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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
(JULY-SEPTEMBER, 2017)
(2nd Quarter of 2017-18)

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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

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Northern Region							
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III.	Punjab						
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12.		-	Shanan HEP	PSPCL	2019-20	Under Tendering	13-14
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IV.	Uttarakhand						
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18.		-	Ramganga	UJVNL	2020-21	Under Tendering	18
19.		-	Dhakrani	UJVNL	2020-21	Under Tendering	18
V.	Uttar Pradesh						
20.		-	Rihand	UPJVNL	2017-18	Under Implementation	19
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Western Region							
VI.	Madhya Pradesh						
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25.		-	Bansagar Ton-I	MPPGCL	2021-22	Under Tendering	23
	Gujarat						
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S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Status	Page No.
		Central	State				
VIII.	Telangana						
29.		-	Nagarjuna Sagar Phase-II	TSGENCO	2018-19	Under Implementation	26-27
30.		-	Nagarjuna Sagar Left Canal Power House	TSGENCO	2018-19	Under Implementation	27
IX.	Karnataka						
31.		-	Bhadra River Bed units	KPCL	2017-18	Under Implementation	28-29
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33.		-	Shivasamudram	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	29
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40.		-	Sharavathy Generating Station	KPCL	2021-22	Under DPR Preparation/ Finalisation/Approval	32
X.	Kerala						
41.		-	Sholayar	KSEB	2018-19	Under Implementation	33
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43.		-	Kuttiadi	KSEB	2021-22	Under DPR Preparation/ Finalisation/Approval	34
XI.	Tamil Nadu						
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S. No.	State	Name of Scheme in the Sector		Agency	Completion Schedule	Status	Page No.
		Central	State				
XIV.	West Bengal						
49.		Maithon, U1&3	-	DVC	2021-22	Under DPR Preparation/ Finalisation/Approval	39
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XV.	Meghalaya						
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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	42
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II.	Kerala						
3.		-	Idukki 2 nd Stage	KSEB	2022-27	Under RLA Studies	43
III.	Tamil Nadu						
4.		-	Moyar PH	TANGEDCO	2022-27	Under Tendering	44
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7.		-	Kundah-I	TANGEDCO	2022-27	Under RLA Studies	45-46
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11.		-	Kundah-V				
12.		-	Mettur Tunnel				
13.		-	Sarkarpathy				
14.		-	Sholayar-II				
15.		-	Suruliyar				
North Eastern Region							
IV.	Manipur						
16.		Loktak	-	NHPC	2022-23	Under DPR Preparation/ Finalisation/Approval	47

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 9354.55 MW at 50 Hydro Electric Power Stations (7 in Central Sector and 43 in State Sector) is programmed for R&M which will accrue benefit of about 4876 MW through Life Extension, Upgrading and Restoration. The state –wise list of hydro R&M schemes expected for completion during 2017-22 is given at Annex-VI.

During 2022-27

Beyond 2022, an aggregate capacity of 1836 MW at 16 Hydro Electric Power Station (1 in Central Sector and 15 in State Sector) is programmed for R&M which will accrue benefit of 623 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 30.09.2017)

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	43	50	9354.55	6191.13	4875.95 [4720.40(LE) +154.95(U)]
2.	Under Implementation	5	21	26	4904.5	3046.86	2159.90 [2043.70 (LE) +116.20 (U)]
3.	Under Tendering	1	11	12	2279.10	1678.80	525.75 [505.75 (LE) +20 (U)]
4.	Under DPR Preparation/ Finalisation/Approval	1	11	12	2170.95	1465.47	2189.70 [2170.95 (LE)+18.75(U)]

Abbreviations:

MW – Mega Watt;
Res. – Restoration;
U – Uprating;
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	15	16	1836	770.51	623 [601(LE)+ 22(U)]
2.	Under Tendering	0	1	1	36	67.05	42 [36 (LE)+ 6 (U)]
3.	Under DPR Preparation/Finalisation/Approval	1	5	6	565	695.10	581 [565 (LE) + 16(U)]
4.	Under RLA Studies	-	10	10	1235	-	-

Abbreviations:

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

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

As on 30.09.2017

State	<u>Year 2017-18</u>	<u>Year 2018-19</u>	<u>Year 2019-20</u>	<u>Year 2020-21</u>	<u>Year 2021-22</u>
Himachal Pradesh	i)Ganguwal U2 & Kotla U3, BBMB, (1x24.2+1x24.2)=48.4 MW ii) Dehar Power House, BBMB, (1x165)=165 MW		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	<u>Year 2017-18</u>	<u>Year 2018-19</u>	<u>Year 2019-20</u>	<u>Year 2020-21</u>	<u>Year 2021-22</u>
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	-	-	-	-	Machkund St.I & St.II, APGENCO, (3x17+3x21.25)=114.75 MW
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) Kodalalli 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 (Kyrdemkulai), MePGCL, (2x30)=60 MW
Total = 9354.55MW (50 Schemes)	575.70 MW (6 Schemes)	1237.60 MW (7 Schemes)	2678.35 MW (9 Schemes)	714.75 MW (6 Schemes)	4152.95 MW (22 Schemes)

