

RENOVATION, MODERNISATION & UPRATING OF HYDRO ELECTRIC POWER PROJECTS

For optimization of resources and to tide over the shortage of electricity in the country, Renovation & Modernisation, Uprating 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.

Recognising the benefits of R&M of hydro electric 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 hydro electric power projects in the country was also prepared in C.E.A. 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.

Under the hydro R&M programme, 65 (15 in Central and 50 in State Sector) hydro R&M schemes (13 upto the VIII Plan, 20 in the IX Plan & 32 in the X Plan) with an aggregate installed capacity of 10511 MW at a cost of Rs. 1726 crores have been completed by the end of the X Plan (i.e by 31st March 2007) & have accrued a benefit of 2351 MW through Life Extension, Uprating and Restoration. The state-wise list of Hydro RM&U schemes completed during VIII, IX & X Plans are given at Annex.-I, II & III respectively.

During the XI Plan, 21 schemes with an installed capacity of 6173 MW at an estimated cost of Rs.530 crore were planned to accrue benefit of about 826 MW. Out of these, 17 schemes (4 in central sector & 13 in state sector) with an installed capacity of 4803 MW were completed till March, 2012 at a cost of about Rs.239 Crore and have accrued a benefit of 715 MW through Life Extension, Uprating and Restoration. In addition, one scheme namely Umium St-II (18 MW) of MePGCL, scheduled during XII Plan, was completed during 2011-12. Thus, during XI Plan, a total of 18 hydro R&M schemes (4 in central sector & 14 in state sector) with an installed capacity of about 4821 MW have been completed at a cost of about Rs.295 Crore and have accrued a benefit of 735 MW through Life Extension, Uprating and Restoration. The state-wise list of these 18 hydro R&M schemes is given at Annex.-IV. The remaining 4 schemes of XI Plan namely Bassi (64.5 MW) in HP, Lower Sileru (460 MW) in AP, Nagarjuna Sagar (815.6 MW) in AP and Nagjhari Units 4-6 (435 MW) in Karnataka were therefore then programmed for completion in XII Plan.

During XII Plan, a total of 22 hydro R&M schemes (2 in Central Sector and 20 in State Sector) having an installed capacity of about 3042 MW and which will accrue benefit of about 567 MW through uprating, life extension and restoration are expected to be completed at an estimated cost of about Rs. 1353 Crores. A total of 46 schemes having an installed capacity of about 8792 MW are programmed as on date for implementation during XIII Plan & beyond and which will accrue benefit of about 3647 MW. The state-wise list of hydro R&M schemes expected for completion during XII Plan (22 schemes) and XIII Plan & beyond (46 schemes) is given at Annex.-V and Annex.-VI respectively. Out of the 22 schemes expected for completion during XII Plan, 2 schemes in Central Sector and 14 schemes in State Sector with an installed capacity of about 2889 MW have been completed till March, 2016 and have accrued a benefit of 466 MW through Uprating, Life Extension and Restoration.

State-wise list of additional hydro projects identified as on March, 2016 for undertaking RMU&LE works is given at Annex-VII.

Plan-wise summary of R&M of H.E. Projects starting from VIII Plan is given below:

Summary of R&M of Hydro Electric Projects

(As on 31.03.2016)

I Hydro R&M schemes completed up to XI Plan

Sl. No.	Plan Period	No. of Projects			Installed Capacity (MW)	Estimated Cost (Rs. in Crs.)	Actual Expenditure (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total				
1.	VIII Plan Schemes completed	2	11	13	1282.00	125.57	127.37	429.00 [39.00(U) + 336.00(Res.) + 54.00(LE)]
2.	IX Plan Schemes completed	8	12	20	4892.10	597.84	570.16	1093.03 [339.00(U) + 331.03(Res.) + 423.00(LE)]
3.	X Plan Schemes completed	5	27	32	4336.60	1016.31	1028.97	829.08 [123.40(U) + 701.25 (LE) + 4.43(Res.)]
4.	XI Plan Schemes completed	4	14	18	4821.20	412.83	294.84	735 [12 (U) + 15 (LE) + 708 (Res.)]

II Hydro R&M schemes programmed for completion during XII Plan

Sl. No.	Description of Status of Scheme	No. of Projects			Installed Capacity (MW)	Estimated Cost (Rs. in Crs.)	Actual Expenditure (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total				
a)	Programmed (Original)	5	40	45	7105.40	5405.85	-	3344.25 [182.05(U) + 3147.20(LE) + 15(Res.)]
	Revised	2	20	22	3041.90	1352.67	1032.96	566.70 [43(U) + 508.70(LE) + 15(Res.)]
b)	Completed	2	14	16	2888.6	875.82	784.17	466 [43 (U)+ 408 (LE)+15(Res.)]
c)	Under Implementation	0	6	6	153.30	476.85	248.79	100.70 [100.70(LE)]
d)	Under Tendering	-	-	-	-	-	-	-

Abbreviations:

MW – Mega Watt;

Res. – Restoration;

U – Up-rating;

LE – Life Extension

III Candidate Hydro R&M schemes to be taken up during the XII Plan and programmed for completion in the XIII Plan & beyond

Sl. No.	Description of Status of Scheme	No. of Projects			Installed Capacity (MW)	Estimated Cost [#] (Rs. in Crs.)	Actual Expenditure (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total				
a)	Programmed	8	38	*46	8791.50	5837.18	621.77	3647.15 [191.25(U) + 3455.90(LE)]
b)	Under Implementation	4	9	13	3874.00	1536.10	581.88	1389.60 [131.20 (U)+ 1258.40 (LE)]
c)	Under Tendering	2	10	12	2026.75	2997.58	31.55	1215.55 [28.80 (U) + 1186.75 (LE)]
d)	Under DPR Preparation	2	10	12	2045.75	1303.50	8.34	1042 [31.25(U) + 1010.75 (LE)]
e)	Under RLA Studies	-	9	9	845.00	-	-	-

Abbreviations:

MW – Mega Watt;

Res. – Restoration;

U – Uprating;

LE – Life Extension

* Out of these 46 schemes, 24 schemes have been rescheduled for completion from XII Plan to XIII Plan & beyond.

Estimated cost of 12 schemes not included in the Estimated Cost as the Estimates of these schemes are yet to be finalized.

XII PLAN COMPLETION PROGRAMME – STATE-WISE/ YEAR-WISE STATUS OF R&M SCHEMES OF HYDRO POWER STATIONS

(As on 31.03.2016)

<u>State</u>	<u>Year 2012-13</u>	<u>Year 2013-14</u>	<u>Year 2014-15</u>	<u>Year 2015-16</u>	<u>Year 2016-2017</u>
I-Schemes Completed					
Odisha	Rengali Unit-1, OHPC (1x50)= 50 MW	*Rengali Unit-2, OHPC, (rescheduled from 2012-13) (1x50)= 50 MW	-	-	-
Andhra Pradesh	-	*Lower Sileru, APGENCO (4x115)=460 MW (rescheduled from 2012-13)	-	*Srisailem RB, APGENCO (7x110)=770 MW (rescheduled from 2013-14)	-
Telangana	Nagarjuna Sagar Ph-I, TSGENCO (1x110+7x100.8)= 815.6 MW	-	-	-	-
Kerala	Idamalayar, KSEB (2x37.5)=75 MW	-	*Sabarigiri, KSEB, (1x55)=55 MW (rescheduled from 2012-13)	*Poringalkuthu, KSEB, (4x8)=32 MW (rescheduled from 2014-15)	-
Himachal Pradesh		*Bassi, HPSEB (4x15)=60 MW (rescheduled from 2012-13)	-	-	-
Assam	-	-	i) Khandong, NEEPCO (1x25)=25 MW ii) *Kopili, NEEPCO (2x50) = 100 MW (rescheduled from 2013-14)	-	-
Karnataka	-	-	**Supa (2x50)=100 MW (Unit 1&2) (rescheduled from 2013-14)	-	-
Uttarakhand	-	-	*Pathri, UJVNL (3x6.8)=20.4 MW (rescheduled from 2013-14)	-	-
Jammu & Kashmir	-	-	*Lower Jhelum, J&KPDC (3x35)=105 MW (rescheduled from 2012-13)	-	-
Uttar Pradesh	-	-	-	*Matatila, UPJVNL (3x10.2)=30.6 MW	-
Tamil Nadu	-	-	-	*Periyar, TANGEDCO (4x35)=140 MW (rescheduled from 2014-15)	-
Sub Total I (Completed Schemes)	940.60 MW (3 Schemes)	570 MW (3 Schemes)	405.40 MW (6 Schemes)	972.6 MW (4 Schemes)	-

<u>State</u>	<u>Year 2012-13</u>	<u>Year 2013-14</u>	<u>Year 2014-15</u>	<u>Year 2015-16</u>	<u>Year 2016-2017</u>
II-Schemes Ongoing					
Himachal Pradesh	-	-	-	-	-
Jammu & Kashmir	-	-	-	-	1. *Chenani, J&KPDC (5x4.66)=23.30 MW (rescheduled from 2013-14) 2. *Sumbal Sindh, J&KPDC (2x11.3)=22.6 MW (rescheduled from 2012-13) 3. * Ganderbal, J&KPDC (2x3+2x4.5)=15 MW (rescheduled from 2014-15)
Uttarakhand	-	-	-	-	*Khatima, UJVNL (3x13.8)=41.4 MW (rescheduled from 2014-15)
Karnataka	-	-	-	-	-*Bhadra River Bed units, KPCL (Unit 1&2) (2x12)=24 MW (rescheduled from 2014-15)
West Bengal	-	-	-	-	*Jaldhaka St.I, WBSEB, (3x9)=27 MW (rescheduled from 2012-13)
Odisha	-	-	-	-	-
Assam	-	-	-	-	-
Jharkhand	-	-	-	-	-
Sub Total (Ongoing schemes)	0	0	0	0	153.30 MW (6 Schemes)
Total (Original)	1720.20 MW (10 Schemes)	2048.70 MW (6 Schemes)	1009.40 MW (9 Schemes)	1238.35 MW (12 Schemes)	1088.75 MW (8 Schemes)
Revised Total (Actual)	940.60 MW (3 Schemes)	570 MW (3 Schemes)	405.40 MW (6 Schemes)	972.6 MW (4 Schemes)	153.30 MW (6 Schemes)

* Schemes rescheduled during XII Plan.

** New schemes taken up for completion during XII Plan.

HIMACHAL PRADESH - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(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	Remarks
I - SCHEMES COMPLETED – STATE SECTOR (HPSEB)										
1.	Bassi 4x15 MW (Original) HPSEB 1970-81 T&G - U-1: AEI, UK T&G - U-2 to 4: BHEL	124.25 (Rev. cost)	RMU &LE	60 (LE) 6(UR)	2013-14	158.25 (as on 31.12.15)	Agency: PFC / MOP Sanct. under AG&SP: 80.00. State Plan- 39.83 Disb: 10.161	Renovation, modernization, life extension and uprating of the units. Rewinding of generators with Class F insulation for their uprating from 15 MW to 16.5 MW each. Replacement of existing runners with high efficiency runner and governor. Replacement of existing XLPE cables to cater uprated load. Provision of SCADA. Construction of additional TRC for unit 1, improvement of water conductor system, dredging of silt accumulated in reservoir etc. ADDITIONAL WORKS: - Retrofitting of 13 nos.11/132 kV, 5.667 MVA, single phase Generator transformers. - Replacement of 9 nos. 132 KV ABCBs with SF6 Breakers. - Provision of CO ₂ system for Generator protection, automatic Breaking and Jacking system. FURTHER ADDITIONAL WORKS: - Replacement/machining of thrust collar of Units # 1&2. - Machining of generator shafts of Units#1&2. - Replacement of pole end plates along with pole assembly components of 5 Nos. poles of Unit-II.	- LOI for RMU&LE works has been awarded to M/s. VA Tech on 21.3.2007 at a contractual value of Rs.70 Crores. - Unit-4 commissioned on 29.3.2010 and running at uprated capacity of 16.5 MW after completion of retrofitting of generator transformer. - Unit-2 handed over on 02.09.2008 and RM&U works completed. While conducting pre-commissioning tests, the stator coils got damaged during OCC (open circuit characteristic) test on 17.6.2011. The machine has been re-commissioned and synchronized with grid on 4.8.2011. - Civil work related to modifications in tail race and construction of new cooling water sump have been completed - Unit 3 & 1 were handed over to firm for R&M on 9.11.2010 & 07.12.2010 respectively. Unit No. 3 was synchronized on 23.02.2012 and unit No.1 has been synchronized on 30.08.2012 and date of C.O.D. is 05.09.2012 at 16.20 Hrs. on 16.50 MW ADDITIONAL WORKS: - The order for retrofitting of GT was placed on M/s Aditya Vidyut Appliances, Maharashtra on 27.11.2009. All the transformers have been retrofitted and received at site and its installation completed. - Work completed. - Work completed. FURTHER ADDITIONAL WORKS: - All works stand completed. However, Unit-4 was again handed over to M/s. Andritz Hydro on 18.02.13 for replacement of Turbine Shaft & associated equipment. Short circuit characteristics conducted (m/c put on bars on 03.01.14). Unit commissioned in March'14.	

