

Capex Plan Petition – FY 17 to FY 20

Submitted By
**MADHYA PRADESH PASCHIM
KSHETRA VIDYUT VITARAN
COMPANY LIMITED, INDORE**



**Madhya Pradesh Paschim Kshetra Vidyut Vitaran
Company Limited, GPH Compound, Pologround,
Indore**

**BEFORE THE HON'BLE MADHYA PRADESH
ELECTRICITY REGULATORY COMMISSION, BHOPAL**

Petition No. _____ of 2017

- (1) Madhya Pradesh PaschimKshetraVidyutVitaran Company Limited (MPPaKVVCL)
GPH, Polo Ground, Indore (MP) ----- Petitioner

IN THE MATTER OF:

Filing of Capex application for the period FY 2016-17 to FY 2019-20 for obtaining approval of Commission for various schemes as per Regulation 10.3 of MPERC Regulations (The Conditions of Distribution License for distribution licensee (including deemed licensee), 2004) by MPPaKVVCL (West Discom) as the Distribution Licensee.

THE HUMBLE APPLICANT NAMED ABOVE MOST RESPECTFULLY SUBMIT AS UNDER:

1. Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Ltd., (hereinafter referred to as the 'Petitioner', MPPaKVVCL, 'the Company' or 'the Licensee' or 'West Discom'), is a Company incorporated under the Companies Act, 1956 (now Companies Act 2013) and having its registered office at GPH, Polo Ground, Indore. The Petitioner is a deemed licensee under the Fifth Provision to Section 14 of the Electricity Act, 2003. The area of supply of the Petitioner comprises Indore and Ujjain Commissionaire within the State of Madhya Pradesh ('MP').
2. The Government of Madhya Pradesh ('GoMP' or 'State Government'), vide an Order No. 3679-FRS-18-13-2002 dated 31st May, 2005, published in the gazette of Madhya Pradesh dated 31st May 2005, have restructured the functions and undertakings of Generation, Transmission, Distribution and Retail Supply of electricity earlier carried out by the Madhya Pradesh State Electricity Board ('MPSEB' or the 'Board') and transferred the same to five Companies to function independently. The five Companies are as under: -
 - a) M.P. Power Generating Company Ltd., Jabalpur (MPPGCL)
 - b) M.P. Power Transmission Company Ltd., Jabalpur (MPPTCL)
 - c) M.P. PooryKshetraVidyutVitaran Company Ltd., Jabalpur (MPPoKVVCL)
 - d) M.P. PaschimKshetraVidyutVitaran Company Ltd., Indore (MPPaKVVCL)
 - e) M.P. Madhya KshetraVidyutVitaran Company Ltd. Bhopal (MPMKVVCL)
3. With effect from 1st June2005, the Operation and Management Agreement that existed between Madhya Pradesh State Electricity Board and the Five Companies came to end with the issue of the said Order dated 31-05-2005. The three Discoms viz. MPPoKVVCL, Jabalpur, MPPaKVVCL, Indore and MPMKVCL, Bhopal started functioning

independently as Distribution Licensees in their respective area of license and from the said date, they are no longer operating as an agent of or on behalf of the Board, subject to Cash Flow Mechanism (CFM) provided in the said Order.

4. Each of the 3 DISCOMs in the state of MP are separately vested with the responsibility of distribution of power in its respective supply area. The DISCOMs have to comply with the various regulations as promulgated by Hon'ble MPERC and is bound to appear before Hon'ble Commission as per the existing provisions of various regulations for various purposes.
5. In the backdrop of the above facts and circumstances, the present application is being made by West DISCOM, Indore for approval of capital expenditure plan for the period FY 2016-17 to FY 2019-20 as per provisions of Regulation 10.3 of MPERC Regulations (The Conditions of Distribution License for distribution licensee (including deemed licensee), 2004).
6. Madhya Pradesh Pashchim Kshetra Vidyut Vitaran Company Limited (henceforth referred to as "MPPaKVVCL" or "Petitioner") is submitting its proposed Investment Plan Petition for the FY 2016-17 to FY 2019-20.
7. The petitioner submits that the proposed amount of **INR 3951.40 Crore** is to be invested across various state and central schemes. The capital expenditure is thought to further strengthen the distribution network of the petitioner and will help in extending quality and reliable power supply in its license area.
8. Based on the information available, the Petitioner have made sincere efforts to comply with The Regulations of the Hon'ble Commission and discharge its obligations to the best of its ability and resources at its command. However, should any further information of material significance becomes available during the process of determination, the petitioners may be permitted to reserve the right to file such additional information and consequently amend/revise the petition.
9. Shri Ashwin Parwal Addl. Superintending Engineer (Works) of MPPaKVVCL, Indore have been authorized to execute and file all the documents on behalf of the petitioner in this regard. Accordingly, the current filing is signed and verified by, and backed by the affidavit of respective authorized signatories.

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Compliance to MPERC Directives

BEFORE THE HON'BLE MADHYA PRADESH ELECTRICITY REGULATORY COMMISSION, BHOPAL

With Reference to – P No. 15/2017

Subject – In the matter of filing of Capex Plan by the MP Pashchim Kshetra Vidyut Vitran Co. Ltd. Indore for FY 2016-17 to FY 2019-20

Commission's observations in the matter are as under –

1. The petition does not contain the comprehensive cost benefit analysis, payback period and also the likely improvement in performance parameters and reliability of sub transmission and distribution system particularly in rural areas.

MPPKVCL, Indore – The Hon'ble commission would find in the petition document a detailed cost benefit analysis, payback period and the likely improvement in performance parameters and reliability of sub transmission and distribution system including both rural and urban areas according to the respective schemes and geographical areas circle-wise. The aforementioned are present from Pg 73-162.

2. District wise existing loss level vis-a-viz loss level projected to be achieved after implementation of aforesaid schemes based on network simulation studies to be furnished. Further, the extent to which the loss level of the company as a whole are expected to be reduced subsequent to execution of these schemes be also furnished.

MPPKVCL, Indore – The Hon'ble commission would find in the petition document Circle wise existing loss level vis-a-viz loss level (The aforementioned are present from Pg 73-162). Network Simulation studies are present (Pg 40-72) with requisite summary of the studies. The loss level projection for the whole company as projected after execution of the schemes has been described in the Conclusion section (Pg 184)

3. The petition is not supported with the details of how availability of adequate supply of electricity shall be ensured in meeting out the energy requirement of domestic and irrigational connections in rural areas for extended hours of supply with the addition in the infrastructure under the capex plan, so as to achieve the goal of 24X7 supply of electricity to all.

MPPKVCL, Indore – The Hon'ble commission would find in the petition document availability of adequate supply of electricity in section 1.5 enumerating monthly feeder outages and month-wise supply, while growth in parameters till date is provided in section 1.3. The petition document further contains details of circle wise projected increase in consumer base and projected requirement of electricity by consumers (Pg 73-162). The petition document further

concludes the Discom wide requirement details in the Conclusion section; 24X7 Supply of electricity for all.

4. Whether the aforesaid Capex schemes are provisioned for achieving 100% meterisation targets in accordance with the Commission's directives in Retail Supply Tariff orders in respect of domestic consumers in rural area, irrigation connections, Distribution Transformers and for replacing the defective meters during the plan period. In case the petitioner has not made the provisions for inclusion of 100% meterisation targets and also for timely replacement of stopped & defective meters, the provision of the same is required to be incorporated in the capex schemes in revised petition showing completion year.

MPPKVCL, Indore – The Hon'ble commission would find in the petition document circle wise breakup of consumer mix (Pg 73-162). The details of schemes undertaken by the Discom for achieving 100% meterisation targets in accordance with the Commission's directives in Retail Supply Tariff orders in respect of domestic consumers in rural area, irrigation connections, Distribution Transformers and for replacing the defective meters during the plan period is present in scheme details sections (Section 2.4-2.14 and section 3.1

5. The financial details of project such as break up of project cost in equity and loan components, terms and conditions of loans including moratorium and repayment schedule and sanction/ approval letter of funding agencies for new projects and extension letter of old projects in case of slippage of time and cost are required to be furnished.

MPPKVCL, Indore – The Hon'ble commission would find in the petition document the financial details of project such as break up of project cost in equity and loan components, terms and conditions of loans including moratorium under section 1.5 Financial Details of Projects (Pg No 34-38) and repayment schedule. Furthermore, sanction/ approval letter from funding agencies including terms and conditions can be found in the Appendix.

6. Soft Copy (in CD) of DPR for each scheme/ project be also furnished supported with the load flow studies/ simulation studies for strengthening sub transmission/ distribution systems clearly indicating the loss reduction profile and improvement of reliability of the system.

MPPKVCL, Indore – The Hon'ble commission would find in the petition document the Network Simulation studies are present (Pg 40-72) with requisite summary of the studies. Furthermore, DPR for each scheme in soft copy is attached with the petition document.

1. Scheme wise Progress Achieved till FY 2015-16

1.1. Details of Scheme wise physical progress and financial costs incurred

Table: Scheme wise progress achieved

S.No.	Particular	Unit	SSTD (GoMP)				SSTD (TSP)				SSTD (SCSP)				Feeders Separation (ADB)			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	33 /11 KV S/S (a) New	No	15	42.79	33	135.05	6	68.87	10	41.85	3	103.22	8	41.28	6	59.00	0	39.57
	(b) Addl	No	7		8		2		3		0		0		5		0	
	(c) Aug.	No	38		33		12		6				4		20		1	
	(d) Conv. of S/S Temp to Perm		1		2		1		2		1		1		17		0	
2	(a) 33KV Line	Km	165		363.79		85		84.62		125		129.13		25		0.00	
	(b) 11KV Line	Km	265		181.89		100		97.50		75		90.21		450		630.75	
	(c) LT Line	Km	300		33.49		115		39.39		75		9.21		12		0.00	
3	Reconductoring																	
	(a) 33KV Line	Km			0.00				0.00				0.00		33		0.00	
	(b) 11KV Line	Km	40.00		16.00		25		0.00		25		0.00		6			
4	33KV Bay at EHV	No	7		2		7		1		3		0					
5	Bay at 33/11 KV S/s (a) 33 KV	No															0	
	(b) 11KV	No	31		38		18		5		5		0		60		6	
6	Installation of VCB																	
	(a) -33 KV	No			20				0				0					
	(b) -11 KV				9				0				0		60		11	
7	R&M of 33/11 KV Sub Stations																	
8	11KV Capacitor	No	151		133		88		57		40		34		17		0	
9	DTR Metering														1500		1378	

S.No.	Particular	Unit	SSTD (GoMP)				SSTD (TSP)				SSTD (SCSP)				Feeders Separation (ADB)				
			Target		Progress		Target		Progress		Target		Progress		Target		Progress		
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
10	11/ 0.4 S/S (a) New / Addl	No	600		221		116		119		94		70		1300		1204		
	(b) Aug.	No	788		974		27		422		18		969						
11	Conversion LT to HT Line	Km													15		0.00		
12	Conversion LT line with bare conductor to PVC/AB Cable														600		502		
13	Conversion 11 KV line with bare conductor to AB Cable																		
14	Single Phase connections	No													66000		23364		
15	Three Phase connections	No																	
16	H.T. connection	No																	
17	Villages electrified																		
18	Procurement of DTR	No																	
19	(a) Procurement of 1 Phase, 3 Phase Meters & M E's	No																	
20	Meterisation of U/M connections																		
21	Activities under MDAS																		
(a)	33 KV,O/D,P/M,O/I ME's	No			65										0				
(b)	11 KV I-Ph O/D,P/M PT's	No			32										0				
(c)	3 Ph , 110 V,5 A, Static Meter	No			6										0				
(d)	GPRS Modem	No			587										0				
20	Material Procurement (Rs. in Crs.)	Amt			0.00				0.00						0.00				
	Total Amount in Cr. Rs.			42.79		135.05		68.87		41.85		103.22		41.28		59.00		39.57	

S.No.	Particular	Unit	Feeders Separation - REC				Feeder Separation - ACA (TSP)				New Irrigation Pumps				RAPDRP Part A															
			Target		Progress		Target		Progress		Target		Progress		Target		Progress													
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin												
1	33 /11 KV S/S (a) New	No	0.00	9.81	395.92	50.65	49.75	1.20	125.00	77.91	32.62	2.30	1988.79	426.05	850	200	3	40	31	2770	8194									
	(b) Addl	No																												
	(c) Aug.	No																												
	(d) Conv. of S/S Temp to Perm																													
2	(a) 33KV Line	Km																												
	(b) 11KV Line	Km																												
	(c) LT Line	Km																												
3	Reconductoring																													
	(a) 33KV Line	Km																												
	(b) 11KV Line	Km																												
4	33KV Bay at EHV	No																												
5	Bay at 33/11 KV S/s (a) 33 KV	No																												
	(b) 11KV	No																												
6	Installation of VCB																													
	(a) -33 KV	No																												
	(b) -11 KV																													
7	R&M of 33/11 KV Sub Stations																													
8	11KV Capacitor	No																												
9	DTR Metering																													
10	11/ 0.4 S/S (a) New / Addl	No		400		269		3		80		32.92																		
	(b) Aug.	No																												
11	Conversion LT to HT Line	Km																												
12	Conversion LT line with bare conductor to PVC/AB Cable			1135		299																								

S.No.	Particular	Unit	Feeders Separation - REC				Feeder Separation - ACA (TSP)				New Irrigation Pumps				RAPDRP Part A			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Conversion 11 KV line with bare conductor to AB Cable																	
14	Single Phase connections	No			1812													
15	Three Phase connections	No																
16	H.T. connection	No																
17	Villages electrified																	
18	Procurement of DTR	No																
19	(a) Procurement of 1 Phase, 3 Phase Meters & M E's	No			5468													
20	Meterisation of U/M connections								704									
21	Activities under MDAS																	
(a)	33 KV,O/D,P/M,O/I ME"s	No																
(b)	11 KV I-Ph O/D,P/M PT's	No																
(c)	3 Ph , 110 V,5 A, Static Meter	No																
(d)	GPRS Modem	No																
20	Material Procurement (Rs in Crs)	Amt																
	Total Amount in Cr. Rs.			0.00		9.81		0.00		1.20		125.00		77.91		32.62		2.30

S.No.	Particular	Unit	RAPDRP Part B				RGGVY 11th Plan				RGGVY 12th Plan				ADB II TR-VI - (E R P)			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	33 /11 KV S/S (a) New	No	1	95.22	1	60.48		60.93		87.15		41.37		72.90		5.73		
	(b) Addl	No			0										0			
	(c) Aug.	No	1		1										0			
	(d) Conv. of S/S Temp to Perm																	
2	(a) 33KV Line	Km	50		15.60			3135	1713.00	433		597.55		1543.6				
	(b) 11KV Line	Km	100		40.66				1216.00									
	(c) LT Line	Km			35.26													
3	Reconductoring				4.19													
	(a) 33KV Line	Km	14.00		0.00													
	(b) 11KV Line	Km	56.00		0													
4	33KV Bay at EHV	No			4													
5	Bay at 33/11 KV S/s (a) 33 KV	No			0													
	(b) 11KV	No			1909													
6	Installation of VCB				550													
	(a) -33 KV	No			825													
	(b) -11 KV				578													
7	R&M of 33/11 KV Sub Stations		40		131													
8	11KV Capacitor	No			349													
9	DTR Metering																	
10	11/ 0.4 S/S (a) New / Addl	No	1080															
	(b) Aug.	No																
11	Conversion LT to HT Line	Km																
12	Conversion LT line with bare conductor to PVC/AB Cable																	

S.No.	Particular	Unit	RAPDRP Part B				RGGVY 11th Plan				RGGVY 12th Plan				ADB II TR-VI - (E R P)			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Conversion 11 KV line with bare conductor to AB Cable																	
14	Single Phase connections	No																
15	Three Phase connections	No																
16	H.T. connection	No																
17	Villages electrified																	
18	Procurement of DTR	No																
19	(a) Procurement of 1 Phase, 3 Phase Meters & M E's	No																
20	Meterisation of U/M connections																	
21	Activities under MDAS																	
(a)	33 KV,O/D,P/M,O/I ME"s	No																
(b)	11 KV I-Ph O/D,P/M PT's	No																
(c)	3 Ph , 110 V,5 A, Static Meter	No																
(d)	GPRS Modem	No																
20	Material Procurement (Rs in Crs)	Amt																
	Total Amount in Cr. Rs.			95.22		60.48		60.93		87.15		41.37		72.90		0.00		5.73

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S.No.	Particular	Unit	ADB III				IPDS				DDUGJY				Simhastha 2016				Deposit Works (T/C to P/C) Pumps				G.TOTAL			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	33 /11 KV S/S (a) New	No	8		5		0		0		1		2							40		59				
	(b) Addl	No	14		5		0		5		2		2							30		23				
	(c) Aug.	No	26		58		2		10		26		4		6					103		145				
	(d) Conv. of S/S Temp to Perm																			20		5				
2	(a) 33KV Line	Km	80.0		227.42		8		8.50		40.00		29.20							578		858.26				
	(b) 11KV Line	Km	348		214.27		150		14.00		37.05		161.00							55.25		6191		6230.54		
	(c) LT Line	Km	240		150		140		35.00		0.00		30		370.00				75.87		3938		3933.40			
3	Reconductoring								0.00											0		0				
	(a) 33KV Line	Km							0.00											14		4.19				
	(b) 11KV Line	Km							0										279		20					
4	33KV Bay at EHV	No			80.00		3		4		8.60		70.14						6.68		807.62		724.16			
5	Bay at 33/11 KV S/s (a) 33 KV	No							0										0		0					
	(b) 11KV	No							0										114		53					
6	Installation of VCB																		0		0					
	(a) -33 KV	No																	0		20					
	(b) -11 KV																		63		20					
7	R&M of 33/11 KV Sub Stations								9		8.60		70.14						49		13					
8	11KV Capacitor	No							13										296		224					
9	DTR Metering																		1500		1378					

S.No.	Particular	Unit	ADB III				IPDS				DDUGJY				Simhastha 2016				Deposit Works (T/C to P/C) Pumps				G.TOTAL			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	11/ 0.4 S/S (a) New / Addl	No	500		265		200		85		0		100		700		253		9250		14723					
	(b) Aug.	No					200		0										0		1033		2496			
11	Conversion LT to HT Line	Km					150		0												15		0			
12	Conversion LT line with bare conductor to PVC/AB Cable												8		0						1973		1182.569			
13	Conversion 11 KV line with bare conductor to AB Cable														8						0		8			
14	Single Phase connections	No									0										198053		51836			
15	Three Phase connections	No																			0		0			
16	H.T. connection	No																			0		0			
17	Villages electrified																				4716		998			
18	Procurement of DTR	No																			0		0			
19	(a) Procurement of 1 Phase, 3 Phase Meters & ME's	No																			0		5468			
20	Meterisation of U/M connections																				0		704			
21	Activities under MDAS																				0		0			
(a)	33 KV,O/D,P/M,O/I ME's	No																			0		65			