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 ONGOING – Under Implementation - CENTRAL SECTOR (BBMB)									
1.	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)	341.73 cr. (as on 31.08.17)	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. First Unit (Unit 2) - 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. Due to design and Runner crown & Runner Band quality issues in Lower and Upper Brackets, mismatching of Bus Duct sections, in-adept handling of site issues and non-deputing of Project Manager, etc by M/s Andritz, completion of RM&U of the first Unit got delayed. Further progress was hampered due to failure in four attempts of Spinning carried out on 10.07.2011, 01.08.2011, 05.10.2011 and 07.10.2011. 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. - The overall Unit performance was scheduled in mid-March, 2017. However, as the maximum head achieved was 478.67 feet and the Unit has not operated at high head range (480-512 feet), the joint inspection with M/s Hitachi was not carried out. - Now, Unit No. 2 is running on high head range w.e.f 13.08.2017. The head on 29.08.2017 was 497.07 feet and is further expected to increase during this filling season. Hence, Unit-2 will be run for three months up to mid of November, 2017 and thereafter it may be taken on shutdown on 20th November, 2017. Joint inspection of modified runner profile of Unit-2 of Bhakra left bank is proposed in the third week of November, 2017. If the Joint inspection of modified runner is successful, then proposal for replacement of runners in other units will be put up for the board approval as per MOM dated 13.01.2016 and 02.03.2016. Second Unit (Unit 5) - The unit was under shut down for RM&U works since 11.4.2011 with scheduled completion by 6th November, 2011. Mechanical

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
									run was successfully carried out on 28.08.13 and unit was synchronized on 07.09.2013. - Based on CPRI report, it has been decided that spare new Generator Shaft shall be used on Power House unit no. 5. - 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. 10% Advance Payment released by field office against acceptance of Bank Guarantees of value 11%. Drawings reviewed jointly by BBMB field and design engineers with the firm engineer on 22.12.2016. Completion Period for the entire Work is up to 15.03.2018. The Unit is presently under shutdown. - The works of dismantlement of rotor is completed. All the dismantled material such as spider hub, rotor punching, old generator shaft etc. has been shifted to Neilla store, BBMB. Existing Thrust Head, Rotor lifting bolts and Brake Track segments have already been sent to Prithla works for the matching with new spider. The witness inspection of rotor punching, rim end plats, rotor core pressing bolts and first inspection of rotor spider of welded Area has been carried ou at the works of M/s Andritz Hydro, Bhopal (dated 18th and 19th July, 2017), M/s Randack, Pune (dated 3rd to 5th August, 2017) and Prithla (Palwal) works (dated 22nd to 23rd August, 2017) respectively. The witness inspection of turbine and generator shaft coupling bolts and second inspection of rotor spider on VTL machines has been carried out on 5th and 6th September, 2017 at M/s Randuck, Pune and M/s Andritz Hydro Prithla works respectively. Spider is expected to reach at Bhakra by end of October, 2017. The other components required for re-assembly of spider are likely to be completed, prior to receipt of Shaft and Spider (likely to be received by end of October, 2017 at Bhakra) for further Site works. <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 at high head range of 480-512 feet. <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 24th December, 2017) - 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 commerce at site 3-4 months prior to taking Unit on shutdown for RM&U works.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
									In case Unit No. 5 is commissioned by 15th March, 2018, Unit No. 3 would be commissioned by November, 2018 <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 November, 2018, Unit No.1 shall be commissioned by July, 2019. RM&U works at all the units would be completed in 2019-20.
2.	Ganguwal (Unit-2) BBMB (1x29.25+2x24.2) MW (Original) 1962 (U1, 1955 (U2&3) <u>Unit-1</u> T&G-Hitachi <u>Unit-2&3</u> 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 <u>Unit-2&3</u> T-Baldwin G-Westinghouse, USA (Original) T&G- BHEL (after R&M)	14.19	RM& LE	48.4 (LE)	2017-18	4.24	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.	Purchase Order was issued on 08.01.2016. Material against this purchase order have been received at respective sites. The repair of runner Chamber at Ganguwal & Kotla Power Houses has been completed. After coupling, work of shaft leveling & alignment of runner's shaft under process at both the power houses.
3.	Dehar Power House, BBMB (Unit 6) 1x165 MW 1983 T&G - BHEL	19.87	R&M	-	2017-18	15.00	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.	Purchase order placed on M/s GE Power India Limited (formerly M/s Alstom India Limited) for the said work on 25.01.2016. After replacement of all the stator components and other allied items as per scope of work. Unit was put on bar w.e.f 10.07.2017. Unit to be likely taken over by BBMB in November.

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.	DPR submitted in CERC for approval. DPR submitted in Mar'15 to MoP/ CEA for approval. 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. 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. Civil package: Price Bid 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	-	2017-18 (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.	Works under RMU&LE Scheme for Turbine& Generator: 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.	- Power House 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. Unit-1: The repair & rehabilitation works have been completed. - Unit No. 1 was commissioned on 10.07.2016 but due to over speeding, stator winding damaged & machine again stopped on 25.09.2016. Inspection from BHEL Engineers arranged to assess the damages. NOA has been issued to BHEL on 07.12.2016 for rehabilitation on Unit-1. The Rehabilitation work of the Unit has commenced and 10 out of the 12 poles have been taken out of the rotor, out of which 8 pole have been sent to BHEL's factory at Bhopal. These poles have been

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	120 (LE)	2017-22	Nil		- Providing & installation of 400 kVA, 22/0 415 kV transformer in place of 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. Works under RM&LE scheme for Turbine & Generator	received at Bhopal on 26.12.2016. The key of one pole is stuck up and efforts are on to withdraw this key after which the balance 4 poles shall be sent to BHEL's works at Bhopal. M/s BHEL have committed to spin the Unit on the bars by 31.05. 2017. But during executing of the rehabilitation works of Unit-I, it has been found by BHEL Engineers that the nozzle servomotors of all machines and stator bottom bars & stator core punching of Unit-1 need to be replaced and letter of comfort for same has been issued on 25.03.2017. - Unit -2 has been commissioned on 21.09.2016. - Unit -3 has been commissioned on 20.11.2016. To be finalized later.