HIMACHAL PRADESH - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected BenefitMW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING – Under Implementation - CENTRAL SECTOR (BBMB)										
2.	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(UR)	2012-13 (Contract ual) 2018-19 (Anticipated)	319.47 (as on 29.02.16)	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 30.09.2014) PB-126.08 HAR-73.60 HP-5.75 (Till 31.03.2015 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. Aux. Control & protection panels, generator transformers, bus bars with CTs, PTs etc. LAVT cubicle, switchyard equipments, control cables etc.	- Contract agreements for RM&U works (Uprating of generating units from 108 MW to 126 MW) were signed on 21.11.2007 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. But as per assessment of M/s. Hitachi, the condition of the shafts does not warrant replacement and BBMB has decided to retain the old 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. - Model Testing of runner conducted at the works of M/s. Hitachi, Japan in June,2008 and acceptance has been given by BBMB. - First Unit (Unit 2) RM&U works on first unit (Unit 2) started w.e.f. 26.4.2010, with scheduled completion period of 210 days i.e. upto 21st November, 2010. Due to design and 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 earlier informed schedule of commissioning in January, 2013 was not been achieved in view of the problem faced during commissioning test. The unit after R&M was synchronized on 23.06.13. Cavitation observed in runner and liners after 7550 hours of operation. M/s Hitachi carried requisite repairs and unit again put on operation. Modification of profile of runner blades suggested by M/s Hitachi. Such proposed modification of runner blade profile was not acceptable to BBMB and M/s Hitachi is being pursued to offer new casted runner blades which has not been accepted by M/s Hitachi. Difference in opinion still stands which needs further discussion. Meanwhile, model testing of runner assembly with new runner blade done in Dec'14 and report of same has been accepted. Difference of opinion still stands. M/s Hitachi submitted their Final Settlement proposl by giving two years extended warranty, which has not been accepted. The complete case has been forwarded to CEA for seeking their expert opinion in the matter on 15.05.2015. Meeting was also held with Member (Hydro), CEA. In response to comments/observations of CEA, clarification was sought from Hitachi. The reply of Hitachi has been received. The opinion of CEA, New Delhi was sought and as per their advice, matter referred to Welding Research Institute (WRI), Tiruchirappalli. WRI has opined that they cannot comment as they do not have product expertise. Accordingly, it was considered to again take up the matter with CEA, New Delhi. In the meeting held by	

									BBMB with Consortium, it was mutually agreed that M/s Hitachi would immediately initiate the process for modification of runner profile of Unit No. 2 at site; the unit would be run for a period of about 6,400 hours or till 31st January, 2017, whichever is later. After the successful performance of the post modification runner and other parts of the Unit during aforementioned test period, the modification of runner blade profile through solid piece welding and its implementation in other Units would be accepted by BBMB with the approval of Board. Unit No. 2 shall be taken on shutdown w.e.f. 25th April, 2016. - The Annual Maintenance of Unit No. 2 was taken after running of 8883 hours and the observed pattern of cavitation after welding was almost same as that of earlier observed cavitated areas. The cavitated areas have been repaired by Hitachi. - Second Unit (Unit 5) was under shut down for RM&U works since 11.4.2011 with scheduled completion by 6th November, 2011. Mechanical run was successfully carried out on 28.08.13 and unit synchronized on 07.09.2013. Cavitation observed in runner and liners after 3750 hours of operation. Further action to be taken as per Unit No.2. NDT of Generator shaft to be carried out as per recommendations of CPRI, Bangalore and dismantling of the unit is being considered departmentally under supervision of contractor. The offer has been received by field office and the firm is being pursued to review their terms and conditions. However, as per meeting held with CPRI on 12.05.2015, this unit is to be taken up for continuous run for a period of 8 hours on continual basis/day during peak hours and further NDT inspection is required before the completion of 355 days. To re-conduct Non- destructive testing of Generator shaft, Work Order has been placed on M/s CPRI, Bangalore. The shutdown of the unit is likely to be taken in April, 2016. - Third Unit (Unit 4) The Generator transformer (from M/s CGL) has been received at site. Third unit has been taken up for R&M on 22.11.2013 with completion scheduled on 31.07.2014 Turbine material has been received from Japan. Numerical protection panels from M/s ABB have been received. Final inspection of Aux. Bus Duct, LAVT, NGTR cubicles carried out in mid Dec'13. Stator build up work at service bay is in progress. Final core pressing completed and core induction test completed. HV test on stator bottom bars and top bars completed on 15.01.14 & 27.01.14 respectively. Turbine shaft free achieved on 14.03.14. Unit commissioning was delayed due to welding defects in Rotor spider and other markings on generator shaft. Repair works carried out on rotor spider & generator shaft. Earlier period of commissioning of this unit was March, 2015. Rotor lowered into generator pit on 20.04.2015. Generator and Turbine Shaft coupling and run-out check completed. The subsequent activities on Unit No. 4 were allowed to start without prejudice to outcome of difference in opinion regarding runner issue and reserve its right to for any kind of claim as per Contract Agreement and the Unit was taken over for operational run on 05.08.2015. Old generator	
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									transformer dismantled & new CGL make GT's auxiliaries components assembly work completed. ABB protection panel installation & cable laying completed. Presently, the Unit is running with output of 126 MW. - Fourth Unit (Unit No. 3) shall be taken on shutdown for RM&U works after successful performance of the modified runner of Power House Unit No. 2. - The commencement of RM&U works in Fifth Unit (Unit No. 1) shall be based on commissioning of fourth unit. RM&U works shall be completed in 2018-19. - Purchase order placed on M/s Andritz Hydro on 08.07.2014 to supply one new spare Generator shaft with delivery period of 12 months from the date of techno-commercial confirmation by the firm, at prices, terms and conditions as per earlier signed Contract Agreements. It has been considered to take requisite decision on which specific Unit is to be manufactured after outcome of test results of NDT on unit no.5 by M/s CPRI. In view of the delays in the execution of RM&U works, matter is aggressively being taken up by the management with the consortium and its members. Meetings at various levels are being conducted. A committee was constituted to evaluate the claim regarding consequential losses or/and damages (if applicable) as per the Contract Agreements, Agreement of Implementation and as per applicable Law. The final report of the committee, in consultation with external legal opinion, has been considered by the Management and conveyed to seek 2nd opinion in the matter. The final opinion as received from Senior Advocate was examined by Finance and Legal cells of BBMB and accordingly, a committee has been constituted to adopt dispute resolution mechanism. The committee held its meetings on 02.07.2015, 05.08.2015 and 04.09.2015.	
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HIMACHAL PRADESH - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs. Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING – Under Implementation- CENTRAL SECTOR (BBMB)										
3.	Ganguwal (Unit-2) 27.63 MW (Uprated) 1998 24.2 MW (derated) in 2007 BBMB Kotla (Unit-3) 28.12 MW (Uprated) 1998 24.2 MW (derated) in 2004 BBMB 2x24.2 MW (Original) 1955-56 T -Baldwin G – Westinghouse,USA	14.19	R&M+LE	48.4 (LE)	2017-18	0.84 (as on 31.03.2016)	Own	Replacement of existing damaged propeller type turbine runners; thrust sleeve & turbine water shaft sleeve (GPH only), repair/modification/painting of turbine components and other allied works.	NIT no. 373/PHD(BH-I)-456 was issued on 12.12.2014 for R&M works of hydro turbines of two no. hydro-generating units, having capacity of 24.2 MW, one each at Ganguwal Power House and Kotla Power House, involving replacement of existing damaged propeller type turbine runners; thrust sleeve & turbine water shaft sleeve (GPH only), repair/modification/painting of turbine components and other allied works. Three bidders, i.e. M/s Andritz Hydro Pvt. Ltd., Prithla, Haryana, M/s Voith Hydro Pvt. Ltd., Noida and M/s BHEL satisfied the PQ criteria and submitted their bids till the last date of submission of bids i.e 16.04.2015. Part-I of these bid were opened on 16.04.2015 and after seeking approval of the competent authority, Part-II (Price bids) of techno-commercially suitable bids were opened on 23.09.2015. Purchase proposal approved by Full Board of BBMB in its meeting held on 27.11.2015. LOI issued to M/s BHEL, Chandigarh on 09.12.2015. Purchase order issued on 08.01.2016. Completion schedule is within 80 weeks from the effective date of the contract, i.e. 20.02.2016.	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected BenefitMW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING – Under Implementation- CENTRAL SECTOR (BBMB)										
4.	Dehar Power House, BBMB (Unit 6) 1x165 MW 1983 BHEL	39.14	R&M	-	2017-18	1.52	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.	BBMB made a request to CEA on 19.03.2014 for expert assistance to guide BBMB and facilitate best course of action in view of repeated occurrence of similar faults on Unit No.6. CEA team visited Dehar Power Plant from 13.04.2014 to 15.04.2014, and submitted its report on 16.04.2014, wherein, it recommended that BBMB need to take up immediately with M/s BHEL, without any further delay for replacement of stator to restore Unit No.6 as an interim measure to avoid/minimize loss of generation at Dehar HEP while take up R&M works based on RLA study as a long term measure to improve performance and extend the life of Units at Dehar HEP. NIT No.374 dated 16.01.2015 followed by Corrigendum I dated 19.02.1, Corrigendum. II Dt. 17.04.2015 and last Corrigendum III dated 28.04.2015 with date of tender opening on 19.05.2015 issued. PQ document of 3 nos. firms i.e. M/s Alstom, M/s Andritz Hydro, M/s BHEL were approved and they were allowed to download tender documents. Pre-bid meeting held on 09.04.2015. Part-I (Techno-Commercial) opened on dated 19.05.2015 & Price Bid (Part-II) opened on 31.08.2015. Purchase memo no. 196 dated 23.09.2015 was put up for consideration of Purchase Committee in its meeting held on 29.09.2015 Subsequently, Supplementary purchase Memo no. 198 dt. 15.10.15 was considered on 16.10.2015 by Purchase Committee. As per MOM dated 19.10.15, a negotiation meeting held on 26.10.15 with M/s Alstom and Supplementary Purchase memo no.199 dated 02.11.15 considered on 06.11.15 by Purchase Committee. As per MOM dated 10.12.15, Agenda Note sent on 17.11.2015 for approval of Full Board. Full Board in its meeting held on 27.11.2015 approved the proposal. As per MOM dt. 07.12.2015, LOI issued on 09.12.2015. Purchase Order dated 25.01.2016 placed on M/s Alstom India Ltd., Vadodara and effective date is 26.02.2016 and completion period is 66 weeks from effective date.	

HIMACHAL PRADESH - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations
(Amount in Rs. Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II – SCHEMES ONGOING – Under Tendering - CENTRAL SECTOR (NHPC)										
5.	Baira Siul 3x60 MW NHPC T&G - BHEL	360.79	RM&LE	180 (LE)	2020	-	-	- 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. - Plasma 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 and E&M 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. The Commission has reserved the order in the petition. Price bid has been opened for Main Plant package and tender is under advance stage of award and shall be awarded after receiving the CERC order.	
II - SCHEMES ONGOING – Under Tendering - STATE SECTOR (HPSEB)										
6.	Giri, 2x30 MW HPSEB 1978 T&G - BHEL	139.80	RM&LE	60(LE)	2018-19	Nil	Agency: PFC Rs.38.78 Cr.	Brief description of work proposed to be undertaken are as given below:- Civil works: Protection works on left bank of upstream side of barrage, Repair of power house building and Strengthening of cable tunnel. etc. Mechanical works: Replacement of Guide vanes with stainless steel guide vanes of Unit -1, Overhauling of MIV, Replacement of Governors with modern digital hydraulic governors, Revamping of Cooling water system, Provision of online discharge measurement and head measurement for both machines. Electrical works: Replacement of 11 KV PILCA cable with solid bus duct, Overhauling of 2x40 MVA, 11/132kV generator transformer and Unit auxiliary transformers, Replacement of Control and Protection panels, Replacement of rotor field windings with class "F" Insulation and complete Overhauling of Generators, Replacement of semi-static exciter system by static excitation system. Replacement of ABCBs with SF6 breakers, Replacement of 33 kV MOCB with SF6 breaker or VCBs, Replacement of Batteries and battery charging equipment, etc.	Administrative approval and Expenditure sanction of Rs.34.80 Crore given by Board Management vide letter dated 03.10.2012. Revised administrative approval amounting to Rs. 47.8 Crores accorded vide letter dated 01.08.13. Loan of Rs.38.78 Cr. sanctioned by PFC vide letter dated 20.03.13. M/s BHEL had submitted its techno-commercial offers during March, 2014 for such equipments originally supplied by them in Giri HEP. Bid due to rates offered by BHEL above loan amount was found inadequate and hence revised scheme was framed. 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 vide letter dated 30.12.15. The funding of revised scheme has been taken up with M/s PFC during Jan'16.	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
7.	Bhaba Power House 3x40 MW HPSEB 1989 T&G - BHEL	76.03 (for works of rehabilitation of damaged/ burnt eqpts.)	RM&LE	-	XIII Plan	-	PFC Loan sanctioned Loan=Rs.68.42 Cr. Equity=Rs.7.61 Cr.	<u>Works under Re-habilitation of damaged/burnt equipments:</u> - Replacement of existing 220 kV Gas Insulated Switch Gear, 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 handling over to the Owner” on Single Responsibility Basis. - 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	Power House under forced shut down since 22.01.2015 due to fire incidence. The scheme for Rehabilitation of 3x40 MW Bhaba HEP amounting to Rs.76.07 crore was submitted for A/A and tie-up of funds with funding agencies on 12.06.2015. LOA was issued to M/s Alstom T&D India Ltd. on 09.06.2015 for the Design, Manufacture, Supply of 220 kV Gas Insulated Switch Gear, Control and Relay Panels, 22 kV Indoor Switchgear, 415 V LT Panels, 220 kV EHT Cables, 22 kV HT Cables, Control & Power cables. - Dismantling of material from GIS hall completed. - Dismantling work of damaged LT panels, C&R Panels, 22 kV Switchgear completed. - Dismantling work of damaged Power & Control cables in progress. - Drawings of 220 kV GIS & LA approved. - LCC’s for 220 kV GIS & LA have been inspected & cleared for dispatch. - Completed. - Overhauling of 5 Ton EOT crane completed. Work of 120/20 Ton EOT crane completed. - Tender being floated. - The work of fire detection & emulsifier system for the	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
								System. Providing 50/31.50 MVA, 220/66 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. <u>Works under RMU&LE scheme for Turbine & Generator</u> To be finalized.	Generator-Transformer and 220KV XLPE system has been awarded. Work is to be completed by Apr'16. - All three transformers have been shifted to the service bay for overhauling. The work of Unit-2 is in progress. <u>Civil Works</u> - Work for recasting of slab awarded. Demolition of damaged portion of slab completed. False ceiling in GIS Hall is completed. <u>All Works to be completed by Jun'16.</u> Scope of works to be finalized.	