S.No.	Particular	Unit	ADB III				IPDS				DDUGJY				Simhastha 2016				Deposit Works (T/C to P/C) Pumps				G.TOTAL			
			Target		Progress		Target		Progress		Target		Progress		Target		Progress		Target		Progress		Target		Progress	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
(b)	11 KV I-Ph O/D,P/M PT's	No																					0		32	
(c)	3 Ph , 110 V,5 A, Static Meter	No																					0		6	
(d)	GPRS Modem	No																					0		587	
20	Material Procurement (Rs in Crs)	Amt																					0		0	0.00
	Total Amount in Cr. Rs.			80.00		43.92		90.00		20.09		0.00		8.108		8.60		70.14		0.00		6.68		807.62		724.16

1.2. Cost Benefit Analysis showing physical & financial benefits against intended targets of Capex plan for FY 11-12 to FY 15-16

1.2.1. Progress achieved in last 5 year plan

(FY 11-12 to FY 15-16)

MPERC approved 5 year investment plan (FY 2011-12 to FY 2015-16) of Rs 3988.15 Cr. Scheme wise break up filed by the MPPKVVCL Is as following:

Approved Investment

S.No	Name of Schemes	Total (Cr.)
1	GoMP Funded Works	320.00
2	Scheduled Cast Sub Plan (SCSP)	334.00
3	Tribal Sub Plan (TSP)	223.33
4	Feeder Separation	1407.46
5	New Pump Connections	285.00
6	ADB-II	330.00
7	RGGVY	535.96
8	R-APDRP Part A	49.30
9	R-APDRP Part B	459.22
10	Simhasth 2016	43.88
	Grand Total (A+B)	3988.15

The Year wise expenditure approved per scheme from FY 11-12 to FY 15-16 is as following:-

Year wise expenditure approved during the year FY 11-12 to FY 15-16

Sl. No	Name of Scheme	FY-12 (Cr.)	FY-13 (Cr.)	FY-14 (Cr.)	FY-15 (Cr.)	FY-16 (Cr.)	Total (Cr.)
1	GoMP Funded Works	20.00	60.00	70.00	80.00	90.00	320.00
2	Scheduled Cast Sub Plan (SCSP)	29.00	37.32	77.68	90.00	100.00	334.00
3	Tribal Sub Plan (TSP)	18.33	25.00	50.00	60.00	70.00	223.33
4	Feeder Separation	593.04	814.42	0.00	0.00	0.00	1407.46
5	New Pump Connections	57.00	57.00	57.00	57.00	57.00	285.00
6	ADB-II	160.00	100.00	70.00	0.00	0.00	330.00
7	RGGVY	149.39	42.95	107.38	128.86	107.38	535.96
8	R-APDRP Part A	24.52	13.10	5.59	4.90	1.19	49.30
9	R-APDRP Part B	227.35	150.00	81.87	0.00	0.00	459.22
10	Simhasth 2016	3.09	4.17	8.75	24.62	3.25	43.88
Total		1281.72	1303.96	528.27	445.38	428.82	3988.15

The actual expenditure incurred from FY 12 to FY 16 is as following:

Expenditure incurred during the year FY 11-12 to FY 15-16

Sl. No	Name of Scheme	FY-12 (Cr.)	FY-13 (Cr.)	FY-14 (Cr.)	FY-15 (Cr.)	FY-16 (Cr.)	Total (Cr.)
1	GoMP Funded Works	23.35	82.12	275.58	152.95	135.05	669.05
2	Scheduled Cast Sub Plan (SCSP)	28.85	35.79	37.52	35.45	41.28	178.89
3	Tribal Sub Plan (TSP)	17.96	25.49	47.82	53.90	41.85	187.02
4	Feeder Separation	248.91	693.48	138.56	73.47	50.58	1205.00
5	New Pump Connections	39.26	127.11	71.34	109.98	77.91	425.60
6	ADB-II	139.59	122.69	35.73	53.16	49.65	400.82
7	RGGVY	93.08	80.73	74.66	100.84	160.06	509.37
8	R-APDRP Part A	5.35	4.69	6.96	18.69	2.3	37.99
9	R-APDRP Part B	65.05	133.61	90.34	88.18	60.48	437.66
10	Simhasth 2016	3.09	2	2.78	4.37	70.14	82.38
Total		664.49	1307.71	781.29	690.99	689.30	4133.78

From the above table it can be depicted that INR 4133.78 Cr has been invested during FY 11-12 to FY 15-16 in various scheme. Scheme wise progress achieved from FY 11-12 to FY 15-16 is as following:-

GoMP Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	75	7	1	24	11	33	76
2	Installation of Addl PTR	52	6	51	85	14	8	164
3	Augmentation of PTR	126	4	56	59	32	33	184
4	New 33 kV Line	452	58.92	58.85	237.66	219.77	363.79	938.99
5	New 11 kV line	430	52.64	54.09	585.99	524.49	181.89	1399.1
6	New LT line	25	1.98	22.73	170	139	33.49	367.2
7	Installation of DTRs	5600	97	207	1728	1309	221	3562

SCSP Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	86	2	2	2	2	8	16
2	Installation of Addl PTR	59	17	27	19	1	0	64
3	Augmentation of PTR	134	35	23	19	8	4	89

4	New 33 kV Line	480	65.95	55.50	21	46.99	129.13	318.57
5	New 11 kV line	474	16.89	21.13	83.52	65.5	90.21	277.25
6	New LT line	49	1.37	2.05	17.78	20.34	9.21	50.75
7	Installation of DTRs	5930	63	45	300	155	70	633

TSP Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	59	1	1	1	4	10	17
2	Installation of Addl PTR	41	11	9	19	5	3	47
3	Augmentation of PTR	108	13	7	13	22	6	61
4	New 33 kV Line	270	6.2	12.3	16	102.2	84.62	221.32
5	New 11 kV line	307	25.6	30.16	194.18	123.55	97.5	470.99
6	New LT line	54	1.96	5.62	61.09	37.97	39.39	146.03
7	Installation of DTRs	4050	73	112	653	332	119	1289

Feeder Separation Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	45	0	18	2	0	0	20
2	Installation of Addl PTR	31	0	11	4	1	0	16
3	Augmentation of PTR	90	15	45	0	0	1	61
4	New 33 kV Line	283	0	32.61	49.64	8.09	0	90.34
5	New 11 kV line	16678	1462	8303.38	5718.87	1397.14	1076.42	17957.81
6	New LT line	17820	873	3092.44	200	209	0	4374.44
7	Installation of DTRs	24091	1168	7934	6207	2125	1504	18938

New Pump Connection Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	0	0	0	0	0	0	0
2	Installation of Addl PTR	0	0	0	0	0	0	0

3	Augmentation of PTR	0	0	0	0	0	0	0
4	New 33 kV Line	0	0	0	0	0	0	0
5	New 11 kV line	7500	925	2303.21	2403.16	1371.52	1988.79	8991.68
6	New LT line	2250	428	735.91	496.12	395.28	426.05	2481.36
7	Installation of DTRs	20000	2905	7460	8312	5142	8194	32013

ADB II Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	15	5	6	4	0	5	20
2	Installation of Addl PTR	0	0	0	0	0	5	5
3	Augmentation of PTR	48	41	7	0	28	58	134
4	New 33 kV Line	358	30	159.26	28.79	55	227.42	500.47
5	New 11 kV line	4916	1472	1911.97	447.68	43.96	214.27	4089.88
6	New LT line	0	0	0	0	23	149.53	172.53

7	Installation of DTRs	6740	4048	2144	417	112	265	6986
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RGGVY Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	0	0	0	0	0	0	0
2	Installation of Addl PTR	0	0	0	0	0	0	0
3	Augmentation of PTR	0	7	1	0	0	0	8
4	New 33 kV Line	0	0	0	0	0	0	0
5	New 11 kV line	12451	1270	2107.14	1823.4	1643.68	2310.55	9154.77
6	New LT line	5462	2156	1575.6	737.2	1698.6	2759.6	8927
7	Installation of DTRs	8724	1595	826	1180	1867	2734	8202

R-APDRP Part A Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	0	0	0	0	0	0	0

2	Installation of Addl PTR	0	0	0	0	0	0	0
3	Augmentation of PTR	0	0	0	0	0	0	0
4	New 33 kV Line	0	0	0	0	0	0	0
5	New 11 kV line	0	0	0	0	0	0	0
6	New LT line	0	0	0	0	0	0	0
7	Installation of DTRs	0	0	0	0	0	0	0

R-APDRP Part B Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	22	5	9	4	3	1	22
2	Installation of Addl PTR	24	5	13	5	1	0	24
3	Augmentation of PTR	16	4	10	2	1	1	18
4	New 33 kV Line	148	24.65	26.53	8.46	11.62	15.6	86.86
5	New 11 kV line	674	134	87.11	76.12	66.1	40.66	403.99

6	New LT line	511	41	80.05	56.43	28.02	35.26	240.76
7	Installation of DTRs	4122	386	702	315	634	578	2615

Simhasth Funded Works Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	1	0	0	1	0	2	3
2	Installation of Addl PTR	6	1	1	0	3	2	7
3	Augmentation of PTR	10	1	3	0	3	6	13
4	New 33 kV Line	35	1	0	3	10	29.2	43.2
5	New 11 kV line	75	2	0	9	6	161	178
6	New LT line	230	0	0	0	0	370	370
7	Installation of DTRs	400	0	0	0	0	700	700

Total physical progress achieved from FY 11-12 to FY 15-16 is as following:-

Total Physical Achievement during FY 11-12 to FY 15-16

Sl. No	Name of Project	Approved target in Capex	FY-12	FY-13	FY-14	FY-15	FY-16	Total Achievement
1	New 33/11 kV S/S	303	20	37	38	20	59	174
2	Installation of Addl PTR	213	40	112	132	25	18	327
3	Augmentation of PTR	532	120	152	93	94	109	568
4	New 33 kV Line	2026	186.72	345.05	364.55	453.67	849.76	2199.75
5	New 11 kV line	43505	5360.13	14818.19	11341.92	5241.94	6161.29	42923.47
6	New LT line	26401	3503.31	5514.4	1738.62	2551.21	3822.53	17130.07
7	Installation of DTRs	79657	10335	19430	19112	11676	14385	74938

1.2.2. Payback Period for Investment

After capital expenditure, during the FY 12 to FY 16, Payback Period was calculated and it is 4 years for the investment.

		31-Mar-2012	31-Mar-13	31-Mar-14	31-Mar-15	31-Mar-16
Total Project Cost (Rs.)	INR Crores		4133.78			
Project Cost (phasing)	INR Crores	664.49	1,307.71	781.29	690.99	689.30
Total Input (Units)	MU	16,173.10	17,203.45	18,121.64	19824.9	21591.74
AT&C Losses	%	26.40%	24.51%	23.67%	23.53%	22.01%
Total Units for which revenue is realized	MU	12,102.60	12,988.10	13832.8	15481.6	16715.56
Average Tariff	(INR/Unit)	4.17	4.61	5.20	5.48	5.86
Total Realization	INR Crores	5,052.64	5,988.08	7,186.70	8,486.12	9,803.25
Incremental Benefit	INR Crores		935.44	2,134.06	3,433.48	4,750.61

Net Cash Flow	INR Crores	(664.49)	(372.27)	1,352.77	2,742.49	4,061.31
Payback Period	4 Years					

From the above it may be concluded that MPPKVVCL wisely invested the approved Capex plan and reduced its AT&C loss while also increasing its consumer base. MPPKVVCL achieved both physical as well as financial targets.

1.2.3. Conclusion

In the present scenario of Discom the capital investment is play a vital role from the point of view of Discom as well as customer. There are many advantage of capital investment for both Discom as well as consumer. The capital investment is segregate in different type of works like Network strengthening, Technology upgradation, extension of network in rural areas etc. The consumer will benefited with this capital investment in different terms like less interrupted supply, Better voltage at tail end consumer, easily approachable to Discom, Reducing time for bill payment due to improvement in IT technology & More ATP machine, less power cut in rainy season and in storms, 24hrs supply to non-agricultural consumers etc.

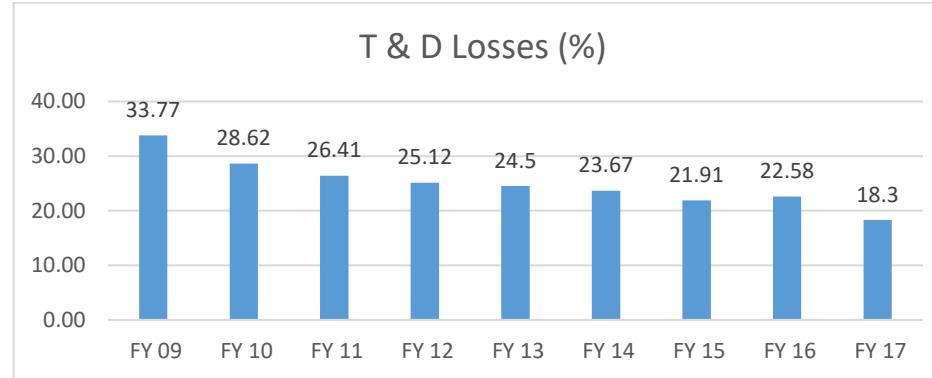
On the other side the Discom is also benefited from this capital investment in terms like Reduction of AT&C losses, increased revenue realization, Customer satisfaction, data accuracy, less maintenance, increased safety standard etc.

The impact of capital investment in terms of finance is very less to both Discom as well as consumer in long term perspective.

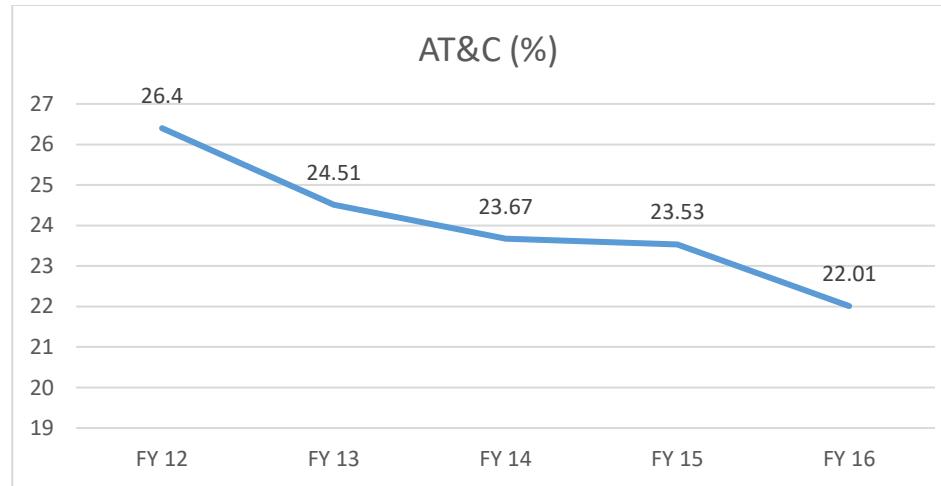
1.3. Growth in parameters

Due to above investments, MPPKVVCL has shown significant growth in the various parameters-

Improvement in T&D loss from FY 09 to FY 17 for MPPKVVCL:



Improvement in AT&C Loss from FY 09 to FY 17 for MPPKVVCL:



Profile of the Distribution licensee

Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited (MPPKVVCL) is a power distribution company formed out of the unbundling of Madhya Pradesh State Electricity Board in 2005, as a part of the MP power sector reforms. The Company is incorporated under the Companies Act, 1956 and has its registered office at GPH Compound Polo ground Indore. MPPKVVCL, Indore is engaged in distribution and retail supply business of electricity in the commissionaires of Indore and Ujjain. The gross area of operation covers 77.021 sq.km.

- Its business scope includes:
- Distribution of electricity to retail consumers;
- Operation and Maintenance of distribution assets;
- Collection of tariff from retail consumers;
- Investing in capital works related to improvement of distribution networks.
- The gross area of operation under the Distribution licensee covers 77.021 sq.km. The operational area covers two (02) regions namely Indore and Ujjain, 15 circles and fifty two (52) divisions.

1.4. Need of Capital Investment plan

In order to provide quality and reliable power supply and ensure commercial oriented distribution and retail supply business, the distribution licensee should ensure planned and systematic execution of Capital investment plan.

MPPKVVCL, Indore is one of the distribution licensees which have executed a planned capital expenditure. One of the key aspects which affect planning of investment plan in the coming years is commercial.

The key operational statistics related to power distribution infrastructure erected and maintained by the Distribution licensee are given below:

S No	Parameters	Unit	2016-17	2017-18
1	33Kv Line	Km	15225	16407
2	11Kv Line	Km	106957	118785
3	LT Line	Km	153735	162512
4	33/11kV S/S	No.	1218	1332
5	Power Transformer Capacity	MVA	9944	11272
6	Power Transformer	No.	2173	2397
7	Distribution Transformer	No.	189068	222215
8	Distribution Transformer Capacity	MVA	12987	14461
9	LT:HT Ratio	-	1.26	1.20

It is pertinent to mention that the Distribution licensee operates over a large portion of the Madhya Pradesh state as a whole and has to maintain and upgrade the existing distribution system as well as erect new distribution infrastructure in order to supply reliable and quality power supply. In order to supply quality power supply, distribution infrastructure needs to be augmented and strengthened; this needs planned execution of capital investment in its operational area by the Distribution licensee.