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 (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, 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	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. The funding of revised scheme has been taken up with M/s PFC during January 2016. Bid specifications for the equipment depicted in the Scheme being prepared. HEPRC 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
								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 expected to be completed by December 2017. Retrofitting of numerical relays and protection completed for 3 units and balance 2 units expected to be completed by Dec'17. Tender for refurbishment of six nos transformers extended thrice due to poor response. Two bids have been received Pre-qualification bid opened and is under evaluation. 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 December 2017. 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	Turkey 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. Four bids have been received for the work of dismantling of existing 2x4.5 MW units and installation of new 2x4.5 MW unit including transformer, switchgear, MIV etc. but two firms could not qualify due to non submission of requisite documents. Hence tendering process was cancelled and fresh bids were invited. 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. 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. 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 process of dispatching of items 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 (Manufacturing of Runner is in progress). 3rd & 4th Runner: 2018-19 5th & 6th Runner: 2019-20 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.	Mukerin 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-Mechanical Relays with Numerical Relays of all twelve Machines of MPH-1,2,3&4. 4. Replacement of existing conventional DPRs, O/Cs & Directional E/F Relays with Numerical relays of Two Nos. 5. Replacement of existing 3 nos. 630 KVA, 11KV/415 Volt UATs with Dry Type Transformers of similar capacity at MPH-1. 6. Replacement of existing 4 nos. 800 KVA, 11KV/415 Volt UATs at MPH-3 & 4. 7. Capital overhauling along-with replacement of stator core & stator coils and strengthening of Rotor poles with class F insulation of Machine No. 2, 5, 9 & 10. 8. Replacement of existing 11 KV XLPE Aluminum cables of size 1x500 mm² with XLPE Aluminum 1x800 mm² cables from Generator Bus duct to LV side of Generator Transformers of all units at MPH-1 & 2. 9. Procurement of one no. Trash Rack Cleaning Machine at MPH-1. 10. Procurement of 2 sets of Trash Racks for intake bays of Machine No.2&3 at MPH-1 11. Replacement of existing One No. Drainage and One No. Dewatering VT Pumps with submersible	1. Administrative approval got accorded from competent authority. Specification is under preparation. 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. Tender opened on 06.07.2017. Tender under Technical& Commercial evaluation. 4. The case being prepared for approval of the competent authority. 5. Purchase proposal under consideration by competent authority. 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. NIT under preparation. 11. NIT under preparation for Replacement of existing Dewatering VT Pumps

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								Pumps at each Power House. 12. Replacement of existing LT Scheme/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 Five 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.	with Submersible pumps for PH 1,2&3 of MHP. 12. The case under preparation by site office. 13. Tender for 14 nos. 132 KV Line circuit breakers opened on 23.05.2017. Tender under Technical & Commercial evaluation. 14. PO 38 dt.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). Inspection under progress. 15. Case under preparation by site office. 16. Tender opened on 02.06.2017. Tender under Technical & Commercial evaluation. 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.
11.	Ranjit Sagar Dam, 4x150 MW PSPCL 2000 T&G - BHEL	42.08	R&M	-	2019-20	Nil	Funds will be arranged after getting approval of PSERC	1. Installation and commissioning of Digital Electro Hydraulic Governor Capable of Restricted Gov mode 2. Procurement of spares of Auto Sequencers. 3. Procurement of spares of AVR 4. Procurement of T&P	1. Budgetary offer received from M/s GE and M/s Andritz Hydro, budgetary offer has also been requested from M/s BHEL which is yet to be received. 2. PO Issued for procurement of 20 no input cards. 3. Requirement yet to be finalized. 4. Some T & P purchased and Case for digital multimeter tester floated.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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 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.	5. PO for 4 no. M/C 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. Case of inspection of ACs for their renovation under process. 9. Case under preparation. 10. Case to be initiated. Unit # 2 to be taken up in place on unit # 3. 11.Work order for finding fault in condenser mode operation of machines already issued to M/s BHEL. Based on recommendations of M/s BHEL the technical specification will be prepared and case will be initiated 12. Budgetary offer already requested from firms. 13. Work proposed in 2019-20. 14. Work proposed in 2019-20. 15. Work proposed in next year. 16. Work proposed in next year. 17. Work proposed in 2019-20. 18. Work proposed in next year. 19. Case to be initiated.

[illegible]