JAMMU & KASHMIR - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs. Crores)

S. N.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II – SCHEMES COMPLETED - STATE SECTOR (J&KSPDC)										
8.	Lower Jhelum, 3x35 MW J&KPDCC 1978-79 BHEL (T&G)	101.30 (Revised)	R&M +Res.	15 (Res.)	2014-15	83.65 (as on 31.12.14)	Agency: PFC :70% State Govt:30%	Turbine: New Turbine Runner, Guide Vanes, MIV's renovation, Replacement of Governor. Generator: Stator and Rotor windings with class F insulation Protection: D.C. controls of protection system, cooler nests of transformer Auxiliary System Auxiliary supply & illumination system, Communication & fire fighting system, renovation of crane, procurement of DG set, battery banks and battery charger. New trash rack system etc. Civil Water conductor, log boom structure on river Jhelum near Sheri Barrage, Cross Drainage works, approach/service roads along water conductor. De-silting of BR & forebay, escape and spill channels, base facilities like colony, water supply, sanitary building etc.	RMU of units # 1 & 3 completed. Work of replacement of under water parts of unit II was completed by M/s. BHEL. Other works under execution/tendering are reconditioning of Rotor Field Coils of Unit-2 with Class "F" Insulation, replacement of stator winding bars with Class F insulated windings, renovation of EOT crane, machining of generator shaft, procurement/installation of equipment for remote/auto operation of penstock gates of forebay, procurement/installation of equipment for remote/auto operation of dewatering pumps, reconditioning of penstock gates, repair/reconditioning of MIV, replacement of inlet/outlet HP pipes of unit-II, footbridge system at forebay for effective trash cleaning and discharge measurement system, water level monitoring system with discharge measurement system. Restoration of log boom structure at sheri-baramulla upstream of head regulator, stabilization/ renovation of canal & pillway, desilting of Balancing power house building, renovation of canal inspection road, restoration of suspension bridge at preenia have been completed. Other civil works are under progress.	

JAMMU & KASHMIR - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(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	Remarks
II – SCHEMES ONGOING - Under Implementation - STATE SECTOR (J&KSPDC)										
9.	Chenani 5x4.66 MW J&K PDC 1971-75 T&G - Ganz Mavag, Hungary	39.14 (Rev.)	RM & LE	23.3 (LE)	2016-17	11.41 (as on 31.03.15)	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 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. Work on EHG installation in process. Change of stator winding insulation completed for M/c No. 5, 3 &1. Reconditioning of spherical valve for all machines completed. Erection of all 4 runners completed. New 125 kVA DG set installed. Overhauling of BF Valve, construction of trash racks, fencing of tail race, erection of 12 no. isolators and rewinding of 5 MVA Transformer in s/yard completed. Replacement of MoCBs with SF6 breakers, Replacement of water and oil coolers, reconditioning of gates, trash racks, repair of CO ₂ plant completed. Replacement of speed governors and static excitation system under progress. River channelization works, Nallah retaining works completed. 25% of improvement of water conductor system work completed. Alternate proposals in place of replacement of damaged wooden flume members being worked out. Desilting of forebay completed and 95% of forebay tank lining completed. Balance to be completed during shutdown.	

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(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	Remarks
II – SCHEMES ONGOING - Under Implementation - STATE SECTOR (J&KSPDC)										
10.	Sumbal Sindh (Upper Sindh Stage-I), 2x11.3 MW J&KPDC 1973-74 T&G - BHEL	25.00 (Rev.)	R&M	-	2016-17	22.46 (as on 31.12.14)	Agency: PFC / MOP Sanct. under AG&SP : 16.00 Disb: Nil (till 31.12.2007)	Turbine Replacement of Governors, overhauling of MIVs, reconditioning of Turbines. Generator Procurement of Stator Air Coolers Protection System Replacement of MOCBs by SF6 Breakers. D.C. System, 11 KV & LT Switchgears etc. New 11 KV cables and procurement of a new 200 KVA Servo Voltage Stabilizer. Auxiliary System Replacement of Cooling Water System, Gate Valves and Non Return valves, re-orientation of power communication lines. Civil Civil works in headrace channel/Sumbal Power Canal, construction/strengthening of damaged Sumbal Spillway, Escape channel, protection work of various Nallahs, etc.	All E&M works planned under this scheme have been completed by BHEL except some additional works like replacement of existing excitation system by static excitation. Major civil works have been completed.	Due to canal capacity restriction between BR-I & BR-II (9 km), only 14 MW generation was possible against installed capacity of 22.6 MW. After R&M, firm generation shall increase to 17 MW.

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(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	Remarks
II- SCHEME ONGOING - Under Implementation - STATE SECTOR (J&KSPDC)										
11.	Ganderbal, 2x3 MW+ 2x4.5 MW J&KPDC 1955 (3 MW m/cs) & 1963 (4.5 MW m/cs) 3 MW m/cs – T&G - Escherwyss, Germany 4.5 MW m/cs – T&G - Ganz Mavag, Hungary	39.30 (Revised)	RM&LE	9 (LE)	2016-17	9.51 (as on 31.12.14)	Agency: I. PFC/ MOP Sanct. under AG&SP: 24.00 Disb: Nil II. MNES Sanctioned: 10.00 Disb: 0.55 (till 31.12.2007)	Turbine: Replacement of existing Turbine by modern Horizontal Turbines, existing MIVs by new MIVs, Governors by Electronic Governors, overhauling of hydro-mechanical equipment i.e. Butterfly valve, penstock, PRVs, MIVs, Oil Pressure Pants, H.P. Compressors. General: Replacement of existing generators with new generators with class F insulation and with Static Excitation System, replacement of Generator Transformers, ACR, Fire Protection System, Protection System, Replacement of existing switchgear, MOCBs/OCBs with VCBs or SF6 breakers, replacement of control and power cables, CTs & PTs etc., 110 Volt 300 AH Battery bank Auxiliary System Cooling water system, DC Distribution Unit Control Board, Re-conditioning of Trash rack 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. J&KPDC have informed that 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. Evaluation under progress. Modernization of workshop completed. Proposal for installation of Trivector meters & RTU sent for approval. Works for improvement to communication system, supply & installation of DC battery Bender and Battery charger is being evaluated. Work of procurement of items for monitoring of canal discharge is to be tendered out. Work of renovation of fire fighting system will be decided after R&M. Erection works of 11 kV feeder alongwith substation and Gates under progress., Overhauling of hydro-mechanical equipment i.e. Butterfly Valve, Penstock, PRV's MIV's Oil Pressure Parts and HP Compressors completed. Major Civil works completed. To be completed by August 2016.	Due to upcoming New Ganderbal HEP (93 MW) (NGHEP), only 9 MW generation will be possible post NGHEP. As such, 2x4.5 MW machines are being replaced & after RM&U power house shall generate 9 MW.

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(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II – SCHEMES ONGOING – Under Implementation - CENTRAL SECTOR (NHPC)										
12.	Salal 6x115 MW NHPC T&G - BHEL	58.01	R&M	-	2018	-	-	i) Replacement of runner. ii) Replacement of old governor with digital governor. iii) Replacement of AVR with Digital Automatic Voltage Regulator (DAVR).	i. Purchase Order placed on M/s Voith Siemens. Model test of runner completed. Drawing for modified Runner approved. Manufacturing of Runner is in progress. 1 st Runner to be delivered/installed during 2016-2017. ii. Order for digital governor placed on M/s Alstom. Material received at site. Digital Governor has been installed and commissioned in unit-2,3,4 & 6 and rest of the units will be taken up during Annual maintenance 2016-17. iii. DAVR has been installed & commissioned in unit-4,5 & 6.	

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(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	Remarks
I - SCHEMES COMPLETED - STATE SECTOR (UJVN LTD.)										
13.	Pathri, 3x6.8 MW UJVN LTD. 1955 T - J.M.Voith, Germany G - Siemens, Germany	99.05 (without IDC) 113.25 (with IDC)	RM&LE	20.4 (LE)	2014-15	107.54 (As on 31.03.2016)	Agency: MNRE Grant- Rs 12.5 Crs PNB loan - Rs 65.00 Crs	Replacement of runner, rehabilitation of generators, installation of intake hoisting arrangement, installation of DT gantry crane, 11 kV Circuit Breakers, control protection and instrumentation, governors, pumps and life extension of units based on RLA studies. Replacement of Switchyard equipment, instrumentation, governors, pumps and life extension of units based on RLA studies.	RM&LE works were awarded to M/s Andritz Hydro on 09.03.2010 with a completion schedule of 36 months. 1 st unit i.e. unit no. 3 was given to contractor for reverse engineering on 02.05.2010 and which have since been completed by the firm. Based on reverse engineering, some addition items such as, top cover, Shaft etc. have been included in the scope. LOI for same was placed on 24.05.2011 and unit 3 handed over for RM&LE works on 06.10.2011. Unit 3 synchronized on 10.10.13 & taken over by UJVN Ltd. on 15.10.13. R&M works common for all three units have been completed. 2 nd unit (Unit no. 1) was successfully commissioned and taken over on 26.04.2014 after R&M. Third unit (Unit no. 2) commissioned and taken over by UJVN Ltd. on 31.08.2014 after its successful trial run and commissioning tests.	

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(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	Remarks
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (UJVN LTD.)										
14.	Khatima, 3x13.8 MW UJVN LTD. 1955(U-I&2) 1956(U-3) T & G – English Electric, UK	215.83 (without IDC) 256.77 (with IDC)	RM&LE	41.4 (LE)	2016-17	108.52 (as on 31.03.2016) Including 17.26 Cr. advance	Agency: PFC	Upgradation of machines, rehabilitation of Generators, modification of control, protection & instrumentation, construction of new by pass, enhancement of Nagla escape channel capacity and repair of TRC etc. through UPID.	Board has approved the DPR on 11.02.2008. UJVN LTD. decided to complete the Electro Mechanical (E&M) works for which tenders were invited on 25.02.2011. Five firms participated & prebid held on 16.03.2011 & 27.04.2011. Contract for Electro- mechanical & Hydro mechanical works signed with JV of M/s Alstom (India) & M/s PES Engineers Pvt. Ltd. on 3.1.12 with the completion period of 36 months. One set of new Draft tube gates, 132 kV & 33 kV CTs, PTs & LAs, cables, Isolators and UATs have been supplied. Replacement of LT switchgear, LT cables, contact cable, switchyard equipment of feeder completed. Cable trays laid. Turbine shaft and stator frame refurbished & supplied at site. Stator core assembly completed. Dismantling of generator transformer cables of all three units completed. DCDB, PDBs, UDBs, new 220AH Battery bank supplied and commissioned at site. Dismantling of LA, CT, PT and isolator of line 2 completed and line energized. Excitation system for all three units, 11 kV and LT switchgear and NG panel supplied. Civil works is being carried out through Deptt. of Irrigation, Uttar Pradesh. Embedded parts of stop log gates of all the units replaced during canal closure. Draft tube cone & DT liner of unit-1 erected. Centering and alignment of runner chamber of U-1 completed. Likely commissioning of unit-1 was Dec, 2014 but due to incidents of breaching of Sharda Canal on 31.08.2014, schedule of its completion got delayed. Stator Lamination, Stator Coil & Oil Header Accessories of unit-2&3 supplied in Jan, 15. Intake Gates for 2 nos. of Intake Gate Hoists also supplied in Jan, 15. Spiral Casing Drain Valve of Unit 1 supplied in the month of Feb'15. Work of Restoration of Generator Step-up (GSU) Transformers of Unit-2&3 and other associated systems completed. Restoration of Generator Step-up (GSU) Transformer of Unit-2&3 complete and shall be commissioned with the operation of Unit-2&3 respectively. Supply of Machine no. 1 completed. Erection activities are complete with the completion of dry commissioning of checks also. Unit is ready for commissioning with the availability of water in the Sharda Power Channel. Efforts were made with UPID authorities for release of water. Wet commissioning tests on Unit-1 carried out from 29 th March 2015. Unit No. 1 was synchronized with grid on 05.04.2015. Trial runs were completed and machine was synchronized with grid and was formally handed over to UJVN Ltd. for operation on 27.05.2015. Unit 2 has been undertaken for RMU on 22.06.2015. Guide Vanes, Bottom Ring & Inner Head Cover of M/c no.2 and shutter vanes & Rotor spider Hub of M/c no.3 supplied in June, 2015. • Runner and Runner chamber of machine no.2 supplied in the month of July 2015. • Outer Head Cover and regulating ring of unit 2 is supplied in month of September 2015. • Unit no. 2 has been boxed up except for installation of Diffusers. Diffusers of Unit 2 were supplied in Mar'16 and installation of these is under progress. • Cabling from PDB to control room, Generator box to control room and other cabling in unit no 3 UDB in progress. After completion of Canal closure and the settlement of regulation of water in Sharda canal, Unit-3 was handed over to AIL on 03.11.2015 for dismantling, refurbishment and erection. Likely commissioning of Unit 2 by Apr'16 and Unit 3 by Oct'16.	

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S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Tendering - STATE SECTOR (UJVN LTD.)										
15.	Tiloth, 3x30 MW UJVN LTD. 1984 T&G - BHEL	327.90 (without IDC) 384.66 (with 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	Under an agreement signed with KfW, Germany, a grant of 1.61 Million Euro for carrying out feasibility studies, preparation of DPRs and technical specifications was to be given. The contract agreement was signed on 5.3.2008 between UJVN LTD. & Lahmeyer International GmbH, Germany for the above works for about Rs.4.00 Crs. plus 2.00 Million Euro. Final DPRs alongwith Project Design Documents of all six schemes and draft technical specifications of Dhakrani & Kulhal were submitted by the consultant. Subsequently KfW funding was withdrawn in meeting at DEA, New Delhi on 10.10.2012. Board in its, 67th BoD accorded approval for cancellation of KfW funding. Specifications have been prepared afresh on the basis of past experience of other ongoing RMU projects of UJVN Ltd. Proposal for taking up RMU of Tiloth HEP was approved by UJVN Board in its 68 th meeting held on 27.09.2013. DPR was revised in view of the revised scope of work and approved by UJVN Board on 26.11.13. This included cost of civil works amounting to Rs.77.26 crore on account of restoration work of damages due to natural calamity on 16/17 June 2013. NIT was invited on 05.02.14 and pre-Bid meeting held on 21.05.14. Petition for investment approval submitted. Hearing on investment approval held on 13.10.14 by UERC. • Hon'ble UERC issued order dated 30.07.2015 wherein they have significantly changed the scope of work and have also not approved the RMU project cost. • Review petition with Hon'ble UERC for seeking approval for scope of work as per the DPR was submitted for the investment approval of Hon'ble UERC. The review petition was rejected. • Based on the directives of Hon'ble UERC, fresh estimate and tender document with the scope of works as allowed by Hon'ble UERC was framed on the basis of budgetary offer. • Tender for RMU of Tiloth HEP is being scrapped and fresh tender as per allowed scope of Hon'ble UERC is under process. • Pre-bid meeting was held on 01.12.2015. Bid submission rescheduled to 11.04.2016 and opening of Part-I of Bid on 19.04.2016. Investment approval from Hon'ble UERC awaited.	