Key Commercial statistics of the operational area of the MPPKVCL is as following:

Sr. No	Particulars	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	CAGR (Past 5 years)
1	HT consumers (No.)	2055	2244	2468	2710	2893	3101	3312	8.10
2	LT consumers (No.)	3555802	3749742	4008163	4274817	4547755	4752681	5093871	6.32
3	Billing Efficiency (%)	74.83	75.49	76.33	78.09	77.41	82.11	11923.05	

4	Demand (Cr)	5052.64	5988.08	7168.70	8486.12	9803.25	10403.33	11923.05	
5	Amount collected (Cr)	4969.75	6081.51	7536.25	8310.34	9876.51	10253.13	11759.01	
6	Collection Efficiency (%)	98.35	100	100	97.93	100	97.43	98.62	
7	AT & C Loss	26.4%	24.51%	23.67%	23.53%	22.01%	19.48%	18.09%	
8	CRPU	3.3	3.7	3.93	3.03	3.03	3.32	3.49	
9	Load (Kw)	5976505	6484908	7448137	8320562	8899821	9542668	10121734	
10	Cash remittance (Cr)	4560.45	5490.93	5562.6	6012.19	6519.36	7095.63	7826.00	

- Inference: There has been substantial increase in the number of consumers in the past five (5) years depicted by CAGR of 8.10 % for HT and 6.32% for LT consumers.
- The primary reason of increase in the number of consumers besides increase in economy is implementation of various loss reduction schemes such as:
 1. System Strengthening
 - a. (GoMP)
 - b. TSP
 - c. SCSP
 2. ADB
 3. Feeder Separation Scheme
 4. New Agricultural Pumps
 - a. Grant Scheme (Govt. Contribution)
 - b. Mukyamantri Sthai Krishi pump Connection Scheme (Govt. Contribution & Loan)
 5. RAPDRP
 6. RGGVY
 7. DDUGVY
 8. IPDS
 9. Transformer failure reduction Scheme
 10. Procurement of Smart Meters
 11. Installation of meter at agriculture pre-dominant DTR

- There has also been a significant increase in the number of HT consumers at 33 kV and 11 kV level with a CAGR of 8.10%; an increase in load is also observed with a CAGR of 9.22% this has led to planning at EHT level and HT level in coordination by Madhya Pradesh Power Transmission Co. Ltd and MPPKVVCL, Indore for catering to load growth under its operational area.
- In addition, due to increase in the connected load pertaining to existing and new consumers, the Distribution licensee has to initiate various projects catering to various activities such as erection and commissioning of new sub-stations at 33/11 kV level, Augmentation of capacity of existing power transformers, Installation of additional power transformers, Augmentation of capacity of existing distribution transformers, Installation of additional distribution transformers, bifurcation and augmentation and erection of HT and LT lines.

1.5. Availability of Electricity

1.5.1. Power for all: 24 hrs supply concept

- MPPKVVCL, Indore is committed to provide 24 hrs supply of power to consumers. The concept of 24 hrs supply lays emphasis on supply of power to every willing household and 10 hrs continuous quality power supply to agricultural consumers through separate feeders.
- The principle behind 24 hrs supply of powers is to provide commercially viable continuous supply of electricity in rural habitations while ensuring sufficient supply for agricultural use to promote sustainable exploitation of ground water, thereby to accelerate socio-economic development of rural areas.
- The distribution licensee has developed a comprehensive plan for system strengthening, distribution loss reduction, reliability improvement etc. The overall benefit is revenue enhancement of the distribution licensee.

Average supply hours for the year 2016-17 up to March-17

Month wise Supply hours:

Sr. No	Month	Rural			THQ	DHQ	CHQ
		MIX	DLF	IRR			
1	April'16	23:33	23:40	09:51	23:46	23:51	23:49
2	May'16	23:16	23:22	09:42	23:40	23:45	23:44
3	June'16	23:11	23:16	09:39	23:35	23:45	23:45
4	July'16	23:14	23:26	09:41	23:42	23:51	23:50
5	Aug'16	23:08	23:28	09:43	23:42	23:51	23:53
6	Sep'16	23:20	23:20	09:39	23:37	23:46	23:52
7	Oct'16	23:53	23:28	09:44	23:40	23:48	23:53
8	Nov'16	23:02	23:37	09:52	23:51	23:55	23:56
9	Dec'16	23:08	23:36	09:51	23:50	23:55	23:55
10	Jan'17	23:08	23:39	09:51	23:49	23:55	23:55
11	Feb'17	22:55	23:44	09:53	23:50	23:55	23:55
12	March'17	23:32	23:44	09:52	23:52	23:56	23:54

Month wise Feeder outages comparison:

Year	Months	No. of Outages more than 15 minutes	
		33 KV	11 KV
2016	April	611	11725
2016	May	1937	34265
2016	June	2200	38902
2016	July	1319	34317
2016	August	1346	32633
2016	September	1397	35889
2016	October	1105	29170
2016	November	797	21774
2016	December	744	18879
2017	January	852	19175
2017	February	515	14597
2017	March	707	20045
2017	April	799	20177
2017	May	1788	31648

Anticipated power supply position in Madhya Pradesh & West Discom:

Sr.No	Particulars	Madhya Pradesh		West Discom		
		Year 2015-16	Year 2016-17	Year 2015-16	Year 2016-17	Year 2017-18
1	Requirement of Energy(MU)	-	-	23134 (MU)	22497 (MU)	23568 (MU)
2	Availability of Energy (MU)	-	-	23134 (MU)	22497 (MU)	23568 (MU)
3	Peak Demand (MW)	10841(MW)	11385(MW)	4492 (MW)	4857 (MW)	4968 (MW)

1.6. Financial Details of Projects

1.6.1. Project Cost

Table: Project Cost Breakup

Sr. No.	Project	"DPR Available (Yes / No)"	Total Amount	Equity	Loan	Central Govt. Grant	State Govt. Grant	Consumer Contribution
1	M.P. Power Transmission & Distribution System Improvement project-ADB loan No. 3066	Yes	264.96	74.13	204.25	0.00	0.00	0.00
2	RAPDRP PART-B	Yes	538.76	-	538.76	0.00	0.00	0.00
3	IPDS	Yes	523.67	-	157.1 (30%)	314.2 (60%)	52.36 (10%)	0.00
4	Feeder Separation	Yes	1402.26	-	1262.96	NIL	139.3	NIL
5	DDUGJY	Yes	934.66	-	376.66 (40%)	558 (60%)	NIL	NIL
6	RGGVY	Yes	369.2	-	36.92 (10%)	332.28 (90%)	-	-
7	MMSKPCY	Yes	1803.74	-	1082.244 (60%)	-	721.496 (40%)	-

Note:

50% of the loan amount may be converted into grant if AT&C losses of RAPDRP towns be achieved upto or below 15% level.

Details of Project Cost and Loan Terms and conditions of the loans including Moratorium period have been attached in Appendix

1.6.2. Loan Details

Table: Loan Breakup

Sr. No.	Scheme Name	Lender Name	Amount (INR Crore)	Rate of Interest	Moratorium Period	Loan Period	Remark
1	ADB LOAN 3066	ADB	204.25	2.5%	4 Years	20 Years	
2		PFC	74.13	12.5%	3 Years	10 Years	
3	RAPDRP	PFC	80.81	11.5%	5 Years	20 Years	
4		REC	404.07	12.5%	3 Years	13 Years	
5	FS	ABD – FS	554.72	2.5%	6 Years		
6		REC – FS	708.24	11%	3 Years	Paid in Uday	
7	IPDS						Counterpart loan is not sanctioned yet

2. Proposed Investment Plan for the period FY 2016-17 to FY 2019-20

Capital investment is necessary in the company to meet the growth in load by system augmentation, reduce technical and commercial losses through investing in better technology and replacing the aging assets to improve quality of service. A well-implemented capital investment plan is essential to meet the target of 24 hours supply by the Discom while reducing the losses simultaneously.

The distribution licensee has initiated following schemes to decrease its distribution loss level and catering to load growth and reliability improvement of the distribution infrastructure,

- a) Network planning by CYMDIST software for network augmentation of high loss areas;
- b) Installation of capacitors for power factor improvement;
- c) Erection and commissioning of new 33/11 kV substations;
- d) Conversion of LT bare lines by LT XLPE AB cable with higher size;
- e) Installation of Meters on Pre-Dominant Agricultural DTRs
- f) Erection and commissioning of additional/ Augmentation of PTR at 33/11 kV substations;
- g) Renovation and Maintenance of existing substations and lines;
- h) Feeder segregation/bifurcation.
- i) Installation of additional/ Augmentation of DTR with associated lines
- j) Installation of Smart Meters

Significance of Capital investment plan executed by MPPKVVCL, Indore

- Capital investments are necessary in the company to meet the growth in load by system augmentation, reduce technical and commercial losses through investing in better technology and replacing the aging assets to improve quality of service. A well-implemented capital investment plan is essential to meet the target of 24 hours supply by the Distribution licensee while reducing the losses simultaneously.
- In past, the investments made by the Company have not been sufficient which has resulted in lower rate of reduction in distribution losses. Capital investment is necessary in the company to meet the growth in load by system augmentation, new electrical infrastructure development etc.
- MPPaKVCL, Indore has a dedicated planning cell under Works department for planning of new distribution infrastructure in terms of erection of new 33 kV, 11 kV and LT line and augmentation of existing distribution infrastructure catering to load growth, technical loss reduction. The planning cell uses licensed power distribution planning software i.e. Cymdist for load flow analysis, short circuit analysis etc. The software provides accurate forecasted electrical parameters in terms of voltage, current etc for the proposed line. It is pertinent to mention that MPPaKVCL, Indore is using software based system analysis forecasting methodology for proposing new line, augmentation and line segregation and sub-station erection and augmentation. The benefits accrued are as follows,
 - Accurate technical analysis based on baseline data;
 - Accurate financial evaluation of the proposed project and financial benefits in terms of payback period, IRR etc;
 - Streamlined project formulation.

2.1. Simulation studies

Multiple simulation studies were carried out to ascertain the benefits accrued from the implementation of various schemes.

Following are a few examples of loss calculation after bifurcation of 33 KV feeder from 220 KV done to accurately calculate the benefits of physical augmentation of infrastructure through capital injection:

- Loss calculation for 16 KM bifurcation of 33 KV Lohana feeder from 220 KV Barnagar

Loss in Existing 33 KV Lohana feeder									
Annual Energy Loss in 33 KV Lohana Feeder							Max Ampere Loading	390	Amp
Sr. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	33/11 KV Bangred S/s	16.7	Raccoon	0.3656	8150	26300	390	2785.95
2	33/11 KV Bangred S/s	Piploo Tapping	7	Raccoon	0.3656	3150	18150	269	556.16
3	Piploo Tapping	33/11 KV Piploo S/s	4.5	Raccoon	0.3656	5000	15000	222	244.20
4	Piploo Tapping	33/11 KV Lohana S/s	3	Raccoon	0.3656	10000	10000	148	72.35
			31.2						
	Total loss in Kw								3658.66
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)						66.66	LU

2	Loss in residual 33 KV Lohana feeder from 220 KV Barnagar								
Annual Energy Loss in 33 KV Lohana feeder							Max Ampere Loading	200	Amp
Sr. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	Piploo Tapping	8.2	Raccoon	0.3656	15000	15000	200	359.75
2	Piploo Tapping	33/11 KV Piploo S/s	5.6	Raccoon	0.3656	5000	5000	67	27.30
3	Piploo Tapping	33/11 KV Lohana S/s	8.2	Raccoon	0.3656	10000	10000	133	159.89
			22						
	Total loss in Kw								546.94

3	Loss in New 33 KV Bangred feeder from 220 KV Barnagar								
Annual Energy Loss in 33 KV Bangred feeder							Max Ampere Loading	140	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	33/11 KV Bangred S/s	13.5	Dog	0.2754	8150	11300	140	218.61
2	33/11 KV Bangred S/s	33/11 KV Bisalkhedi S/s	13	Raccon	0.3656	3150	3150	39	21.72
			26.5				Total loss in Kw		240.33
							Total loss in Kw		787.27

Annual energy loss								
LLF=.208	(Loss in KW*.208*8760/100000)							14.34
								LU
Payback Calculation								
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)		52.32	Units					
Amount (@ Rs. 2.50 Per/Unit)		130.80	Rs.					
Cost of Proposed Work		68	Rs.					
Pay Back Period		0.52	Years					
Per 1 KM 33 KV Line saving		3.27	LU					

- Bifurcation of 33 KV Kharsodkala Feeder radiating from 220 KV Barnagar EHV S/S

1	Loss in residual 33 KV Lohana feeder from 220 KV Barnagar								
Annual Energy Loss in 33 KV Lohana feeder						Max Ampere Loading	200	Amp	
Sr. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	Piploo Tapping	8.2	Raccoon	0.3656	15000	15000	200	359.75
2	Piploo Tapping	33/11 KV Piploo S/s	5.6	Raccoon	0.3656	5000	5000	67	27.30
3	Piploo Tapping	33/11 KV Lohana S/s	8.2	Raccoon	0.3656	10000	10000	133	159.89
			22						
	Total loss in Kw								546.94

2 Loss in New 33 KV Bangred feeder from 220 KV Barnagar		Annual Energy Loss in 33 KV Bangred feeder				Max Ampere Loading	140	Amp	
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	33/11 KV Bangred S/s	13.5	Dog	0.2754	8150	11300	140	218.61
2	33/11 KV Bangred S/s	33/11 KV Bisalkhedi S/s	13	Raccon	0.3656	3150	3150	39	21.72
			26.5				Total loss in Kw		240.33
							Total loss in Kw		787.27

Annual energy loss							
LLF=.208	(Loss in KW*.208*8760/100000)					14.34	LU
Payback Calculation							
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)		52.32	Units				
Amount (@ Rs. 2.50 Per/Unit)		130.80	Rs.				
Cost of Proposed Work		68	Rs.				
Pay Back Period		0.52	Years				
Per 1 KM 33 KV Line saving		3.27	LU				

- Bifurcation of 33 KV Kharsodkala Feeder radiating from 220 KV Barnagar EHV S/S

1 Existing 33 KV Kharsodkala feeder radaiting from 220 KV Barnagar									
Annual Energy Loss in New 33 KV Kharsodkala feeder							Max Ampere Loading	390	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	33/11 KV Runija S/s	16.7	Raccoon	0.3656	8150	23150	390.0	2785.95
2	33/11 KV Runija S/s	33/11 KV Khedawada S/s	7	Raccoon	0.3656	5000	15000	252.7	490.27
3	33/11 KV Khedawada S/s	33/11 KV Bhatpachlana S/s	7.5	Raccoon	0.3656	10000	10000	168.5	233.46
							Total loss in Kw		3276.22
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)							59.70
	• Loss calculation after 16 KM bifurcation of 33 KV Kharsodkala feeder from 220 KV Barnagar								

1 Loss in New 33 KV Runija Feeder from 220 KV Barnagar EHV S/s									
Annual Energy Loss in New 33 KV Runija feeder							Max Ampere Loading	120	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Barnagar	33/11 KV Runija S/s	17	Dog	0.2754	8150	8150	120.0	202.25
							Total loss in Kw		202.25

2 Loss in residual 33KV Kharsodkala Feeder radaiting from 220 KV Barnagar S/s									
Annual Energy Loss in residual 33 KV Kharsodkala feeder							Max Ampere Loading	200	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)

1	220 KV Barnagar	33/11 KV Khedawada S/s	24	Raccoon	0.3656	5000	15000	200.0	1052.93
2	33/11 KV Khedawada S/s	33/11 KV Bhatpachlana S/s	7.5	Raccoon	0.3656	10000	10000	133.3	146.24
							Total loss in Kw		1199.17

Annual energy loss						
LLF=.208	(Loss in KW*.208*8760/100000)			21.85	LU	
Payback Calculation						
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)		37.85	Units			
Amount (@ Rs. 2.50 Per/Unit)		94.61	Rs.			
Cost of Proposed Work		72.25	Rs.			
Pay Back Period		0.76	Years			
Per 1 KM 33 KV Line saving per km		2.23	LU			

- Loss calculation for 18 KM bifurcation of 33 KV Pipalrawa Feeder

1	33 KV Pipalrawa Feeder from 132 KV Sonkatchh S/s						Max Ampere Loading	340	Amp
Annual Energy Loss in 33 KV Pipalrawa Feeder									
Sr. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						$3 \times (I^2 RL)$
1	132 KV Sonkatchh	G.Puri Tapping	18	Raccoon	0.3656	0	36050	340	2282.22

2	G.Puri Tapping	33/11 KV Choubara Dhira S/s	10	Raccoon	0.3656	8150	8150	77	64.80
3	G.Puri Tapping	33/11 KV Kheriya Jagir S/s	11	Raccoon	0.3656	8150	8150	77	71.28
4	33/11 KV Kheriya Jagir S/s	33/11 KV Pipalrawa S/s	9	Raccoon	0.3656	15000	19750	186	342.49
5	33/11 KV Pipalrawa S/s	33/11 KV Sammaskhedi S/s	8	Raccoon	0.3656	1600	1600	15	2.00
6	33/11 KV Pipalrawa S/s	33/11 KV Lakumdi S/s	6	Raccoon	0.3656	3150	3150	30	5.81
								Total loss in Kw	2760.80
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)						50.30	LU

- Loss calculation after 18 KM bifurcation of 33 KV Pipalrawa Feeder

1 Loss in residual 33 KV Pipalrawa feeder from 132 KV Sonkatchh									
Annual Energy Loss in Residual 33 KV Piaplrawa feeder									
Sr. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	132 KV Sonkatchh	G.Puri Tapping	18	Raccoon	0.3656	0	16300	154	466.58
2	G.Puri Tapping	33/11 KV Choubara Dhira S/s	10	Raccoon	0.3656	8150	8150	77	64.80
3	G.Puri Tapping	33/11 KV Kheriya Jagir S/s	11	Raccoon	0.3656	8150	8150	77	71.28
								Total loss in Kw	602.66

2 Loss in New 33 KV Pipalrawa `feeder from 132 KV Sonkatchh									
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Annual Energy Loss in 33 KV Bangred feeder							Max Ampere Loading	140	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	132 KV Pipalrawa S/s	33/11 KV Pipalrawa S/s	18	Dog	0.2754	15000	19750	140	291.48
2	33/11 KV Pipalrawa S/s	33/11 KV Sammaskhedi S/s	6	Raccoon	0.3656	1600	1600	11	0.85
3	33/11 KV Pipalrawa S/s	33/11 KV Lakumdi S/s	8	Raccoon	0.3656	3150	3150	22	292.33
							Total loss in Kw		292.33
	Total Energy loss in Kw								894.99
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)						16.31	LU

Payback Calculation				
1	Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)		34.00	Units
2	Amount (@ Rs. 2.50 Per/Unit)		84.99	Rs.
3	Cost of Proposed Work		76.5	Rs.
4	Pay Back Period		0.90	Years
	Per 1 KM 33 KV Line saving			1.89 LU

- 33 KV Unhel feeder radiating from 132 KV Nagda EHV S/s

1	Existing 33 KV Unhel feeder radiating from 220 KV Nagda
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Annual Energy Loss in New 33 KV Unhel feeder							Max Ampere Loading	360	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						$3 \times (I^2 RL)$
1	220 KV Nagda	33/11 KV Unhel S/s	15	Raccoon	0.3656	10000	31300	360	2132.18
2	33/11 KV Unhel S/s	33/11 KV Gurla S/s	3	Raccoon	0.3656	3150	21300	388	496.00
3	33/11 KV Gurla S/s	33/11 KV Suwasa S/s	4	Raccoon	0.3656	13150	18150	312	428.32
4	33/11 KV Unhel S/s	33/11 KV Rupakhedi	6	Raccoon	0.3656	5000	5000	86	48.76
							Total loss in KW		3105.25
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)						56.58	LU

