode operation. 12. Replacement of drainage pumps of unit bay and service bay side-2 nos each. 13. Capital Maintenance of Unit no 4	1. Single tender NIT floated to BHEL and quotation received. 2. P.O Issued to BHEL under revenue head for procurement of 20 no input cards and cards received. Under MYT, this case has been dropped and implementation of SCADA system has been proposed in subsequent years. 3. Under MYT, work proposed in 2018-19 but this case has been dropped and implementation of SCADA system has been proposed in subsequent years. 4. Some T & P purchased and Case for procurement of 2 nos. digital insulation testers under progress. 5. PO for 4 nos. Machine breakers placed. However, the case for breakers of the feeders shall be initiated for approval of the competent authority in due course of time (2019-20). 6. Work proposed in 2019-20. 7. Rescheduled in 2018-19, capital maintenance of unit no 1 wii be taken first. 8. Agenda put up approval from board. 9. Open tender NIT floated. 10. Proposed in 2019-20. 11. As per BHEL recommendations, magnetic float level indicators to be replaced first, for rectification of fault of condenser mode operation. 12. Works proposed in 2018-19. 13. Work proposed in 2020-21.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								14. Replacement of flow meters 15. Renovation of drinking water supply system of Power Plant& Switch House Building. 16. Providing RCC Wall with water gate from right bank of tail race to dam. 17. Replacement of Blowers of Ventilation System-5 nos. 18. Renovation of Circle Office and R.E.Office. 19. Construction of Porches over all entry points of Power House Building. 20. Renovation of 5 No. Store Sheds at S&T Store Yard. 21. Renovation of UC fencing around S&T Store Yard & 220 KV Switch yard. 22. Providing Detachable scaffolding set for Power Plant Maintenance. 23. Condenser mode of operation of 4 no. units	14. NIT under Preparation. 15. Work proposed in 2018-19. 16. Work proposed in 2018-19. 17. Work proposed in 2019-20. 18. Case under preparation by site office. 19. Case under process. The special civil estimate has been sent to Dy.CE/Civil Hydel Design, Chandigarh for vetting. 20. Work proposed in 2018-19. 21. Work proposed in 2019-20. 22. Work proposed in 2019-20. 23. Work order dated 27.08.2014 already issued on BHEL. BHEL Bhopal visited RSD on 18.12.2016. BHEL 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 and water pressure being depressed more than required. As such air mixed with water is being released in the tail race. As such BHEL recommended that the capacity of air compressors and required volume and pressure applied for water depression is required to be analyzed by BHEL. 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 side. This issue has been taken by Dy.CE/RSD with BHEL. Further, BHEL Engineers again visited RSD power house and have recommended replacement of magnetic float level indicators.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								24. Repair of Single phase 13.8 KV/220/√3 KV, 62.5 MVA, Generator Transformer make NGEF, S No. 6800000152, YOM-1996 of unit no.2 (W-phase) damaged at RSD HEP Shahpurkandi. 25. Procurement of 220V, 2000 AH battery. 26. Replacement of DPR. 27. Procurement of 4 nos Magnetic Float Level Indicators with switching contacts. 28. Procurement of 4 nos Magnetic Float Level Indicators with switching contacts for RSD Power House.	24. Tendering Enquiry dated 21.12.2017 has been floated. 25. Batteries have been commissioned. 26. PO issued to GE T&D India Ltd. Delivery period extended due to amendment in technical parameters. Material yet to be received. 27. Tendering Enquiry dated 21.12.2017 has been floated. 28. Tendering Enquiry dated 21.12.2017 has been floated.
12.	Shanan HEP, 4x15 MW+1x50 MW PSPCL 1932(U1 to U4) T - Ganz Mavag, Hungary G – BTH, UK 1982 (U5-extn) T&G - BHEL	40.2	R&M	-	2019-20	Nil	Funds will be arranged after getting approval of PSERC	1. Renovation of water cooling bus of 4x15 MW machines. 2. Procurement of 01 No. 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.	1. NIT No. 08/SE/Shanan/15-16 placed to M/s BHEL to submit the offer. 2. For procurement of Fully Forged Pelton Turbine Runners P.O. dt. 04.01.2017 placed to M/s Flovel Energy Pvt. Ltd., Faridabad with delivery period 14 months (1st runner, 50 MW), 15.5 months (2nd runner 15 MW), 17 months (3rd runner 15 MW). Stage Inspection of 50 MW runner has been conducted on 28 & 29.12.2017. Material is expected to be received at Shanan Power House from January, 2018 to March, 2018. 3. Purchase Order cum-Contract Agreement dated 12.01.2017 has been placed upon M/s BBL. 7 No. GTs alongwith accessories have been received at site. 4 nos 12 MVA GTs have been erected and commissioning is in progress. 4. Fresh Proposal as per BBMB pattern is under progress. 5. P.O. No.15/SE/Shanan/2015-16 dated 15.01.2016 placed to M/s BHEL, 20 nos nozzels has been received at Shanan.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								6. Replacement/Retrofitting of 66, 132 KV isolators & L.E with new ones at 132 KV Sub-station. 7. Replacement of 33 KV BOCB with new 66 KV SF6 breaker at 132 KV sub-station. 8. Procurement of 2 nos. SAN Container DC Batteries of 400AH Capacity for the replacement of existing DC Batteries 9. 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.	6. Budgetary offer called from reputed firms. 7. Proposal for Construction of foundation work is under progress, 66kV Breakers received in S&T Shanan Store. 8. Material has been received and commissioned at site as such work has been completed. 9. NIT floated upon M/s BHEL. 10. Case is under preparation. 11. Case is under preparation. 12. Approval has been obtained from the worthy board in its 183rd meeting held on 02.08.2016 at Patiala amounting to Rs. 1.23 crore under GH-74.4 and e-tendering of the same has been done with opening date 12.01.2018. 13. Purchase Order dated 22.07.2017 has been issued to M/s Shalimar Paint Ltd. Parvanu (HP) for procurement of aluminum paint and the material has been received at site. The case for supply of labour for painting work is under process.
13.	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	21.05	R&M	-	2019-20	Nil	Funds will be arranged after getting approval of PSERC	1. Capital overhauling of Power House No.2 Stage I. 2. Replacement of Existing Electro-Mechanical Excitation/AVR system with Digital Static Excitation System of UBDC Stage II Power Houses. 3. R&M of Protection and measurement system by providing new C&R Panels equipped with numerical relays and digital instruments of UBDC Stage I Power Houses. 4. Spare Generator Transformers 20 MVA 11/132 KV.	1. Case under consideration for administrative approval. 2. NIT under preparation. 3. NIT under preparation. 4. PO dated 11.01.2017 issued to M/s BBL, New Delhi for supply of 4 no. GTs (2 for UBDC and 2 for MHP). 2 no. GTs for UBDC received and

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								5. Capital overhauling of UBDC Power House No.3 Stage I. 6. Replacement of Electro Hydraulic Governors with microprocessor based digital governor of UBDC Stage II Power Houses. 7. R & M of dewatering and drainage system of UBDC Stage II Power Houses. 8. Replacement of Protection and measurement system by Electromagnetic relays and instruments with numerical relays and digital instruments of UBDC Stage II Power Houses. 9. R & M of C&R panels of 132 KV O/G feeders at UBDC Power House No.3 Stage I. 10. Replacement of Governor Pumps of UBDC Stage I Power Houses	commissioned. Case under consideration for administrative approval of 1 no. Spare GT. 5. Case to be processed in 2018-19. 6. Case to be processed in 2018-19. 7. Case to be processed in 2018-19. 8. Case to be processed in 2019-20. 9. Case to be processed in 2019-20. 10. Case to be processed in 2019-20.

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

UTTARAKHAND

NORTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation - STATE SECTOR (UJVN LTD.)									
14.	Tiloth, 3x30 MW UJVN LTD. 1984 T&G - BHEL	384.66 (with IDC) 327.90 (without IDC)	RM&LE	90(LE)	2021-22	NIL	Agency: To be tied up	- 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	- M/s BHEL, M/s Andritz Hydro and M/s GE (Alstom) India Pvt. Ltd. participated in tendering. - Agreement for carrying out RMU Works of Tiloth HEP for amount 139.9 Cr. has been signed between UJVN Ltd. and M/s Andritz Hydro on 14.12.2016. Kick-off meeting was held on 02.02.2017 between UJVN Ltd. and Andritz Hydro Pvt. Ltd. (AHPL). Unit-I handed over to AHPL for reverse engineering on 13.02.2017. <u>Works Completed</u> Reverse Engineering works of Unit-I completed on 14.07.2017. <u>Works Under Progress</u> Design and Engineering works are under progress.
15.	Dhalipur, 3x17 MW UJVN LTD. 1965-70 T - Litostroj, Yugo. G - Rade Koncar, Yugo	152.65 (with IDC) 121.84 (without IDC)	RM&LE	51 (LE)	2021-22	NIL	Agency: To be tied up	- Replacement of turbine, 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 power channel, power station & Tail race channel.	- NIT was floated on 20.02.2014. DPR was revalidated and approved by UJVN Board in its 72nd meeting held on 26.09.2014 - Approval from Hon'ble UERC received vide order dated 14.09.2016. - LOI for RMU Works of Dhalipur HEP has been issued to M/s Gogoal Energy Pvt. Limited (JV), New Delhi amounting Rs 78.25 crs on 28.12.2016. - One machine (Unit-B) has been handed over to the contractor for reverse engineering on 09.03.2017. <u>Work Completed</u> Reverse Engineering Works for Unit-B have been completed on 19.07.2017. <u>Work Under Progress</u> Design and Engineering works are in progress.
B - SCHEMES ONGOING - Under Tendering - STATE SECTOR (UJVN LTD.)									
16.	Chilla (Ph-B), 4x36 MW UJVN LTD. 1980(U-1 to 3) 1981(U-4) T&G – BHEL	490.56 (with IDC) 359.70 (without IDC)	RMU&LE	144 (LE) + 12 (U)	2021-22	NIL	Agency: Tie up for loan with PFC of India.	- Replacement of existing Kaplan turbine and their complete auxiliaries, refurbishment of existing generators, enhancement of plant discharge capacity. Complete replacement of switchyard equipment along	UJVN LTD. informed that under Phase I, DPR has been prepared by M/s SNC Lavlin which has been approved by the Board. Under Phase II, order was to be placed on M/s SNC Lavlin for execution of RM&U works. GoU decided not to go ahead with present arrangement and signing of agreement of Phase II was cancelled on 28.03.2013. Revalidation of DPR was done by AHEC,