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S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - 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	359.70 (without IDC) 490.56 (with IDC)	RMU&LE.	28.8 (U) + 144 (LE)	2019-20	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, Governing, control metering & protection system & SCADA. - Up-rating from 4x36 MW i.e. 144 MW to 4x43.2 i.e. 172.8 MW.	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 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. Consent of beneficiary UPPCL sought on 02.05.15. Reply on observations submitted to Hon'ble UERC on 14.05.15. Capital Investment approval has been accorded by Hon'ble UERC on 29.01.2016. Based on UERC approved, revised Tender Document is under preparation.	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
17.	Kulhal, 3x10 MW UJVN LTD. 1975 T&G - BHEL	99.31 (without IDC) 115.24 (with IDC)	RM&LE	30(LE)	2020-21	NIL	Agency: To be decided	- Refurbishment of turbine, new runner blades, new governors, 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	• 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 • Further decision is under consideration.	

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S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Tendering - STATE SECTOR (UJVN LTD.)										
18.	Ramganga 3x66 MW UJVN LTD. 1976 T&G-BHEL	360.83 (without IDC) 455.20 (with IDC)	RM&LE	198 (LE)	2020-21	-	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.	- 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. - Further decision is under consideration. Bid submission date has been re-scheduled for 01.06.16 and opening of Part-I of Bid on 06.06.16.	
19.	Dhakrani, 3x11.25 MW UJVN LTD. 1965-70 T - Litostroj, Yugo. G - Rade Konkar, Yugo.	112.89 (without IDC) 137.31 (with IDC)	RM&LE	33.75 (LE)	2020-21	NIL	Agency: To be decided	- Refurbishment of turbine, new runner blades, new governors, 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	- 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 meeting held on 30.09.2015. - RMU is proposed to be taken up in 2017-18.	
20.	Dhalipur, 3x17 MW UJVN LTD. 1965-70 T - Litostroj, Yugo. G - Rade Konkar, Yugo	121.84 (without IDC) 152.65 (with IDC)	RM&LE	51 (LE)	2020-21	NIL	Agency: To be decided	- 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 power channel, power station & Tail race channel.	- NIT issued on 20.02.14 for Dhalipur HEP. DPR has been revalidated and approved by Board in its 72nd meeting on 26.09.14 Tender documents for E&M works prepared and uploaded on e-portal on 12.12.14. Pre-Bid meeting held on 25.02.15. Bid submission date rescheduled on 18.04.16 and opening of part-I of Bid on 21.04.16. Petition for Investment approval submitted to Hon'ble UERC and has been heard on 17.11.2015.	

UTTARAKHAND - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(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	Remarks
II - SCHEMES ONGOING - Under DPR Preparation - STATE SECTOR (UJVN LTD.)										
21.	Chibro 4x60 MW UJVN LTD. 1975 (U-1 to 3) 1976 (U-4) T&G – BHEL	180.61 (without IDC) 184.88 (with IDC)	RM&LE	240(LE)	2023-24	NIL	Agency: To be decided	- 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 rotor winding. Replacement of 220 kV oil filled cable by XLPE cable. Replacement of ageing parts of 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. RMU is proposed to be taken up in middle of 2017.	
22.	Khodri (Ph-B) 4x30 MW UJVN LTD. 1984 T&G – BHEL	165.85 (without IDC) 169.63 (with IDC)	RM&LE	120(LE)	2023-24	NIL	Agency: To be decided	- 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		

UTTAR PRADESH - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs. Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I - SCHEMES COMPLETED - Under Implementation - STATE SECTOR (UPJVNL)										
23.	Matatila, 3x10.2 MW UPJVNL 1965 T - Hitachi, Japan G - Toshiba, Japan	10.29	RM & LE	30.6 (LE)	2015-16	7.09 (as on 31.12.15)	Own Resources proposed	Replacement of: 1. Governors 2. Static Excitation System 3. Control Protection & Metric(ng) System for all three M/Cs 4. Repair of Generator air cooler including re-tubing. Generator Stator Cooler, cooling water supply and return header 5. Ventilation fans 6. Refurbishment of DC & AC System 7. Supply & erection of 4 Nos. 25 HP Electric Submersible Dewatering Pump 8. Procurement and erection of 2 Nos. 500 PSI Air compressor for Governing & braking system 9. Procurement of 1 No. Electrostatic liquid cleaner & 1 No. Low vacuum dehydration unit 10. 5 Nos. 300 KVA, 11/0.4 KV Transformer for UAT & Station supply 11. G.C. sheets of roof of Power house building including tarfelting. Rehabilitation Refurbishment of: 12. Generator Air Coolers including retubing 13. Power House building's submerged walls with water proof cement and provision of smoke/fire detection system.	RLA studies done by BHEL (for E&M works) and AHEC, IIT Roorkee (for civil works). DPR for RM&LE works had been prepared and submitted to Board for approval with only need based R&M works. Board approval received. Repair of Generator Air Coolers, smoke fire detection system, replacement of UATs and SATs, replacement of stator cooling water supply and return header, erection of 4 nos. 25 HP submersible dewatering pumps, erection of 2 nos. 500 PSI air compressor for governing & braking system and replacement of power house building ventilation fans treatment of power house building walls (sub-merged portion) with water proof cement completed. Refurbishment of DC & AC system, replacement of existing control, protection and monitoring system by Numeric/Static protection, erection of digital governor for unit 3 and renovation of instrumentation system for entire station completed. Supply, erection, testing & commissioning of digital governor for unit 2 & 3 and static excitation system for unit 2 completed. Supply, erection, testing & commissioning of digital governor (M/s Andritz Hydro) and static excitation system (M/s AMTEC Ltd.) for all units completed. All R&M works completed.	

UTTAR PRADESH - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs. Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (UPJVNL)										
24.	Obra 3x33 MW UPJVNL 1970 (U-1&2), 1971 (U3) U-1: T - AEI, UK G - BHEL U-2&3: T&G - BHEL	58.8	RM&L E	99 (LE)	2017-18	14.77 (as on 31.03.16)	Own resources	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 <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. <u>SCADA</u>	The R&M scheme has been appraised by CEA for an estimated cost of Rs. 58.80 crores. On account of high offer of BHEL (OEM) and present satisfactorily running of m/cs, Nigam decided for completion of only essential R&M works through Pvt. Contractors. UPJVNL have revised the estimated cost to 43.14 Crs. The following works have been completed. i) Replacement of stator winding with class F insulation of m/c. no.3 & 2 completed ii) Governor (3 nos.) replaced & commissioned. iii) Supply, erection, testing & commissioning of 132 KV circuit breakers. iv) Replacement of stator & rotor pole winding, overhang support ring & stator core for unit 2 completed. v) One set of Generator air cooler procured & commissioned. vi) Re-tubing of thrust bearing cooler & replacement of oil of GT&UAT for all 3 m/c completed vii) Replacement of spider arm of m/c. no. 3 & m/c no. 1 completed. viii) Replacement of Governor oil pumps. ix) Replacement of underwater MS pipeline in intake gate by SS pipeline. x) Replacement of draft tube gates of unit 3 completed. xi) Control & Protection of Generator, GT & UAT for all the units. Supply & replacement of lightning arrestors. xii) Refurbishment of intake gate crane. Replacement of control & protection system of 8 nos. 132 kV feeders & 2 nos. station transformers, Renovation of fire extinguishing system is under progress. xiii) Replacement of 11/0.4 kV,400 KVA station transformers xiv) 132 kV CTs & PTs Renovation of fire Extinguishing System Replacement of stator core & coil for units 1 & 3, re-insulation of rotor pole coils with F class insulation in unit-1, replacement of dynamic excitation with static excitation system for units 1, 2 & 3, refurbishment of generator coolers of units 1 & 2, supply & replacement of 132 kV Bus Bar, metering/measuring instruments, & new elevator for power house are yet to be taken up. For the balance work, approval of ETF (Energy Task Force) will be taken. Since offer of BHEL is too high, tendering for award of work will be taken up. R&M works of unit 1 is under progress and likely to be completed by Mar' 17. R&M works of unit 2 & unit 3 are likely to be completed by Nov' 17 & Mar' 18 respectively.	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
25.	Rihand, 6x50 MW UPJVNL 1962 (U-1to5) 1966 (U-6) T&G - EE, UK	132.20 (Revised)	RM&L E	300 (LE)	2017-18	90.38 (as on 31.03.16)	Own resources	- Replacement of stator core, stator & Rotor coils insulation with Class F. - Replacement of insulation of field coils with Class F - Replacement of Governors - Replacement of excitation equipment, 67.5 MVA generating transformers by 75 MVA transformers, switchyard equipments, Bus bars and under water parts - New Air Cooler and Ventilation system	Works completed: - Re-insulation of field pole of m/c No.6 - One set of generator air cooler was procured and commissioned. Another set of generator air cooler was modified and commissioned. - Supply & Commissioning of 132 kV, 33 KV CTs & PTs, CBs, 11kV switchgear and XLPE cable for switchyard completed. - 12 Nos. governor oil pumps commissioned. A.C. Plant (2x40T) commissioned. - Supply & work of battery, charger & DCDB completed. Supply order of copper bus bar completed. 500kVA transformer (8 Nos.) commissioned. One No. GT for Unit 3 supplied by EMCO has been commissioned. - Repair works of various gates completed. - Repair & overhauling of 100/20MT Dam Top Gantry Crane and EOT crane, reservoir water level sensor - 132kV SF6 Breakers, emergency trip unit for 132kV breakers. - Overhauling of intake gate along with alignment of T-guide and their hoisting for unit-2,3, 4 & 5 completed. - R&M works of unit no. 5 completed & m/c commissioned on 16.04.2011. - Electronic part of 6 governors received and HMC of 2 units received. - SEE of all units received. One unit commissioned. - Water leakage from penstock expansion joint of unit 5 arrested by filling semi-viscous fluid on required pressure. - Erection of 132 kV CT, PT and 500 KVA unit transformers & diesel set with new L.T. Breaker Panel. - Supply of control cable for switchyard equipment, silicon rubber disc insulator, power cable for auxiliary equipment & stringing of copper conductor for main and reserve bus. - R&M works of unit no. 4 completed. This unit was re-commissioned on 11.12.2005 and was running on full load till 15.11.2006 when it's stator & rotor windings got damaged due to D.C. failure. Order for Turbine, Generator & associated aux. placed on BHEL. Works completed by M/s BHEL. - R&M works of unit no. 3 completed. - R&M of Unit No. 1, 2 and 6 expected to be completed by Jul'16, Oct'16 & Jul'16 respectively. - Supply, erection, testing and commissioning of Generator Transformers for unit 1, 2, 4, 5 & 6 is expected to be completed by Dec'16, Oct'16, July' 17, Apr'17 and Oct'17 respectively.	

ANDHRA PRADESH - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I - SCHEMES COMPLETED - STATE SECTOR (APGENCO)										
26.	Lower Sileru, 4x115 MW APGENCO 1976-78 <u>Units 1&2:</u> T - LMW, USSR & G – Electrosila, USSR <u>Units 3&4:</u> T&G - BHEL	8.75	R&M		2013-14	6.77	Agency: PFC / MOP Sanct. under AG&SP : 7.00 Disb :6.8 (till 31.03.13)	1. Procurement of Alarm and annunciation panels, Auto synchronizer panels 2. Renovation of protection system of units & feeders, Replacement of ABCB's, Procurement of 0.2 Class Bus PTs 3. Repair/ Replacement of cooling water pumps gen. transformer, control panels, compressor control panels and dewatering control panels and dewatering pumps 4. Repair of Shut Off Rotary Valves, 25 Ton Gantry Crane, Draft tube gates. 5. Retubing of stator air coolers and oil coolers 6. Temperature scanners 7. 220V Lead acid battery set along with battery charger 8. Replacement of D.C. Distribution board and procurement of A.C. emergency board 9. Renovation works on Unit no. I & IV 10. Renovation of HP & LP compressor systems 11. Repair of 42.5 MVA TELK make single ph. GT 12. Renovation of Excitation System 13. Repair & rehabilitation of thrust bearing pads 14. Capital overhaul of Unit 2 15. Procurement of 4 nos., 1 MVA UATs 16. Supply of Static Excitation System spares for all units (except unit-3) 17. Generator numerical protection relays for all units	All activities under 1 to 17 have been completed.	

ANDHRA PRADESH - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
27.	Srisailem R.B. 7x110 MW APGENCO 1982-87 U-1 to 7: T&G - BHEL	16.70	R&M	-	2015-16	16.56 (as on 31.03.2016)	Agency: PFC / MOP Sanct. under AG&SP: 13.36 Disb.:6.74 (till 31.03.13)	1. Capital overhaul work of all the seven units 2. ERW pipes for multisfire system. 3. Procurement of motorized valves for cooling water system 4. Procurement of CTs & CVTs. 5. Procurement of dry type excitation transformer 6. Procurement of normal & anti fog type Insulators 7. Procurement of 6 KL transformer oil filtration plant 8. Procurement of 20 KM ACSR conductor 9. Automation of generation unit through SCADA and DCS for single push button operation	1. Completed. 2. Completed. 3. Completed. 4. Completed. 5. Completed. 6. Completed. 7. Completed. 8. Completed. 9. Completed.	

ANDHRA PRADESH - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II- SCHEMES ONGOING -Under DPR 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 - BBC, Germany	124.45	RMU & LE	114.75 (LE) + 5.25 (UR)	XIII Plan	-	Agency: Yet to be decided	1. Replacement of runner and refurbishing out 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 27 th & 28 th 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. Two signed copies of MOM sent to APGENCO by GOO/OHPC for signing of AP officials and for sending one copy to them. 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.	Three of the six units each rated at 21.25 MW are proposed to be uprated to 23 MW.