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								received at site & will be replaced shortly. 4. Providing CCTV cameras at Shanan PH. 5. Procurement of needles and nozzles of all six machines. 6. Replacement/Retrofitting of 66, 132 KV isolators & L.E with new ones at 132 KV Sub-station. 7. Replacement of 33 KV BOCB with new 66 KV SF6 breaker at 132 KV sub-station. 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.	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, 14 nos. nozzels has been received at Shanan and rest of material is yet to be received. 6. Budgetary offer called from reputed firms. 7. Proposal for Construction of foundation work in pipeline 66kV Breakers received in S&T Shanan Store. 8. Material has been received and commissioned at site as such work has been completed. 9. Case is under preparation. 10. Case is under preparation. 11. Case is under preparation. 12. Approval has been obtained from the worthy WTD's 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 03.11.2017. 13. Purchase Order Civil dated 22.17.2017 has been issued to M/s Shalimar Paint Ltd. Parvanu (HP) for procurement of aluminum paint and the case for supply of labour for painting work is under process.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
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. 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	1. Case is under preparation by site office. 2. Case is under preparation by site office. 3. Case is under preparation by site office. 4. PO dt.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 dispatched by the firm. 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)	2019-20	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 F class 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. Kickoff meeting was held on 02.02.2017 between UJVN Ltd. and Andritz Hydro Pvt. Ltd. (AHPL). Unit-1 handed over to AHPL for Reverse Engineering (RE) on 13.02.2017 and RE works completed on 14.07.2017. 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)	2020-21	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 F class 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 Energo Pvt. Limited (JV), New Delhi amounting Rs 78.25 crs on 28.12.2016. - One machine (Unit-8) has been handed over to the Contractor for Reverse Engineering works on 09.03.2017 and Reverse Engineering Works have been completed on 19.07.2017. - 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: To be decided.	- Replacement of existing Kaplan turbine with propeller turbine and their complete auxiliaries, refurbishment of existing generators, enhancement of plant discharge capacity. Complete replacement of switchyard equipment along with Power Transformer, Replacement of 11 kV system, New Excitation, Electronic Governors, control metering & protection system & SCADA HM Works and	UJVN LTD. informed that under Phase I, DPR has been prepared by M/s SNC Lavlin which has been approved by the Board. The Financial tie up was done on EDC line of credit for this scheme and agreement was to be signed between GoU and Canadian Commercial Corporation (CCC). Under Phase II, order was to be placed on M/s SNC Lavlin for execution of RM&U works. The approval of revised recommendation regarding phase II agreement was submitted to GoU in November, 2012. GoU decided not to go ahead with present arrangement. Signing of agreement of Phase II was cancelled on 28.03.2013. Nigam is taking up RMU at its end. Revalidation of DPR done by AHEC, IIT Roorkee and approved by UJVN Board on 26.11.13. Based on same, required changes in specifications were done by the

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								Civil Works. - Uprating from 4x36 MW i.e. 144 MW to 4x39 i.e. 156 MW.	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. Petition submitted for the investment approval to UERC on 04.03.15. 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. Pre Bid queries/clarifications asked by Bidders has been replied. Part-1 has been opened on 27.06.2017. Techno Commercial 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)	2020-21	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 F class 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. - UJVNL Board in its 75th meeting held on 27.06.2015 directed to resubmit the proposal of investment for RMU works of Kulhal HEP to Hon'ble UERC for reconsideration. Same was submitted to Hon'ble UERC. - 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 18.12.2017 and 21.12.2017 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)	2020-21	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 F class 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. The hearing was on 07.06.2016 in the Hon'ble UERC. - Hon'ble UERC instructed the UJVN Ltd to consult with the beneficiaries namely UPPCL & HPSEB Ltd. and submit the record of consultation to the Commission. - NIT was floated on 30.08.2016. - Pre bid meeting was held on 27.10.2016. - Pre bid queries/clarifications asked by Bidders has been replied. - 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 issued order on 27.06.2017 on the petition filed by UJVN Ltd for seeking prior approval of capital investment for RMU of Dhakrani HEP.

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	99.74	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 & 6</u> R&M Work Completed of both units by M/s BHEL. Supply, Erection, Testing & Commissioning of G.T of both units and over hauling of intake gate along with alignment of T-Guide and their hoisting of Unit - 6 is yet to be taken up. <u>UNIT NO. 3</u> R&M work Completed by M/s BHEL. <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. <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. Supply of 132KV Isolators for all Units. 11. Fabrication & Supply of Draft Tube gates 3 Set (6 Nos.). B. <u>WORK UNDER EXECUTION</u> 1. Commissioning of Draft Tube gates, 3 set (6 Nos.). 2. Commissioning of 132KV Isolators for all Units. C. <u>WORK YET TO BE TAKEN UP</u> 1. Supply of delivery pipe (2 sets) for dewatering pump. 2. SCADA System including Auto Synchronizer & Auto Sequencer. 3. Lifts. 4. Smoke Detection System except in cable gallery. 5. Mulsifire Pipeline. Supply and Commissioning of 132KV Isolators for feeders.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
21.	Obra 3x33 MW UPJVNL 1970 (U-1&2), 1971 (U-3) <u>U-1:</u> T - AEI, UK G - BHEL <u>U-2&3:</u> T&G - BHEL	58.80	RM&LE	99 (LE)	2018-19	18.51	Own resources proposed	Replacement of: - Stator cores, Stator & Rotor Coils with class F insulation - Spider arms of Generator Rotors - Stator water coolers, cooling water system etc. - Existing Governors & Excitation System - Existing Control, Metering & Instrumentation Protection System - Existing 132 KV CB/CT/PT & LA - New earthing of Switchyard - Station battery - Supply & replacement of elevator - Air cooler pipeline - Installation RRC for both EOT cranes. - Over hauling of 132kV Isolators (32 sets) - Supply of: Transformer oil dewatering pumps and compressor - Governor oil pumps - Generator air cooler (unit-1) - 1No. ELC & 1 No. LVD machine. - Smoke & Fire detection system SCADA <u>Rehabilitation/Refurbishment of:</u> - Draft tube, spiral casing, runner & its chamber, guide vanes, stay vanes etc. cover assembly. - Stop logs, intake gates & draft tube gates etc. Other works covered in various packages approved by ETF.	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 tyoe 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 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-

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
									lubricating system, refurbishment of runner, runner chamber, GV & Stay vanes, liner of pivot ring etc. Replacement of Vane type pump of Intake Gate with new one. 3. Replacement of Vane type pump of Intake Gate with new one. 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	1. Rewinding of generator with class F insulation from class B. 2. Operation of DG set in Auto Mode so that DG set starts automatically. 3. Procurement, erection & commissioning of 6 nos. each of numerical type distance protection relays & 6 Nos. Directional protection relays for 132 KV outgoing feeders. 4. 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. 5. Procurement of 48-volt battery charger along with 24 Nos., 2 volts, 300 Ah battery cell. 6. Procurement, erection & commissioning of new digital governor with RGMO feature including dismantling of existing governor.	1. 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. 2. e-Tender is under Techno-commercial vetting. 3. Order placed. Drawing is under approval. 4. 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. 5. Techno-commercial Bid under correspondence with the Bidders for clarification and to be submitted for technical vetting shortly. 6. NIT is to be issued by site office.
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	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

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								/Electrostatic Relays to be replaced with numerical relays.	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. Techno-commercial bid is under technical vetting at engineering cell. 2. The item is under procurement process. e-Tender has been opened and under technical vetting.