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								with Power Transformer, Replacement of 11 kV system, New Excitation system, Electronic Governors, new control metering & protection system & SCADA, HM Works and Civil Works. -Uprating from 4x36 MW i.e. 144 MW to 4x39 i.e. 156 MW.	IIT Roorkee and approved by UJVN Board on 26.11.13. Based on same, required changes in specifications were done by the committee constituted by Managing Director, UJVN Ltd. NIT on NCB route for E&M works invited on 05.02.14 and pre-bid meeting held on 20.05.14. Capital Investment approval has been accorded by Hon'ble UERC on 29.01.2016. Based on the directives of Hon'ble UERC, revised Tender Document prepared & NIT floated on 15.10.2016. Pre Bid meeting was held on 18.11.2016. Part-1 has been opened on 27.06.2017. Part-2 has been opened on 23.12.2017. Financial evaluation is in progress.
17.	Kulhal, 3x10 MW UJVN LTD. 1975 T&G - BHEL	115.24 (with IDC) 99.31 (without IDC)	RM&LE	30(LE)	2021-22	NIL	Agency: To be tied up.	- 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	- Tender was floated on 25-03-2011. - Techno commercial portion of the Bids were opened on 30.03.2012. In compliance with decision of UJVN Board in its 67th meeting dated 07.08.2013, KfW funding has been cancelled. UJVN Board in its 68th meeting held on 27.09.2013 decided to proceed with evaluation of old bids already received rather than going for re-tendering. Evaluation of Part-I (Techno-Commercial) has been initiated. LOI has been issued to M/s GoGoal-Emico (Consortium) on 04.03.14 after financial approval from UJVN Board. Petition for investment approval submitted to UERC on 22.03.14. Hearing on investment approval held by them on 01.07.2014. Investment approval from Hon'ble UERC declined vide order dt. 13.03.15 with the advice that on account of obsolescence of protection equipment, suitable proposal be mooted for their replacement and those would be considered by the Commission. Reply by UJVNL on Hon'ble UERC decision sent on 24.4.15 to consider according investment approval for RMU works along with protection and safety works costing approx. 33 crores. - As per decision of 76th Board meeting, review petition for investment approval for RMU was submitted to Hon'ble UERC and was heard on 17.11.2015 & 09.02.2016. - Investment approval from Hon'ble UERC declined vide its order dated 11.02.2016 due to better availability of the machines. - Appeal has been filed in the Hon'ble Appellant Tribunal New Delhi. Matter is being heard in the Hon'ble Appellant Tribunal. - Further decision is under consideration.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
18.	Ramganga 3x66 MW UJVN LTD. 1976 T&G-BHEL	455.20 (with IDC) 360.83 (without IDC)	RM&LE	198 (LE)	2021-22	-	To be decided	- 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 for RMU was prepared in-house and was reviewed by AHEC, Roorkee. DPR was approved by UJVN Board on 13.09.2012. Specifications were checked and reviewed by AHEC, IIT, Roorkee, and vetted on 15.04.13. Pre-qualification criteria was approved. Tender for RMU on turnkey basis was uploaded on e-portal on 27.08.2013. Pre-bid meeting held on 10.10.2013 and addendum issued on 26.11.13. Clarifications on pre-bid queries uploaded. Petition for investment approval submitted to UERC on 08.07.13. - Investment approval from Hon'ble UERC declined vide its order dated 12.02.2016. - Appeal has been filed in the Hon'ble Appellant Tribunal New Delhi. Matter is being heard in the Hon'ble Appellant Tribunal. - Bid submission dates has been re-scheduled for 16.03.2018 and 19.03.2018 respectively.
19.	Dhakrani, 3x11.25 MW UJVN LTD. 1965-70 T - Litostroj, Yugoslavia. G - Rade Konkar, Yugoslavia.	137.31 (with IDC) 112.89 (without IDC)	RM&LE	33.75 (LE)	2021-22	NIL	Agency: To be tied up	- 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	- NIT was published on 23-11-2011. - Following the decision taken in 67th BoD meeting to cancel KfW loan, proposal for the consideration of UJVN Limited Board was put up for cancellation of Notice Inviting Bids (NIBs) for RMU of Dhakrani and Dhalipur HEPs. Approval accorded for inviting fresh bids on NCB route through domestic funding. - DPR was revised based on present price level. Specifications were reframed. Revised DPR was approved by UJVN Board in its 76th meeting held on 30.09.2015. - Petition for investment approval has been submitted to Hon'ble UERC after approval from board. - NIT was floated on 30.08.2016. - Pre bid meeting was held on 27.10.2016. - Part-1 has been opened on 15.06.2017. Techno Commercial evaluation completed on 19.09.2017 and Part – II opened on 22.09.2017. - Hon'ble UERC has approved RMU of Dhakrani on 27.06.2017 on the petition filed by UJVN Ltd for seeking prior approval of capital investment for RMU of Dhakrani HEP. - Financial approval has been accorded by CPC on 16.11.2017.

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

UTTAR PRADESH

NORTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
I - SCHEMES ONGOING - Under Implementation - STATE SECTOR (UPJVNL)									
20.	Rihand, 6x50 MW UPJVNL 1962 (U-1to5) 1966 (U-6) T&G - EE, UK	132.20 (Revised)	RM&LE	300 (LE)	2017-18	100.84	Own resources	- 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.	<u>UNIT NO. 1</u> R&M Work completed by M/s BHEL (Commissioned on 16.09.2016). Supply, Erection, Testing & Commissioning of G.T and over hauling of intake gate along with alignment of T-Guide and their hoisting is yet to be taken up. <u>UNIT NO. 2</u> R&M work under execution by M/s BHEL. Over hauling of intake gate along with alignment of T-Guide and their hoisting completed. Supply, Erection, Testing & Commissioning of G.T is yet to be taken up. <u>UNIT NO. 3</u> R&M work Completed by M/s BHEL. Supply, Erection, Testing & Commissioning of G.T and over hauling of intake gate along with alignment of T-Guide and their hoisting completed. <u>UNIT NO. 4 & 5</u> R&M Work completed by M/s BHEL. Supply, Erection, Testing & Commissioning of G.T is yet to be taken up in Unit- 4&5. Over hauling of intake gate along with alignment of T-Guide and their hoisting completed in Unit-4 and yet to be taken up in Unit - 5. <u>UNIT NO. 6</u> R&M Work completed by M/s BHEL. Supply, Erection, Testing & Commissioning of G.T and over hauling of intake gate along with alignment of T-Guide and their hoisting is yet to be taken up. <u>COMMON WORK</u> A. <u>WORK COMPLETED</u> 1. Supply of Control cable for Switchyard equipment. 2. Erection of 132KV CT & PT. 3. Supply of silicon rubber disc Insulator 4. Supply of power cable for auxiliary equipment 5. Supply & commissioning of 500KVA Unit & Station T/fs (8Nos.). 6. DG Set with new L.T. Breaker Panel. 7. Supply and commissioning of L.T. Breaker. 8. Stringing of copper Conductor for main & reserve bus. 9. Fabrication & supply of Draft Tube gates 3 Set (6 Nos.). 10. Commissioning of 132KV Isolators for all Units. 11. Commissioning of Draft Tube gates 3 Set (6 Nos.). B. <u>WORK YET TO BE TAKEN UP</u> 1. Supply of delivery pipe (2 sets) for dewatering pump.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
									2. SCADA System including Auto Synchronizer & Auto Sequencer. 3. Lifts. 4. Smoke Detection System except in cable gallery. 5. Mulsifire Pipeline. 6. Supply and Commissioning of 132KV Isolators for feeders.
21.	Obra 3x33 MW UPJVNL 1970 (U-1&2), 1971 (U-3) U-1: T - AEI, UK G - BHEL U-2&3: T&G - BHEL	58.80	RM&LE	99 (LE)	2019-20	18.51	Own resources proposed	- 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.	UNIT NO. 1 A. <u>WORK 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. B. <u>WORK UNDER EXECUTION</u> 1. Replacement of stator core & coil. 2. Re-insulation of rotor pole coils with F class insulation. 3. Replacement of dynamic excitation with Static Excitation System. 4. Refurbishment of generator coolers of machines. C. <u>WORK YET TO BE TAKEN UP</u> 1. Capital overhauling along with replacement of vapors 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. UNIT NO. 2 A. <u>WORK COMPLETED</u> 1. Replacement of oil after overhauling of GT& UAT. 2. Replacement of stator winding, rotor winding overhang support ring and stator core. 3. Control & Protection of Generator, GT & UAT. B. <u>WORK YET TO BE TAKEN UP</u> 1. Replacement of dynamic excitation with Static Excitation. Supply received at site. 2. Refurbishment of generator coolers of machines. 3. Rehabilitation of Intake Gate with new vane type pumps. 4. Capital overhauling along with replacement of vapors 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. UNIT NO. 3 A. <u>WORK 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 dynamic excitation with Static Excitation system.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								- SCADA - Other works covered in various packages approved by ETF.	B. <u>WORK YET TO BE TAKEN UP</u> 1. Replacement of stator core. 2. Capital overhauling along with replacement of vapors 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. COMMON WORK A. <u>WORK COMPLETED</u> 1. Replacement of cable of tainter Gate & dam Top Gantry Crane-II ckt. 2. Supply & Replacement of Lightning Arrestors. 3. Refurbishment of Intake gate crane 125/25 T- order placed. 4. Erection of 132kV CTs & PTs. 5. Supply & replacement of 400 KVA Station Transformer. 6. Control & Protection of 6 Nos. 132 kV feeders & 2 Nos. Station. Tr. 7. Supply & replacement of deluge valves and NRV's of mulsifyree system. 8. Supply & replacement of metering/ measuring instruments. B. <u>WORK UNDER EXECUTION</u> 1. Control and protection system of 2 nos.132KV feeders. 2. Renovation of CO2 Fire extinguishing system of generator of all 3 machines (Centralized Unit). 3. Provision of station supply from Obra HEP 132 KV Bus. C. <u>WORK YET TO BE TAKEN UP</u> 1. Supply & replacement of 132KV Bus Bar. 2. Supply & replacement of Power and Control Cable. 3. Supply, Erection and Commissioning of new elevator.