TELANGANA - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I - SCHEMES COMPLETED - STATE SECTOR (TSGENCO)										
29.	Nagarjuna Sagar Ph.I 1x110 + 7x100.8 MW, TSGENCO 1978-85 <u>Unit-1:</u> BHEL (T&G) <u>Units 2 to 8:</u> T - Hitachi, Japan G - MIT, Japan	33.35	R&M	-	2012-13	13.90 (as on 31.03.2012)	Agency: PFC / MOP Sanct. under AG&SP: 26.68 Disb: 3.98 (till 31.12.07)	1. Capital overhaul of units 2. Provision of Public address system. 3. Replacement of static excitation system of unit -1. 4. Renovation of generator components like insulation material, pole coils, carbon brushes, brake pads etc 5. Replacement of turbine components i.e guide vane housing/bushes etc 6. Self lubricating bushes. 7. Provision of ventilation system. 8. Procurement of 220 KV SF6 Breakers and other switchyard equipments 9. Replacement of governor of U-1. 10. Unit automation works.	1. Completed. 2. Completed 3. Completed 4. Completed 5. Completed. 6. Completed. 7. Completed 8. Completed 9. Completed 10. Completed	

TELANGANA - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II- SCHEMES ONGOING -Under Implementation - STATE SECTOR (TSGENCO)										
30.	Nagarjuna Sagar Ph.II 1x110 + 7x100.8 MW, TSGENCO 1978-85 <u>Unit-1:</u> BHEL (T&G) <u>Units 2 to 8:</u> T - Hitachi, Japan G - MIT, Japan	22.17	R&M	-	2018	13.27 (as on 31.03.2016)	Agency: Internal sources	1. Replacing existing AVR's with latest DVR's alongwith thyristor for 7 units at NSPH. 2. Replacement of all L.T. Breakers of all units and SABs of NSPH. 3. Retrofitting of Numerical Relays of Generator Protection Schemes of Units 2 to 8. 4. Overhauling of EOT Cranes and Gantry cranes at NSPH. 5. Procurement of control cables of different sizes for units 1 to 8, common auxiliaries, Switchyard equipments and switchyard marshalling boxes and laying of Power Cables and Control Cables for Pen stock Inlet Gates from main control room for NSPH. 6. Procurement of 245 KV Section Breaker for BUS-A, BUS-B at NSPH switchyard, Bus Coupler at 220 KVRs and the related Isolators and accessories, erection, repositioning of PTs etc. at NSPH Switchyard. 7. Servicing and reconditioning/ procurement of new Isolators required for motoring mode operation for 89G, 89M, 189S1 and 189S2 for units-1 to 8. 8. Procurement of 245 KV SF6 Circuit Breakers for units 1,6&7. 9. 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. 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).	1. Completed. 2. Completed. 3. Completed. 4. Yet to be processed. 5. Material procured. Replacement work in progress in stages based on shutdown availability. 6. Yet to be processed. Feasibility studies are under progress. 7. Completed. 8. Completed. 9. Civil Wing called the tenders. i) at intake side, work is awarded. ii) at tailrace side, trash rack work is completed 10. All items procured and commissioning under progress. 11. Material supplied and commissioning under progress.	

TELANGANA - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S.No.	Scheme Description	Estimated Cost	Scheme category	Expected BenefitMW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
31.	Nagarjuna Sagar Left Canal Power House (2x30 MW) TSGENCO 1992 T-Boving, UK G-General Electric, UK	30.99	R&M	-	2018	0.87 (as on 31.03.2016)	Agency: Internal sources	1. Replacing existing AVR's with latest DVR's along with thyristor modules for 2 units at LCPH. 2. Capital overhauls on generator and turbine and its auxiliaries including spares and consumables for all 2 units of LCPH. 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 (LCPH) for operating at lower heads. 5. Procurement of 245KV and 132KV SF6 Circuit Breakers for both units of LCPH and its feeders. 6. Implementation of SCADA for LCPH. 7. Providing of latest version of EHG System for 1 Unit at LCPH. 8. Cooling water line erections. 9. Overhaul of stop log gates at LCPH and trash rack rectification including gantry crane at LCPH.	1. Yet to be processed. 2. Erection of unit-1 completed. Unit-2 yet to be taken up. 3. Works are under progress. 4. Yet to be processed. 5. Material expected to be delivered within a week. 6. Purchase order placed. 7. Completed. 8. Completed except tapping from penstock is yet to be taken up. 9. i)Trash rack rectification completed. ii) Stop log gates works yet to be taken up. iii) Gantry crane work yet to be taken up.	

KARNATAKA - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I - SCHEMES COMPLETED - STATE SECTOR (KPCL)										
32.	Supa 2x50 MW , KPCL 1985 (unit 1&2) T&G-BHEL	3.45	R&M	-	2014-15	3.88 (as on 30.09.14)	Agency PFC/MOP sanctioned under AG&SP 1.40 (For Xth Plan works) Disb: (till 31.12.2007)	1) Modernisation of analog governors with digital. 2) Modernisation of EM relays with Numerical relays.	1) Works completed on 15.10.14. 2) Works completed in 2011-12.	
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (KPCL)										
33.	Bhadra River bed units , KPCL 2x12 MW (Unit-1&2)	28.015	R&M	-	2016-17	16.92 crores (as on 30.09.15)	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.	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 Commissioning of 1st Unit likely by May'16. All works completed except following works which are under progress in Unit 1: 1. Oil header pipeline trail assembly. 2. High pressure compressed air line erection works. 3. MIV Bypass Pipeline erection works. 4. Governor Oil, Oil header system and cooling water pipe lines fabrication and erection work. 5. LGB and UGB cooling water pipeline fabrication and erection works. 6. Governor Oil pipeline fabrication and installation. 7. Rotor dynamic levelling and Shaft run out checks related works. 8. MIV has been lowered into penstock pit and erection work under in progress. 9. Governor high pressure airline and instrumentation pipeline fabrication and erection works. 10. Installation of Shaft Seal assembly pipeline work.	

KARNATAKA - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
								Refurbishment of Generator Auxiliaries 1. Supply and replacement of exciters with SEE. 2. Replacement of governors. 3. Replacement of electromagnetic relays with digital relays. 4. Replacement of 11 kV switchgear, LAVT & NGT/NGR cubicles.	Tenders were floated for following works: 1. Work awarded on 21.08.13 to M/s ABB Ltd. SEE Panels, Excitation Transformer supplied in Dec'13. Erection of panels completed & commissioned for Unit-2. 2. Work awarded on 12.09.13 to M/s Andritz Hydro Ltd. 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 on 24.04.13 to M/s Alstom India Ltd. Retrofitting of relays completed. Erected & commissioned for Unit-2. 4. P.O. dated 19.09.13 placed on M/s Schneider Electric (i) Numericalrelays supplied to site. (ii) 6 nos. of 11kV switchgear supplied to site. (iii) 2 nos. of LAVT & NG/NGR panel supply completed. Dispatch clearance issued on 29.03.14. Testing of all panels completed for both the units. Work completed for Unit-I and Unit-II.	

KARNATAKA - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (KPCL)										
34.	Nagjhari,U-1 to 6 1x135 MW (being uprated to 150 MW) 6x135 MW (original) KPCL 1982(U-4), 1983(U-5) & 1984(U-6) T&G - BHEL	50.87	RMU of U-6	15 (UR)	XIII Plan	64.49 (upto 31.12.2014)	Own funds	RM&U of Unit-6	All units commissioned except Unit#6. Unit-6 taken for RMU from 21.12.2012. Dismantling of U#6 completed. NDT tests of components completed. Crack observed in turbine shaft in shaft sleeve area. Delay is due to observation of small cracks on the turbine shaft after opening of the unit which needs refurbishment. Additional order placed on M/s. BHEL for refurbishment of turbine shaft. Heavy pitting & scouring have been observed in top cover and hence cannot be refurbished. Additional order placed on M/s. BHEL for the supply of new top cover with the delivery period being 10 months. The same has been delivered. Heavy pitting and corrosion observed on critical areas of runner. Additional order placed on M/s. Andritz for refurbishment of runner, and same delivered in July, 14. Rim building has been completed and shrink fitting of rotor spider with generator shaft completed. Refurbishment of poles completed. MIV refurbishment works under progress. Guide vane refurbishment completed. Stator lowered into generator pit. Levelling and centering of pivot ring completed. MIV control panel pipe line for isolating seal and main seal completed. Trial assembly of top cover with guide vanes in Turbine pit carried out. Stator instrumentation works completed. Trail assembly of oil sleeve seal ring carried out. Assembly of Top cover completed. Shrink fitting of rotor spider on the generator shaft completed. Generator instruments completed. On 25.11.2015, Unit-6 was successfully synchronized with grid. At 75% full load, water leakage observed in turbine pit from aeration cone. On 26.11.15, load was raised to 150MW and thrust bearing temperatures recorded. Rectification works of runner aeration cone completed. GV cup seal replacement works completed. After completion of aeration cone leakage arresting works and replacement of cup seals, unit was started and synchronized to grid on 25.11.2015. Unit-6 load throw-off test at full load conducted on 29.11.2015 after attending to problems & balance. Some additional work has been taken up in Unit-5 like replacement of Bus Couplers and ABCBs works completed. Scope & work finalization in progress.	
		16.5	R&M	-			Own funds	1. SCADA.		

KARNATAKA - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

II - SCHEMES ONGOING - Under Tendering - STATE SECTOR (KPCL)										
35.	Nagjhari,U-1 to 3 3x150 MW KPCL 1979 (U-1), 1980 (U-2), 1981 (U-3) T&G-BHEL	51	R&M	-	XIII Plan	28.41 (as on 30.09.15)	-	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. Conducting model studies of turbine.	Technical Specification finalised 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 under preparation for submission to Hon'ble KERC for approval. Initial study awarded to AHEC, Roorkee in Dec'14. Report is likely to come by May'16.	
II - SCHEMES ONGOING - Under DPR Preparation/Approval - STATE SECTOR (KPCL)										
36.	Sharavathy (Ph B) 10x103.5 MW KPCL 1965-77 T&G, U-1&2 (Hitachi), 3 to 8 GE, Canada, 9 & 10 BHEL	20	R&M	-	XIII Plan	2.59 (upto 31.12.2014)	Own funds	1. SCADA	Scope of works to be finalized.	

KERALA - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I - SCHEMES COMPLETED - STATE SECTOR (KSEB)										
37.	Idamalayar, 2x37.5 MW KSEB 1987 T&G-BHEL	14.50	R&M	--	2012-13	13.22 (as on 31.03.13)	Agency: Own funds	Replacement of semi-static excitation system & electro-mechanical governor. Procurement of high pressure oil system for the thrust bearing, Replacement of air cooler, valves & TGB cooler.	Order for R&M works had been placed on OEM i.e. BHEL in Nov., 2008 with a completion schedule of 24 months. Unit I handed over to BHEL on 30.5.2011. The unit was put back into service on 25.01.12. The works on Unit II were completed and Unit commissioned on 26.12.12.	The payback is expected in one year.
38.	Sabarigiri, Rebuilding of unit 4 1x55 MW (Original) KSEB 1966 T&G - Allis Chalmers, USA	52.2	RMU & LE	5 (UR)	2014-15	50.41 (as on 30.09.15)	Own funds	Supply, erection and commissioning of 60 MW generating unit with all accessories.	The RMU&LE work of Six units were completed by M/s. Andritz Hydro in 2008-09. Due to accident during May, 2008, Unit 4 got completely damaged. <u>Unit-4:</u> Order for rebuilding placed on M/s. PDL Power Systems, Bangalore on 16.11.2009 at contractual value of Rs. 52.20 Crs. Procurement of all required material including imported equipment from KEM, China was completed. Test synchronization was done on 20.06.2013 and the unit was put under trial run of 72 hrs. The stator winding failed on 10.10.13. The unit after completion of R&M works was commissioned on 06.05.14.	
39.	Poringalkuthu, 4x8 MW KSEB 1957-60 T - Charmiles, Geneva G - EE, UK	88.63	RM&LE	32 (LE)+ 4 (UR)	2015-16	51.63 (as on 31.12.15)	Agency: REC	Replacement of Turbine & PRV, Governors, stator & rotor windings with Class F insulation, excitation system, control & protection system of generator, feeder & transformer, LT Distribution system, 11 kV panels, DC panel, battery & battery charger, refurbishment of BFV & MIV, replacement of switchyard equipments i.e. BOCBs and CTs & PTs etc.	DPR was approved by the Board. For execution of Electro & Hydro Mechanical works, detailed purchase order and work order was issued to M/s Allonword SSIPL consortium (Shari Saravana Industries Pvt. Ltd.), Madurai on 23.12.2011. As per the work order, the supply and work was to be completed within 36 months (i.e. by 14.01.2015). Unit-1 handed over for R&M on 22.02.13. Concreting of spiral casing of Unit-I completed on 25.09.2013. 72 hour run test completed and unit commissioned on 14.04.14. Unit 2 R&M works completed and Unit commissioned on 15.08.14. Dismantling of Unit 3 started on 22.08.14 and commissioned on 12.02.15. 4th unit commissioned on 29.05.15.	The payback is expected in two years.