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 pumps 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 Completed. 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

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)									
28.	Machkund, 3x17 MW (St.-I) & 3x21.25 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	124.45	RMU & LE	114.75 (LE) + 5.25 (St.-I) (U)	2021-22	-	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 existing breakers and switchyard equipments, 5. Reconditioning of MIVs. 6. Replacement of Protection & Control equipment. 7. Replacement of turbine and other auxiliary equipment	The draft modified supplementary agreement was prepared according to the decisions arrived in the meeting dated 28.4.2010. APGENCO Board accorded approval and directed to obtain the views/remarks of Chief Engineer (Inter-State), I&CAD, Andhra Pradesh. CE, I&CAD has informed the clauses of inter-state agreement on irrigation and stated that the same may be considered as view of irrigation department. There are no objections from irrigation wing to carry out R&M works on Machkund units and the first clause of inter-state agreement on irrigation specified the right to use Machkund water for power development. 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. Also, the transfer of assets of Machkund HES from Govt. of AP to APGENCO is under progress to enable to take up R, M & U by APGENCO. Note: Three of Stage-I units each rated at 21.25 MW are proposed to be uprated to 23 MW.

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)									
29.	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. - Feasibility studies are under progress. - 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 completed. Gantry crane works are yet to be taken up.

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. Material received & replaced.
30.	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 DVR's 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 245KV and 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 overhaul started on 14.06.2014 and erection of Unit-1 completed. Unit-2 overhaul yet to be taken up. 3. Fixing of agency is under progress. 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)									
31.	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 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. During the alignment it was noticed that there was runout in the coupling area and the coupling was dog legged in nature, coupling area run-out was 26 divisions. It was decided to provide shims in the coupling area. 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. It established the bend present in the shaft which reflected during dynamic balancing. 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. • The generator shaft has been dismantled and sent to works for machining. • Inspection / testing of 24 Nos. Rotor poles of Unit-1 on 07.09.2017 carried out after completion of refurbishment works at M/s Abhirami Engineering Works, Chennai. • After completion of refurbishment work, inspection and runout checks of Generator rotor shaft of Unit-1 was carried out on 08.09.2017 at M/s Toshiba-JSW Power Systems Pvt. Ltd., Chennai. • The Rotor poles (24 Nos.) were received at Bhadra site on 18.09.2017. • The Generator rotor shaft was received at Bhadra site on 27.09.2017. • Arrangements for rotor rim heating to fit on the rotor shaft is under progress. • The unit is expected to be brought back by Dec-2017. 1. Work awarded to M/s ABB Ltd. on 21.08.13. SEE Panels, Excitation Transformer supplied in Dec'13. Erection of panels completed & commissioned for Unit-2. 2. Work awarded to M/s Andritz Hydro Ltd. on 12.09.13.

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.	Governor panel inspection completed and dispatch clearance issued. Dispatch instructions issued for cables, pressure gauge, temperature gauge and feedback transducers. All the materials received at site & erection work completed and commissioned for Unit-2. 3. Work awarded to M/s Alstom India Ltd. on 24.04.13. Retrofitting of relays completed for both units. Commissioning of relays completed for Unit-2. 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. 11kV switchgear, LAVT, NGT/NGR panels commissioned for Unit-2.
B - SCHEMES ONGOING - Under Tendering - STATE SECTOR (KPCL)									
32.	Nagjhari, U-1 to 3 3x150 MW KPCL 1979 (U-1), 1980 (U-2), 1981 (U-3) T&G - BHEL	51	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 etc.	Technical Specification finalized and commercial offer received. BHEL gave offer of Rs.35 Cr. which has been sent to Board and for which financial approval is under process. DPR prepared and submitted to Hon'ble KERC for approval. DPR was approved by Board and Hon'ble KERC. Action initiated for the works in the DPR.
C - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval - STATE SECTOR (KPCL)									
33.	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	41.05 Cr (Including IDC)	R&M	42 (LE)	2021-22	-	-	R&M of turbines, 66 kV switchyard, Control and relay panels, Governor & Excitation system, improvements in water conducting system.	DPR has been prepared. The DPR has to put to be Board for approval and onward submission to Hon'ble KERC for approval.
34.	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)	74.10	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	DPR has been prepared as per the recommendation of Technical Committee and it is to be put to Board for approval and onward submission to Hon'ble KERC for approval.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								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 CO₂ gas system (Clean gas based) for generators, replacement of relays with numerical relays etc. Complete renovation of outdoor 110kV switchyard with all line and unit bays. Replacement of 8 Nos. Generator Transformer. 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. Civil works Repair works of power channel side walls, bed, collapsed abutments and piers of foot bridge and aqueduct cum bridge.	
35.	Kadra Dam Power House (3x50MW) KPCL 1997-1999 T&G - BHEL	44.47 Cr. (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, 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.	DPR was approved by Board and it is submitted to Hon'ble KERC for approval.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								- 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	
36.	Kodasalli Dam Power House. (3x40MW) KPCL 1998-1999 T&G - BHEL	50.60 Cr (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. 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	DPR was approved by Board and it is submitted to Hon'ble KERC for approval.