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

MADHYA PRADESH

WESTERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation - STATE SECTOR (MPPGCL)									
22.	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	21.83	R&M	-	2018-19		Agency: GoMP	Unit-1 Unit-2 Unit-4 Unit-5 Unit-3 Rewinding of generator with class F insulation from class B. Common Works: 1. Operation of DG set in Auto Mode so that DG set starts automatically. 2. Procurement, erection & commissioning of 6 nos. 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. Procurement of 48-volt battery charger along with 24 Nos., 2 volts, 300 Ah battery cell. 5. Procurement, erection & commissioning of new digital governor with RGMO feature including dismantling of existing governor.	M/S Tata Power have carried out RLA studies for Unit-1 in the year 2002 and have found that the condition of the unit components is satisfactory. Capital overhauling & RLA study of Unit-2 completed in 2006. The condition of T.G. component found satisfactory. Capital overhauling and RLA study of Unit-4 has been carried out by CPRI, Bangalore in 2003. The condition of Unit-4 components is satisfactory. The RLA study of U-5 is to be taken up. RLA Study of U-3 completed and found that the condition of the components is satisfactory except the hot spots in core detected in RLA study have been attended but the ELCID test carried out after repair of hot spots does not indicate substantial improvement. e-Tender has been issued on GoMP. e-Procurement portal. Tender is under correspondence with Bidders. 1. Proposal is under correspondence with bidders on deviation. 2. Order placed. Drawing approved on 04.01.2018. 3. Order has been placed on M/s. Electro Services, Vadodara on 13.04.2016. Drawing approved. DI has been issued on 30.09.2016. The Firm has dispatched the material on 01.10.2016. Material has reached the site. 4. Techno-commercial Bid under correspondence with the Bidders for clarification and to be submitted for technical vetting shortly. 5. NIT is to be issued by site office.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
23.	Bargi, 2x45 MW MPPGCL 1988 T&G – BHEL	3.12	R&M	-	2021-22	0.36	Agency: GoMP	1. Procurement, erection & commissioning of Digital AVR for replacement of existing AVR under modernization & up-gradation of excitation system. 2. Procurement, erection, testing & commissioning of 4 Nos. 132 KV SF6 Circuit Breakers including dismantling of existing old MOCB installed at outgoing 132 kV feeders. 3. All Existing Electromechanical /Electrostatic Relays to be replaced with numerical relays.	1. Order has been placed on BHEL. Delivery of material is expected by January 2018. 2. Order has been placed on M/s. Electro Services, Vadodara on 13.04.2016. Drawing approved. The Firm has dispatched the material on 01.10.2016 and reached at the site. 3. 20 MVA 132/33 KV ICT Backup Over current relay for HV has been replaced with numeric type relay.
24.	Pench, 2x80 MW MPPGCL 1986-87 T&G – BHEL	13.36	R&M	-	2021-22	-	Agency: GoMP	1. Change in insulation class of stator from Class B to Class F. 2. Procurement, erection, testing & commissioning of 4 Nos. 132 kV SF6 Circuit Breakers including dismantling of existing old MOCB installed at outgoing 132 KV feeders.	1. Offer for RLA is being obtained. 2. Order has been placed on M/s. Electro Services, Vadodara on 13.04.2016. Drawing approved. DI has been issued on 30.09.2016. The Firm has dispatched the material on 01.10.2016. Material has reached at the sites. 3. Unit-2 RLA of machine is to be done.
B - SCHEMES ONGOING - Under Tendering - STATE SECTOR (MPPGCL)									
25.	Bansagar Tons-I, 3x105 MW MPPGCL 1991-92 T&G – BHEL	4.97	R&M	-	2021-22	-	Agency: GoMP	1. Procurement, erection, testing & commissioning of Duplex Type Control & Relay panels fitted with numerical relays. 2. GPS Time Synchronizer, Sequence Event Recorder, Disturbance Event Recorder & Diagnostic Station.	1. LOI has been issued on 05.01.2018. 2. LOI has been issued on 05.01.2018.

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

GUJARAT

WESTERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation - STATE SECTOR (GSECL)									
26.	Ukai, (U- 1, 2, & 4), 4x75 MW GSECL 1974-76 T&G – BHEL	7.3	R&M	-	2021-22	-	Agency:	Supply, erection, commissioning & testing of New Microprocessor based digital Governing System and dismantling of existing governing system.	Orders for Supply & Works placed to BHEL. 50% material received at the site.
27.	Kadana PSS, 4x60 MW GSECL <u>Units 1&2</u> 1989-90 T&G-Skoda <u>Units 3&4</u> 1998-99 T&G-BHEL	7.1	R&M	-	2021-22	-	Agency:	Replacement of Governing System (Unit 1& 3). Refurbishment of upgrading for successful running in pump mode operation of Unit-1. Replacement of existing AVR excitation system by DVR excitation system of Unit-2. Installation of vibration monitoring system for 60 MW Unit no. 3&4 Supply, erection, Commissioning and testing of on line ultrasonic flow measurement system of any two units.	Work of one unit is pending. OEM, M/s CKD Blansko, Czech Republic had visited KHEP site in July 2017 and submitted their offer on 12/09/2017. The offer is under scrutiny. M/s Voith Hydro Pvt. Ltd. submitted their offer. The detail scope of work and cost justification is under scrutiny. M/s BHEL had visited the site on 03/11/2017 and will submit the offer in due course. Work completed. Technical bid opened on 02.11.2017 and is under scrutiny

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

TELANGANA

SOUTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A- SCHEMES ONGOING -Under Implementation - STATE SECTOR (TSGENCO)									
28.	Nagarjuna Sagar Phase II works 1x110 + 7x100.8 MW, TSGENCO 1978-85 <u>Unit-1:</u> T&G - BHEL <u>Units 2 to 8:</u> PT - Hitachi, Japan G - MELCO, Japan	22.17	R&M	-	2018-19	14.34	Agency: Internal resources	- Replacing existing AVR's with latest DVR's alongwith thyristor modules for 7 units at NSPH. - Replacement of all L.T. Breakers of all units and SABs of NSPH. - Retrofitting of Numerical Relays of Generator Protection Schemes of Units 2 to 8. - Overhauling of EOT Cranes and Gantry cranes at NSPH. - 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. - 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. - Servicing and reconditioning/ procurement of new Isolators required for motoring mode operation for 89G, 89M, 189S1 and 189S2 for units-1 to 8. - Procurement of 245 KV SF6 Circuit Breakers. - Overhaul of stop log gates, penstock gates and seals replacement for draft tube gates for all units at NSPH including trash rack at tail race.	- Completed. - Completed. - Completed. - Completed. - Material procured. - Not suitable for Nagarjuna Sagar Power House Switch Yard due to space constraint. - Completed. - Completed. - Overhaul of stoplog gates: Out of 18 elements reconditioning of one element completed and for remaining 17 elements yet to be taken up. - Overhaul of penstock gates and seals replacement for draft tube gates is yet to be taken up. - Trash rack rectification works at tail race and reservoir side completed.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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).	10. Material received & replaced. 11. Completed.
29.	Nagarjuna Sagar Left Canal Power House (NSLCPH) 2x30 MW TSGENCO 1992 T-Boving, UK G-General Electric, UK	30.99	R&M	-	2018-19	2.00	Agency: Internal resources	1. Replacing existing AVR's with latest DVRs along with thyristor modules for 2 units at NSLCPH. 2. Capital overhauls on generator and turbine and its auxiliaries including spares and consumables for all 2 units of NSLCPH. 3. Overhauling of EOT Cranes and gantry cranes at NSLCPH. 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 of NSLCPH and its feeders. 6. Implementation of SCADA for NSLCPH. 7. Providing of latest version of EHG System for 1 Unit at NSLCPH. 8. Cooling water line erections. 9. Overhaul of stop log gates at NSLCPH and trash rack rectification including gantry crane at NSLCPH.	1. Yet to be processed. 2. Unit-1 completed and unit taken into service. Unit-2 overhaul yet to be taken up. 3. Yet to be taken up. 4. Yet to be processed. 5. Completed. 6. Material delivered and erection is under progress. 7. Completed. 8. Completed. 9. Trash rack rectification works completed. Gantry crane works yet to be taken up and reconditioning of stop log gates is to be taken up.