KERALA - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (KSEB)										
40.	Sholayar, 3x18 MW KSEB 1966-68 T - Litostroj, Yugo G - Rade Konkar, Yugo	199.55 Rs. 173 Cr. (excluding IDC) Rs.199.55 Cr. (including IDC)	RM&LE	54 (LE)	2018-19	-	Agency: yet to be decided	Replacement of Butterfly valve, penstock pipes, turbine & PRV, Governors, stator & rotor windings with Class F insulation, excitation system, control & protection, 11 kV panels etc.	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 re-tender was opened on 06.05.14 and Bid evaluation completed. Prequalified four firms and price bid opened on 27.01.2015. Lowest bidder is M/s FEPL-FUYUAN Consortium, Supply order and work order issued on 30.06.2015. Agreement executed with M/s FEPL-FUYUAN Consortium on 06/07/2015 with the time of completion being 15.04.2018. The model test report submitted by the firm is under scrutiny. The existing runner of Unit 3 was dismantled and necessary measurements were taken by the contractor so that detailed engineering can be started. E-tender for the renovation of Sholayar penstock and allied works were floated on 14.12.15. Last date of bid submission was 31.03.16.	The payback is expected in 4 years.
II - SCHEMES ONGOING - Under Tendering - STATE SECTOR (KSEB)										
41.	Idukki 1st Stage (3x130 MW) T - GE, Canada G - GE, Canada	79.45	R&M		2018-19	Nil	Agency: yet to be decided	Refurbishing the main inlet valves, Generator Transformers, modernizing the auxiliary systems, governing systems, the excitation systems, new PLC and SCADA systems.	DPR approved. Administrative sanction issued by the Board. Pre-qualification Bid opened. Tender evaluation completed. Renovation works schedule is as follows: Unit 1: 06/2016 to 12/2016 Unit 2: 06/2017 to 12/2017 Unit 3: 06/2018 to 12/2018 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. The scheduled date of bid opening is 21.04.2016.	

KERALA - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under DPR Preparation- STATE SECTOR (KSEB)										
42.	Kuttiyadi, KSEB 3x25 MW 1972 T&G-Fuji, Japan	Not estimated	RM&LE	75 (LE)	XIII Plan	-	Agency: Yet to be decided.	The scope of work is to be finalized after conducting RLA studies.	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. They have recommended to provide a new penstock for unit 4. Services of M/s NHPC is being availed for feasibility study of an independent penstock for Kuttiyadi Extension Scheme (1x50 MW) HEP. Offer received from M/s NHPC and is under the consideration of Board.	Originally Kuttiyadi commissioning in 1972 with 3x25 MW generating units. A 50 MW unit was added to the same penstock in 2001. After this addition, considerable pitting noticed on runners of old machines. Hence old machines now running at derated capacity of 20 MW. A detailed study about the capacity of the new machine is to be conducted.

TAMIL NADU - XII PLAN Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES COMPLETED - STATE SECTOR (TANGEDCO)										
43.	Periyar, 4x35 MW (Original) TANGEDCO 1958-65 <u>Unit 1 to 3:</u> T&G - Voith, W. Germany <u>Unit-4:</u> T - Litostroj Yugo G - Rade Konkar, Yugo.	161.18	RMU&LE	140+ (LE) 28 (UR)	2015-16	133.68 (as on 31.03.16)	Agency: PFC: 153.31 Cr	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	The work of RMU&LE was done by M/s. Andritz Hydro. RMU&LE work of Unit-1 commenced on 6.3.2009 and completed on 15.11.2010. During performance testing, cooling water choking problem was observed and the same was rectified. Since then, unit is in service and running at full load of 42 MW. Unit No. 2 RM&U works have been completed and unit commissioned on 11.09.2012. Unit-3 was handed over to M/s Andritz Hydro on 11.09.2012 for RMU works. The truck carrying some of the materials of critical requirement met with an accident on 03.06.2013 and hence the delay. Erection works completed and unit commissioned on 08.01.14. Unit no.4 was handed over for RMU works on 05.04.14 and work completed on 23.03.16. Unit-4 has reached full load of 42MW.	

TAMIL NADU - XIII PLAN Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (TANGEDCO)										
44.	Sholayar Ph-1, 2x35 MW TANGEDCO 1971 T - Litostroj, Yugoslavia G - Rade Konkar, Yugoslavia	120	RMU&LE	70 (LE)+ 14(UR)	2018-19	Nil	Agency: Proposed for availing loan submitted to PFC.	Replacement of stator core winding, rotor winding, poles, Excitation system, Governing System, Runner, guide vanes, cooling water & dewatering systems, generator transformers, generator protection, LT switchgear, lubrication system, 11 KV LAVT, NGT, Annunciation system, power & control cables, UAT, fire fighting system for generator, yard & cable gallery and Refurbishment of turbine inlet valves and BF valves, Air admission system, brake & jack and bearings.	It has been decided in the full 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 and pre-bid meeting held on 19.03.14. The tender was opened on 27.06.14. The price Bid was opened on 14.11.14. After the evaluation of tender, M/s Andritz Hydro Private Limited became the L1 (Lowest) Bidder and High Level Negotiation Meeting was convened on 04.12.14. The Board approved to place orders on M/s Andritz Hydro Private Limited, 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 R&M 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 I received from M/s. Andritz Hydro Private Ltd., Haryana. Scrutinizing process is under progress. Overall completion period of 42 months from the zero date comprises of Reverse Engineering, submission of drawings, supply of new materials and completion of unit-wise RMU works.	
II - SCHEMES ONGOING - Under DPR Preparation - STATE SECTOR (TANGEDCO)										
45.	Kodayar, Ph-II, 1x40 MW TANGEDCO 1971 T-Litostroj,Yugo G-Rade Konkar,Yugo.	-	RMU&LE	40 (LE)+ 4 (UR)	XIII Plan	-	Agency: Yet to be decided	Replacement of Stator core and winding, rotor winding poles, excitation system, governing system, runner, watering systems, LT Switchgear, Lubrication system, 1 KV LAVT, Neutral grounding transformers, annunciation system, Power And control cables UAT, Generator Transformer fire fighting system for generator, yard, cable gallery yard refurbishment of turbine inlet valves and butterfly valves, Air Admission system, brake and jack and bearings.	MECON submitted RLA study report in 2006. The tender for RMU work shall be floated on obtaining revised Administrative approval, which is under process. 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.	

46.	Moyar PH 3x12 MW TANGEDCO T – Boving, UK G - Metropolitan Vickers, London	65.45	RM&LE	36 (LE)+ 6 (UR)	XIII Plan	-	As above	Detailed scope of work after RLA studies.	Tender for RLA studies was floated and opened on 01.03.13. Only one bid i.e. MECON was received. The work for RLA study was awarded to M/s MECON, Ranchi on 17.06.2013. The firm submitted the draft DPR. 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 and is to be approved. 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 will present the implementation report to CMD/TANGEDCO on or before 01.06.16 after detailed study. Proposal for obtaining administrative approval is under progress.	
47.	Kodayar, Ph-I, 1x60 MW TANGEDCO 1970 T-Vevey Engg. works, France G-Alstom, France	78.59	RM&LE	60 (LE)+ 10 (UR)	XIII Plan	-	Agency: Yet to be decided	Detailed scope of work after RLA studies.	Revised administrative approval was obtained. R&M work of scheme shall be finalized after completion of RLA studies. Tender for taking up RLA study was floated. Contract awarded to M/s MECON Ltd. on 22.09.14 for conducting RLA study and uprating study. 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 21.09.15. Meeting with the Standing Committee members of TANGEDCO was convened on 17 th and 18 th March, 2016 regarding the RLA study report submitted by M/s MECON, Ranchi. It is proposed to convene a meeting with M/s Mecon on 06.04.16 to discuss about the remarks on Draft DPR, so as to finalize the DPR.	

JHARKHAND - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Tendering - CENTRAL SECTOR (DVC)										
48.	Panchet, U-1 1x40 MW DVC, Jharkhand 1959 Turbine: NOHAB, Sweden Generator: AEG, West Germany	58.22	RM & LE	40 (LE)	XIII Plan	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 as revised scope of works have been received from M/s Alstom and M/s Voith till date. NIT is expected to be floated in 2016-17.	

ODISHA - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I - SCHEMES COMPLETED - STATE SECTOR (OHPC)										
49.	Rengali Unit-1 HEP 1x50 MW OHPC (1985-92) T-BHEL G-BHEL	47.50	RM&LE	50(LE)	2012-13	36.76 (as on 30.06.12)	Agency: Own resources	Replacement of Stator winding, Rotor Pole Coils, runner hub, digital governor, DAVR, relays with instrument & cables, repair of gates.	R&M work completed and unit synchronized to grid on 31.05.2012 at 23:27 Hrs.	
50.	Rengali Unit-2 HEP 50 MW OHPC 1986 T&G-BHEL	25.2 (approx)	RM&LE	50(LE)	2013-14	20.73	Own funds	Replacement of existing damaged runner by new one, replacement of excitation and governing system with digital AVR and microprocessor based governor and other associated works.	The R&M work was carried out by M/s BHEL from 01.12.12. The unit after completion of R&M work was synchronized on 20.04.2013.	

ODISHA - XIII PLAN Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING – Under Implementation - STATE SECTOR (OHPC)										
51.	Hirakud-I (U5&6), Burla 2x37.5 MW OHPC 1962-63 T&G - Hitachi, Japan	158.77	RMU	75 (LE) + 12.2 (UR)	2018-19	11.85 (as on 31.03.16)	Agency: Punjab National Bank	Replacement of new TG set and associated equipment with new digital microprocessor based governor, DAVR, PLC based C&I system, numerical relays. Refurbishment of Intake and Draft Tube Gates.	RLA studies were made by M/s TATA Power Co. Ltd. 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. Four bidders submitted their Bid on 26.08.14. Evaluation of Part-I (Qualification Bid), Part II (Techno-commercial) and Part III (Price Bid) have been completed. Hon'ble OERC has accorded approval for this R&M work vide order dated 31.03.2014. 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. 16.10.2015. The activity for R&M has commenced.	
52.	Hirakud II, (Chiplima) 3x24 MW OHPC 1962-64 <u>Unit-1&2:</u> T - Voith, W. Germany, G - Hitachi, Japan	161.64 (95.97 for U-1 & II and 65.67 for U-III)	RM&LE	72(LE)	2017-18	58.97 (for Unit 1 & 2) (till 30.06.09)+ 5.45 (for unit 3 till 31.03.16)	Agency: PFC loan Sanctioned: 26.68 (for U-I&II) and 23.64 (for U-III) Disb:26.68 (for	Stator winding of Unit I & II; Replacement of new TG set and associated equipment with New digital microprocessor based governor, DAVR, PLC based C&I system, numerical relays. Refurbishment of Intake gates and	Unit-I - R&M works were completed on 29.7.98 Unit II - R&M works were completed on 27.3.2008. Unit III- After conducting the RLA studies in July, 2004, OHPC engaged MECON as consultant for implementation	

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
	<u>Unit-3:</u> T - LMW,USSR, G - Electrocilla, USSR						U-1& II) and Nil (for U-III) (till 30.09.08)	draft tube gates.	of R&M works. M/s. MECON prepared the Draft Tender Specification but later on backed out from the consultancy contract. The final DPR has been submitted by M/s MECON Ltd. The DPR has been approved by Board of Directors of OHPC. The tender was floated on 02.04.2013 and six nos. of bidders submitted their bids as on 30.08.2013. As per decision of OHPC to include life cycle cost analysis in the evaluation process and modify pre-qualification criteria, the previous tender was cancelled. A fresh tender was floated on 22.02.14. Three Bidders submitted their Bid on 05.08.14. Evaluation of Part-I (Qualification Bid) has been completed. Evaluation of Part II (Techno-commercial) and Part III (Price bid) has been completed. 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 is under progress.	
II - SCHEMES ONGOING - Under Tendering - STATE SECTOR (OHPC)										
53.	Balimela, 6x60 MW OHPC 1973-77 T - LMW, USSR G - ElectroSila, USSR	664.7	RM&LE	360 (LE)	2020-21	1.15 (till 31.12.15)	Agency: Yet to be decided	Replacement of new TG set and associated equipment with new digital microprocessor based governor, DAVR, PLC based C&I system, numerical relays. Refurbishment of Intake gates and draft tube gates and civil works.	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 12 th 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. Five Bidders submitted their Bid on 25.08.14. Evaluation of Part-I (Qualification Bid) and Part II (Techno-commercial) have been completed. Revised Price Bid of the techno-commercially qualified bidders was opened on 18.03.2016. Evaluation of Price Bid is under progress. Hon'ble OERC has accorded approval for this R&M work vide order dated 31.03.2014..	

WEST BENGAL - XII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES ONGOING - Under Implementation - STATE SECTOR (WBSEDCL)										
54.	Jaldhaka St. I 3x9MW , 1967 (U-I&2) 1972 (U-3) Unit-1&2: T -Litostroj, Yugoslavia G-R.Koncar:Yugoslavia Unit-3 T&G - Fuji, Japan	88.62	RM&LE (St-I)	27 (LE)	2016-17	79.97 (as on 31.12.15)	Agency: <u>PFC/MOP</u> disbursed Rs. 1.38 Cr. till 31 Dec. 07 under AG&SP against sanction of 36.52 Cr. which has been foreclosed. <u>REC</u> Rs. 62.03 Cr. Disbursed Rs. 28.17 Cr. Till 31.3.2010	1. Renovation & repair works for Barrage, Water Intake & Water Conductor System, Power House Buildings & Yards including equipment foundation etc. and TRC of Stage – I P.H.(Lot I) 2. R&M of all spillway gates, intake gate, emergency intake gates & trash rack. Installation of stoplog gates & operating mechanism. Draft Tube & valves related to Stage-I P.H.(Lot II) 3. R&M of Turbines/Generators & Aux. of units incl. instruments, cooling water system, Air conditioning & fire fighting etc. along with associated civil works related to Stage-I P.H.(Lot III) 4. Design, Manufacturing, supply & erection, testing & commissioning of new electrical equipments consisting of 66 KV C&R panel, 11 KV control desk relay panel, 11 KV Switchgear, Battery, D.C. Board, A.C. Board, Cables, illumination, UPS, D.G. sets, Transformers along with associated civil works related to Stage-I P.H. (Lot IV) 5. New addl. Unit of 9 MW (Lot V) 6. Design, supply & installation of SCADA System for entire JHP.Set-I(Lot VI)	1. Lot-I: Major part of work completed. Balance works are in progress. 2. Lot-II: All the works have been completed on 29.05.2007 and taken over. 3. Lot-III: Unit 2: Commissioned on 30.07.2010 & available. Unit 1: Commissioned on 08.07.2012 & available. Unit 3: Commissioned on 07.10.2011 & available. Taking over of units awaited pending miscellaneous. contractual obligations. 4.Lot-IV: All work completed on 20.04.2010. 5. Lot-V: Not in R&M scope 6. Lot-VI: Tender invited earlier in April 2009 for the said package has been cancelled on 04.09.2012 due to paucity of Bidders & retendering shall be taken up after stabilisation of all four units (including the new 4 th unit). Exclusion of SCADA Package from R&M has been considered by WBSEDCL authority. Further Tendering & implementation of SCADA work shall be taken up subsequently covering both Stage-I & Stage-II as a composite package after stabilization of all 4 units at Stage-I & after installation of Digital Governor/ Numerical relays (Compatible to SCADA) at Stage-II.	Time-overrun factors: i)Prolonged unrest in hills from end-2007 to early-2011. ii) Additional works had to be ordered as same not foreseen due to it being R&M work. iii) Delay due to Contractor (M/s Andritz Hydro).