- Loss calculation after 9 KM bifurcation of 33 KV Unhel feeder from 220 KV Nagda

1	Loss in New 33 KV Unhel Feeder from 220 KV Nagda EHV S/s								
Annual Energy Loss in New 33 KV Unhel feeder							Max Ampere Loading	140	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						$3 \times (I^2 RL)$
1	220 KV Nagda	33/11 KV Gurla S/s	9	Dog	0.2754	10000	13150	140	145.74
	33/11 KV Gurla S/s	33/11 KV Suwasa S/s	4	Raccoon	0.3656	3150	3150	57	14.46
							Total loss in Kw		145.74

2	Loss in residual 33KV Unhel Feeder radaiting from 220 KV Nagda S/s								
Annual Energy Loss in residual 33 KV Unhel feeder							Max Ampere Loading	220	Amp
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)

	From	To	Length (Km)						3 X(I ² RL)
1	220 KV Nagda	33/11 KV Unhel S/s	15	Raccoon	0.3656	10000	15000	220	796.28
2	33/11 KV Unhel S/s	33/11 KV Roopakhedi S/s	6	Raccoon	0.3656	5000	5000	91	54.66
							Total loss in Kw		850.94
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)							15.50
									LU

Payback Calculation				
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)		41.08	Units	
Amount (@ Rs. 2.50 Per/Unit)		102.69	Rs.	
Cost of Proposed Work		38.25	Rs.	
Pay Back Period		0.37	Years	
Per 1 KM 33 KV Line saving per km		4.56	LU	

- 33 KV Panbihar feeder radiating from 132 KV Ratadiya EHV S/s

1 Existing 33 KV Panbihar feeder radiating from 132 KV Ratadiya									
S. No.	Annual Energy Loss in Existing 33 KV Panbihar feeder			Max Ampere Loading			390		Amp
	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	132 KV Ratadiya	33/11 KV Ratadiya S/s	0.3	Raccoon	0.3656	3150	29450	390	50.05

2	33/11 KV Ratadiya S/s	33/11 KV Panbihar S/s	17	Raccoon	0.3656	10000	13150	240	1071.27
3	33/11 KV Panbihar S/s	33/11 KV Kaluheda S/s	7	Raccoon	0.3656	3150	3150	54	22.58
4	33/11 KV Ratadiya S/s	33/11 KV Chakrawda S/s	13	Raccoon	0.3656	10000	13150	226	730.71
5	33/11 KV Chakrawda S/s	33/11 KV Borkheda Bhalla S/s	12.5	Raccoon	0.3656	3150	3150	54	40.32
			49.8						
							Total loss in KW		1874.61
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)							34.16
									LU

- Loss calculation after 1 KM bifurcation of 33 KV Panbihar feeder from 132 KV Ratadiya

1 Loss in New 33 KV Ratadiya Feeder from 132 KV Ratadiya EHV S/s									
Annual Energy Loss in New 33 KV Chakrawada feeder									
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						$3 \times (I^2 RL)$
1	132 KV Ratadiya	33/11 KV Ratadiya S/s	0.3	Dog	0.2754	3150	3150	40	0.40
							Total loss in Kw		0.40

2 Loss in New 33KV Chakrawda Feeder radaiting from 132 KV Ratadiya S/s									
Annual Energy Loss in New 33 KV Charawda feeder									
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						$3 \times (I^2 RL)$
1	132 KV Ratadiya	Chakrwada Tapping	0.3	Dog	0.2754		13150	170	7.16
2	Chakrwada Tapping	33/11 KV Chakrawda S/s	13	Raccoon	0.3656	10000	13150	170	412.07

3	33/11 KV Chakrawda S/s	33/11 KV Borkheda Bhalla S/s	12.5	Raccoon	0.3656	3150	3150	41	22.74
							Total loss in Kw		441.97

3 Loss in Residual 33KV Panbihar Feeder radaiting from 132 KV Ratadiya S/s									
Annual Energy Loss in New 33 KV Charawda feeder									
S. No.	Section			Conductor Size	Resistance/KM	KVA	Comm. KVA in the Section	Ampere in the Section	Loss (KW)
	From	To	Length (Km)						3 X(I ² RL)
1	132 KV Ratadiya	33/11 KV Panbihar S/s	17.3	Raccon	0.3656	10000	13150	170	548.37
2	33/11 KV Panbihar S/s	33/11 KV Kaluheda S/s	7	Raccoon	0.3656	3150	3150	41	12.73
							Total loss in Kw		561.10
	Total Energy Loss in Kw								1003.46
	Annual energy loss								
	LLF=.208	(Loss in KW*.208*8760/100000)							18.28
									LU

Payback Calculation				
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)		15.87	Units	
Amount (@ Rs. 2.50 Per/Unit)		39.68	Rs.	
Cost of Proposed Work		4.25	Rs.	
Pay Back Period		0.11	Years	
Per 1 KM 33 KV Line saving per km		15.87	LU	

The summary of the above simulation studies are as follows-

Benefits Realized-

Summary of loss calculation saving in Bifurcation of 33 KV Feeders							
Sr.No	Circle	Name of Work	Annual Loss in 33 KV Feeder Before bifurcation work (LU)	Annual Loss in 33 KV Feeder after bifurcation work (LU)	Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System) (LU)	33 KV Line (Km)	Saving in losses per Km of 33 KV Line (LU)
1	Ujjain	Bifurcation of 33 KV Bhatpachlana Feeder radaiting from 220 KV Barnagar EHV S/s	59.7	21.85	37.85	17	2.23
2	Ujjain	Bifurcation of 33 KV Lohana Feeder radaiting from 220 KV Barnagar S/s	66.66	14.34	52.32	16	3.27
3	Ujjain	Bifurcation of 33 KV Unhel Feeder radiating from 220 KV Nagda S/s	56.58	15.5	41.08	9	4.56
4	Ujjain	Bifurcation of 33 KV Panbihar Feeder radiating from 132 KV Ratadiya S/s	34.16	18.28	15.88	1	15.88
5	Dewas	Bifurcation of 33 KV Pipalrawa feeder radaiting from 132 KV Sonkatchh S/s	50.3	16.31	33.99	18	1.89
					181.12	61	2.97

Following are a few examples of studies done at a Sub-Station level to accurately calculate the benefits of physical augmentation of infrastructure through capital injection:

1. Feeder loading Report of 11 KV Jambura Feeder radiating from 33/11 KV Tajpur S/s Before erecting New 33/11 KV Substation at Nahariya

Parameter	Value
Circle	Ujjain
Distribution Center	Nahariya
Ampere loading Report	11 KV Jambura Feeder
Ampere	255

Substation: 3009_TAJPUR :

	Total Loading	Total Losses	Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %
11 KV Jambura Feeder	4268.52	81.12	1077.15	25%	64.3
Total			1077.15		
Total loss in KW			1077.15	KW	
Annual Energy losses			9.44	L.U	
LLF=.10					
Feeder loading report after erecting New 33/11 KV S/s at Nahariya					
11 KV Jambura Feeder from Tapur S/s	10	Ampere			
New 11 KV Sayarkhedi Feeder	130	Ampere			
New 11 KV Undasa Feeder	70	Ampere			

New 11 KV Nahariya Feeder	40	Ampere				
Substation: 3009_TAJPUR :						
	Total Loading		Total Losses	Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %	m
11 KV Jambura Feeder	252.23	78.82	12.52	5%	91.08	5500
Substation: 33/11KV_S/S :						
	Total Loading		Total Losses	Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %	m
New 11 KV Sayarkhedi Feeder	1994.06	80.34	131.25	7%	91.66	14700
New 11 KV Undasa Feeder	1018.52	80.16	34.47	3%	96.04	12100
New 11 KV Nahariya Feeder	815.25	80.13	31.25	4%	96.20	9100
Total loss in KW			196.97			
Total loss in KW			209.49	KW		
Annual Energy losses			1.84	L.U		
LLF=.10						
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)			7.60		LU	
Amount (@ Rs. 4.00 Per/Unit)			30.40		Rs. In lacs	
Cost of Proposed Work			163.83		Rs. In lacs	
Pay Back Period			5.39		Years	

2. Feeder Loading Report Before Erecting New 33/11 KV Substation at Sunwani Gopal

Parameter	Value
Circle	Dewas
Distribution Center	Sunwani Gopal
Ampere loading Report	(Ampere)
11 KV Sunwani Gopal	185
11 KV Datottar Feeder	180

Substation: 3109_V_G_MANDI :							
	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Sunwani Gopal	3585.24	80.52	523.21	93.1	15%	85.15	17700
11 KV Datottar Feeder	3412.31	80.46	502.33	93.1	15%	84.25	17400
Total	5535.25	80.49	1025.54	93.1			35100
Annual energy loss			8.98	L.U			
LLF=.10							
Feeder Loading Report after erecting New 33/11 KV S/s at Sunwani gopal							
Ampere loading							
11 KV Sunwani Gopal	90	Amp					
11 KV Datottar Feeder	50	Amp					
F1_FDR_Chhaplakhedi	90	Amp					

F2_FDR_Jawasiya	130	Amp					
Substation: 3109_V_G_MANDI :							
	Total Loading		Total Losses	Losses	Tail End	3ph Length:	
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Sunwani Gopal	1694.56	79.92	64.56	93.1	4%	95.55	8900
11 KV Datottar Feeder	1543.02	79.94	53.29	93.1	3%	93.52	5300
Total			117.84				
Substation: 33/11KV_SS :							
	Total Loading		Total Losses	Losses	Tail End	3ph Length:	
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
F1_FDR_Chaplakhedi	1890.68	79.65	19.04	88.9	1%	97.12	8800
F2_FDR_Jawasiya	1869.29	79.51	10.27	89.28	1%	98.14	12100
Total			29.31				
Total loss in KW			147.15				
Annual energy loss			1.29	L.U			
LLF=.1							
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)			7.69	L.U			
Total Saving in Units (Rs 4. 0 per unit)			30.78				
Cost of Proposed Work			127.26	Rs. In Lacs			
Overall Payback Period			4.13	Years			

3. Feeder Loading Report before Erecting New 33/11 KV Substation at Gunawad

Parameter	Value
Circle	Ujjain
Distribution Center	Gunawad
Ampere loading Report	11 KV Bisalkhedi -Lohana Fdr
Ampere	300

Substation: 3023_LOHANA :

	Total Loading	Total Losses	Loss	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %
11 KV Bisalkhedi Fdr	4674.72	81.52	1176.15	25%	71.7
Total	4674.72	81.52	1176.15	25%	71.7
Total Loss			1176.15		
Annual Energy loss			10.30		L.U
LLF=.10					

Feeder Loading Report after erecting new 33/11 KV S/s at Gunawad

Ampere Loading			
11 KV Bisalkhedi -Lohana Fdr	35	Amp	
11 KV Bisalkhedi Feeder	90	Amp	
11 KV Pithora	95	Amp	
11 kv Gunawad	80	Amp	

Substation: 3023_LOHANA :			
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	Total Loading		Total Losses	Loss	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %	m
11 KV Bisalkhedi -Lohana Fdr	623.54	84.56	32.52	5%	91.08	6500
Substation: 33/11KV_S/S :						
	Total Loading		Total Losses	Loss	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %	m
11 KV Bisalkhedi Feeder	1383.92	80.19	10.38	1%	98.5	14500
11 KV Pithora	1447.19	80.14	41.92	3%	96.55	10100
11 kv Gunawad	1224.54	80.19	37.54	3%	96.5	12000
Total			89.84		KW	
Total			122.36		L.U	
Annual Energy loss			1.07		L.U	
LLF=.10						
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)			9.23		LU	
Amount (@ Rs. 4.00 Per/Unit)			36.92		Rs. In lacs	
Cost of Proposed Work			131.21		Rs. In lacs	
Pay Back Period			3.55		Years	

4. Feeder Loading Report of 11 KV Tokra feeder radiating from 220 KV EHV Barnagar before erecting New 33/11 KV Substation at Birakhedi

Parameter	Value
Circle	Ujjain
Distribution Center	Birakhedi
Ampere loading Report	220 KV EHV Barnagar
Ampere	200

Substation: 3070_BADNAGAR_132KV :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Tokra Feder	3479.2	80.71	948.2	93.1	27%	74.13	44400
Total			948.2				
Total loss in KW			948.2	KW			
Annual Energy losses			8.31	L.U			
LLF=.10							

Feeder Loading Report after Erecting New S/s at Biriyakhedi

11 KV Tokra Feder	35	Amp				
11 KV Singawada Fdr	75	Amp				
F2_FDR	40	Amp				
F3_FDR	30	Amp				

Substation: 3070_BADNAGAR_132KV :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Tokra Feder	724.83	77	26.52	93.1	4%	94.99	15100
Total							

Substation: 33/11KV_S/S :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Singawada Fdr	1504.3	80.15	38.13	91.08	3%	97.1	13100
F2_FDR	846.3	76.29	4.55	82.44	1%	99.7	500
F3_FDR	156.18	76.83	5	91.64	3%	99.4	11300

Total loss			47.68	KW			
Total loss in KW			74.2	KW			
Annual Energy losses			0.65	L.U			
LLF=.10							
Saving in Annual Energy Loss			7.66	L.U			
Amount (@ Rs. 4.00 Per/Unit)			30.62	L.U			
Cost of Proposed Work			150.98	Rs in LACS			
Maximum Pay Back Period			4.93	Years			

5. Feeder Loading Report before erecting New 33/11 KV S/s at Dongargaon

Parameter	Value
Circle	Khandwa
Distribution Center	Dongargaon
Ampere loading Report	11 KV Kalmukhi Feeder
Ampere	200

Substation: 1324_ATTOTKHAS :						
	Total Loading		Total Losses		Losses	3ph Length:
Substation/feeder name	kW	PF (%)	kW	%	Volt %	m
11 KV Kalmukhi Feeder	3865.23	80.12	952.23	25%	76.24	40700
Total loss in kw			952.23			
Annual Energy loss			8.34		L.U	
LLF=.10						
Feeder Loading Report after erecting new 33/11 KV S/s at Gunawad						

Ampere Loading					
Residual 11 KV Kalmukhi Feeder	25	Amp			
11 KV Kalmukhi Feeder	100	Amp			
11 KV Dongargaon Feeder	75	Amp			
Substation: 3023_LOHANA :					
	Total Loading		Total Losses	Loss	Tail End
Substation/feeder name	kW	PF (%)	kW	%	Volt %
11 KV Kalmukhi Feeder	416.23	84.56	21.25	5%	98.56
Substation: 33/11KV_S/S :					
	Total Loading		Total Losses	Loss	Tail End
Substation/feeder name	kW	PF (%)	kW	%	Volt %
11 KV Kalmukhi Feeder_New	1526.76	80.14	45.59	3%	96.66
11 KV Dongargaon Feeder	1180.11	80.14	29.16	2%	97.23
Total			96	KW	
Total			117.25	L.U	
Annual Energy loss			1.03	L.U	
LLF=.10					
Saving in Annual Energy loss (Losses in Existing System - Losses in Proposed System)			7.31	LU	
Amount (@ Rs. 4.00 Per/Unit)			29.26	Rs. In lacs	
Cost of Proposed Work			131.21	Rs. In lacs	
Pay Back Period			4.48	Years	

6. Feeder Loading Report of existing 11 KV Dharmat feeder radiating from 33/11 KV Padliya Substation before erecting New 33/11 KV Substation at Dharmat

Parameter	Value
Circle	Indore
Distribution Center	Dharmat

Ampere loading Report	11 KV Dharmat Feeder
Ampere	260

Substation: 1234_PADLIYA :

	Total Loading	Total Losses		Losses	Tail End	3ph Length:	
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
123412_DHARMAT	4114.89	80.86	911.23	93.1	22%	81.22	20300
Total			911.23				
Total loss in KW			911.23	KW			
Annual energy loss			7.98	L.U			
LLF=.10							

Feeder Loading Report after erecting New S/s at Dharmat

123412_DHARMAT	50	Amp
New 11 KV Dharmat Feeder	150	Amp
11 KV Dharmat_2 Feeder	60	Amp

Substation: 1234_PADLIYA :

	Total Loading	Total Losses		Losses	Tail End	3ph Length:	
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
123412_DHARMAT	1196.2	78.82	24.36	93.1	2%	97.84	7300
Total			24.36				

Substation: Dharmat

	Total Loading	Total Losses		Losses	Tail End	3ph Length:	
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Dharmat Feeder	2390.21	80.15	52.25	89.12	2%	96.16	13700
11 KV Dharmat_2 Feeder	528.46	80.04	3.01	82.45	1%	99.02	8200
Total			79.62	kw			
Total loss in KW			79.62	KW			

Annual energy loss			0.70	L.U			
LLF=.10							
Annual saving			7.3	L.U			
Amount (Rs 4.0per unit)			29.1	Rs in Lacs			
Cost of project			161.38	Rs in Lacs			
Payback period			5.5	Years			

7. Feeder Loading Report before erecting New 33/11 KV S/s Chamati

Parameter	Value
Circle	Khandwa
Distribution Center	Chamati
Ampere loading Report	11 KV Mokalgaon Feeder
Ampere	230

Substation: 1330_CHHEGAONMAKHAN :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Mokalgaon Feeder	3513.83	81.48	853.91	93.1	24%	71.18	34500
Total			853.91				
Annual energy loss			7.48	L.U			
LLF=.1							
Feeder Loading Report after erecting New 33/11 KV ss at Chamati							
Ampere							
11 KV Mokalgaon Feeder	30	Amp					

11 KV Badiya feeder	60	Amp					
11 KV Chamati feeder	140	Amp					
Substation: 1330_CHEGAONMAKHAN :							
	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Mokalgaon Feeder	1099.33	78.32	31.22	93.1	3%	95.58	5000
Total							
Substation: 33/11KV_S/S :							
	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Badiya feeder	906.94	80.13	18.99	91.28	2%	97.72	9000
	2176.3	80.31	92.56	92.26	4%	92.86	20100
Total KW							
Annual Energy loss			142.77				
LLF=.1			1.25	L.U			
Saving in Annual Energy loss							
Total Saving in Amount (@ Rs. 4.00Per/Unit)		6.23	L.U				
Cost of Proposed Work		24.9	Rs. In lacs				
Overall Payback Period		118.6	Rs. In Lacs				