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

KARNATAKA

SOTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimate d Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation - STATE SECTOR (KPCL)									
30.	Bhadra River Bed units, 2x12 MW KPCL T- Neyrpic, France G- Hitachi, Japan	28.015	R&M	-	2017-18	21.81 crores	MNRE has sanctioned financial assistance of Rs.6.81 crores out of which 6.13 crores has been received. Balance requirement to be met from own funds.	Replacement/Refurbishment of Turbine & associated equipment as below: Refurbishment of Turbine & Auxiliaries 1. Replacement of BF valve, TGB, Guide vanes, Rubber hub, Top cover, Vacuum break valve, Air compressor system, 11 kV cables, 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. Refurbishment of Generator Auxiliaries 1. Supply and replacement of existing excitation system with SEE. 2. Replacement of governors.	Contract agreement executed by M/s Andritz Hydro Pvt. Ltd. on 10.12.2009 for R&M works. Contract Agreement for addl. works executed on 21.09.2012. Unit 2 commissioned and was synchronized to the grid on 18.02.2016. Since this is a River bed unit, the unit is taken into service depending on the water availability. Status of Unit-1: • After completion of erection works of Unit-1 and coupling of Turbine and Generator shafts, alignment was started on 26.12.2015. The alignment readings were beyond permissible limits and oil leakage was observed through runner blade servomotor to shaft coupling flange area. • The turbine and generator shafts were decoupled and laser alignment test was carried out, the readings obtained were beyond permissible limits. The problem was discussed with leading manufacturers of the generating units and it was decided to carryout machining of the rotor shaft to bring the alignment within the tolerable limits. Additional order was placed for refurbishment of generator shaft at a total cost of Rs.2.5 crores. • Rotor winding resistance, IR test, Pole impedance test & HV test were carried out at repair bay. • Coupling of generator shaft with intermediate flange and turbine shaft work completed. • Dynamic rotor level, runner blade gap measured. • After repeated trials, the combined alignment run out checks competed. • Assembling of Turbine Guide bearing works completed and measured bearing gap. • Instrumentation and all control wiring works completed. • Boxing up of unit is in progress. Unit is ready for testing & commissioning subject to release of water by Irrigation department. 1. Work awarded to M/s ABB Ltd. on 21.08.13. Static Excitation Panels, Excitation Transformer supplied in Dec'13. Commissioning of Unit-1 is pending commissioning for Unit-2 has been completed. 2. Work awarded to M/s Andritz Hydro Ltd.on 12.09.13. All the materials received at site & erection work completed Commissioning of Unit-1 is pending. Commissioning of unit-2 completed.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								3. Replacement of electromagnetic relays with digital relays. 4. Replacement of 11 kV switchgear, LAVT & NGT/NGR cubicles.	3. Work awarded to M/s Alstom India Ltd. on 24.04.13. Retrofitting of relays completed for both units. Commissioning of Unit-1 is pending. 4. P.O. dated 19.9.13 placed on M/s Schneider Electric Infrastructure limited. Replacement of 11 kV Switchgear, LAVT panels, NGT/NGR pertaining to Unit-1&2 completed. Commissioning of Unit-1 is pending.
B - SCHEMES ONGOING - Under Tendering - STATE SECTOR (KPCL)									
31.	Nagihari, U-1 to 3 3x150 MW KPCL 1979 (U-1), 1980 (U-2), 1981 (U-3) T&G - BHEL	222 (Including IDC)	RM&LE	450 (LE)	2021-22	28.46 (as on 30.09.16)	-	R&M of Turbine of Unit-1, 2 & 3. Top cover, Pivot ring, labyrinth, MIV seals, guide vanes, aeration valves, runner, guide apparatus, regulating ring, rotary valve, shaft coupling bolt, spare guide vanes, runner & shaft etc. Replacement of Auxiliary panels fitted with electromagnetic relays by new panels with Numerical relays, new meters and supply switches/MCBs /MCCBs. SCADA	- Hon'ble KERC has accorded approval to take up R&M works proposed in the DPR subject to obtaining consent from all ESCOMs. All ESCOMs accorded consent. - Replacement of Generator gauge panel, Brack & Jack assembly, oil coolers, thrust collar, unit auxiliary panels, Generator coupling bolts, High Pressure lubrication system, replacement of Lower End Bearing as per DPR planned in phased manner. - Further, procurement of 245kV CTs is planned. - Mid-term life assessment of 245kV Circuit Breakers is planned. - Replacement / Refurbishment of Turbine components, MIV & its auxiliaries as per DPR is planned in phased manner. - Offer obtained from M/s BHEL and discussions & negotiation were held with M/s BHEL for finalization of offer. - Techno- commercial Bid opened. 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 signalling devices in addition to RTD's, replacement of hydraulically operated valves by electrically operated. Solenoids as per DPR will be under taken.
32.	Kadra Dam Power House (3x50MW) KPCL 1997-1999 T&G - BHEL	44.47 (Including IDC)	RM&LE	150 (LE)	2021-22	-	KPCL	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,	Hon'ble KERC has accorded approval to take up the works proposed in the approved DPR. Techno-commercial offer furnished by M/s BHEL is under review.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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. 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. - Excitation system - Replacement of excitation system, digital voltage regulator. - SCADA - New SCADA System is to be implemented. - Battery Charger - New battery charger with battery bank DC source for Main I & II protection is to be commissioned as per SRPC guidelines to maintain two sources of DC for Main I & Main II. - Civil works: Repair works of power channel side walls, bed, collapsed abutments and piers of foot bridge and aqueduct cum bridge.	
33.	Kodasalli Dam Power House. (3x40MW) KPCL 1998-1999 T&G - BHEL	50.60 (Including IDC)	RM&LE	120 (LE)	2021-22	-	KPCL	- 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.	Hon'ble KERC has accorded approval to take up the works proposed in the approved DPR. Techno-commercial offer furnished by M/s BHEL is under review.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								• 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. • Excitation system - Replacement of excitation system, digital voltage regulator. • SCADA - New SCADA System is to be implemented. • Battery Charger - New battery charger with battery bank DC source for Main I & II protection is to be commissioned as per SRPC guidelines to maintain two sources of DC for Main I & Main II.	
C - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval - STATE SECTOR (KPCL)									
34.	Sivasamudram Hydro Power Station 6x3 MW 4x6 MW KPCL 1920-38 T - Boving, UK (U1 to U6) Escher Wyess, Switzerland (U7 to U10) G - GEC, USA	125.15 (Including IDC)	RM&LE	42 (LE)	2021-22	-	-	R&M of turbines, Governor & Excitation system, improvements in water conducting system, 66 kV switchyard, Control and relay panels.	Draft DPR has been prepared and the same is under examination. Efficiency testing of the existing units done by IIT, Roorkee.
35.	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)	97 (Including IDC)	RM&LE	139.2 (LE)	2021-22	-	-	Hydro- Mechanical Works Refurbishment works of penstock intake gates & trash racks, replacement of stop log gates and refurbishment of penstocks etc. Turbine and Inlet valve Refurbishment of butterfly valves, over velocity devices installed on penstocks, procurement of spare bearing shells, capital overhauling of turbine components along with the replacement of damaged parts etc. Generator and its auxiliaries Refurbishment of generator components along with air coolers, Fire protection system with non CO ₂ gas system (Clean gas based) for generators, replacement of relays	Draft DPR has been prepared and study of efficiency viz. cost involved in R&M works is under progress.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								with numerical relays etc. Complete renovation of outdoor 110kV switchyard 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. Civil works Repair works of power channel side walls, bed, collapsed abutments and piers of foot bridge and aqueduct cum bridge.	Order placed on M/s GE T&D India LTD. at a cost of Rs. 8.63 crores (after deducting buy back cost of Rs. 65 lacs) towards supply portion, Rs. 2.77 crores towards erection & Commissioning, Rs, 87,40,00/- towards Civil works. All the drawings except Wedge connectors were approved. At Stage-I, major materials are inspected and dispatch clearance issued for the same. Dismantling works started. In the first phase replacement of 1st stage 4x16.5MVA GTs taken up and NIT issued on 03.11.2017.
36.	Supa Dam Power House (2x50MW) KPCL 1985 T&G - BHEL	47.91 (Including IDC)	RM&LE	100 (LE)	2021-22	-	KPCL	Electro-mechanical Works: Turbine - Refurbishment of underwater turbine components. Generator and its auxiliaries- Replacement of air coolers, flow meters for cooling water system. Inspection of Stator & Rotor. • 110kV Switchyard, UAP & CAP- 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	Draft DPR has been prepared and under review Price Bid opened for Unit Auxiliary Panel (UAP) & Common Auxiliary Panel (CAP).

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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.	
37.	Linganamakki Dam Power House (LDPH) (2x27.5MW) KPCL 1979-1980 T – Electrosilla, USSR G - Electrosilla, Energomach-USSR	56.20 (Including IDC) 2.04	RM&LE	55 (LE)	2021-22	-	KPCL	- Major civil works proposed. Replacement of seals of penstock gates proposed. - Replacement of damaged runner cone - Refurbishment of turbine and associated equipment's. - Refurbishment of generator along with replacement of air coolers. - Replacement of relays with numerical relays meters proposed. Line protection panels & DCS based SCADA system.	Hon'ble KERC has accorded approval to take up the works proposed in the approved DPR. Out of major civil works proposed the works of drilling and grouting in the masonry portion of Linganamakki dam which includes shotcreting, plugging of suction points is under progress. LOA is issued to M/s ABB limited at the cost of Rs. 2.46 crores on 23.11.2017. Detailed order issued on 27.12.2017.
38.	Gerusoppa Dam Power House (Sharavathy Tail Race) (4x60MW) KPCL 2001-2002 T&G - BHEL	59.66 (Including IDC)	RM&LE	240 (LE)	2021-22	-	KPCL	Refurbishment of Turbine and associated parts, generator. Replacement of relays with numerical relays meters proposed. Midlife replacement of switchyard equipment's planned. SCADA implementation planned.	Hon'ble KERC has accorded approval to take up the works proposed in the approved DPR.
39.	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,	196.56 (Including IDC)	RM&LE	1035 (LE)	2021-22	-	KPCL	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: Uprating/ redesign of NGT to suit uprated capacity, providing 2 X 115 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,	Draft DPR has been prepared and the same is under review.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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.	

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

KERALA				SOUTHERN REGION				(Amount in Rs. Crores)	
S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation - STATE SECTOR (KSEB)									
40.	Sholayar, 3x18 MW KSEB 1966-68 T-Litostroj, Yugoslavia G-Rade Koncar, Yugoslavia	Rs.199.55 Cr. (including IDC) Rs. 173 Cr. (excluding IDC)	RM&LE	54 (LE)	2018-19	19.70	Agency: PFC/ REC (to be decided)	Replacement of old machine with new machine. Replacement of 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 Equipment: Board approval on Draft DPR proposal was obtained and administrative sanction accorded on 5.1.2011. Tender documents for the E&M part commenced on 03.06.2013. PQ Bid opened on 24.09.2013. Decided to retender through e-Tender as only one bidder qualified. The PQ Bid of re-tender was opened on 06.05.14 and Bid evaluation completed. Prequalified four firms and price bid opened on 27.01.2015. Lowest bidder is M/s FEPL-FUYUAN Consortium, Supply order and work order issued on 30.06.2015. Agreement signed with M/s FEPL-FUYUAN Consortium on 06.07.2015 with the time of completion being 15.04.2018. Dismantling of Unit-3 completed. Drawing approval and supply of equipment completed. Drainage and dewatering system of all machines completed. MIV: New MIV of Unit-3 was supplied. 95% erection work has been completed. Renovation of Penstock: E-tender for the renovation of Sholayar penstock and allied works were floated on 14.12.2015. The P.Q. bid opened and revoked due to the payment failure of one of the bidders and reopened on 11.05.2016. Price bid opened and LOA issued to L1 bidder i.e. M/s PES Engineering Pvt. Ltd., Hyderabad on 31.03.2017. Agreement signed on 29.04.2017. Dismantling of penstock of Unit - 3 completed. Ultrasonic inspection on plates of new penstock for Unit-3 completed. Fabrication is in progress. 15% of penstock renovation work completed. R&M works of Unit-1&2 will be taken up after completion of Unit-3 works. Note: - The entire project cost including IDC is expected to be paid back in four years.
41.	Idukki 1st Stage 3x130 MW KSEB 1975-76 T - Neyrpic, France G - GE, Canada	89.9 Cr (including IDC)	R&M	-	2019-20	10.03 (Including advance payment of Rs. 2.3 Cr)	KSEB Funds. PSDF available for fire protection system installation of GTs	Refurbishing the Main Inlet Valves, Generators, Generator Transformers, modernizing the auxiliary systems, replacement of Governing Systems & Excitation Systems with new PLC and introduction of SCADA control.	Pre-qualified two firms and Price Bid opened on 03.03.15. The Board decided to go for retender since R&M requirement could not be met by the L1 bidder. The retender was floated on 7.01.16. Pre-Bid meeting was held. PQ bid opened on 21.04.2016. The Single bidder, M/s ALSTOM, participated in the tender. The firm was prequalified and price bid opened on 15.06.16. In the month of August 2016, M/s Alstom (L1 bidder) was taken over by M/s GE Power India Ltd. The work of modernizing the auxiliary system, replacement of