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)									
41.	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	1.833	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 were invited for the E&M part. Tender document sale 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 retender 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 are in progress and is scheduled to be completed in January, 2018. MIV: New MIV of Unit-3 was supplied. Its erection 90% of the 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 almost completed. Ultrasonic inspection on plates of new penstock for Unit-3 is in progress. Note: - The entire project cost including IDC is expected to be paid back in four years.
42.	Idukki 1st Stage 3x130 MW KSEB 1975-76 T - Neyrpic, France G - GE, Canada	89.9 Cr (including IDC)	R&M	-	2019-20	4.04 (Including advance payment)	Agency: yet to be decided	Refurbishing the Main Inlet Valves, Generator Transformers, modernizing the auxiliary systems, replacement of Governing Systems & Excitation Systems with new PLC and Introduction of SCADA control.	DPR approved. Administrative sanction issued by the Board. Pre-qualification Bid opened. Tender evaluation completed Bid opened on 03.09.14. 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

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
									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 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 progressing. Drawing approval is in progress. 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 is in progress. The renovation work of Unit-3 is scheduled to be completed by Feb-2018. Renovation of firefighting of Unit-3 & 1 completed. Installation of new DG set completed. The manufacturing of one no MIV is progress at the works of M/s HBHC China.
C - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval- STATE SECTOR (KSEB)									
43.	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 vide B.O (DB) No. 1519/2077 (DGE)/G2/RMU-KTDY/2017-18) Thiruvanthapuram Dated 14.06.2017 for executing renovation work of Kuttiyadi Power Station. Tender specification is being finalized.

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)									
44.	Sholayar PH-1, 2x35 MW TANGEDCO 1971 T - Litostroj, Yugoslavia G - Rade Koncar, Yugoslavia	120	RMU&LE	70 (LE)+ 14(U)	2018-19	15.00 (upto 30.09.17)	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	It has been decided in the Board Meeting of TNEB to take up the RMU of Sholayar PH-I after the ongoing RMU of Periyar PH. Revised administrative approval was obtained. Tender was floated on 19.01.14. The Board approved to place orders on M/s Andritz Hydro Private Limited (AHPL), Haryana. LOI was issued. In continuation, Contract Agreement between TANGEDCO and M/s AHPL was signed on 21.07.15. Machine-2 was handed over to M/s. AHPL for carrying out Reverse Engineering works on 23.12.15 and works 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. 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. Some common works have been completed by M/s. AHPL in Units-1 & 2 of Sholayar PH-I. The dismantling works of Unit-1 is under progress. 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 and the RMU works for Unit II 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)									
46.	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. NHPC was requested to take up consultancy job for R&M work as per their earlier composite offer. In absence of positive response from NHPC, Ph.II work could not be taken up. Attempt was also made by DVC to engage alternative agency capable of taking up consultancy services by publishing 'Expression of Interest'. However, no suitable agency could be identified through this EOI. DVC explored the possibilities of uprating in consultation with agencies of repute. Agencies were 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)									
47.	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	15.35	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. The activity for R&M has commenced. Refurbishment works of Draft Tube Gate of Unit-5 & 6 completed and 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. The Dismantling of Unit-6 is completed and shifted to store yard. Dismantling of Generator and BoP equipment's of Unit-5 completed and Dismantling of turbine is in progress. Sand blasting and 1st coat of painting partially completed. 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.
48.	Hirakud-II (U-3), (Chiplima) 3x24 MW OHPC Ltd. 1962-64 Unit-1&2 T-JM Voith, Germany	65.67	RM&LE	24(LE)	2018-19	14.16	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	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

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
	G-Hitachi, Japan Unit-3 T-LMZ, USSR G-Electrosila, USSR							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.	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. The activity for R&M has commenced. Intake Gate and Draft tube gate refurbishment work (Guide grooves & underwater concrete) completed. Dismantling activities completed. Final assembly of the discharge ring segment for welding has been completed. Refurbishment and repair works of Drainage & dewatering pit and other civil works of Penstock and spiral case are in progress. 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. Supply of major equipment are under progress. Building of Stator winding is in progress. LAVT, NGT, Protection panel, Excitation panels & Excitation Transformer, UAB, DCDB, UAT, Instrumentation & D&D System placed in respective location and Cabling work started. 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.
49.	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. 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.	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. Tenders floated and last date of submission of Bid was scheduled on 24.01.2014. 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. Five Bidders submitted their Bid which were opened on 25.08.14. Evaluation of Part-I (Qualification Bid) and Part II (Techno-commercial) Bid have been completed. Revised Price Bid of the techno-commercially qualified bidders was opened on 18.03.2016. 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 21.09.2016. The Effective date of contract is from 05.08.2016. 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. Kick off meeting with M/s BHEL was held on 08.11.2016. Design & drawing submission and review is under process.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
								xii) One No. of Bay will be extended in Switch yard.	

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)									
50.	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.	NHPC was approached for their service as Consultant for the R&M job. But no response was obtainable from them. Attempt was also made to engage alternative suitable agency capable of taking up services by publishing EOI but no suitable agency could be identified. On further persuasion later, NHPC submitted that RLA study was required to establish detailed scope of R&M work. DVC had consented to this and requested NHPC to forward its offer for consultancy services for the RLA study but NHPC did not respond. 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. Note: 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)									
51.	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 & TEPCO, 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 revised DPR was submitted to the State govt. and the same was forwarded to the Ministry of Finance, Dept. of Economic Affairs, Japan-II Section vide letter No. PLR. 74/92 Pt. II/487 dated 09.01.12. The Concept Paper regarding Preliminary Project Report (PPR) was submitted to the State Govt. vide letter No. MTN/2006/216 (Pt-II)/14 Dt. 20th March, 2012. The clarification sought by CEA was submitted to the State Govt. vide letter no. MTN/2006/21628 dated 15th December, 2012. The points raised by the Director, Ministry of DONER was submitted to the State Govt. vide letter no. MTN/2006/216 dated 17th December, 2012. The latest observation raised by the MoP vide letter no. 15/13/2012-HL 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 and further action initiated on the same. In this regard, CEA vide its letter dated 28.11.2014 has communicated its observations on MePGCL reference dated 19.11.2014. 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. In pursuance of this, MePGCL has submitted a copy of DPR to DEA on 14.01.2015. 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 Affairs).