8. Feeder Loading Report of 11 KV feeder Ioni radiating from EHV Bahadarpur before erecting New S/s at Biroda

Parameter	Value
Circle	Burhanpur
Distribution Center	Biroda

Ampere loading Report	11 KV Loni Feeder
Ampere	240

Substation: 132/33KV_BAHADURPUR :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
136012_LONI	4138.04	80.16	915.23	93.1	22%	77.22	27300
Total			915.23				
Annual energy loss			8.02	L.U			
LLF=.10							

Feeder Loading Report after erecting new S/s at Loni

Ampere loading							
11 KV Loni Feeder	20	Amp					
11 KV Bholana Feeder	76	Amp					
11 KV Emagrid Feeder	130	Amp					

Substation: 132/33KV_BAHADURPUR :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Loni Feeder	354.64	80.46	18	93.1	5%	99.93	4000
Total	354.64	80.46	18	93.1	5%	99.93	4000

Substation: 33/11KV_S/S Loni :

	Total Loading		Total Losses		Losses	Tail End	3ph Length:
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %	m
11 KV Bholana Feeder	1513.52	80.12	29.16	89.41	2%	97.23	10200
11 KV Emagrid Feeder	2270.56	80.14	57.67	89.06	3%	96.6	13700
Total			104.83				

Annual Energy loss	0.92	L.U
LLF=.10		
Saving in Annual Energy loss	7.1	L.U
Total Saving in Amount (@ Rs. 4.00Per/Unit)	28.4	Rs. In lacs
Cost of Proposed Work	165.2	Rs. In Lacs
Overall Payback Period	5.8	Years

9. Feeder Loading Report before erecting New 33/11 KV Substation at Baghana

Parameter	Value
Circle	Indore
Distribution Center	Baghana
Ampere loading Report	11 KV Baghana Feeder
Ampere	270

Substation: 1234_PALIYA :						
Substation/feeder name	Total Loading		Total Losses		Losses	TailEnd
	kW	PF (%)	kW	PF (%)	%	Volt %
11 KV Baghana Feeder	4789.07	80.5	1230.12	93.1	26%	70.55
Total			1230.12			
Annual Energy Losses			10.78		L.U	
Feeder loading report after erecting New S/s at Baghana						
Residual 11 KV Baghana Feeder	30	Amp				
F1_FDR	70	Amp				

F2_FDR	50	Amp					
F3_FDR	40	Amp					
Substation: 1234_PALIYA :							
Substation/feeder name	Total Loading		Total Losses		Losses	TailEnd	3ph Length:
	kW	PF (%)	kW	PF (%)	%	Volt %	m
Residual 11 KV Baghana Feeder	560	80.56	20.36	90.64	4%	99.89	10000
Total	560	80.56	20.36	90.64	4%	99.89	10000
Substation: 33/11KV_S/S :							
Substation/feeder name	Total Loading		Total Losses		Losses	TailEnd	3ph Length:
	kW	PF (%)	kW	PF (%)	%	Volt %	m
F1_FDR	1578.24	75.79	56.25	90.64	4%	96.63	10500
F2_FDR	1085.62	75.73	95.56	91.02	9%	97.41	8000
F3_FDR	843.11	75.55	25.25	89.81	3%	98.92	7500
	3506.96	75.71	177.06	90.66			26000
Total loss in kw			197.42	kw			
Annual Energy Losses			1.73	L.U			
LLF=0.10)							
Saving in Annual Energy loss			9.05	L.U			
Total Saving in Amount (@ Rs. 4.00 Per/Unit)			36.2	Rs in Lacs			
Cost of Proposed Work			166.7	Rs in Lacs			
Overall Payback Period			4.6	Years			

10. Feeder Loading Report of 11 KV Doulatpur feeder radiating from 33/11 kv Sonkatch substation before erecting New 33/11 KV Substation at Agera under Dewas O&M Circle

Parameter	Value
Circle	Dewas
Distribution Center	Agera
Ampere loading Report	11 KV Doulatpur Feeder
Ampere	250

Substation: 3116 SONKATCH :						
	Total Loading		Total Losses		Losses	Tail End
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %
311621_Doulatpur	4869.2	80.98	925.22	93.1	19%	78.22
Total			925.22	93.1		
Annual energy loss			8.10	L.U		
LLF=.1						
Feeder Loading Report after erecting New S/s at Agera under Dewas O&M Circle						
Ampere loading report						
Residual 11 KV Doulatpur Feeder	60				Amp	

11 KV Khari Feeer	130	Amp				
11 KV Lalakhedi Fdr	60	Amp				
Substation: 3116_SONKATCH :						
Substation/feede name	Total Loading		Total Losses		Losses	Tail End
	kW	PF (%)	kW	PF (%)	%	Volt %
Residual 11 KV Doulatpur Feeder	1052.5	87.41	45.52	93.25	4%	96.66
Substation: 33/11 KV Agera Substation :						
ho@	Total Loading		Total Losses		Losses	Tail End
Substation/feede name	kW	PF (%)	kW	PF (%)	%	Volt %
11 KV Khari Feeder	2556.2	87.41	134.5	93.1	5%	91.8
11 KV Lalakhedi Feeder	1260.5	80.15	16.93	93.1	1%	97.87
Total loss in kw			196.95	KW		
Annual energy loss			1.73	LU		
LLF=.1						
Saving in Annual Energy loss		6.38	L.U			
Total Saving in Amount (@ Rs. 4.00 Per/Unit)		25.5	Rs. In lacs			
Cost of Proposed Work		116.8	Rs. In Lacs			
Overall Payback Period		4.6	Years			

11. Feeder Loading Report before erecting New 33/11 KV S/s at Attar

Parameter	Value
Circle	Khandwa

Distribution Center	Attar
Ampere loading Report	11 KV Attar Feeder
Ampere	290

Substation: 1325_CHICHGOHAN :						
	Total Loading		Total Losses		Tail End	Losses
Substation/feeder name	kW	PF (%)	kW	PF (%)	Volt %	%
11 KV Attar Feeder	4456.23	80.11	1325.25	82.45	71.25	30%
Total Loss in Kw			1325.25			
Annual energy loss			11.6	L.U		
LLF=.1						
Feeder Loading Report after erecting New 33/11 KV S/S at Attar						
Ampere loading Report						
11 KV Attar Feeder	10	Amp				
11 KV Kankriya feeder	140	Amp				
11 KV Salai feeder	145	Amp				
Substation: 1330_CHHEGAONMAKHAN :						
	Total Loading		Total Losses		Losses	Tail End
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %
11 KV Attar Feeder	1099.33	78.32	31.22	93.1	3%	95.58
Total						3000
Substation: 33/11KV_S/S :						
	Total Loading		Total Losses		Losses	Tail End
Substation/feeder name	kW	PF (%)	kW	PF (%)	%	Volt %

11 KV Kankriya feeder	2236.52	80.38	115.25	92.56	5%	90.39	26000
11 KV Salai feeder	1993.61	80.44	105.22	92.56	5%	90.6	29700
Total KW			251.69				
Annual Energy loss			2.20	L.U			
LLF=.1							
Saving in Annual Energy loss		9.4		L.U			
Total Saving in Amount (@ Rs. 4.00Per/Unit)		37.6			Rs. In lacs		
Cost of Proposed Work		135.0			Rs. In Lacs		
Overall Payback Period		3.6			Years		

The summary of the above simulation studies are as follows-

Benefits Realized

Sr.No	Circle	Name of 33/11 KV S/s	Saving in Annual Energy loss (LU)			Per Unit Rate (Rs/Kwh)	Cost of New 33/11 KV Substation (Rs in Lacs)	Total Saving in Amount (@ Rs. 4.00Per/Unit)	Payback Period (Years)
			Losses in Existing System	Losses in New System	Losses saving (LU)				
1	Indore	Dharmat	7.98	0.70	7.28	4.00	161.38	29.12	5.54
2	Indore	Baghana	10.78	1.73	9.05	4.00	166.7	36.2	4.60
3	Burhanpur	Biroda	8.02	0.92	7.10	4.00	165.2	28.4	5.82
4	Khandwa	Chamati	7.48	1.25	6.23	4.00	118.6	24.92	4.76
5	Khandwa	Attar	11.60	2.20	9.40	4.00	135	37.6	3.59
6	Khandwa	Dongargaon	8.34	1.03	7.31	4.00	131.21	29.24	4.49
7	Ujjain	Nahariya	9.44	1.84	7.60	4.00	163.83	30.4	5.39
8	Ujjain	Gunawad	10.30	1.07	9.23	4.00	131.21	36.92	3.55
9	Ujjain	Birakhedi	8.31	0.65	7.66	4.00	150.98	30.64	4.93

10	Dewas	Sunwani Gopal	8.98	1.29	7.69	4.00	127.26	30.76	4.14
11	Dewas	Agera	8.1	1.73	6.37	4.00	116.8	25.48	4.58
Average				7.72	4.00		142.56	30.88	4.67

2.2. Circle Wise Scheme Break-Ups and Payback Period

2.2.1. Agar Circle



Consumer mix in terms of -

Category	Number
Domestic	85233
Non Domestic	6211
Public WW/STLT	571
LT Industry	726
Irrigation Pumps	31794
HT Consumers	77

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Agar Circle as on 31st March 2017 as following:-

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	2
2	Total No. of DC	Nos.	10
3	Total No. of 33/11 KV Substation	Nos.	33
4	Total No. of Power Transformer	Nos.	63
5	Length of total 33KV Line	Km.	494
6	Length of total 11KV Line	Km.	2736

7	Total LT length	Km.	4624
8	Total No. of Consumer	Nos.	112234
9	Population	Nos.	559233
10	Total Non Agri Consumer	Nos.	81740
11	Total Agri Consumer	Nos.	30494
12	Total Area	Sqkm	2,785
13	T & D Losses	%	20.62%
14	AT&C Losses	%	27.71%
15	RPU	INR	4.13
16	CRPU	INR	1.56

Projected AT&C Loss:

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Agar Circle	29.70%	9.76%	17.74%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Agar circle for 4 years as following:

Scheme wise physical and financial expenditure in Agar Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	3	0	0	0	4		0	0	0			
Addl PTR	9	0	0	0	0		0	0	0			
Aug PTR	6	0	0	0	3		0	0	0			
33 KV line	26	7	0	0	16		19	0	0			
11 KV line	115	0	0	26	264	0	0	801	0			
LT line	95	6	0	85	351		55	113	0			
DTR	547	160	0	63	1079		91	7958	0			
TC TO PC								6945				
Installation meter on Predominant Agri. DTRs												139
Transformer failure reduction Scheme										475		
Amount spent (Cr)	38.39	0.77	0.00	13.79	50.05	0.49	3.10	36.84	6.00	1.42	4.00	0.35
Expected saving in MU	40.07											

From the above table it is depicted that total approx. 155.21 Cr will be required for capital expenditure of Agar Circle. After improvement in technical conditions, Agar Circle will able to save 40.07 MU in 4 years from FY 17 to FY 20.

Expenditure on Agar Circle

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Agar circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	384.77	294.19	148.75	137.01	76.46%	92.11%	29.58%
FY 16-17	398.25	315.18	178.80	163.96	79.14%	91.70%	27.43%
FY 17-18	416.90	332.10	208.90	184.35	79.66%	88.25%	29.70%
FY 18-19	469.49	373.37	233.90	265.41	79.53	113.47	9.76%
FY 19-20	445.09	366.13	230.31	230.31	82%	100%	17.74%

Payback Period for investment

In Agar Circle, Payback period for the investment is calculated and it is less than 6 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23	30-Mar-24	30-Mar-25	30-Mar-26	30-Mar-27
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost	INR Crores	155.21										
Project Cost (phasing)	INR Crores		69.84	46.56	38.80							
Total Input (Units)	MU	398.25	416.90	469.49	492.96	517.61	543.49	570.66	599.20	629.16	660.61	693.64
AT&C Losses	%	27.43%	29.70%	9.76%	17.74%	17.74%	17.74%	17.74%	17.74%	17.74%	17.74%	17.74%
Total Units for which revenue is realised	MU	289	293	424	406	426	447	469	493	518	543	571

Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	180.63	183.18	264.79	253.44	266.12	279.42	293.39	308.06	323.46	339.64	356.62
Base Case	INR Crores	180.63	180.63	180.63	180.63	180.63	180.63	180.63	180.63	180.63	180.63	180.63
Benefit through savings	INR Crores		(5.92)	51.85	29.85	31.35	32.91	34.56	36.29	38.10	40.01	42.01
Net Cash Flow (revenue basis with investments across schemes)		-	(75.76)	5.29	(8.95)	31.35	32.91	34.56	36.29	38.10	40.01	42.01
IRR (after)		22.9%										
Payback Period		< 5 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.2. Barwani Circle



Consumer mix in terms of:

Category	Number
Domestic	178354
Non Domestic	10886
Public WW/STLT	894
LT Industry	1987
Irrigation Pumps	59064
HT Consumers	67

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Barwani Circle as on 31st March 2017 as following:-

Technical parameters of Barwani Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	2
2	Total No. of DC	Nos.	18
3	Total No. of 33/11 KV Substation	Nos.	65
4	Total No. of Power Transformer	Nos.	109
5	Length of total 33KV Line	Km.	745
6	Length of total 11KV Line	Km.	6309
7	Total LT length	Km.	6693

8	Total No. of Consumer	Nos.	251277
9	Population	Nos.	1,385,881
10	Total Non Agri Consumer	Nos.	192187
11	Total Agri Consumer	Nos.	59090
12	Total Area	Sqkm	5,427
13	T & D Losses	%	20.62%
14	AT&C Losses	%	23.75%
15	RPU	INR	4.28
16	CRPU	INR	1.73

Projected AT&C Loss:

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Barwani Circle	24.75%	20.57%	18.02%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Barwani circle for 4 years as following:

Scheme wise physical and financial expenditure in Barwani Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJY	RAPDRP	RGGVY	MMSKPCY	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	8	1	0	0	2		0	0	0			
Addl PTR	6	2	0	0	0		0	0	0			
Aug PTR	11	3	0	0	7		0	0	0			
33 KV line	84	13	0	0	8		19	0	0			
11 KV line	185	16	0	23	651	0	150	1243	411			
LT line	96	14	0	129	895		172	168	70			
DTR	240	72	0	66	403		160	4001	129			
TC TO PC								12576				
Installation meter on Predominant Agri. DTRs												95
Transformer failure reduction Scheme										662		
Amount spent (Cr)	43.20	4.90	0.00	13.46	72.01	0.48	10.08	66.83	54.87	1.98	4.00	0.24
Expected saving in MU	87.82											

From the above table it is depicted that total approx. 272.04 Cr will be required for capital expenditure of Barwani Circle. After improvement in technical conditions, Barwani Circle will able to save 87.82 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Barwani circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	861.42	651.83	328.62	319.77	75.67	97.31%	26.37%
FY 16-17	854.15	678.13	376.35	359.95	79.39	95.64%	24.07%
FY 17-18	905.55	710.10	435.52	417.96	78.42	95.97%	24.75%
FY 18-19	999.75	765.88	471.07	488.42	76.61	103.68%	20.57%
FY 19-20	966.77	792.56	480.16	480.16	81.98%	100%	18.02%

Payback Period for investment

In Barwani Circle, Payback period for the investment is calculated and it is less than 7 years. Project IRR are also calculated Detail illustration is as following:-

Particulars		Units	31 Mar 2017	31-Mar- 18	01-Apr- 19	31-Mar- 20	31-Mar- 21	31-Mar- 22	31-Mar- 23				
			Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	272.04											
Project Cost (phasing)	INR Crores		122.42	81.61	68.01								
Total Input (Units)	MU	854.15	905.55	999.75	1,049.74	1,102.22	1,157.33	1,215.20	1,275.96	1,339.76	1,406.75	1,477.08	
AT&C Losses	%	24.07%	24.75%	20.57%	18.02%	18.02%	18.02%	18.02%	18.02%	18.02%	18.02%	18.02%	
Total Units for which revenue is realised	MU	649	681	794	861	904	949	996	1,046	1,098	1,153	1,211	
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	

Incremental Realisation	INR Crores	405.35	425.89	496.31	537.86	564.75	592.99	622.64	653.77	686.46	720.78	756.82
Base Case	INR Crores	405.35	405.35	405.35	405.35	405.35	405.35	405.35	405.35	405.35	405.35	405.35
Benefit through savings	INR Crores		(3.85)	21.87	39.69	41.68	43.76	45.95	48.25	50.66	53.19	55.85
Net Cash Flow (revenue basis with investments across schemes)		-	(126.27)	(59.74)	(28.32)	41.68	43.76	45.95	48.25	50.66	53.19	55.85
IRR		8.7%										
Payback Period		< 7 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.3. Burhanpur Circle



Consumer mix in terms of

Category	Number
Domestic	111748
Non Domestic	11062
Public WW/STLT	934
LT Industry	5384
Irrigation Pumps	28996
HT Consumers	52

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Burhanpur Circle as on 31st March 2017 as following:-

Technical parameters of Burhanpur Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	2
2	Total No. of DC	Nos.	15
3	Total No. of 33/11 KV Substation	Nos.	37
4	Total No. of Power Transformer	Nos.	67
5	Length of total 33KV Line	Km.	458

6	Length of total 11KV Line	Km.	4056
7	Total LT length	Km.	2975
8	Total No. of Consumer	Nos.	158187
9	Population	Nos.	757,847
10	Total Non Agri Consumer	Nos.	129180
11	Total Agri Consumer	Nos.	29007
12	Total Area	Sqkm	3,427
13	T & D Losses	%	21.76%
14	AT&C Losses	%	22.74%
15	RPU	INR	4.48
16	CRPU	INR	2.73

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Burhanpur Circle	20.09%	22.20%	18.5%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Burhanpur circle for 4 years as following

Scheme wise physical and financial expenditure in Burhanpur Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJY	RAPDRP	RGGVY	MMSKPCY	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PRE-DOMINANT AGRI DTR
33/11 KV ss	7	1	0	0	2		0	0	0			
Addl PTR	6	0	0	0	0		0	0	0			
Aug PTR	7	1	0	0	0		0	0	0			
33 KV line	56	0	0	0	10		21	0	0			
11 KV line	200	3	0	8	248	0	195	655	0			
LT line	104	0	0	66	294		426	93	0			
DTR	214	0	0	5	309		138	2163	0			
TC TO PC								3709				
Installation meter on Predominant Agri. DTRs												46
Transformer failure reduction Scheme										1019		
Amount spent (Cr)	47.52	1.64	0.00	14.99	30.98	0.34	18.80	34.10	2.00	3.06	4.00	0.12
Expected saving in MU	44.50											