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								switchyard equipment's, replacement of Governing system, Excitation system and Introduction of SCADA was awarded to M/s GE Power on 22.09.2016 and agreement signed on 24.09.2016. The period of contract is 42 months. The renovation works of fire fighting system of Generator and Generator Transformers of both of 1st and 2nd stage units are also awarded to M/s GE Power. Detailed Engineering is in progress. Drawing approval is in final stage. Procurement of equipment already started. The first Unit (Unit -3) was handed over to M/s GE Power on 17-06-2017 and dismantling work of Unit-3 completed. The renovation work of Unit-3 was originally scheduled to be completed by February,2018 but due to extra work on pole end plate, commissioning will be delayed. Exciter Panels arrived at site. Inspection of Protection panels completed at suppliers works. Procurement of one no. MIV. The manufacturing of one no. MIV is in progress at the works of M/s HBHC China. Inspection scheduled in third week of January at suppliers works. Installation of new D.G. Set. Completed. Renovation work of fire fighting system of Generator and Generator Transformers of 1st and 2nd stage. Installation work for Generators in all units except Unit-1 completed. Installation work in all GTs except that of Unit-4 completed.	
B - SCHEMES ONGOING - Under Tendering - STATE SECTOR (KSEB)									
42.	Kuttiadi 3x25 MW KSEB 1972 T&G-Fuji, Japan	377.41 Crores (Including IDC)	RMU&LE	75 (LE)+ 7.5 (U)	2021-22	-	Agency: Yet to be decided.	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 DG set. Integrated SCADA, New fire protection system, Store and AC system modification of switchyard. New 11 kV switch gear	JBIC had carried out feasibility studies for R&M works through EPDC and had submitted the report. The Board vide sanction dated 01.03.2012 decided to entrust M/s. AHEC, IIT, Roorkee for conducting RLA study on the generating unit. Final RLA report submitted in October 2013, but it didn't mention about the uprating of the existing units. As it left many components like spiral casing, further RLA study was conducted to explore the possibility of uprating the units and final report submitted to KSEB. Board accorded Administrative sanction on 14.06.2017 for executing renovation work of Kuttiyadi Power Station. Tender invited on 20.12.2017 for Electro-Mechanical works.

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

TAMIL NADU

SOUTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Implementation - STATE SECTOR (TANGEDCO)									
43.	Sholayar PH-1, 2x35 MW TANGEDCO 1971 T - Litostroj, Yugoslavia G - Rade Koncar, Yugoslavia	120	RMU&LE	70 (LE)+ 14(U)	2018-19	26.49 (upto 31.12.17)	Agency: Proposal for availing loan has been submitted to PFC and Sanctioned.	Replacement of stator core & winding, rotor winding, poles, Excitation system, Governing system, Runner, guide vanes, Cooling water & De-watering systems, Generator Transformers, Generator protection, LT switch gear, lubrication system, 11 KV LAVT, Neutral Grounding Transformer, Annunciation system, power and control cable, UAT, fire-fighting system for generator, yard, cable gallery yard, Refurbishment of turbine inlet valves and Butterfly valves, Air admission system, brake & jack and bearings	Tender was floated on 19.01.14. The Board approved to place orders on M/s Andritz Hydro Private Limited (AHPL), Haryana. Contract Agreement between TANGEDCO and M/s AHPL was signed on 21.07.15. <u>Works Completed</u> Reverse Engineering works of Machine-2 were completed on 23.03.16. The machine was synchronized with Grid and achieved 33 MW of load on 01.04.16 and performance found satisfactorily. Electrical Single Line Diagram of Sholayar PH-1 received from M/s. AHPL. The dismantling works of Unit-1 completed. Some common works have been completed by M/s. AHPL in Units- 1 & 2 of Sholayar PH-1 and Unit-2 has been put into operation on 18.07.17. <u>Works Under Progress</u> Erection of turbine in Unit-1 is under progress. Overall completion period of 42 months from the zero date comprises of Reverse Engineering, submission of drawings, supply of new materials and completion of unit-wise RMU works. The RMU work completion period in respect of Unit-1 includes dismantling of existing unit, refurbishment of items, complete erection of unit, mechanical completion and commissioning (i.e.) thirty days' trial run including 72 hours' continuous full load operation. The RMU works is expected to be completed on or before 28.02.2018. The RMU works for Unit-2 will be completed one year thereafter.

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

JHARKHAND

EASTERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Tendering - CENTRAL SECTOR (DVC)									
44.	Panchet, U-1 2x40 MW DVC 1959 T - NOHAB, Sweden G - AEG, West Germany	48.92	RMU & LE	40 (LE) +8(U)	2021-22	1.99 [NHPC - 1.44 MECON - 0.55]	Own funds	Refurbishment of turbine, turbine shaft journal, runner blade servomotor, penstock, spiral casing wicket gates, regulating ring stay vane & shaft seal. Replacement of governor and governor oil pumping system, HP/LP compressed air system, & generator air coolers. Rewinding of Generator, refurbishment of exciter collector rings, brush gears, bus duct disconnecting switch, generator grounding system etc. Refurbishment of generator Guide bearing upper and lower bracket Generator rotor shaft and journal, Braking and jacking system, Replacement of Control and Protection system, Fire fighting system, Refurbishment of Ventilation and air conditioning Drainage and Dewatering system, cooling water system, EOT Crane etc. Refurbishment of switchyard equipments and Hydro-mechanical equipments.	After RLA study, DPR was prepared by M/s NHPC. DVC invited the agencies invited for their budgetary offer for taking up R&M work of the unit. Offers received from M/s Alstom & M/s Andritz were found to be on higher side. Hence, scope of works was revised. Budgetary estimates based on revised scope of works have been received from M/s Alstom, M/s Andritz and M/s Voith. Based on the Budgetary offers further processing is underway regarding tariff benefits from CERC & necessary approvals from DVC Board. NIT is expected to be floated in 2017-18.

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

ODISHA

EASTERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING – Under Implementation - STATE SECTOR (OHPC)									
45.	Hirakud-I HEP (U5&6), 2x37.5 MW OHPC Ltd. 1962-63 T&G - Hitachi, Japan	158.77	RMU & LE	75 (LE) + 12.2 (U)	2019-20	22.09	Agency: Yet to be decided.	i) The Turbine & Generator will be replaced with new ones except the embedded parts. ii) The auxiliaries of the Unit are to be replaced including the common auxiliaries. iii) Replacement of existing Governor with micro-processor based Digital Governor. iv) Replacement of Exciter and AVR with Static Excitation System. v) New Thrust bearing pads shall be self-lubricated PTFE Type. vi) Replacement of C&I system. vii) Replacement of protection system by state of the art Numerical Relays. viii) New 55 MVA, 11/132 kV Generator Transformer. ix) Replacement of power and control cable with FRLS type cable. x) Architectural works including interior decoration of Power House.	RLA studies were made by M/s TATA Power. OHPC invited Expression of Interest (EOI) for engagement of consultant for starting the process of RMU&LE works from concept to commissioning. NHPC showed interest but quoted high price for consultancy services. OHPC then decided to complete the work utilizing their own resources for tendering etc. Draft DPR prepared and approved by Board on 15.11.2010. The DPR was approved by Project Approval Committee, Govt. of Orissa on 20.10.11. The techno-commercial bid was opened on 22.05.12. and M/s Marubeni Corporation was found qualified. After approval of BOD of OHPC, the Price Bid of M/s Marubeni was opened. The negotiated price offer approved by Board of Directors of OHPC was filed before OERC for approval. However, this was rejected by OERC. After directive of Hon'ble OERC to go for installation of new units, the Tender (ICB) floated on 07.08.2013. The date of submission of Bid was scheduled on 25.01.2014. As per decision of OHPC to include life cycle cost analysis in the evaluation process and modify pre-qualification criteria, the previous tender was cancelled. A fresh tender was floated on 22.02.14. Hon'ble OERC has accorded approval for this R&M work vide order dated 31.03. 2014. The contract agreement for R&M with new T&G set of Unit-5&6 was signed with M/s Voith Hydro Pvt. Ltd on 16.10.2015. <u>Works Completed:</u> The activity for R&M has commenced. Refurbishment works of Draft Tube Gate of Unit-5 & 6 completed and The Dismantling of Unit-6 is completed and shifted to store yard. Dismantling of Generator and BoP equipment's of Unit-5 completed. Sand blasting and 1st coat of painting partially completed. Ultrasonic test & DP test on existing stay vane completed. <u>Works under progress:</u> Refurbishment works of Intake of Unit-5 & 6 are under progress. Dismantling of Generator and Balance of Plant equipment of Unit No. 6 & Unit No. 5 has been started from 04.08.2016 & 01.12.2016 respectively. Dismantling of turbine of Unit-5 is in progress. Installation of Stator frame under process. Supply of different material are under process. OHPC has engaged M/s WAPCOS Ltd. as consultant for Providing Consultancy services for implementations of the R&M project of U 5 & 6 of HHEP and the agreement was signed on 05.07.2016.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
46.	Hirakud-II (U-3), (Chiplima) 3x24 MW OHPC Ltd. 1962-64 Unit-1&2 T-JM Voith, Germany G-Hitachi, Japan Unit-3 T-LMZ, USSR G-Electrosila, USSR	65.67	RM&LE	24(LE)	2018-19	18.34	Agency: PFC loan Sanctioned:	i) The Turbine & Generator will be replaced with new ones except the embedded parts. ii) The auxiliaries of the Unit are to be replaced including the common auxiliaries. iii) Replacement of existing Governor with micro-processor based Digital Governor. iv) Replacement of Exciter and AVR with Static Excitation System. v) New Thrust bearing pads shall be self-lubricated PTFE Type. vi) Replacement of C&I system. vii) Replacement of protection system by state of the art Numerical Relays. viii) New 30 MVA, 11/132 kV Generator Transformer. ix) Replacement of Power and Control cable with FRLS type cable. x) Architectural works including interior decoration.	Unit-3-After conducting the RLA studies in July, 2004, OHPC engaged MECON as consultant for implementation of R&M works. M/s. MECON prepared the Draft Tender Specification but later on backed out from the consultancy contract. The final DPR has been submitted by M/s MECON Ltd. The DPR has been approved by Board of Directors of OHPC. The tender was floated on 02.04.2013 and six nos. of bidders submitted their bids as on 30.08.2013. As per decision of OHPC to include life cycle cost analysis in the evaluation process and modify pre-qualification criteria, the previous tender was cancelled. A fresh tender was floated on 22.02.14. Hon'ble OERC has accorded in-principle approval for R&M work vide its order dated 31.03.14. LOA was issued to M/s Voith Hydro Pvt. Ltd., India on Dt. 17.08.2015. The contract agreement was signed with M/s Voith Hydro Pvt. Ltd on Dt. 15.10.2015. Works Completed: The activity for R&M has commenced. Intake Gate and Draft tube gate refurbishment work (Guide grooves & underwater concrete) completed. Dismantling activities completed Final machining of discharge ring completed. Line boring with rectification works of Bottom Guide Vane bush housing completed. Stator placed inside the generator pit. Erection of Generator transformer completed. OHPC has already approved various design drawing/ documents like CFD Analysis. Turbine Design, Generator cross Section D&D System Design Memo of different auxiliaries which are essential for manufacturing of the equipment. LAVT, NGT, Protection panel, Excitation panels & Excitation Transformer, UAB, DCDB, UAT, Instrumentation & D&D System placed in respective location and Cabling work started. Works under progress: Guide vane fitting started and in progress. Refurbishment and repair works of Drainage & dewatering pit and other civil works of Penstock and spiral case are in progress. Erection of bus duct is in progress. Turbine HPU system of Governor & Accumulator, cooling water system installation is in progress. OHPC has engaged M/s WAPCOS Ltd. as consultant for providing Consultancy services for implementation of the R&M project Unit 3 of CHEP and the agreement was signed on 05.07.2016.
47.	Balimela, 6x60 MW OHPC 1973-77 T-LMZ, USSR G-Electrosila, USSR	382.91	RM&LE	360 (LE)	2020-21	1.70	Agency: Yet to be decided	i) The Turbine & Generator will be replaced with new ones except the water conductor system. ii) The auxiliaries of the Units are to be replaced including the common auxiliaries. iii) Replacement of existing Governors with micro-processor based Digital Governor. iv) Replacement of Exciter and AVR with Static Excitation System. v) New Thrust bearing pads shall be self-lubricated PTFE Type.	The final DPR was submitted by M/s MECON Ltd. The DPR was approved for R&M with replacement by new TG by BOD of OHPC on 12th Nov, 2012. The DPR was approved by project approval committee, Govt. of Odisha, and ICB was floated for R&M (with new TG) on 07.08.2013. As per decision of OHPC to include life cycle cost analysis in the evaluation process and modify pre-qualification criteria, the previous tender was cancelled. A fresh tender was floated on 22.02.14. Hon'ble OERC has accorded approval for this R&M work vide order dated 31.03.2014. After evaluation of Price Bids, BOD approved the project cost of Rs. 382.91 Crs which includes the L1 price of Rs. 295 Crs offered by M/s BHEL. The LoA has already been issued to M/s BHEL on 06.06.2016. The contract agreement with M/s BHEL was signed on