							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.	However, this proposal did not materialize. In the recent meeting of our CMD, MeECL with the Chairperson of CEA, it has been discussed about the other source of funding. So it is proposal that the source of funding may be from the PSDF Scheme. In this regard the letter has been written for request on comments on the revised estimate with proposal funding from PSDF Scheme. HE&RM Division, CEA vide letter dated 12.01.2017. has informed MePGCL to directly submit its proposal to NRLDC, the Secretariat handling PSDF proposals, in the prescribed format as per stipulated guidelines and as available on their website. 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. In view of the urgency of the work for R&M of Stage III, the Govt. of Meghalaya Vide Letter No. POWER-152/2011/376 Dated Shillong the 7th July 2016 has requested the Ministry of Power, Govt. of India to accord topmost priority for JICA funding for the project so that renovation and modernization work can be started at the earliest. The Department of Economic Affairs, Ministry of Finance, Government of India, vide letter No. F.1/22/2004-Japan 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. 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 during which time discussions were also had on issues pertaining to the scheme. 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 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)	2023-24	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)	2023-24	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

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)									
4.	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. TANGEDCO discussed the technical issues with the firm and the final draft DPR was submitted on 15.11.14 by the firm after incorporating corrections pointed out by TANGEDCO. Further corrections noted and intimated to the firm. Final DPR was received on 07.02.15. Specification is under scrutiny. 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. Administrative approval has been accorded on 04.06.2016.
B - SCHEMES ONGOING - Under DPR Preparation/ Finalisation/ Approval - STATE SECTOR (TANGEDCO)									
5.	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. Preliminary data collection and NDT tests completed by M/s MECON. Basic study report was furnished by M/s MECON. Draft DPR was received from M/s MECON on 21.09.2015. Meeting with the Standing Committee members of TANGEDCO was convened on 17th and 18th March, 2016 regarding the RLA study report submitted by M/s MECON, Ranchi. Meeting with M/s Mecon was convened on 06.04.2016 and remarks on Draft DPR were discussed. M/s Mecon have furnished corrected portion (both technical & commercial) on 25.04.2016. The same was communicated to field on 19.05.2016. On receipt of remarks received from field on 29.06.2016, the same was communicated to M/s Mecon on 01.07.16 for incorporating the same in Draft DPR. Final Draft received from M/s Mecon on 22.07.2016. Standing committee meeting convened on 20.09.2016 to finalize final DPR. Remarks communicated to M/s Mecon on 28.09.2016. Final DPR yet to be received. Administrative approval has been accorded on 03.02.2017 at an estimated cost of Rs88.48 Cr.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
6.	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.

C - SCHEMES ONGOING - Under RLA Studies - STATE SECTOR (TANGEDCO)

7.	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.
8.	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.
9.	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.
10.	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.
11.	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.

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status
12.	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.
13.	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.
14.	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.
15.	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)									
16.	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.	DPR has been prepared. Proposal for R&M has been approved by the Board of Directors. Copy of the Proposal was sent by NHPC to Ministry of Power on 01/03/2016 for advising CEA to examine and vet the proposal. MoP directed CEA vide their lr. 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 received vide letter dt. 19.12.2016. Civil & Hydro-Mechanical (HM) part of DPR is under examination in CWC. NHPC Reply to the queries on cost estimate of E&M works is awaited.

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.	.
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 (3MW)	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

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 2/3

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

Annex- III
(Sheet 3/3)

Sheet 5/5

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
30	Koyna Gen. Complex, MSPGCL	SS	4x70+4x80+4x80	12.00	11.50	-	R&M	2004-05
Meghalaya								
31	Umium St.I, MePGCL	SS	4x9	81.88	84.21	36(LE)	RM&LE	2002-03
32	Khandong, NEEPCO	CS	2x25	4.00	3.35	-	R&M	2003-04
Total			4446.60	1016.31	1029.24	829.08 [123.40(U) +701.25(LE) + 4.43(Res.)]		

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

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

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

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

Annex- IV
(Sheets 2 of 2)

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

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

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

Sl. No	Project, Agency	CS/ SS	Inst. Cap. (No.x.MW)	Est. Cost	Actual Exp	Benefits (MW)	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. Ongoing Schemes – Under Implementation								
Himachal Pradesh								
1	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	341.73	540.00(LE)+ 90.00 (U)	RMU&LE	2019-20
2	Ganguwal (1x29.25+2x24.2) & Kotla (1x29.25+2x24.2), BBMB	CS	1x24.2 (U-2) 1x24.2 (U-3)	14.19	4.24	48.4 (LE)	RM&LE	2017-18
3	Dehar Power House, BBMB (6x165)	CS	1x165	19.87	15.00	-	R&M	2017-18
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	2021-22
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	2019-20
10	Dhalipur, UJVNL (3x17)	SS	3x17	152.65	-	51.00 (LE)	RM&LE	2020-21