Capital Expenditure & Revenue Leakage Prevention

From the above table it is depicted that total approx. 157.54 Cr will be required for capital expenditure of Burhanpur Circle. After improvement in technical conditions, Burhanpur Circle will able to save 44.50 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Burhanpur circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	827.49	607.75	324.85	327.11	73.45	100.70	26.04%
FY 16-17	776.37	607.74	348.90	344.86	78.28	98.84	22.63%
FY 17-18	789.55	630.47	398.11	398.38	79.85	100.07	20.09%
FY 18-19	879.40	692.34	435.96	430.81	78.73	98.82	22.20%
FY 19-20	842.93	695.41	438.92	438.92	82.50%	100%	17.50%

Payback Period for investment

In Burhanpur Circle, Payback period for the investment is calculated and it is less than 6 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar- 18	01-Apr- 19	31-Mar- 20	31-Mar- 21	31-Mar- 22	31-Mar- 23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	157.54										

Project Cost (phasing)	INR Crores		70.89	47.26	39.39							
Total Input (Units)	MU	776.37	789.55	879.40	923.37	969.54	1,018.02	1,068.92	1,122.36	1,178.48	1,237.41	1,299.28
AT&C Losses	%	22.63%	20.09%	22.20%	17.50%	17.50%	17.50%	17.50%	17.50%	17.50%	17.50%	17.50%
Total Units for which revenue is realised	MU	601	631	684	762	800	840	882	926	972	1,021	1,072
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	375.43	394.33	427.61	476.11	499.92	524.91	551.16	578.72	607.65	638.04	669.94
Base Case	INR Crores	375.43	375.43	375.43	375.43	375.43	375.43	375.43	375.43	375.43	375.43	375.43
Benefit through savings	INR Crores		12.53	2.36	29.61	31.09	32.64	34.27	35.99	37.79	39.67	41.66
Net Cash Flow (revenue basis with investments across schemes)		-	(58.36)	(44.90)	(9.78)	31.09	32.64	34.27	35.99	37.79	39.67	41.66
IRR		16.2%										
Payback Period		< 6 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.4. Dewas Circle



Consumer mix in terms of

Category	Number
Domestic	223404
Non Domestic	18302
Public WW/STLT	1846
LT Industry	2671
Irrigation Pumps	102511
HT Consumers	220

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Dewas Circle as on 31st March 2017 as following:-

Technical parameters of Dewas Circle:

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	5
2	Total No. of DC	Nos.	35
3	Total No. of 33/11 KV Substation	Nos.	115
4	Total No. of Power Transformer	Nos.	209
5	Length of total 33KV Line	Km.	1437

6	Length of total 11KV Line	Km.	10614
7	Total LT length	Km.	13831
8	Total No. of Consumer	Nos.	348954
9	Population	Nos.	1,563,715
10	Total Non Agri Consumer	Nos.	246442
11	Total Agri Consumer	Nos.	102512
12	Total Area	Sqkm	7,020
13	T & D Losses	%	21.74%
14	AT&C Losses	%	26%
15	RPU	INR	4.41
16	CRPU	INR	2.48

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Dewas Circle	25.14%	12.30%	15.94%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Dewas circle for 4 years as following:

Scheme wise physical and financial expenditure in Dewas Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	8	4	2	0	7		0	0	0			
Addl PTR	7	1	0	0	5		0	0	0			
Aug PTR	7	2	4	0	11		0	0	0			
33 KV line	100	47	4	0	11		24	0	0			
11 KV line	333	70	0	63	481	0	163	824	264			
LT line	106	39	0	234	928		173	134	0			
DTR	563	93	0	64	909		201	3004	74			
TC TO PC								14802				
Installation meter on Predominant Agri. DTRs												127
Transformer failure reduction Scheme										1195		
Amount spent (Cr)	65.66	16.45	11.36	21.10	110.75	0.32	10.74	42.10	30.42	3.59	3.00	0.32
Expected saving in MU	76.15											

From the above table it is depicted that total approx. 315.81 Cr will be required for capital expenditure of Dewas Circle. After improvement in technical conditions, Dewas Circle will able to save 76 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Dewas circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	1782.62	1349.48	737.52	711.95	75.70	96.53	26.92%
FY 16-17	1805.07	1404.81	829.12	791.38	77.83	95.45	25.72%
FY 17-18	1845.05	1491.29	958.06	887.32	80.83	92.62	25.14%
FY 18-19	1995.49	1597.16	1030.20	1128.79	80.04	109.57	12.30%
FY 19-20	1969.78	1655.80	1056.27	1056.27	84.06%	100%	15.94%

Payback Period for investment

In Dewas Circle, Payback period for the investment is calculated and it is less than 3 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	315.81										
Project Cost (phasing)	INR Crores		142.11	94.74	78.95							
Total Input (Units)	MU	1805.07	1,845.05	1,995.49	2,095.26	2,200.03	2,310.03	2,425.53	2,546.80	2,674.14	2,807.85	2,948.24

AT&C Losses	%	25.72%	25.14%	12.30%	15.94%	15.94%	15.94%	15.94%	15.94%	15.94%	15.94%	15.94%
Total Units for which revenue is realised	MU	1,341	1,381	1,750	1,761	1,849	1,942	2,039	2,141	2,248	2,360	2,478
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	838.00	863.25	1,093.78	1,100.80	1,155.84	1,213.63	1,274.31	1,338.03	1,404.93	1,475.18	1,548.93
Base Case	INR Crores	838.00	838.00	838.00	838.00	838.00	838.00	838.00	838.00	838.00	838.00	838.00
Benefit through savings	INR Crores		6.69	167.37	128.07	134.48	141.20	148.26	155.67	163.46	171.63	180.21
Net Cash Flow (revenue basis with investments across schemes)		-	(135.43)	72.63	49.12	134.48	141.20	148.26	155.67	163.46	171.63	180.21
IRR		67.2%										
Payback Period		< 3 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.5. Dhar Circle



Consumer mix in terms of

Category	Number
Domestic	275786
Non Domestic	17943
Public WW/STLT	1370
LT Industry	2902
Irrigation Pumps	121932
HT Consumers	78

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Dhar Circle as on 31st March 2017 as following:-

Technical parameters of Dhar Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	5
2	Total No. of DC	Nos.	34
3	Total No. of 33/11 KV Substation	Nos.	109
4	Total No. of Power Transformer	Nos.	194
5	Length of total 33KV Line	Km.	1304

6	Length of total 11KV Line	Km.	12566
7	Total LT length	Km.	15864
8	Total No. of Consumer	Nos.	420013
9	Population	Nos.	2,185,793
10	Total Non Agri Consumer	Nos.	298079
11	Total Agri Consumer	Nos.	121934
12	Total Area	Sqkm	8,153
13	T & D Losses	%	8.99%
14	AT&C Losses	%	12.03%
15	RPU	INR	4.87
16	CRPU	INR	1.79

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Dhar Circle	12.67%	8.10%	11.37%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Dhar circle for 4 years as following:

Scheme wise physical and financial expenditure in Dhar Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PRE-DOMINANT AGRI DTR
33/11 KV ss	4	3	4	0	5		0	0	0			
Addl PTR	10	6	1	0	5		0	0	0			
Aug PTR	17	1	3	0	8		0	0	0			
33 KV line	63	41	23	0	10		19	0	0			
11 KV line	315	55	0	36	1026	0	492	1018	484			
LT line	122	26	0	176	1434		575	129	0			
DTR	458	81	0	39	847		399	2962	233			
TC TO PC								20393				
Installation meter on Predominant Agri. DTRs												75
Transformer failure reduction Scheme										1530		
Amount spent (Cr)	63.32	14.21	12.77	12.49	201.20	0.39	35.43	53.70	64.53	3.59	6.00	0.19
Expected saving in MU	113.31											

From the above table it is depicted that total approx. 315.81 Cr will be required for capital expenditure of Dhar Circle. After improvement in technical conditions, Dhar Circle will able to save 113 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Dhar circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	1458.94	1172.68	584.67	579.02	80.38	99.03	20.40%
FY 16-17	1420.42	1288.83	700.33	682.45	90.74	97.45	11.58%
FY 17-18	1506.15	1358.11	816.27	790.53	90.17	96.85	12.67%
FY 18-19	1555.10	1371.20	857.09	857.09	88.17%	100%	8.10%
FY 19-20	1607.97	1425.15	899.94	899.94	88.63%	100%	11.37%

Payback Period for investment

In Dhar Circle, Payback period for the investment is calculated and it is less than 5 years. Project IRR are also calculated Detail illustration is as following:

Particulars	Units	Base Year	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
			Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	
Total Project Cost (Rs.)	INR Crores	467.82											
Project Cost (phasing)	INR Crores		210.52	140.35	116.96								
Total Input (Units)	MU	1420.42	1,506.15	1,795.99	1,885.79	1,980.08	2,079.08	2,183.04	2,292.19	2,406.80	2,527.14	2,653.50	

AT&C Losses	%	11.58%	12.67%	8.10%	11.37%	11.37%	11.37%	11.37%	11.37%	11.37%	11.37%	11.37%
Total Units for which revenue is realised	MU	1,256	1,315	1,651	1,671	1,755	1,843	1,935	2,032	2,133	2,240	2,352
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	784.96	822.07	1,031.57	1,044.61	1,096.84	1,151.68	1,209.27	1,269.73	1,333.22	1,399.88	1,469.87
Base Case	INR Crores	784.96	784.96	784.96	784.96	784.96	784.96	784.96	784.96	784.96	784.96	784.96
Benefit through savings	INR Crores		(10.26)	39.06	2.48	2.60	2.73	2.87	3.01	3.16	3.32	3.48
Net Cash Flow (revenue basis with investments across schemes)		-	(202.22)	22.02	15.35	158.54	186.09	215.02	245.39	277.29	310.78	345.94
IRR		48.4%										
Payback Period		< 4 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.6. Indore City Circle



Consumer mix in terms of

Category	Number
Domestic	482748
Non Domestic	106097
Public WW/STLT	5133
LT Industry	8339
Irrigation Pumps	1680
HT Consumers	1004

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Indore City Circle as on 31st March 2017 as following:-

Technical parameters of Indore City Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	5
2	Total No. of DC	Nos.	28
3	Total No. of 33/11 KV Substation	Nos.	98
4	Total No. of Power Transformer	Nos.	189

5	Length of total 33KV Line	Km.	564
6	Length of total 11KV Line	Km.	1466
7	Total LT length	Km.	3537
8	Total No. of Consumer	Nos.	605005
9	Population	Nos.	1638349
10	Total Non Agri Consumer	Nos.	603319
11	Total Agri Consumer	Nos.	1686
12	Total Area	Sqkm	3,898
13	T & D Losses	%	17.96%
14	AT&C Losses	%	18.79%
15	RPU	INR	5.89
16	CRPU	INR	5.86

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Indore City Circle	17.74%	16.20%	14.63%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Indore City circle for 4 years as following:

Scheme wise physical and financial expenditure in Indore City Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PRE-DOMINANT AGRI DTR
33/11 KV ss	5	4	0	1	0		0	0	0			
Addl PTR	4	3	0	0	0		0	0	0			
Aug PTR	6	3	0	0	0		0	0	0			
33 KV line	26	0	0	0	6		0	0	0			
11 KV line	108	3	0	164	0	0	0	0	0			
LT line	55	0	0	876	0		0	0	0			
DTR	155	8	0	372	80		0	1702	0			
TC TO PC								0				
Installation meter on Predominant Agri. DTRs												0
Transformer failure reduction Scheme										0		
Amount spent (Cr)	10.30	7.82	0.00	162.82	0.00	3.00	0.00	0.00	0.00	0.00	12.00	0.00
Expected saving in MU	11.77											

From the above table it is depicted that total approx. 195.94 Cr will be required for capital expenditure of Indore City Circle. After improvement in technical conditions, Indore City Circle will able to save 11.77 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Indore City circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	2481.53	2011.28	1370.96	1358.79	81.05	99.11	19.67%
FY 16-17	2678.91	2191.00	1578.73	1570.06	81.79	99.45	18.66%
FY 17-18	2764.27	2292.65	1744.50	1730.22	82.94	99.18	17.74%
FY 18-19	2,893	2,457	1,879	1,855	85	99	16.20%
FY 19-20	2951.15	2527.65	1923.32	1923.32	85.65%	100%	14.63%

Payback Period for investment

In Indore City Circle, Payback period for the investment is calculated and it is less than 3 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	195.94										
Project Cost (phasing)	INR Crores		88.17	58.78	48.98							

Total Input (Units)	MU	2678.91	2,764.27	2,893.44	3,038.11	3,190.02	3,349.52	3,516.99	3,692.84	3,877.48	4,071.36	4,274.93
AT&C Losses	%	18.66%	17.74%	16.20%	14.63%	14.63%	14.63%	14.63%	14.63%	14.63%	14.63%	14.63%
Total Units for which revenue is realised	MU	2,179	2,274	2,425	2,594	2,723	2,859	3,002	3,153	3,310	3,476	3,650
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	1,361.89	1,421.18	1,515.44	1,621.02	1,702.07	1,787.18	1,876.54	1,970.36	2,068.88	2,172.32	2,280.94
Base Case	INR Crores	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89	1,361.89
Benefit through savings	INR Crores		15.89	44.49	76.52	80.35	84.37	88.58	93.01	97.66	102.55	107.67
Net Cash Flow (revenue basis with investments across schemes)		-	(72.28)	(14.29)	27.54	80.35	84.37	88.58	93.01	97.66	102.55	107.67
IRR		51.4%										
Payback Period		< 3 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.7. Indore O&M Circle



Consumer mix in terms of

Category	Number
Domestic	222403
Non Domestic	19523
Public WW/STLT	1598
LT Industry	2897
Irrigation Pumps	91225
HT Consumers	790

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Indore O&M Circle as on 31st March 2017 as following:-

Technical parameters of Indore O&M Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	4
2	Total No. of DC	Nos.	39
3	Total No. of 33/11 KV Substation	Nos.	123
4	Total No. of Power Transformer	Nos.	231
5	Length of total 33KV Line	Km.	1750

6	Length of total 11KV Line	Km.	7863
7	Total LT length	Km.	13482
8	Total No. of Consumer	Nos.	338489
9	Population	Nos.	1638348
10	Total Non Agri Consumer	Nos.	247203
11	Total Agri Consumer	Nos.	91286
12	Total Area	Sqkm	3,898
13	T & D Losses	%	17.13%
14	AT&C Losses	%	18.72%
15	RPU	INR	5.07
16	CRPU	INR	4.04

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Indore O&M Circle	17.47%	15.43%	13.05%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Indore O&M circle for 4 years as following:

Scheme wise physical and financial expenditure in Indore O&M Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGVY	MMSKPC Y	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	12	3	1	0	6		0	0	0			
Addl PTR	7	6	1	0	1		0	0	0			
Aug PTR	15	5	1	0	5		0	0	0			
33 KV line	61	54	4	0	32		17	0	0			
11 KV line	276	43	0	42	181	0	52	566	3			
LT line	115	28	0	200	377		165	61	36			
DTR	346	97	0	38	752		81	2358	6			
TC TO PC								15678				
Installation meter on Predominant Agri. DTRs												76
Transformer failure reduction Scheme										1264		
Amount spent (Cr)	60.23	14.55	11.19	15.92	42.04	0.40	9.93	26.44	4.05	3.79	4.00	0.19
Expected saving in MU	43.48											

Capital Expenditure Analysis

From the above table it is depicted that total approx. 192.73 Cr will be required for capital expenditure of Indore O&M Circle. After improvement in technical conditions, Indore O&M Circle will able to save 43.48 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Indore O&M circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	3278.87	2551.89	1475.54	1469.32	77.83	99.58	22.50%
FY 16-17	3141.55	2586.21	1600.25	1593.41	82.32	99.57	18.03%
FY 17-18	3326.63	2811.40	1850.80	1807.41	84.51	97.66	17.47%
FY 18-19	3,726	3,153	2,069	2,068	85	100	15.43%
FY 19-20	3551.53	3088.05	2040.51	2040.51	86.95%	100%	13.05%

Payback Period for investment

In Indore O&M Circle, Payback period for the investment is calculated and it is less than 2 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar- 18	01-Apr- 19	31-Mar- 20	31-Mar- 21	31-Mar- 22	31-Mar- 23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10

Total Project Cost (Rs.)	INR Crores	192.73									
Project Cost (phasing)	INR Crores		86.73	57.82	48.18						
Total Input (Units)	MU	3141.55	3,326.63	3,725.92	3,912.21	4,107.82	4,313.22	4,528.88	4,755.32	4,993.09	5,242.74
AT&C Losses	%	18.03%	17.47%	15.43%	13.05%	13.05%	13.05%	13.05%	13.05%	13.05%	13.05%
Total Units for which revenue is realised	MU	2,575	2,745	3,151	3,402	3,572	3,750	3,938	4,135	4,341	4,559
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	1,609.46	1,715.92	1,969.38	2,126.04	2,232.35	2,343.96	2,461.16	2,584.22	2,713.43	2,849.10
Base Case	INR Crores	1,609.46	1,609.46	1,609.46	1,609.46	1,609.46	1,609.46	1,609.46	1,609.46	1,609.46	1,609.46
Benefit through savings	INR Crores		11.64	60.55	121.77	127.86	134.25	140.96	148.01	155.41	163.18
Net Cash Flow (revenue basis with investments across schemes)		-	(75.08)	2.73	73.59	127.86	134.25	140.96	148.01	155.41	163.18
IRR		80.4%									
Payback Period		< 2 Years									

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.8. Jhabua Circle



Consumer mix in terms of

Category	Number
Domestic	216809
Non Domestic	12825
Public WW/STLT	469
LT Industry	2591
Irrigation Pumps	49134
HT Consumers	61

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Jhabua Circle as on 31st March 2017 as following:-

Technical parameters of Jhabua Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	2
2	Total No. of DC	Nos.	20
3	Total No. of 33/11 KV Substation	Nos.	43
4	Total No. of Power Transformer	Nos.	75
5	Length of total 33KV Line	Km.	835

6	Length of total 11KV Line	Km.	7158
7	Total LT length	Km.	12270
8	Total No. of Consumer	Nos.	281892
9	Population	Nos.	1,025,048
10	Total Non Agri Consumer	Nos.	232755
11	Total Agri Consumer	Nos.	49137
12	Total Area	Sqkm	3,600
13	T & D Losses	%	16.32%
14	AT&C Losses	%	19.87%
15	RPU	INR	4.58
16	CRPU	INR	1.89