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								vi) Replacement of C&I system. vii) Replacement of protection system by state of the art Numerical Relays. viii) Replacement, 11/220 kV Generator Transformer, Bus Duct system. ix) Replacement of new Station auxiliary transformer. x) Replacement of Control Power cable with FRLS type cable. xi) Architectural works including interior decoration of Power House. xii) One No. of Bay will be extended in Switch yard.	21.09.2016. The Effective date of contract is from 05.08.2016. Kick-off meeting with M/s BHEL was held on 08.11.2016. BHEL Deputed Site-In charge for site activities to Balimela. Site mobilization has been commenced. After Electrical and mechanical isolation of Unit 1&2, M/s BHEL took over the units on 18.12.2017 & started dismantling works, PMG, Pilot exciter and Main exciter of Unit 1 and Unit 2 dismantled. Design & drawing submission and review is under process. OHPC has engaged M/s WAPCOS Ltd. as consultant for Providing Consultancy services for Implementation of the R&M project of Unit 1 to 6 and the agreement was signed on 21.09.2016.

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

WEST BENGAL			EASTERN REGION			(Amount in Rs. Crores)			
S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
C - SCHEMES Ongoing - Under DPR Preparation/ Finalisation/ Approval - CENTRAL SECTOR (DVC)									
48.	Maithon, U-1&3, 2x20 MW + 1x23.2 MW DVC 1957-58 T - Neyrpic, France G - Siemens, W.Germany	56.034	RM& LE	40 (LE)	2021-22	5.75 Cr. (as on 30.06.2016)	Agency: DVC for Switchyard work	1. Refurbishment of runners, Replacement of Governor, Guide vanes & guide vane bushes. Re-babbiting of turbine & generator bearings. Replacement of generator winding, Excitation system, control & protection & synchronization panels (including relays), Generator transformers, 33kV power cables, LT Power & Control cables, all CTs/PTs & isolators in Gen. Aux. panels., all pumps and motors of aux. system, different coolers, refurbishment of cranes and intake gates and auxiliaries etc. 2. Renovation work of 132/33 kV Switchyard.	DVC has taken up work of renovation of Maithon switchyard at an estimated cost of Rs 6.98 Crs and Rs. 5.75 Crs. incurred as on 30.06.16. Contract is going to be closed shortly after completion of minor pending jobs. DVC has now planned that R&M of these units shall be taken up after observing the performance of Panchet Unit-1.

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

MEGHALAYA

NORTH EASTERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
C – SCHEMES ONGOING – Under DPR Preparation/ Finalisation/Approval -STATE SECTOR (MePGCL)									
49.	Umiam Stage-III (Kyredemkulai) 2x30 MW MePGCL 1979 T&G - BHEL	408	RMU & LE	60(LE) +6(U)	2021-22	-	Agency: Yet to be decided.	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 & TEPSCO, Japan under JETRO grant.IIT Roorkee was engaged as consultant for undertaking head measurement studies and which have been completed The DPR was revised as per CEA's recommendation. The latest observation raised by the MoP vide letter dated 21.05.2013 was discussed on 17.09.2013 in the office of Joint Secretary, MoP (Hydro), Govt. of India wherein it was decided to examine whether R&M can be done through domestic supplier with domestic funding. However, Govt. of Meghalaya has expressed its inability to raise funds from domestic sources owing to the need of contributing a substantial amount as matching equity which is not possible due to fund constraints. An updated DPR has been prepared by MePGCL. MoP has agreed to put the proposal back in the rolling plan of JICA funding and forwarded a copy of DPR to Department of Economic Affairs, New Delhi on 02.01.2015. The preliminary project report of R&M of stage III was submitted on 17.06.2015 for placing it before the screening committee of project in DEA (Department of Economic Affair). However, this proposal did not materialized. The Ministry of Power, Government of India vide letter No. 15/20/216-H-1 Dated 28th April 2016 has intimated the inclusion of Renovation and modernization of Umiam Stage III HEPP in JICA rolling plant on priority list and was accorded priority No. 2, as per letter no. F. 1/1/2016-Japan, 1 Dated April 19, 2016, from Department of Economic Affairs, Ministry of Finance, Govt. of India. The Department of Economic Affairs, Ministry of Finance, vide letter dated 20.10.2016 had 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.

								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.	A meeting was also held on 12.09.2017, under the chairmanship of the Joint Secretary (IC), Ministry of Power, the minutes of meeting of which was circulated vide letter No.12/1/201-IC dated on 19.09.2017, wherein it was informed that the matter is now pending with JICA. The JICA study team consisting of 3 members, visited Shillong from 2nd to 7th October,2017, as part of the ‘‘Preparatory Survey on the Renovation and Modernization of the Umaiam-Umtru Stage-III Power Station’’, This is the 1st Survey of the JICA study team to enable for collection of information / data / documents relevant to the Scheme. Site visits were also made to ascertain several requirements by the JICA study team. The JICA Team will make further visits to Shillong and sites later, as part of the 2nd, 3rd and 4th Surveys. The visits are likely anticipated in the 1st week of November, 2017 (2nd Survey), last week of November to last week of December, 2017 (3rd Survey) and February 2018(4th Survey).
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**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

UTTARAKHAND				NORTHERN REGION				(Amount in Rs. Crores)		
S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	
B - SCHEMES ONGOING - Under DPR Preparation/Finalisation/Approval - STATE SECTOR (UJVN LTD.)										
1.	Chibro 4x60 MW UJVN LTD. 1975 (U-1 to 3) 1976 (U-4) T&G – BHEL	184.88 (with IDC) 180.61 (without IDC)	RM&LE	240(LE)	2025-26	NIL	Agency: To be tied up	- 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 in its 67th BoD meeting accorded approval for cancellation of KfW funding. KfW funding has already been withdrawn for these projects as per decision taken in meeting in DEA on 10.10.2012 and confirmed by JS, DEA vide letter 18.10.2012. Further action was taken accordingly. • DPR to be revised based on present price level and specifications are to be reframed. • Tenders shall be invited through NCB route. • These projects are proposed to be taken up for RMU after RMU works of Dhakrani HEP and Chilla HEP.	
2.	Khodri (PH-B) 4x30 MW UJVN LTD. 1984 T&G – BHEL	169.63 (with IDC) 165.85 (without IDC)	RM&LE	120(LE)	2025-26	NIL	Agency: To be tied up	- 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 for completion during 2022-27

KERALA

SOUTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under RLA Studies - STATE SECTOR (KSEB)									
3.	Idukki 2nd Stage 3x130 MW KSEB	-	RM&LE	-	2022-27	-	Agency: yet to be decided	Detailed scope of work will 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

ANDHRA PRADESH

SOUTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
C- SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval - STATE SECTOR (APGENCO)									
4.	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	350	RMU & LE	120 (LE) + 9 (St.-I) (U)	2024-25	-	Agency: Yet to be decided	1. Replacement of runner and refurbishment of associated equipment, 2. Digital Speed Governor, 3. Replacement of Generator components and excitation system, 4. Replacement of GTs, breakers and switchyard equipments, 5. Reconditioning of MIVs. 6. Replacement of Protection & Control equipment. 7. Replacement of turbine and other auxiliary equipment Note: Three of Stage-I units each rated at 17 MW are proposed to be uprated to 20 MW.	The draft modified supplementary agreement was prepared according to the decisions arrived in the meeting dated 28.4.2010. APGENCO Board accorded approval. The draft modified agreement was then sent to Energy department, Govt. of Odisha for approval to precede further on RM&U works. High level meeting was held between officials of Odisha and A.P. on 27th & 28th May 2013 to resolve the various issues pertaining to Machkund HES. The OHPC has proposed modifications on certain clauses on Modified Agreement and the same was agreed to by GoAP/APGENCO. GoO/ OHPC proposed in signed MOM to freeze the 20% cost of project less depreciation, calculated as on June, 2012 against APGENCO proposal of payment of 20% cost of the project to be arrived as on the date of payment. Final decision on conclusion of 20% project cost and subsequently the modified agreement is to be taken by higher authorities. Soon after signing of MOM and subsequently the modified agreement, the RMU works will be taken up. A meeting was conducted on 30.07.2016 between OHPC, GRIDCO, OPTCL, SOUTHCO, and APGENCO under the chairmanship of EIC (Electricity) cum—PCEI, Govt. of Odisha to discuss and resolve the issues involved in finalization and signing of the JV agreements between Govt. of AP and Govt. of Odisha including R&M of Machkund. The Govt. of AP & Govt. of Odisha have mutually agreed for carrying out RM&U by sharing the costs & benefits in the ratio of 50:50. The modified agreement is to be entered by both Govt. of AP & Govt. of Odisha for carrying out RM&U of Machkund HES. The conditions stipulated in the modified agreement by both Govt. of AP & Odisha agreed by APGENCO is conveyed to Govt. of Odisha for consent on 29.12.2017 and reply awaited. 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.