WEST BENGAL - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II - SCHEMES Ongoing - Under DPR Preparation - CENTRAL SECTOR (DVC)										
55.	Maithon, U-1&3, 2x20 MW DVC, West Bengal Commissioned Oct. 1957 and March 1958 respectively Neyrpic, Alstom France (T) & Siemens, W.Germany	56.034 Cr.	RMU&LE	40 (LE)	XIII Plan	5.75 Cr.	Agency: DVC for Switchyard work	1. Refurbishment of runners, Replacement of Governor, Guide vanes & guide vane bushes. Re-habitting 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 31.03.15. Contract is going to be closed shortly after completion of minor pending jobs.	DVC has now planned that R&M of these units shall be taken up after observing the performance of Panchet U#1.

Assam - XII Plan Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I – SCHEMES COMPLETED - CENTRAL SECTOR (NEEPCO)										
56.	Khandong 1x25 MW NEEPCO 1984 T&G - BHEL	25.05 (excluding IDC)	RM&LE	25 (LE)	2014-15	29.18 (as on 30.09.14)	Internal Resources	I-Generator Replacement of stator with improved design, low loss core material along with new set of stator windings. Re-insulation of rotor pole windings, replacement of rotor pole keys. Incorporation of brake dust collector system & carbon dust collector. Replacement of all generator air coolers, LGB & UGB oil coolers with low pH value of water resistive material, oil level switches of all bearing housing. Incorporation of digital type flow meters in the return side of cooling water system of all types of coolers II-Turbine Rectification of top covers, Replacement of MS guide vanes with SS guide vanes, Repairing and HVOF coatings of runner. Replacement of vortex pipes attached with upper cone with SS pipes, existing shear pin failure detecting device with new system, existing MIV/Bypass valve control cabinet with new solenoid valve type control cabinet. Replacement of turbine discharge measuring device with new set. Overhauling of guide vane servo motors. Overhauling of MIV, building up of eroded areas of valve body, door disc, MIV servo motors and by-pass valves including supply of necessary spares. Replacement of TGB coolers. Incorporation of Online vibration monitoring system, air gap measurement III-GENERATOR TRANSFORMERS Overhauling of the GTs, Replacement of oil coolers. Replacement of all NRVs and all types of valves. Procurement of two nos. of spare limbs. IV- Control System Replacement of defective distance protection scheme of 132 kV feeders.	Considering long delivery schedule of BHEL, orders have already been placed with BHEL for all major items. Most of the items have been received at site. Replacement of TGB Coolers, overhauling of unit-1 GT, replacement of defective distance protection scheme of 132kV feeders completed. Assembly of new stator and H.V. test completed. Balance material & equipment from BHEL has been received. R&M work completed on 30.06.2014.	Acidity of water in Kopili reservoir and bad Law and Order situation prevailing at project site were reasons for slow progress in execution of R&M works. Delay also due to delay in supply by BHEL.

Assam - XII Plan Programme/Status of Renovation and Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
I – SCHEMES COMPLETED - CENTRAL SECTOR (NEEPCO)										
57.	Kopili, 2x50 MW (St.I) NEEPCO 1988 T&G - BHEL	50.22 (Rev.)	R&M & Refurbishment of U-1 &2	-	2014-15	50.92 (as on 30.09.14)	Internal Resources	TURBINE of Units – 1 & 2 – One new runner as spare, Replacement of top cover & pivot ring with SS liner for Unit-1, – Overhauling of Turbine section – Governors, Piston rings of MIV, bushes of guide vanes, all seals of PRV, Turbine Discharge Measurement device, flow relay / Limit switches. GENERATOR Unit -1 & 2 – Re-insulation of stator windings and Rotor windings. Re-Varnishing & Building of punching of stator, Replacement of PMG, AVR, seals of all bearings, Stator Air cooler, header pipe lines including supply of Gate valves, Slip Rings etc. Incorporation of brake Dust Collector, carbon dust collector, brake jack assembly etc. On line Monitoring System for Vibration, Labyrinth Clearance, Bearing Temperature Measurement. GT & PROTECTION SYS - Replacement of oil coolers, cooler valves, reducer valves, Diff. Pressure gauges etc. – Replacement of relays for protection of Generator & Feeders, Control & Relay panel of 220kV/11kV 3x20 MVA Transformers. SWITCHYARD – Replacement of MOCB with SF6 CBs. AUXILIARIES – Replacement of pumps of cooling Water, Drainage & De-watering system etc, Battery Bank, Cables. Procurement of One set of DT & PRV Gates	Orders for most of the electro mechanical equipments etc. have been placed on OEM i.e. BHEL. Considering long delivery period (16 to 24 months) of BHEL for manufacture and supply of items, it was planned to complete entire scheme by May, 2014. Most of the items have been received at site. Replacement of oil coolers, installation of 20 MVA Generator transformer, replacement of MoCB completed. Balance material and equipment from BHEL has been received. R&M of Unit-1 has been completed on 24.05.2014 and in Unit-2 on 29.07.14. MOU signed with PGCIL for installation of a new 132/33 KV SST in Kopili Switchyard and works completed. 4 sets of SF6 220kV CB and one set of 132kV CB procured and replacement carried out.	Acidity of water in Kopili reservoir and bad Law and Order situation prevailing at project site are reasons for slow progress in execution of R&M works.

MEGHALAYA- XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II – SCHEMES ONGOING – Under DPR approval -STATE SECTOR (MePGCL)										
58.	Umiam Stage-III Kyredemkulai 2x30 MW MePGCL 1979 T&G - BHEL	344	RM U & LE	6(UR) + 60(LE)	XIII Plan	-	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.	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, Deptt. 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. 20 th March, 2012. The clarification sought by CEA was submitted to the State Govt. vide letter no. MTN/2006/21628 dated 15 th December, 2012. The points raised by the Director, Ministry of DONER was submitted to the State Govt. vide letter no. MTN/2006/216 dated 17 th December, 2012.	

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

MANIPUR - XIII Plan Programme/Status of Renovation And Modernisation Schemes of Hydro Power Stations

(Amount in Rs.Crs.)

S. No.	Scheme Description	Estimated Cost	Scheme category	Expected Benefit MW	Completion Schedule	Expenditure incurred	Funding details	Scope of work	Present Status	Remarks
II – SCHEMES ONGOING – Under DPR Preparation - CENTRAL SECTOR (NHPC)										
59.	Loktak 3x35 MW NHPC 1983 T&G - U-1: Lanin, USSR T&G – U-2&3: BHEL	260.47	RM&LE	105 (LE)	2022	-	-	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 has been sent to Ministry of Power on 01/03/2016 for advising CEA to examine and vet the proposal.	

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	18.00 (U)	RM&U	1991-92
2.	Giri, HPSEB	SS	2x30	9.85	7.90	6.00 (U)	RM&U	1995-96
Punjab								
3.	UBDC-I, PSEB	SS	3x15	11.00	8.00	11.00 (Res)	R&M+Res.	1990-92
Uttar Pradesh								
4.	Rihand, UPJVNL	SS	6x50	1.43	1.43	100.00 (Res)	R&M+Res.	1995-96
Karnataka								
5.	Nagjhari, U-2, KPCL	SS	1x135	11.97	11.32	15.00 (U)	RM&U	1995-96
6.	Shivasamudra m, VVNL	SS	6x3 + 4x6	8.00	8.00	18.00 (LE)	RM&LE (3 MW Units)	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	200.00 (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	25.00 (Res)	R&M+Res.	1991-92
Tripura								
13.	Gumti, TSECL	SS	3x5	17.50	17.50	-	R&M	1994-95
	Total		1282.00	125.57	127.37	429.00 [39.0 (U) + 336.0 (Res) + 54.0(LE)]		

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

S. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Himachal Pradesh								
1.	Bhakra RB, BBMB	CS	5x132	88.45	90.68	125.00 (U)	RM&U	2000-01
2.	Dehar U-2, BBMB	CS	1x165	10.74	10.74	25.00 (Res.)	R&M+Res.	1998-99
3.	Bairasiul, NHPC	CS	3x66	18.45	18.45	-	R&M	2000-01
4.	Bassi, HPSEB	SS	4x15	5.35	4.3446	-	R&M	2000-01
Jammu & Kashmir								
5.	Salal St.I, NHPC	CS	3x115	51.50	51.50	-	R&M	2000-01
6.	Chenani, J&KPDC	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	4.1136	-	R&M	1998-99
12	Tiloth, UJVNL	SS	3x30	8.02	5.513	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, 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	178.20 (Res) + 115.20 (U)	RM&U +Res.	1997-98
16	Sharavathy, U-9&10, KPCL	SS	2x89.1	17.96	14.68	19.10 (Res) + 28.80(U)	RM&U +Res.	1997-98
Orissa								
17	Hirakud-I, U1&2, OHPC	SS	2x37.5	95.10	95.10	24.00(U) + 75.00(LE)	RMU&LE	1997-98

Annex-II
(Sheet 2/ 2)

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

S. 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 (incl. IDC 6.28)	81.9935	25.89 (LE) +2.10 (Res)	RM& LE+Res.	2006-07
3.	Kotla, U-1, BBMB	CS	1x29.25	51.28 (incl. IDC 6.28)		26.61 (LE) +2.33 (Res)	RM&LE + Res.	2006-07
4.	Shanan Ph.A, PSEB	SS	4x15+ 1x50 \$	11.35	10.93	-	R&M	2003-04
5.	Shanan, Ph.B, PSEB	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, PSEB	SS	4x33.5	3.68	1.04	-	R&M	2006-07
7.	UBDC I&II, PSEB	SS	3x15 + 3x15.45	7.89	2.44	45.00 (LE)	RM&LE (LE for 3x15 MW & R&M for 3 x 15.45 MW	2006-07
8.	Mukerian St.I, PSEB	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	30.00 (U)	RM&U	2002-03
11.	Supa PH, KPCL	SS	2x50	2.64	2.47	-	R&M	2002-03

S. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
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
14	Mani Dam, KPCL	SS	2x4.5	1.00	1.00	-	R&M	2002-03
15	Shivasamudra m, VVNL	SS	6x3+ 4x6	68.38	73.17	42.00 (LE)	RM&LE	2004-05
16	Bhadra, Ph.II, KPCL	SS	1x2	3.30	2.51	2.00 (LE)	RM&LE	2005-06
17	Varahi, KPCL	SS	2x115	2.57	2.66	-	R&M	2006-07
18	Sharavathy, Ph.A, KPCL	SS	10x103.5	5.22	3.52	-	R&M	2006-07
Kerala								
19	Neriamangalam KSEB	SS	3x15	58.00	53.05	45.00 (LE) + 9.00 (U)	RMU&LE	2006-07
20	Pallivasal, KSEB	SS	3x5+3x 7.5	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 14	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	20.00(LE) +3.20(U)	RMU&LE	2004-05

S. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost	Actual Exp.	Benefits (MW)	Category	Year of completion
				(Rs. in Crs.)				
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
30	Koyna Gen. Complex, MSPGCL	SS	4x70+4x80+4x80	12.00	11.50	-	R&M	2004-05
Meghalaya								
31	Umium St.I MeSEB	SS	4x9	81.88	84.21	36.00 (LE)	RM&LE	2002-03
32	Khandong, NEEPCO	CS	2x25	4.00	3.3499	-	R&M	2003-04
	Total		4336.60	1016.31	1028.9704	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 already 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

S. No	Project, Agency	CS/SS	Inst. Cap. (MW)	Estimated Cost	Actual Expenditure	Benefits (MW)	Category	Completion Schedule
				(Rs. in Crs.)				
Completed Schemes								
Himachal Pradesh								
1.	Dehar Ph. A BBMB	CS	6x165	11.00	6.936		R&M	2010-11 Completed
2.	Dehar Ph. B BBMB	CS	6x165	49.00	24.454	330 (LE)	RM&LE	2009-10 Completed
Uttarakhand								
3	Tanakpur, NHPC	CS	3x31.4	10.77	11.95	-	R&M	2007-08 Completed
4	Khodri Ph.A UJVNL	SS	4x30	5.25	6.39	-	R&M	2008-09 Completed
5	Chilla Ph.A, UJVNL	SS	4x36	23.55	21.24	-	R&M	2008-09 Completed
Andhra Pradesh								
6	Upper Sileru, APGENCO	SS	4x60	4.20	3.34	-	R&M	2009-10 Completed
Karnataka								
7	Nagjhari, U1 to 6, KPCL	SS	5x150 + 1x135	14.75	15.31	-	R&M	2009-10 Completed
8	Sharavathy Ph.B, KPCL	SS	10x103.5	20.50	11.14	-	R&M	2009-10 Completed
9	Supa, KPCL	SS	2x50	3.45	4.90	-	R&M	2009-10 Completed
10	Bhadra, KPCL	SS	2x12	1.44	0.85	-	R&M	2009-10 Completed
11	Lingnamakki, KPCL	SS	2x27.5	3.81	2.62	-	R&M	2010-11 Completed
Tamil Nadu								
12	Mettur Dam, TANGEDCO	SS	4x10	30.17	24.16	10 (U) + 40 (LE)	RMU&LE	2007-08 Completed
Maharashtra								
13	Koyna St.I & II, MSPGCL	SS	4x70 + 4x80	87.50	81.82	-	R&M	2008-09 Completed
14	Vaitarna, MSPGCL	SS	1x60	16.00	0.14	-	R&M	2009-10 Completed
15	Koyna Dam PH, MSPGCL	SS	2x18	5.78	0.25	-	R&M	2009-10 Completed
16	Koyna St.III, MSPGCL	SS	4x80	16.65	5.79	320 (LE)	RM&LE	2011-12 Completed
Manipur								
17.	Loktak, NHPC	CS	3x30 derated	18.55	17.88	15.00 (Res.)	R&M + Res.	2011-12 Completed