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								
11	Rihand, UPJVNL (6x50)	SS	6x50	132.20	99.74	300.00 (LE)	RM&LE	2017-18
12	Obra, UPJVNL (3x33)	SS	3x33	58.80	18.51	99.00 (LE)	RM&LE	2018-19
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	1.833	54.00 (LE)	RM&LE	2018-19
19	Idukki 1 st stage, KSEB (3x130)	SS	3x130	89.90	4.04	-	R&M	2019-20

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.)				
Tamil Nadu								
20	Sholayar-I, TANGEDCO (2x35)	SS	2x35	120.00	15	70.00 (LE) + 14.00(U)	RMU&LE	2018-19
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	15.35	75.00 (LE) + 12.2 (U)	RMU&LE	2019-20
25	Hirakud-II (Chilima), OHPC (3x24)	SS	1x24 (U3)	65.67	14.16	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 (A)			4904.5	3046.86	675.13	2159.90 [2043.70(LE) + 116.20(U)]		
B. 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

Annex- VI
(Sheet 4 of 6)

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.)				
29	Ranjit Sagar Dam, PSPCL (4x150)	SS	4x150	42.08	-	-	R&M	2019-20
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
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	2020-21
Karnataka								
36	Nagjhari KPCL (3x150)	SS	3x150 (U-1 to 3)	51	28.46	-	R&M	2021-22
Madhya Pradesh								
37	Bansagar Ton-I, MPPGCL (3x105)	SS	3x105	4.97	-	-	R&M	2021-22
Jharkhand								
38	Panchet, DVC (2x40)	CS	1x40 (U-1)	48.92	1.99	40(LE)+ 8(U)	RMU&LE	2021-22
Sub Total (B)			2279.10	1678.8	30.45	525.75 [505.75(LE) 20(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.)				
C. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval								
Andhra Pradesh								
39	Machkund St.I & St.II, APGENCO (3x17+3x21.25)	SS	3x17+ 3x21.25	124.45	-	5.25 (U)+ 114.75(LE	RMU&LE	2021-22
Karnataka								
40	Shivasamudram, KPCL (6x3+4x6)	SS	6x3+4x6	41.05	-	42 (LE)	RM&LE	2021-22
41	MGHE, KPCL (4x21.6+4x13.2)	SS	4x21.6+ 4x13.2	74.10	-	139.2 (LE)	RM&LE	2021-22
42	Kadra Dam Power House, KPCL (3x50)	SS	3x50	44.47	-	150 (LE)	RM&LE	2021-22
43	Kodasalli Dam Power House, KPCL (3x40)	SS	3x40	50.6	-	120 (LE)	RM&LE	2021-22
44	Supa Dam Power House, KPCL (2x50)	SS	2x50	66.00	-	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	107.50	-	1035 (LE)	RM&LE	2021-22

Annex- VI
(Sheet 6 of 6)

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.)				
Kerala								
48	Kuttiyadi, KSEB (3x25)	SS	3x25	377.41	-	75.00 (LE) + 7.5 (U)	RMU&LE	2021-22
West Bengal								
49	Maithon, DVC (2x20+1x23.2)	CS	2x20 (U-1&3)	56.03	5.75	40.00 (LE)	RM&LE	2021-22
Meghalaya								
50	Umium St.III, (Kyrdemkulai) MePGCL (2x30)	SS	2x30	408.00	-	60(LE) + 6(U)	RMU&LE	2021-22
Sub Total (C)			2170.95	1465.47	5.75	2189.70 [2170.95(LE)+ 18.75(U)]		
Total (A+B+C)			9354.55	6191.13	711.33	4875.95 [4720.40(LE) +154.95(U)]		

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

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

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

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

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	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	2023-24
3	Khodri PH-II UJVNL (4x30)	SS	4x30	169.63	-	120(LE)	RM&LE	2023-24
Tamil Nadu								
4	Kodayar PH.I, TANGEDCO (1x60)	SS	1x60	88.48	-	60 (LE)+ 10 (U)	RMU&LE	2022-27
5	Kodayar PH-II, TANGEDCO (1x40)	SS	1x40	-	-	40.0(LE)+ 6(U)	RMU&LE	2022-27
Manipur								
6	Loktak, NHPC (3x35)	CS	3x35	260.47	-	105 (LE)	RM&LE	2022-23
Sub Total(B)			565	703.46	-	581.00 [565(LE)+ 16(U)]		
C. Ongoing Schemes – Under RLA Studies								
Tamil Nadu								
7	Kundah-I, TANGEDCO (3x20)	SS	3x20	-	-	-	RM&LE	2022-27

Annex- VII

(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.)				
8	Kundah-II, TANGEDCO (5x35)	SS	5x35	-	-	-	RM&LE	2022-27
9	Kundah-III, TANGEDCO (3x60)	SS	3x60	-	-	-	RM&LE	2022-27
10	Kundah-IV, TANGEDCO (2x50)	SS	2x50	-	-	-	RM&LE	2022-27
11	Kundah-V, TANGEDCO (2x20)	SS	2x20	-	-	-	RM&LE	2022-27
12	Mettur Tunnel, TANGEDCO (4x50)	SS	4x50	-	-	-	RM&LE	2022-27
13	Sarkarpathy, TANGEDCO (1x30)	SS	1x30	-	-	-	RM&LE	2022-27
14	Sholayar-II, TANGEDCO (1x25)	SS	1x25	-	-	-	RM&LE	2022-27
15	Suruliyar, TANGEDCO (1x35)	SS	1x35	-	-	-	RM&LE	2022-27
Kerala								
16	Idukki 2 nd stage, KSEB (3x130)	SS	3x130	-	-	-	RM&LE	2022-27
Sub Total(C)			1235	-	-	-		
Total (A+B+C)			1836	770.51	-	623.00 [601(LE)+ 22(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