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

TAMILNADU

SOUTHERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
A - SCHEMES ONGOING - Under Tendering- STATE SECTOR (TANGEDCO)									
5.	Moyar PH 3x12 MW TANGEDCO 1952-53 T – Boving, UK G - Metropolitan Vickers, UK	67.05	RMU&LE	36 (LE)+ 6 (U)	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	Tender for RLA studies was floated and opened on 01.03.13. Only one bid i.e. MECON was received. 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. The firm submitted the draft DPR for R&M works and after incorporating corrections pointed out by TANGEDCO Final DPR was received on 07.02.15. Specification is under scrutiny. Administrative approval has been accorded on 04.06.2016. As per the instruction of CMD, TANGEDCO, a Committee has been formed with 3 engineers under the head of CE/Hydro to study the implementation points of DPR. The Committee submitted the implementation report to CMD, TANGEDCO after detailed study on 26.10.2016. The remarks on the commercial part of tender specification have been communicated to M/s MECON. The technical part is under scrutiny.
B - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval - STATE SECTOR (TANGEDCO)									
6.	Kodayar, PH-I, 1x60 MW TANGEDCO 1970 T-Vevey Engg. works, Switzerland G-Alstom, France	88.48	RMU&LE	60 (LE)+ 10 (U)	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	Contract 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. Draft Tender Specification received from M/s MECON and is under scrutiny. Administrative approval has been accorded on 03.02.2017.
7.	Kodayar, PH-II, 1x40 MW TANGEDCO 1971 T-Litostroj, Yugoslavia G-Rade Koncar, Yugoslavia.	-	RMU&LE	40 (LE)+ 6 (U)	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Replacement of stator core & winding, rotor winding, poles, Excitation system, Governing system, Runner, guide vanes, Cooling water & De-watering systems, Generator Transformers, Generator protection, LT switch gear, lubrication system, 11 KV LAVT, Neutral Grounding Transformer, Annunciation system, power and control cable, UAT, fire-fighting system for generator, yard, cable gallery yard, Refurbishment of turbine inlet valves and Butterfly valves, Air admission system, brake & jack and bearings.	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 Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
C - SCHEMES ONGOING - Under RLA Studies - STATE SECTOR (TANGEDCO)									
8.	Kundah-I, 3x20 MW TANGEDCO	-	RM&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
9.	Kundah-II, 5x35 MW TANGEDCO	-	RM&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
10.	Kundah-III, 3x60 MW TANGEDCO	-	RM&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
11.	Kundah-IV, 2x50 MW TANGEDCO	-	RM&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
12.	Kundah-V, 2x20 MW TANGEDCO	-	RM&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
13.	Mettur Tunnel, 4x50 MW TANGEDCO	-	RM&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
14.	Sarkarpathy, 1x30 MW TANGEDCO	-	RMU&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
15.	Sholayar-II, 1x25 MW TANGEDCO	-	RMU&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will arrived after finalization of specification based on RLA study report.	RLA studies to be taken up in due course.
16.	Suruliyar, 1x35 MW TANGEDCO	-	RMU&LE	-	2022-27	Nil	Agency: To be finalized by TANGEDCO later.	Detailed scope of work will 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

MANIPUR

NORTH EASTERN REGION

(Amount in Rs. Crores)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
B – SCHEMES ONGOING – Under DPR Preparation/ Finalisation/ Approval - CENTRAL SECTOR (NHPC)									
17.	Loktak 3x35 MW NHPC USSR 1983 LMZ T-LMZ G-Leningrade, (U-1) T&G –BHEL(U-2&3)	260.47	RM&LE	105 (LE)	2022-23	-	-	i) Activities covering main equipment i.e. turbine, generator, generator transformers other plant equipment essential for efficient and sustained performance of the units as well as station. ii) Activities having direct impact on improvement of generation, efficiency, machine availability etc. iii) Activities for Integration of Control, Monitoring & Protection system of Power Plant such as Electronic Governors, Static Excitation System, numerical relays, SCADA. iv) Augmentation of water conductor system and associated Civil/HM works and infrastructure works.	Proposal for R&M has been approved by the Board of Directors on 10.02.2016. MoP directed CEA vide their letter dt. 29.04.2016 to examine the R&M proposals. CEA team visited Loktak Power Station from 26.09.2016 to 28.09.2016. Approval of Design Energy has been accorded on 19.12.2016. BoQ of E&M, HM and Civil works have been finalized and Cost estimate is under vetting.

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) + 336 (Res) + 54(LE)]		

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) + 331.03(Res.) + 423.0(LE)]		

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

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

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

Annex- III
(Sheet 2/3)

Sheet 2 of 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
Maharastra								
28	Bhira Tail Race, MSPGCL	SS	2x40	1.60	0.70	-	R&M	2003-04
29	Tillari, MSPGCL	SS	1x60	4.50	4.24	6.0 (U)	RM&U	2004-05

Annex- III
(Sheet 3/3)

(Sheet 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(L E) + 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 – Upgrading; 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)	Category	Year of Completion
				(Rs . in Crs)				
Himachal Pradesh								
1	Bassi, HPSEB	SS	4x15	124.25	158.26	6.0(U)+ 60(LE)	RMU&LE	2013-14
Jammu & Kashmir								
2	Lower Jhelum, J&KSPDC	SS	3x35	101.3	96.10	15.00(Res)	R&M+ Res.	2014-15
3	Sumbal Sindh, J&KSPDC	SS	2x11.3	25.00	24.59	-	R&M	2016-17
Uttarakhand								
4	Pathri, UJVNL	SS	3x6.8	113.25	108.3	20.40(LE)	RM&LE	2014-15
5	Khatima, UJVNL	SS	3x13.8	256.77	118.83	41.40 (LE)	RM&LE	2016-17
Uttar Pradesh								
6	Matatila, UPJVNL	SS	3x10.2	10.29	7.21	30.6 (LE)	RM&LE	2015-16
Andhra Pradesh								
7	Lower Sileru, APGENCO	SS	4x115	8.75	6.77	-	R&M	2013-14
8	Srisailem RB, APGENCO	SS	7x110	16.70	17.60	-	R&M	2015-16
Telangana								
9	Nagarjuna Sagar Ph-I works, TSGENCO	SS	1x110+ 7x100.8	33.35	13.90	-	R&M	2012-13
Karnataka								
10	Supa, KPCL	SS	2x50	3.45	3.88	-	R&M	2014-15
11	Nagjhari,U-1 to 6, KPCL	SS	1x135 (U-6)	69.21	64.49	15 (U)	RM&U	2015-16
12	Sharavathy Genarating Station (Ph B), KPCL	SS	10x103.5	20.00	29.27	-	R&M	2016-17
Kerala								
13	Idamalayar, KSEB	SS	2x37.5	14.50	13.22	-	R&M	2012-13

Annex- V
(Sheet 2 of 2)

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (No.x.MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs . in Crs)				
14	Sabarigiri, U-4 KSEB	SS	1x55	52.20	50.41	5(U)	RM&U	2014-15
15	Poringalkuthu, KSEB	SS	4x8	88.63	51.90	4 (U)+ 32.00 (LE)	RMU&LE	2015-16
Tamil Nadu								
16	Periyar, TANGEDCO	SS	4x35	161.18	133.68	28.00(U)+ 140(LE)	RMU&LE	2015-16
Odisha								
17	Rengali Unit-1 OHPC	SS	1x50	47.50	36.76	50(LE)	RM&LE	2012-13
18	Rengali Unit-2 OHPC	SS	1x50	25.20	20.73	50(LE)	RM&LE	2013-14
West Bengal								
19	Jaldhaka St.I, WBSEDCL	SS	3x9	88.62	79.97	27 (LE)	RM&LE	2016-17
Assam								
20	Khandong NEEPCO	CS	1x25	25.05	29.18	25(LE)	RM&LE	2014-15
21	Kopili, NEEPCO	CS	2x50	50.22	50.92	-	R&M	2014-15
Total			4149.6	1335.42	1115.97	549.40 [58(U)+ 476.40 (LE) + 15 (Res)]		

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)	Category	Year of Completion
				(Rs. in Crs.)				
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	9.34	48.4 (LE)	RM&LE	2017-18
2	Dehar Power House, BBMB (6x165)	CS	1x165	19.87	16.00	-	R&M	2017-18
Sub Total (A)			213.4	34.06	25.34	48.4 (LE)		
B. Ongoing Schemes – Under Implementation								
Himachal Pradesh								
3	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	342.03	540.00(LE)+ 90.00 (U)	RMU&LE	2019-20
4	Baira Siul, NHPC (3x60)	CS	3x60	341.41	-	180 (LE)	RM&LE	2020-21
5	Bhaba Power House, HPSEB (3x40)	SS	3x40	166.17	76	120 (LE)	RM&LE	2019-20
Jammu & Kashmir								
6	Salal, NHPC (6x115)	CS	5x115	58.01	-	-	R&M	2019-20
7	Ganderbal, J&KSPDC (2x3+2x4.5)	SS	2x4.5	39.30	14.66	9.00 (LE)	RM&LE	2017-18
8	Chenani, J&KSPDC (5x4.66)	SS	5x4.66	39.14	14.66	23.30 (LE)	RM&LE	2017-18
Uttarakhand								
9	Tiloth, UJVNL (3x30)	SS	3x30	384.66	-	90 (LE)	RM&LE	2021-22
10	Dhalipur, UJVNL (3x17)	SS	3x17	152.65	-	51.00 (LE)	RM&LE	2021-22
Uttar Pradesh								
11	Rihand, UPJVNL (6x50)	SS	6x50	132.20	100.84	300.00 (LE)	RM&LE	2017-18

Annex- VI

(Sheet 2 of 5)

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)	Category	Year of Completion
				(Rs. in Crs.)				
Uttar Pradesh								
12	Obra, UPJVNL (3x33)	SS	3x33	58.80	18.51	99.00 (LE)	RM&LE	2019-20
Gujarat								
13	Ukai, GSECL (4x75)	SS	3x75 (U-1,2,&4)	7.3	-	-	R&M	2021-22
14	Kadana PSS, GSECL (4x60)	SS	4x60	7.1	-	-	R&M	2021-22
Telangana								
15	Nagarjuna Sagar Ph-II works, TSGENCO (1x110+7x100.8)	SS	1x110+7x100.8	22.17	14.34	-	R&M	2018-19
16	Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)	SS	2x30.6	30.99	2.00	-	R&M	2018-19
Karnataka								
17	Bhadra River Bed units, KPCL (2x12)	SS	2x12	28.015	21.81	-	R&M	2017-18
Kerala								
18	Sholayar, KSEB (3x18)	SS	3x18	199.55	19.7	54.00 (LE)	RM&LE	2018-19
19	Idukki 1 st stage, KSEB (3x130)	SS	3x130	89.90	10.03	-	R&M	2019-20
Tamil Nadu								
20	Sholayar-I, TANGEDCO (2x35)	SS	2x35	120.00	15	70.00 (LE) + 14.00(U)	RMU&LE	2018-19