S. No	Project, Agency	CS/SS	Inst. Cap. (MW)	Estimated Cost	Actual Expenditure	Benefits (MW)	Category	Completion Schedule
				(Rs. in Crs.)				
Meghalaya								
18	Umium St.II , MeSEB	SS	2x9	90.46	55.67 (as on 31.03.12)	2(U)+ 18.00 (LE)	RM&LE	2011-12
	Total		4821.20	412.83	294.84	735 [12.00(U) + 708.00 (LE) + 15.0(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 programmed for completion in the XII Plan

(As on 31.03.2016)

S. No	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Prov.)	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Completed Schemes								
Odisha								
1	Rengali Unit-1 OHPC	SS	1x50	47.50	36.76 (as on 30.06.12)	50(LE)	RM&LE	2012-13
2	Rengali Unit-2 OHPC	SS	1x50	25.2 (approx)	20.73	50(LE)	RM&LE	2013-14
Himachal Pradesh								
3	Bassi, HPSEB	SS	4x15	124.25	158.25 (as on 31.12.15)	6.0(U)+ 60 (LE)	RMU&LE	2013-14
Andhra Pradesh								
4	Lower Sileru, APGENCO	SS	4x115	8.75	6.77	-	R&M	2013-14
5	Srisaillam RB, APGENCO	SS	7x110	16.70	16.56	-	R&M	2015-16
Telangana								
6	Nagarjuna Sagar Ph-I, TSGENCO	SS	1x110+ 7x100.8	33.35	13.90 (as on 31.03.2012)	-	R&M	2012-13
Kerala								
7	Idamalayar, KSEB	SS	2x37.5	14.50	13.22 (as on 31.03.13)	-	R&M	2012-13
8	Sabarigiri, KSEB Unit-4	SS	1x55	52.2	50.41 (as on 30.09.15)	5(U)	RMU&LE	2014-15
9	Poringalkuthu, KSEB	SS	4x8	88.63	51.63 (as on 31.12.15)	32.00 (LE)+ 4 (U)	RM&LE	2015-16
Assam								
10	Khandong, NEEPCO	CS	1x25	25.05	29.18 (as on 30.09.14)	25.00 (LE)	RM&LE	2014-15
11	Kopili, NEEPCO	CS	2x50	50.22	50.92 (as on 30.09.14)	-	R&M & Refurbishment of Units 1 & 2	2014-15
Karnataka								
12	Supa, KPCL	SS	2x50	3.45	3.88 (as on 30.09.14)	-	R&M	2014-15
Uttarakhand								
13	Pathri, UJVNL	SS	3x6.8	113.25	107.54	20.40(LE)	RM&LE	2014-15
Jammu & Kashmir								
14	Lower Jhelum, J&KSPDC	SS	3x35	101.30	83.65 (as on 31.12.14)	15.00 (Res.)	R&M+ Res.	2014-15
Uttar Pradesh								
15	Matatila, UPJVNL	SS	3x10.2	10.29	7.09 (as on 31.12.15)	30.6 (LE)	RM&LE	2015-16
Tamil Nadu								
16	Periyar, TANGEDCO	SS	4x35	161.18	133.68	140 (LE) + 28.00(U)	RMU&LE	2015-16
	Sub Total(A)		2888.6	875.82	784.17	466 [43(U)+ 408 (LE)+ 15 (Res)]		

Annex- V
(Sheet 2 of 2)

S. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Prov.)	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Ongoing Schemes – Under Implementation								
Jammu & Kashmir								
17	Ganderbal, J&KSPDC	SS	2x3+ 2x4.5	39.30	9.51 (as on 31.12.14)	9.00 (LE)	RM&LE	2016-17
18	Chenani, J&KSPDC	SS	5x4.66	39.14	11.41 (as on 31.03.15)	23.30 (LE)	RM&LE	2016-17
19	Sumbal Sindh, J&KSPDC	SS	2x11.3	25.00	22.46 (as on 31.12.14)	-	R&M	2016-17
Uttarakhand								
20	Khatima, UJVNL	SS	3x13.8	256.77	108.52	41.40 (LE)	RM&LE	2016-17
Karnataka								
21	Bhadra River Bed units, KPCL	SS	2x12	28.015	16.92 (as on 30.09.15)	-	R&M	2016-17
West Bengal								
22	Jaldhaka St.I, WBSEB	SS	3x9	88.62	79.97 (as on 31.12.15)	27 (LE)	RM&LE	2016-17
	Sub Total(B)		153.30	476.85	248.79	100.70 [100.7 (LE)]		
	Total (A+B)		3041.90	1352.67	1032.96	566.70 [43(U) + 508.70 (LE) + 15(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 programmed for completion in the XIII Plan & beyond
(As on 31.03.2016)

S. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Prov.)	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Ongoing Schemes – Under Implementation								
Jammu & Kashmir								
1.	**Salal, NHPC	CS	6x115	58.01	-	-	R&M	2018
Uttar Pradesh								
2.	*Rihand, UPJVNL	SS	6x50	132.20 (Rev.)	90.38	300.00 (LE)	RM&LE	2017-18
3.	*Obra, UPJVNL	SS	3x33	58.8	14.77	99.00 (LE)	RM&LE	2017-18
Karnataka								
4.	Nagjhari, U-1 to 6, KPCL	SS	5x150+ 1x135	50.87	64.49 (upto 31.12.14)	15 (U)	R&M	XIII Plan
Himachal Pradesh								
5.	*Bhakra LB, BBMB	CS	5x108	489.77	319.47 (as on 29.02.16)	540.00 (LE) + 90.00 (U)	RMU&LE	2018-19
6.	**Ganguwal U2& Kotla U3, BBMB	CS	2x24.2	14.19	0.84	48.4 (LE)	RM&LE	2017-18
7.	*Dehar Power House, BBMB	CS	1x165	39.14	1.52	-	R&M	2017-18
Odisha								
8.	*Hirakud-I U5&6, OHPC	SS	2x37.5	158.77	11.85	75.00 (LE) + 12.2 (U)	RM&LE	2018-19
9.	*Hirakud-II, OHPC	SS	3x24	161.64	64.42	72.00 (LE)	RM&LE	2017-18
Tamil Nadu								
10.	**Sholayar-I, TANGEDCO	SS	2x35	120	-	14.00(U) + 70.00 (LE)	RMU&LE	2018-19
Kerala								
11.	*Sholayar, KSEB	SS	3x18	199.55	-	54.00 (LE)	RM&LE	2018-19
Telangana								
12.	**Nagarjuna Sagar Ph-II, TSGENCO	SS	1x110+ 7x100.8	22.17	13.27	-	R&M	2018
13.	**Nagarjuna Sagar Left Canal Power House, TSGENCO	SS	2x30	30.99	0.87	-	R&M	2018
	Sub Total (A)		3874	1536.10	581.88	1389.60 [131.20 (U) + 1258.40 (LE)]		
Ongoing Schemes – Under Tendering								
Himachal Pradesh								
14.	**Baira Siul, NHPC	CS	3x60	360.79	-	180 (LE)	RM&LE	2020
15.	*Giri, HPSEB	SS	2x30	47.80	-	60.00 (LE)	RM&LE	2018-19
Uttarakhand								
16.	*Chilla Ph B UJVNL	SS	4x36	490.56	-	28.8(U) + 144(LE)	RMU&LE	2019-20
17.	*Kulhal, UJVNL	SS	3x10	115.24	-	30(LE)	RM&LE	2020-21
18.	**Ramganaga	SS	3x66	455.20	-	198(LE)	RM&LE	2020-21

Annex- VI
(Sheet 2 of 3)

S. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Prov.)	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
19.	*Tiloth, UJVNL	SS	3x30	384.66	-	90 (LE)	RM&LE	2019-20
20.	*Dhakrani, UJVNL	SS	3x11.25	137.31	-	33.75 (LE)	RM&LE	2020-21
21.	*Dhalipur, UJVNL	SS	3x17	152.65	-	51.00 (LE)	RM&LE	2020-21
Odisha								
22.	*Balimela, OHPC	SS	6x60	664.7	1.15 (as on 31.12.15)	360(LE)	RM&LE	2020-21
Kerala								
23.	*Idukki 1 st stage, KSEB	SS	3x130	79.45	-	-	R&M	2018-19
Karnataka								
24.	**Nagihari, U-1 to 3, KPCL	SS	3x150	51	28.41 (upto 30.09.15)	-	R&M	XIII Plan
Jharkhand								
25.	*Panchet, U-1, DVC	CS	1x40	58.22	1.99	40.00 (LE)	RM&LE	XIII Plan
	Sub Total (B)		2026.75	2997.58	31.55	1215.55 [28.80(U)+ 1186.75(LE)]		
Ongoing Schemes – Under DPR Preparation/Finalisation/Approval								
Himachal Pradesh								
26.	**Bhaba Power House, HPSEB	SS	3x40	-	-	120 (LE)	RM&LE	XIII Plan
Uttarakhand								
27.	*Chibro, UJVNL	SS	4x60	184.88	-	240(LE)	RM&LE	2023-24
28.	*Khodri UJVNL	SS	4x30	169.63	-	120(LE)	RM&LE	2023-24
Meghalaya								
29.	Umium St.III, Kyrdemkulai, MePGCL	SS	2x30	344	-	60(LE)+ 6 (U)	RMU&LE	XIII Plan
Manipur								
30.	**Loktak, NHPC	CS	3x35	260.47	-	105 (LE)	RM&LE	2022-23
Tamil Nadu								
31.	*Kodayar Ph-II, TANGEDCO	SS	1x40	-	-	40.0(LE) +4(U)	RMU&LE	XIII Plan
32.	**Moyar PH, TANGEDCO	SS	3x12	65.45	-	36(LE)+ 6 (U)	RM&LE	XIII Plan
33.	*Kodayar Ph.I, TANGEDCO	SS	1x60	78.59	-	60 (LE)+ 10(U)	RM&LE	XIII Plan
Andhra Pradesh								
34.	*Machkund, APGENCO	SS	3x17 (St.I) & 3x21.25 (St.II)	124.45	-	5.25 (U) + 114.75 (LE)	RMU&LE	XIII Plan
Kerala								
35.	*Kuttiadi, KSEB	SS	3x25	-	-	75.00 (LE)	RM&LE	XIII Plan
West Bengal								
36.	*Maithon, U-1&3, DVC	CS	2x20	56.03	5.75	40.00 (LE)	RMU&LE	XIII Plan
Karnataka								
37.	*Sharavathy (Ph B), KPCL	SS	10x103.5	20	2.59 (upto 31.12.14)	-	R&M	XIII Plan
	Sub Total(C)		2045.75	1303.50	8.34	1042 [31.25(U)+ 1010.75 (LE)]		

S. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Est. Cost (Prov.)	Actual Exp.	Benefits (MW)	Category	Year of Completion
				(Rs. in Crs.)				
Ongoing Schemes – Under RLA Studies								
Tamil Nadu								
38.	**Kundah-I, TANGEDCO	SS	3x20	-	-	-	RM&LE	XIV Plan
39.	**Kundah-II, TANGEDCO	SS	5x35	-	-	-	RM&LE	XIV Plan
40.	**Kundah-III, TANGEDCO	SS	3x60	-	-	-	RM&LE	XIV Plan
41.	**Kundah-IV, TANGEDCO	SS	2x50	-	-	-	RM&LE	XIV Plan
42.	**Kundah-V, TANGEDCO	SS	2x20	-	-	-	RM&LE	XIV Plan
43.	**Mettur Tunnel, TANGEDCO	SS	4x50	-	-	-	RM&LE	XIV Plan
44.	**Sarkarpathy, TANGEDCO	SS	1x30	-	-	-	RM&LE	XIV Plan
45.	**Sholayar-II, TANGEDCO	SS	1x25	-	-	-	RM&LE	XIV Plan
46.	**Suruliyar, TANGEDCO	SS	1x35	-	-	-	RM&LE	XIV Plan
	Sub Total(D)		845	-	-	-		
	Total (A+B+C+D)		8791.50	5837.18	621.77	3647.15 [191.25 (U) +3455.90 (LE)]		

* These 24 schemes have been rescheduled for completion from XII Plan to XIII Plan & beyond.

** These 20 new schemes were taken up during XII Plan.

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

**STATE-WISE LIST OF ADDITIONAL HYDRO PROJECTS IDENTIFIED AS ON
31.03.2016 FOR UNDERTAKING RMU&LE WORKS**

S. No.	Project, Agency	CS/ SS	Inst. Cap. (MW)	Remarks
Himachal Pradesh				
1.	Pong, BBMB	CS	6x66	
2.	Dehar, BBMB	CS	4x165	BBMB has placed a Work Order upon M/s CPRI, Bangalore for RLA Study of various equipment for preparation of the “Detailed scope of RLA” to be undertaken on Dehar Power House. The detailed report is awaited.
Maharashtra				
3.	Koyna Stage-III, MSPGCL	SS	4x80	
4.	Vaitarana, MSPGCL	SS	1x60	
Gujarat				
5.	Ukai (U- 1, 2, 3 & 4), GSECL	SS	4x75	
Andhra Pradesh				
6.	Tungabhadra Dam, APGENCO	SS	4x9	
7.	Hampi, APGENCO	SS	4x9	
Jharkhand				
8.	Sikidiri, JSEB	SS	2x65	
Total			1938	

Abbreviations of Agencies

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.	NEEPCO	North-East Electric Power Corporation
13.	OHPC	Odisha Hydro Power Corporation
14.	TANGEDCO	Tamil Nadu Generation and Distribution Corporation Ltd.
15.	TSGENCO	Telangana State Power Generation Corporation
16.	UPJVNL	Uttar Pradesh Jal Vidyut Nigam Ltd.
17.	UJVNL	Uttarakhand Jal Vidyut Nigam Ltd.
18.	WBSEDCL	West Bengal State Electricity & Dist. Co. Ltd.