Annex- VI

(Sheet 3 of 5)

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)	Category	Year of Completion
				(Rs. in Crs.)				
Madhya Pradesh								
21	Gandhi Sagar, MPPGCL (5x23)	SS	5x23	21.83	-	-	R&M	2018-19
22	Bargi, MPPGCL (2x45)	SS	2x45	3.12	0.36	-	R&M	2021-22
23	Pench, MPPGCL (2x80)	SS	2x80	13.36	-	-	R&M	2021-22
Odisha								
24	Hirakud-I OHPC (2x37.5)	SS	2x37.5 (U5&6)	158.77	22.09	75.00 (LE) + 12.2 (U)	RMU&LE	2019-20
25	Hirakud-II (Chilima), OHPC (3x24)	SS	1x24 (U-3)	65.67	18.34	24.00 (LE)	RM&LE	2018-19
26	Balimela, OHPC (6x60)	SS	6x60	382.91	1.70	360(LE)	RM&LE	2020-21
Sub Total (B)			4691.1	3012.80	692.07	2111.50 [1995.30(LE) + 116.20(U)]		
C. Ongoing Schemes – Under Tendering								
Himachal Pradesh								
27	Giri, HPSEB (2x30)	SS	2x30	139.8	-	60.00 (LE)	RM&LE	2020-21
Punjab								
28	Mukerin St.I, St.II, St.III & St.IV, PSPCL (3x15, 3x15, 3x19.5&3x19.5)	SS	3x15, 3x15, 3x19.5& 3x19.5	132.47	-	-	R&M	2019-20
29	Ranjit Sagar Dam, PSPCL (4x150)	SS	4x150	42.08	-	-	R&M	2020-21
30	Shanan HEP, PSPCL (1x50+4x15)	SS	1x50+ 4x15	40.20	-	-	R&M	2019-20
31	UBDC St.I & St.II, PSPCL (3x15+3x15.45)	SS	3x15+ 3x15.45	21.05	-	-	R&M	2019-20

Sl. No	Name of Project, Age Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Uttarakhand								
32	Chilla Ph B UJVNL (4x36)	SS	4x36	490.56	-	144(LE)+ 12(U)	RMU&LE	2021-22
33	Kulhal, UJVNL (3x10)	SS	3x10	115.24	-	30(LE)	RM&LE	2020-21
34	Ramganaga, UJVNL (3x66)	SS	3x66	455.2	-	198(LE)	RM&LE	2021-22
35	Dhakrani, UJVNL (3x11.25)	SS	3x11.25	137.31	-	33.75 (LE)	RM&LE	2021-22
Karnataka								
36	Nagjhari KPCL (3x150)	SS	3x150 (U-1 to 3)	222	28.46	-	R&M	2021-22
37	Kadra Dam Power House, KPCL (3x50)	SS	3x50	44.47	-	150 (LE)	RM&LE	2021-22
38	Kodasalli Dam Power House, KPCL (3x40)	SS	3x40	50.6	-	120 (LE)	RM&LE	2021-22
Kerala								
39	Kuttiyadi, KSEB (3x25)	SS	3x25	377.41	-	75.00 (LE) + 7.5 (U)	RMU&LE	2021-22
Madhya Pradesh								
40	Bansagar Ton-I, MPPGCL (3x105)	SS	3x105	4.97	-	-	R&M	2021-22
Jharkhand								
41	Panchet, DVC (2x40)	CS	1x40 (U-1)	48.92	1.99	40(LE)+ 8(U)	RMU&LE	2021-22
Sub Total (C)			2624.10	2322.28	30.45	878.25 [850.75(LE) + 27.5(U)]		

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)	Category	Year of Completion
				(Rs. in Crs.)				
D. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval								
Karnataka								
42	Shivasamudram, KPCL (6x3+4x6)	SS	6x3+4x6	125.15	-	42 (LE)	RM&LE	2021-22
43	MGHE, KPCL (4x21.6+4x13.2)	SS	4x21.6+ 4x13.2	97.00	-	139.2 (LE)	RM&LE	2021-22
44	Supa Dam Power House, KPCL (2x50)	SS	2x50	47.91	-	100 (LE)	RM&LE	2021-22
45	Linganamakki Dam Power House, KPCL (2x27.5)	SS	2x27.5	56.20	-	55 (LE)	RM&LE	2021-22
46	Gerusoppa Dam Power House, (Sharavathy Tail Race) KPCL (4x60)	SS	4x60	59.66	-	240 (LE)	RM&LE	2021-22
47	Sharavathy Generating Station, KPCL (10x103.5)	SS	10x103.5	196.56	-	1035 (LE)	RM&LE	2021-22
West Bengal								
48	Maithon, DVC (2x20+1x23.2)	CS	2x20 (U-1&3)	56.03	5.75	40.00 (LE)	RM&LE	2021-22
Meghalaya								
49	Umium St.III, (Kyrdekulai) MePGCL (2x30)	SS	2x30	408.00	-	60(LE) + 6(U)	RMU&LE	2021-22
Sub Total (D)			1711.20	1046.51	5.75	1717.20 [1711.20(LE)+ 6(U)]		
Total (A+B+C+D)			9239.80	6415.65	753.61	4755.35 [4605.65(LE) +149.7(U)]		

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

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

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

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
A. Ongoing Schemes – Under Tendering								
1	Moyar PH, TANGEDCO (3x12)	SS	3x12	67.05	-	36(LE)+ 6(U)	RMU&LE	2022-27
Sub Total(A)			36	67.05	-	42.00 [36(LE)+ 6(U)]		
B. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval								
Uttarakhand								
2	Chibro, UJVNL (4x60)	SS	4x60	184.88	-	240(LE)	RM&LE	2025-26
3	Khodri PH-II UJVNL (4x30)	SS	4x30	169.63	-	120(LE)	RM&LE	2025-26
Andhra Pradesh								
4	Machkund St.I & St.II, APGENCO (3x17+3x23)	SS	3x17+ 3x23	350	-	9 (U)+ 120 (LE)	RMU&LE	2024-25
Tamil Nadu								
5	Kodayar PH.I, TANGEDCO (1x60)	SS	1x60	88.48	-	60 (LE)+ 10 (U)	RMU&LE	2022-27
6	Kodayar PH-II, TANGEDCO (1x40)	SS	1x40	-	-	40.0(LE)+ 6(U)	RMU&LE	2022-27
Manipur								
7	Loktak, NHPC (3x35)	CS	3x35	260.47	-	105 (LE)	RM&LE	2022-23
Sub Total(B)			685	1053.46	-	710.00 [685(LE)+ 25(U)]		
C. Ongoing Schemes – Under RLA Studies								
Tamil Nadu								
8	Kundah-I, TANGEDCO (3x20)	SS	3x20	-	-	-	RM&LE	2022-27

Annex- VII

(Sheet 2 of 2)

(Sheet 2 of 2)								
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)	Category	Year of Completion
				(Rs. in Crs.)				
9	Kundah-II, TANGEDCO (5x35)	SS	5x35	-	-	-	RM&LE	2022-27
10	Kundah-III, TANGEDCO (3x60)	SS	3x60	-	-	-	RM&LE	2022-27
11	Kundah-IV, TANGEDCO (2x50)	SS	2x50	-	-	-	RM&LE	2022-27
12	Kundah-V, TANGEDCO (2x20)	SS	2x20	-	-	-	RM&LE	2022-27
13	Mettur Tunnel, TANGEDCO (4x50)	SS	4x50	-	-	-	RM&LE	2022-27
14	Sarkarpathy, TANGEDCO (1x30)	SS	1x30	-	-	-	RM&LE	2022-27
15	Sholayar-II, TANGEDCO (1x25)	SS	1x25	-	-	-	RM&LE	2022-27
16	Suruliyar, TANGEDCO (1x35)	SS	1x35	-	-	-	RM&LE	2022-27
Kerala								
17	Idukki 2 nd stage, KSEB (3x130)	SS	3x130	-	-	-	RM&LE	2022-27
Sub Total(C)			1235	-	-	-		
Total (A+B+C)			1956	1120.51	-	752.00 [721(LE)+ 31(U)]		

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

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

Abbreviations

1	APGENCO	Andhra Pradesh Generation Corporation
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

State-wise List of Additional Hydro Projects Identified for Undertaking RMU&LE Works

Sl. No.	Name of Project, Agency	CS/ SS	Inst. Cap. (No. X MW)	Remarks
Himachal Pradesh				
1	Pong, BBMB	CS	6x66	CPRI Bangalore was hired to prepare scope of work for RLA & R&M studies of Pong machines. Final report received from CPRI and sent to Field office on 11.09.17. Comments from field office awaited.
2	Dehar, BBMB	CS	4x165	BBMB placed a Work Order upon M/s CPRI, Bangalore for firming up scope of RLA Study of various equipment to be under taken by an open tender basic RLA & R&M studies on Dehar Power House. The Report in this has been submitted by M/s CPRI and the detailed scope of RLA study to be undertaken is being perused by the field office. The tender document shall be finalised after receipt of detailed scope of RLA from field office.
Maharashtra				
3	Koyna Stage-III, MSPGCL	SS	4x80	
4	Vaitarana, MSPGCL	SS	1x60	
Andhra Pradesh				
5	Tungabhadra Dam, APGENCO	SS	4x9	
6	Hampi, APGENCO	SS	4x9	
Jharkhand				
7	Sikidiri, JSEB	SS	2x65	
Madhya Pradesh				
8	Rajghat, MPPGCL	SS	3x15	
Assam				
9	Khandong, NEEPCO	SS	2x25	Draft DPR was submitted by M/s CPRI on June,2017. NEEPCO requested to CPRI to submit comparison in terms of generation benefit (MU) and financial involvement against both options i.e. (i) R&M and increase of output of the machines to the rated capacity by changing new runner profile (ii) R&M and uprating up to 10% of installed capacity by changing runner, turbine shaft, increasing diameter of penstock to 2.85 Mtr. in place of 2.5 Mtr. CPRI has submitted modified draft DPR and it is under examination.
Uttar Pradesh				
10	Khara, UPJVNL	SS	3x24	
Rajasthan				
11	Rana Pratap Sagar (RPS), RRVUNL	SS	4x43	
12	Jawahar Sagar, RRVUNL	SS	3x33	
Total			2076	