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Jhabua Circle	21.87%	-3.16%	13.89%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Jhabua circle for 4 years as following:

Scheme wise physical and financial expenditure in Jhabua Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	8	2	0	0	2		0	0	0			
Addl PTR	6	0	0	0	1		0	0	0			
Aug PTR	13	1	1	0	4		0	0	0			
33 KV line	93	14	0	0	10		18	0	0			
11 KV line	206	10	0	16	379	0	392	1220	446			
LT line	92	15	0	70	375		421	175	19			
DTR	240	44	0	57	511		531	3456	315			
TC TO PC								25499				
Installation meter on Predominant Agri. DTRs												92
Transformer failure reduction Scheme										327		
Amount spent (Cr)	49.73	6.31	0.04	19.05	48.35	0.28	30.24	66.06	70.18	0.98	1.00	0.23
Expected saving in MU	87.21											

From the above table it is depicted that total approx. 292.46 Cr will be required for capital expenditure of Jhabua Circle. After improvement in technical conditions, Jhabua Circle will able to save 87.21 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Jhabua circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	734.00	597.45	321.42	293.10	81.40	91.19	25.77%
FY 16-17	677.84	571.36	324.05	325.41	84.29	100.42	15.35%
FY 17-18	737.20	621.82	383.79	355.49	84.35	92.63	21.87%
FY 18-19	845	764	463	528	90	114	-3.16%
FY 19-20	787.04	677.72	423.13	423.13	86.11%	100%	13.89%

Payback Period for investment

In Jhabua Circle, Payback period for the investment is calculated and it is less than 10 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	292.46										
Project Cost (phasing)	INR Crores		131.61	87.74	73.12							
Total Input (Units)	MU	677.84	737.20	844.98	971.73	1,020.31	1,071.33	1,124.89	1,181.14	1,240.20	1,302.21	1,367.32
AT&C Losses	%	15.35%	21.87%	-3.16%	13.89%	13.89%	13.89%	13.89%	13.89%	13.89%	13.89%	13.89%

Total Units for which revenue is realised	MU	574	576	872	837	879	923	969	1,017	1,068	1,121	1,177
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	358.62	359.98	544.80	522.97	549.12	576.58	605.40	635.67	667.46	700.83	735.87
Base Case	INR Crores	358.62	358.62	358.62	358.62	358.62	358.62	358.62	358.62	358.62	358.62	358.62
Benefit through savings	INR Crores		(30.04)	97.75	8.87	9.31	9.78	10.26	10.78	11.32	11.88	12.48
Net Cash Flow (revenue basis with investemnts across schemes)		-	(161.24)	65.87	(14.94)	66.46	75.16	84.30	93.89	103.97	114.55	125.65
IRR		33.9%										
Payback Period		< 4 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.9. Khandwa Circle



Consumer mix in terms of

Category	Number
Domestic	178617
Non Domestic	14543
Public WW/STLT	1308
LT Industry	1853
Irrigation Pumps	61164
HT Consumers	84

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Khandwa Circle as on 31st March 2017 as following:-

Technical parameters of Khandwa Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	4
2	Total No. of DC	Nos.	23
3	Total No. of 33/11 KV Substation	Nos.	73
4	Total No. of Power Transformer	Nos.	118
5	Length of total 33KV Line	Km.	1350

6	Length of total 11KV Line	Km.	7595
7	Total LT length	Km.	9020
8	Total No. of Consumer	Nos.	257580
9	Population	Nos.	1,309,443
10	Total Non Agri Consumer	Nos.	196405
11	Total Agri Consumer	Nos.	61175
12	Total Area	Sqkm	6,206
13	T & D Losses	%	24.09%
14	AT&C Losses	%	26.94%
15	RPU	INR	4.25
16	CRPU	INR	2.45

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Khandwa Circle	16.77%	20.25%	19.80%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Khandwa circle for 4 years as following:

Scheme wise physical and financial expenditure in Khandwa Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	4	2	0	0	7		0	0	0			
Addl PTR	12	3	0	0	0		6	0	0			
Aug PTR	8	0	0	0	2		1	0	0			
33 KV line	88	42	0	0	15		19	0	0			
11 KV line	235	40	0	14	183	0	158	1209	37			
LT line	114	23	0	63	356		403	186	45			
DTR	271	75	0	32	620		276	3405	63			
TC TO PC							22714					
Installation meter on Predominant Agri. DTRs												31
Transformer failure reduction Scheme										944		
Amount spent (Cr)	47.59	10.99	0.00	19.96	25.62	0.38	21.37	63.16	13.05	2.83	3.00	0.08
Expected saving in MU	64.42											

From the above table it is depicted that total approx. 208.04 Cr will be required for capital expenditure of Khandwa Circle. After improvement in technical conditions, Khandwa Circle will able to save 64.42 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Khandwa circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	985.84	711.75	384.81	446.28	72.20	115.97	16.27%
FY 16-17	934.99	704.45	406.00	427.17	75.34	105.22	20.73%
FY 17-18	995.06	767.87	483.81	521.80	77.17	107.85	16.77%
FY 18-19	1,086	820	515	544	76	106	20.25%
FY 19-20	1062.33	851.99	533.40	533.40	80.20%	100%	19.80%

Payback Period for investment

In Khandwa Circle, Payback period for the investment is calculated and it is less than 10 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	208.04										

Project Cost (phasing)	INR Crores		93.62	62.41	52.01							
Total Input (Units)	MU	934.99	995.06	1,085.62	1,139.90	1,196.90	1,256.74	1,319.58	1,385.56	1,454.84	1,527.58	1,603.96
AT&C Losses	%	20.73%	16.77%	20.25%	19.80%	19.80%	19.80%	19.80%	19.80%	19.80%	19.80%	19.80%
Total Units for which revenue is realised	MU	741	828	866	914	960	1,008	1,058	1,111	1,167	1,225	1,286
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	463.23	517.62	541.11	571.38	599.95	629.94	661.44	694.51	729.24	765.70	803.98
Base Case	INR Crores	463.23	463.23	463.23	463.23	463.23	463.23	463.23	463.23	463.23	463.23	463.23
Benefit through savings	INR Crores		24.63	3.26	6.63	6.96	7.30	7.67	8.05	8.46	8.88	9.32
Net Cash Flow (revenue basis with investments across schemes)		-	(52.67)	(35.79)	(12.94)	47.97	57.32	67.13	77.44	88.26	99.62	111.55
IRR		36.7%										
Payback Period		< 4 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.10. Khargone Circle



Consumer mix in terms of

Category	Number
Domestic	244619
Non Domestic	19474
Public WW/STLT	1860
LT Industry	3014
Irrigation Pumps	103613
HT Consumers	125

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Khargone Circle as on 31st March 2017 as following:-

Technical parameters of Khargone Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	4
2	Total No. of DC	Nos.	45
3	Total No. of 33/11 KV Substation	Nos.	107
4	Total No. of Power Transformer	Nos.	197
5	Length of total 33KV Line	Km.	1368

6	Length of total 11KV Line	Km.	10482
7	Total LT length	Km.	14706
8	Total No. of Consumer	Nos.	372731
9	Population	Nos.	1,872,413
10	Total Non Agri Consumer	Nos.	269086
11	Total Agri Consumer	Nos.	103645
12	Total Area	Sqkm	8,030
13	T & D Losses	%	18.47%
14	AT&C Losses	%	18.14%
15	RPU	INR	4.54
16	CRPU	INR	2.89

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Khargone Circle	7.69%	24.50%	14.83%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Khargone circle for 4 years as following:

Scheme wise physical and financial expenditure in Khargone Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PRE-DOMINANT AGRI DTR
33/11 KV ss	7	3	0	0	5		0	0	0			
Addl PTR	6	5	0	0	2		0	0	0			
Aug PTR	4	0	7	0	4		0	0	0			
33 KV line	92	39	0	0	21		23	0	0			
11 KV line	212	17	0	32	482	0	48	1998	90			
LT line	91	26	0	125	1282		191	188	148			
DTR	547	109	0	114	1362		625	10602	144			
TC TO PC								25578				
Installation meter on Predominant Agri. DTRs												88
Transformer failure reduction Scheme										1739		
Amount spent (Cr)	50.96	10.42	0.28	30.64	50.87	0.42	6.26	110.10	34.38	4.22	5.00	0.22
Expected saving in MU	96.62											

From the above table it is depicted that total approx. 303.75 Cr will be required for capital expenditure of Khargone Circle. After improvement in technical conditions, Khargone Circle will able to save 96.62 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Khargone circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	1951.03	1483.20	810.93	923.94	76.02	113.94	13.38%
FY 16-17	1976.71	1599.63	878.17	887.25	80.92	101.03	18.24%
FY 17-18	2085.75	1722.81	1033.92	1155.43	82.60	111.75	7.69%
FY 18-19	2,293	1,866	1,140	1,057	81	93	24.50%
FY 19-20	2226.76	1896.53	1139.90	1139.90	85.17%	100%	14.83%

Payback Period for investment

In Khargone Circle, Payback period for the investment is calculated and it is less than 3 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	303.75										
Project Cost (phasing)	INR Crores		136.69	91.13	75.94							
Total Input (Units)	MU	1976.71	2,085.75	2,293.25	2,407.92	2,528.31	2,654.73	2,787.46	2,926.84	3,073.18	3,226.84	3,388.18

AT&C Losses	%	18.24%	7.69%	24.50%	14.83%	14.83%	14.83%	14.83%	14.83%	14.83%	14.83%	14.83%
Total Units for which revenue is realised	MU	1,616	1,925	1,731	2,051	2,153	2,261	2,374	2,493	2,617	2,748	2,886
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	1,010.10	1,203.35	1,082.13	1,281.76	1,345.85	1,413.14	1,483.80	1,557.99	1,635.89	1,717.69	1,803.57
Base Case	INR Crores	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10	1,010.10
Benefit through savings	INR Crores		137.53	(89.72)	51.32	53.88	56.58	59.41	62.38	65.50	68.77	72.21
Net Cash Flow (revenue basis with investments across schemes)		-	0.84	(180.85)	(24.62)	53.88	56.58	59.41	62.38	65.50	68.77	72.21
IRR		17.4%										
Payback Period		< 5 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.11. Mandsaur Circle



Consumer mix in terms of

Category	Number
Domestic	218759
Non Domestic	24968
Public WW/STLT	1979
LT Industry	2577
Irrigation Pumps	113515
HT Consumers	75

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Mandsaur Circle as on 31st March 2017 as following:-

Technical parameters of Mandsaur Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	4
2	Total No. of DC	Nos.	40
3	Total No. of 33/11 KV Substation	Nos.	93
4	Total No. of Power Transformer	Nos.	169
5	Length of total 33KV Line	Km.	1229

6	Length of total 11KV Line	Km.	9446
7	Total LT length	Km.	14914
8	Total No. of Consumer	Nos.	361875
9	Population	Nos.	1,340,411
10	Total Non Agri Consumer	Nos.	248357
11	Total Agri Consumer	Nos.	113518
12	Total Area	Sqkm	5,535
13	T & D Losses	%	1.29%
14	AT&C Losses	%	2.53%
15	RPU	INR	5.45
16	CRPU	INR	2.69

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Mandsaur Circle	2.64%	-0.15%	0.49%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Mandsaur circle for 4 years as following:

Scheme wise physical and financial expenditure in Mandsaur Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PRE-DOINANT AGRI DTR
33/11 KV ss	4	3	2	0	6		0	0	0			
Addl PTR	5	9	2	0	3		0	0	0			
Aug PTR	9	1	0	0	11		0	0	0			
33 KV line	86	65	4	0	20		16	0	0			
11 KV line	348	24	0	30	405	0	74	1476	10			
LT line	133	31	0	123	588		238	155	175			
DTR	1303	280	0	96	2489		663	16287	21			
TC TO PC								25724				
Installation meter on Predominant Agri. DTRs												118
Transformer failure reduction Scheme										820		
Amount spent (Cr)	75.34	11.82	11.65	19.69	71.30	0.38	7.65	85.89	18.99	2.46	4.00	0.30
Expected saving in MU	80.58											

From the above table it is depicted that total approx. 309.46 Cr will be required for capital expenditure of Mandsaur Circle. After improvement in technical conditions, Mandsaur Circle will able to save 81 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Mandsaur circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	1059.54	1009.54	517.60	515.59	95.28	99.61	5.09%
FY 16-17	1043.08	1022.88	566.99	565.03	98.06	99.65	2.28%
FY 17-18	1112.57	1116.36	672.43	652.48	100.34	97.03	2.64%
FY 18-19	1226.927	1243.744	744.917	735.940	101.371	98.795	-0.15%
FY 19-20	1187.78	1181.96	741.35	741.35	99.51%	100%	0.49%

Payback Period for investment

In Mandsaur Circle, Payback period for the investment is calculated and it is less than 3 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	309.46										
Project Cost (phasing)	INR Crores		139.26	92.84	77.36							
Total Input (Units)	MU	1043.08	1,112.57	1,226.93	1,288.27	1,352.69	1,420.32	1,491.34	1,565.90	1,644.20	1,726.41	1,812.73

AT&C Losses	%	2.28%	2.64%	-0.15%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%
Total Units for which revenue is realised	MU	1,019	1,083	1,229	1,282	1,346	1,413	1,484	1,558	1,636	1,718	1,804
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	637.06	677.00	767.98	801.23	841.29	883.35	927.52	973.89	1,022.59	1,073.72	1,127.40
Base Case	INR Crores	637.06	637.06	637.06	637.06	637.06	637.06	637.06	637.06	637.06	637.06	637.06
Benefit through savings	INR Crores		(2.50)	18.63	14.41	15.13	15.89	16.68	17.52	18.39	19.31	20.28
Net Cash Flow (revenue basis with investments across schemes)		-	(129.78)	(34.93)	(13.70)	76.40	89.78	103.82	118.57	134.05	150.31	167.38
IRR		31.4%										
Payback Period		< 5 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.12. Neemuch Circle



Consumer mix in terms of

Category	Number
Domestic	129992
Non Domestic	16887
Public WW/STLT	1495
LT Industry	1300
Irrigation Pumps	60069
HT Consumers	55

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Neemuch Circle as on 31st March 2017 as following:-

Technical parameters of Neemuch Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	3
2	Total No. of DC	Nos.	26
3	Total No. of 33/11 KV Substation	Nos.	63
4	Total No. of Power Transformer	Nos.	106

5	Length of total 33KV Line	Km.	753
6	Length of total 11KV Line	Km.	4703
7	Total LT length	Km.	8936
8	Total No. of Consumer	Nos.	209798
9	Population	Nos.	826,067
10	Total Non Agri Consumer	Nos.	149729
11	Total Agri Consumer	Nos.	60069
12	Total Area	Sqkm	4,256
13	T & D Losses	%	6.87%
14	AT&C Losses	%	9.77%
15	RPU	INR	5.34
16	CRPU	INR	2.88

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Neemuch Circle	0.49%	7.06%	10.12%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Neemuch circle for 4 years as following:

Scheme wise physical and financial expenditure in Neemuch Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	6	3	0	0	2		0	0	0			
Addl PTR	4	0	3	0	2		1	0	0			
Aug PTR	6	0	1	0	5		1	0	0			
33 KV line	68	19	0	0	25		18	0	0			
11 KV line	247	12	0	37	350	0	165	523	0			
LT line	135	10	0	158	376		379	102	0			
DTR	342	12	0	40	416		142	1218	0			
TC TO PC							7988					
Installation meter on Predominant Agri. DTRs												197
Transformer failure reduction Scheme										833		
Amount spent (Cr)	44.34	6.94	10.19	21.68	60.09	0.40	18.06	22.32	0.00	2.50	3.00	0.49
Expected saving in MU	46.91											

From the above table it is depicted that total approx. 190.01 Cr will be required for capital expenditure of Neemuch Circle. After improvement in technical conditions, Neemuch Circle will able to save 47 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Neemuch circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	776.34	659.65	354.07	405.05	84.97	114.40	2.80%
FY 16-17	759.00	703.87	411.11	419.29	92.74	101.99	5.42%
FY 17-18	791.52	729.75	470.45	507.79	92.20	107.94	0.49%
FY 18-19	816.63	780.21	500.60	486.98	95.54	97.28	7.06%
FY 19-20	845.03	759.51	518.67	518.67	89.88%	100%	10.12%

Payback Period for investment

In Neemuch Circle, Payback period for the investment is calculated and it is less than 6 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	190.01										
Project Cost (phasing)	INR Crores		85.51	57.00	47.50							
Total Input (Units)	MU	759.00	791.52	816.63	857.46	900.34	945.35	992.62	1,042.25	1,094.37	1,149.08	1,206.54

AT&C Losses	%	5.42%	0.49%	7.06%	10.12%	10.12%	10.12%	10.12%	10.12%	10.12%	10.12%	10.12%
Total Units for which revenue is realised	MU	718	788	759	771	809	850	892	937	984	1,033	1,084
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	448.66	492.27	474.36	481.68	505.76	531.05	557.61	585.49	614.76	645.50	677.77
Base Case	INR Crores	448.66	448.66	448.66	448.66	448.66	448.66	448.66	448.66	448.66	448.66	448.66
Benefit through savings	INR Crores		24.39	(8.37)	(25.19)	(26.45)	(27.77)	(29.16)	(30.62)	(32.15)	(33.75)	(35.44)
Net Cash Flow (revenue basis with investments across schemes)		-	(26.23)	(44.82)	(46.28)	19.23	38.14	57.99	78.84	100.73	123.71	147.84
IRR		33.0%										
Payback Period		<6 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.13. Ratlam Circle



Consumer mix in terms of

Category	Number
Domestic	236593
Non Domestic	24138
Public WW/STLT	2514
LT Industry	2558
Irrigation Pumps	101939
HT Consumers	119

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Ratlam Circle as on 31st March 2017 as following:-

Technical parameters of Ratlam Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	4
2	Total No. of DC	Nos.	30
3	Total No. of 33/11 KV Substation	Nos.	86
4	Total No. of Power Transformer	Nos.	161
5	Length of total 33KV Line	Km.	957

6	Length of total 11KV Line	Km.	9406
7	Total LT length	Km.	14060
8	Total No. of Consumer	Nos.	367887
9	Population	Nos.	1,455,069
10	Total Non Agri Consumer	Nos.	265921
11	Total Agri Consumer	Nos.	101966
12	Total Area	Sqkm	4,861
13	T & D Losses	%	11.66%
14	AT&C Losses	%	14.88%
15	RPU	INR	4.86
16	CRPU	INR	2.46

AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Ratlam Circle	14.79%	11.37%	12.49%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Ratlam circle for 4 years as following:

Scheme wise physical and financial expenditure in Ratlam Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJY	RAPDRP	RGGVY	MMSKPCY	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	13	1	1	0	4		0	0	0			
Addl PTR	12	0	1	0	3		0	0	0			
Aug PTR	9	5	2	0	6		0	0	0			
33 KV line	71	13	10	0	8		17	0	0			
11 KV line	201	8	0	33	428	0	46	1000	72			
LT line	93	17	0	162	519		110	137	0			
DTR	996	242	0	214	2381		686	14940	55			
TC TO PC							20547					
Installation meter on Predominant Agri. DTRs												54
Transformer failure reduction Scheme										1651		
Amount spent (Cr)	63.21	2.42	0.56	44.18	69.40	0.47	5.01	52.56	11.43	4.95	3.00	0.14
Expected saving in MU	60.65											

From the above table it is depicted that total approx. 257.32 Cr will be required for capital expenditure of Ratlam Circle. After improvement in technical conditions, Ratlam Circle will able to save 60.65 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Ratlam circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	1521.07	1174.12	619.21	609.34	77.19	98.40	24.04%
FY 16-17	1383.58	1215.29	686.99	666.09	87.84	96.96	14.84%
FY 17-18	1458.14	1277.29	801.78	779.96	87.60	97.28	14.79%
FY 18-19	1591.77	1406.81	884.77	887.31	88.38	100.29	11.37%
FY 19-20	1556.72	1362.28	883.96	883.96	87.51%	100%	12.49%

Payback Period for investment

In Ratlam Circle, Payback period for the investment is calculated and it is less than 4 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	257.32										
Project Cost (phasing)	INR Crores		115.79	77.20	64.33							

Total Input (Units)	MU	1383.58	1,458.14	1,591.77	1,671.36	1,754.93	1,842.68	1,934.81	2,031.55	2,133.13	2,239.78	2,351.77
AT&C Losses	%	14.84%	14.79%	11.37%	12.49%	12.49%	12.49%	12.49%	12.49%	12.49%	12.49%	12.49%
Total Units for which revenue is realised	MU	1,178	1,242	1,411	1,463	1,536	1,613	1,693	1,778	1,867	1,960	2,058
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	736.41	776.55	881.74	914.13	959.84	1,007.83	1,058.22	1,111.13	1,166.69	1,225.02	1,286.27
Base Case	INR Crores	736.41	736.41	736.41	736.41	736.41	736.41	736.41	736.41	736.41	736.41	736.41
Benefit through savings	INR Crores		0.46	34.52	24.55	25.78	27.06	28.42	29.84	31.33	32.90	34.54
Net Cash Flow (revenue basis with investments across schemes)		-	(115.34)	(42.67)	(39.78)	25.78	27.06	28.42	29.84	31.33	32.90	34.54
IRR		1.1%										
Payback Period		<9 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.14. Shajapur Circle



Consumer mix in terms of

Category	Number
Domestic	123845
Non Domestic	11308
Public WW/STLT	571
LT Industry	1326
Irrigation Pumps	54389
HT Consumers	66

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Shajapur Circle as on 31st March 2017 as following:-

Technical parameters of Shajapur Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	3
2	Total No. of DC	Nos.	22
3	Total No. of 33/11 KV Substation	Nos.	83
4	Total No. of Power Transformer	Nos.	132

5	Length of total 33KV Line	Km.	922
6	Length of total 11KV Line	Km.	5483
7	Total LT length	Km.	8969
8	Total No. of Consumer	Nos.	191512
9	Population	Nos.	1,512,681
10	Total Non Agri Consumer	Nos.	137115
11	Total Agri Consumer	Nos.	54397
12	Total Area	Sqkm	6,195
13	T & D Losses	%	39.10%
14	AT&C Losses	%	43.77%
15	RPU	INR	3.211
16	CRPU	INR	1.41

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Shajapur Circle	39.54%	30.45%	30.90%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Shajapur circle for 4 years as following:

Scheme wise physical and financial expenditure in Shajapur Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJY	RAPDRP	RGGVY	MMSKPCY	SAUBHAGAYA	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	6	2	0	0	7		0	0	0			
Addl PTR	10	4	0	0	4		0	0	0			
Aug PTR	9	0	0	0	14		0	0	0			
33 KV line	43	34	0	0	5		15	0	0			
11 KV line	194	18	0	49	391	0	201	953	0			
LT line	124	38	0	186	604		214	128	0			
DTR	284	60	0	33	576		239	2280	0			
TC TO PC							12622					
Installation meter on Predominant Agri. DTRs												43
Transformer failure reduction Scheme										825		
Amount spent (Cr)	54.50	10.59	0.00	14.40	44.25	0.45	11.82	50.53	3.00	2.48	4.00	0.11
Expected saving in MU	60.70											

From the above table it is depicted that total approx. 196.12 Cr will be required for capital expenditure of Shajapur Circle. After improvement in technical conditions, Shajapur Circle will able to save 61 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Shajapur circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	990.56	594.73	313.49	300.98	60.04%	96.01%	42.36%
FY 16-17	988.38	593.75	335.39	317.06	60.07%	94.53%	43.21%
FY 17-18	953.34	627.06	390.06	358.55	65.78%	91.92%	39.54%
FY 18-19	1053.02	683.68	424.00	454.21	64.93	107.12	30.45%
FY 19-20	1017.79	703.30	430.04	430.04	69.10%	100%	30.90%

Payback Period for investment

In Shajapur Circle, Payback period for the investment is calculated and it is less than 3 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	196.12										
Project Cost (phasing)	INR Crores		88.25	58.83	49.03							

Total Input (Units)	MU	988.38	953.34	1,053.02	1,105.67	1,160.96	1,219.01	1,279.96	1,343.95	1,411.15	1,481.71	1,555.79
AT&C Losses	%	43.21%	39.54%	30.45%	30.90%	30.90%	30.90%	30.90%	30.90%	30.90%	30.90%	30.90%
Total Units for which revenue is realised	MU	561	576	732	764	802	842	884	929	975	1,024	1,075
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	350.81	360.24	457.74	477.51	501.39	526.46	552.78	580.42	609.44	639.91	671.91
Base Case	INR Crores	350.81	350.81	350.81	350.81	350.81	350.81	350.81	350.81	350.81	350.81	350.81
Benefit through savings	INR Crores		21.87	83.98	85.07	89.32	93.79	98.48	103.40	108.57	114.00	119.70
Net Cash Flow (revenue basis with investments across schemes)		-	(66.38)	25.14	36.04	89.32	93.79	98.48	103.40	108.57	114.00	119.70
IRR		75.2%										
Payback Period		< 3 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 to 2018-19 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.2.15. Ujjain Circle



Consumer mix in terms of

Category	Number
Domestic	310731
Non Domestic	36581
Public WW/STLT	2987
LT Industry	4279
Irrigation Pumps	123512
HT Consumers	231

In the consumer mix of the Circle, Domestic consumers contributes large no. of consumers. So in this area, more LT works as well as HT works are to be required for improvement of the lines & conductors. There are a lot schemes work been carried out for improvement of lines. In the schemes, defined activities were carried out for network improvement and loss reduction.

The status of technical parameters for the Ujjain Circle as on 31st March 2017 as following:-

Technical parameters of Ujjain Circle

Sr. No.	Particular	Unit	Qty
1	Total No. of Division	Nos.	7
2	Total No. of DC	Nos.	44
3	Total No. of 33/11 KV Substation	Nos.	157
4	Total No. of Power Transformer	Nos.	289

5	Length of total 33KV Line	Km.	1792
6	Length of total 11KV Line	Km.	11825
7	Total LT length	Km.	13463
8	Total No. of Consumer	Nos.	478348
9	Population	Nos.	1,986,864
10	Total Non Agri Consumer	Nos.	354809
11	Total Agri Consumer	Nos.	123539
12	Total Area	Sqkm	6,091
13	T & D Losses	%	21.52%
14	AT&C Losses	%	22.83%
15	RPU	INR	4.64
16	CRPU	INR	3.02

Projected AT&C Loss

Circle	As on 31st March 2018	As on 31 st March 2019	As on 31 st March 2020
Ujjain Circle	26.06%	16.84%	19.32%

Due to capital expenditure works, Technical loss can be reduced which indirectly helps to reduce the commercial losses.

Scheme wise expenditure for Ujjain circle for 4 years as following:

Scheme wise physical and financial expenditure in Ujjain Circle

Technical Parameters	SSTD	ADB	FS	IPDS	DDUGJ Y	RAPDR P	RGGV Y	MMSKPC Y	SAUBHAGAY A	TRANSFORMER FAILURE REDUCTION SCHEME	SMART METERING	METER INSTALLATION OF PREDOMINANT AGRI DTR
33/11 KV ss	4	4	0	1	5		0	0	0			
Addl PTR	16	13	0	0	3		0	0	0			
Aug PTR	18	3	0	0	9		0	0	0			
33 KV line	71	102	10	0	20		19	0	0			
11 KV line	366	113	0	71	546	5	360	1804	16			
LT line	134	65	0	206	328		709	175	32			
DTR	473	159	0	79	703	108	167	5015	30			
TC TO PC								31813				
Installation meter on Predominant Agri. DTRs												119
Transformer failure reduction Scheme										1716		
Amount spent (Cr)	79.69	29.07	0.50	102.11	57.74	25.94	28.64	92.03	6.99	4.15	10.00	0.30
Expected saving in MU	109.18											

From the above table it is depicted that total approx. 437.15 Cr will be required for capital expenditure of Ujjain Circle. After improvement in technical conditions, Ujjain Circle will able to save 109 MU in 4 years from FY 17 to FY 20.

Based on the above expenditure, there will prevention of revenue leakage. Input energy, sold units & collection of the Ujjain circle shall be projected as following:

Year	Input Energy (MU)	Sold Units (MU)	Demand (In Cr.)	Collection (In Cr.)	Billing efficiency	Collection Efficiency	AT&C loss (%)
FY 15-16	2497.99	1845.93	1018.75	986.97	73.90%	96.88%	28.41%
FY 16-17	2539.58	1982.63	1178.68	1136.31	78.07%	96.41%	24.74%
FY 17-18	2636.16	2051.04	1274.64	1211.34	77.80%	95.03%	26.06%
FY 18-19	2900.71	2265.15	1394.82	1485.35	78.09	106.49	16.84%
FY 19-20	2814.37	2270.64	1405.29	1405.29	80.68%	100%	19.32%

Payback Period for investment

In Ujjain Circle, Payback period for the investment is calculated and it is less than 3 years. Project IRR are also calculated Detail illustration is as following:-

Particulars	Units	31 Mar 2017	31-Mar-18	01-Apr-19	31-Mar-20	31-Mar-21	31-Mar-22	31-Mar-23				
		Base Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Total Project Cost (Rs.)	INR Crores	437.15										
Project Cost (phasing)	INR Crores		196.72	131.14	109.29							

Total Input (Units)	MU	2539.58	2,636.16	2,900.71	3,045.74	3,198.03	3,357.93	3,525.83	3,702.12	3,887.23	4,081.59	4,285.67
AT&C Losses	%	24.74%	26.06%	16.84%	19.32%	19.32%	19.32%	19.32%	19.32%	19.32%	19.32%	19.32%
Total Units for which revenue is realised	MU	1,911	1,949	2,412	2,457	2,580	2,709	2,845	2,987	3,136	3,293	3,458
Average Tariff	(INR/Unit)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Incremental Realisation	INR Crores	1,194.56	1,218.23	1,507.64	1,535.82	1,612.61	1,693.24	1,777.90	1,866.79	1,960.13	2,058.14	2,161.05
Base Case	INR Crores	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56	1,194.56
Benefit through savings	INR Crores		(21.75)	143.22	103.17	108.33	113.75	119.44	125.41	131.68	138.26	145.18
Net Cash Flow (revenue basis with investments across schemes)		-	(218.46)	12.08	(6.11)	108.33	113.75	119.44	125.41	131.68	138.26	145.18
IRR		28.3%										
Payback Period		< 4 Years										

The Payback Period is calculated by taking the actual input units sold in FY 2016-17 and 2017-18 thereafter, 5% increase in input units sold, they would serve as the minimum sold in successive years. This is possible owing to the fact that the number of consumers would be increasing each year and the expected payback period would then be reduced. The Base Case is used to show the difference made by incremental realization of the capital expenditure made in the requisite circle vis-à-vis the returns garnered in the current year.

The Net Cash Flow is determined by taking into account the benefits realized from increment in the number of consumers achieved by achieving greater supply reliability and the savings garnered from the system strengthening investments.

2.3. Need for further improvement in coming years (FY 2016-17 to FY 2019-20)

For the more further improvement in coming years proposed Investment for the MPPKVVCL for the period FY 2016-17 to FY 2019-20 is as following

Following table contains the details of the proposed investment plan for the period FY2016-17 to FY2019-20 -

Table: Investment Plan proposed by West Discom (INR Crore)

S. No.	NAME OF THE PROJECT / SCHEME / PROGRAMME	2016-17	2017-18	2018-19	2019-20	TOTAL
SUB-TRANSMISSION & DISTRIBUTION						
1	System Strengthening					
i	SSTD	208.95	106.77	211.03	267.23	793.98
2	ADB	86.80	44.47	18	0	148.90
3	Feeder Separation Scheme	54.16	4	0.00	0	58.54
4	MukyamantriSthaiKrishi pump Connection Scheme (Govt. Contribution & Loan)	184.99	281.17	278.80	57.71	802.66
5	RAPDRP	34.14	0.00	0.00	0.00	34.14
6	RGGVY	139.28	65.57	12.26	0	217.11
7	DDUGVY	7.28	200.37	561.43	165.57	934.65
8	IPDS	0.00	15.61	206.17	305	526.29
9	Transformer failure reduction Scheme	0.00	0.00	0.00	42.00	42.00
10	Smart Meters	0.00	0.00	0.00	70	70.00
11	Saubhagya Scheme	0.00	0.00	319.88	0.00	319.88
12	Installation of meter at agriculture pre-dominant DTR	0.00	0.00	0.00	3.25	3.25
	TOTAL (WZ)	715.60	718.34	1,607.20	910.26	3,951.40

Expected Benefits to be realized post execution of the capital invest plan

- The distribution licensee has planned to achieve the following benefit areas post execution of the Capital investment plan,
 - Aggregate Technical and Commercial loss reduction;
 - System strengthening to meet out enhanced load;
 - Reliability improvement;
 - Information technology application.

The table given below summarises the funding agency wise benefit areas:

Funding agency wise benefits

Benefit areas/ Funding	ST(N), TSP, SCP	New Agri Pumps- Mukyamantri Sthai Krishi Pump Scheme	ADB	Feeder bifurcation (ADB & REC)	RGGVY	RAPDRP (Part- A & B)
Aggregate Technical and Commercial loss reduction						√
System strengthening (Load growth)	√		√	√		√
Reliability improvement	√		√	√		√
Customer care						√
Infrastructure development	√	√	√	√	√	√
New service connection		√			√	
Information technology						√

2.4. System Strengthening Scheme

2.4.1. SSTD Scheme

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> To build up additional capacity of transmission of power and to provide quality power to the consumers residing in the remote areas of the company. 	<ul style="list-style-type: none"> Under system strengthening (SSTD) Scheme, GoI is providing fund for scheduled caste predominant area through GoMP out of which 70% is loan and 30% is equity.
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Providing new 33/11 KV S/s, Aug. of capacity of existing power transformer and installation Additional power transformers in the existing 33/11 KV Substations. Interconnection of 33 KV feeders to connect new/existing EHV S/s and existing distribution system Bifurcation of existing 33 KV and 11 KV feeders. Augmentation of capacity of distribution transformer and installation of additional distribution transformers at the locations where transformers are overloaded. 	<ul style="list-style-type: none"> Quality power to the benefited consumers Improvement in the voltage profile Creation of new area of employment

Table: Physical and Financial Outlay of SSTD Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	22	14	17	46	99
2	Addl PTR	19	1	43	57	120
3	Aug PTR	20	8	48	69	145
4	33 KV line	341	179	169	329	1,018
5	11 KV line	723	382	651	1,785	3,541
6	LT line	402	145	97	965	1,608

7	DTR	1,699	767	1,235	1,158	4,859
8	TC TO PC	0	0	0	0	0
9	Installation meter on Predominant Agri. DTRs	0	0	0	0	0
10	Transformer failure reduction Scheme	0	0	0	0	0
	Total Amount (Rs in lacs)	208.95	106.77	211.03	267.23	793.98

2.5. ADB

Project Description

Key Objectives	Funding Mechanism (Under ADB Loan 3066)
<ul style="list-style-type: none"> • System strengthening to meet load growth • Improvement in quality of power • Reliability of Supply 	1) Loan No.3066 100% Finance except taxes Tax to be arranged from other financial institute (Arranged from PFC)
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> • New 33/11 KV Substation • Additional Power Transformer • Capacity Augmentation of Power transformer • New 33/11 KV Bay • 33 KV line • 11 KV line • New DTR – 100kVA 	<ul style="list-style-type: none"> • System strengthening in the area of the Company to meet load growth. • Improvement in quality of power • Reliability of Supply

Table: Physical and Financial Outlay of ADB Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	12	17	7	0	36
2	Addl PTR	29	21	2	0	52
3	Aug PTR	22	3	0	0	25
4	33 KV line	366	124	0	0	489
5	11 KV line	285	133	15	0	432

6	LT line	246	94	0	0	340
7	DTR	593	233	0	0	826
8	TC TO PC			0	0	0
9	Installation meter on Predominant Agri. DTRs			0	0	0
10	Transformer failure reduction Scheme			0	0	0
	Total Amount (Rs in lacs)	86.80	44.47	17.63	0.00	148.90

2.6. Feeder Separation Scheme

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> To provide commercially viable continuous supply of electricity for domestic consumption in rural areas while ensuring sufficient supply for agricultural use to promote sustainable exploitation of ground water. Thereby to accelerate socio-economic development of rural areas. 	<ul style="list-style-type: none"> Sanctioned Cost of FS Phase-I funded by REC is INR 708.24 Cr Sanctioned Cost of FS Phase-II funded by ADB is INR 554.72 Cr
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Erection of 11 kV additional bays & renovation of existing bays with VCB and Laying of 11 kV lines on 140 Kg 8 mtr long PCC poles with (rabbit) AAA conductor Installation of 25 kVA 11/0.433 kV DTR and its metering Replacement of bare conductor of LT lines by AB cables in abadi area, damaged service lines by PVC armored cables & installation of meters in unmetered / defective / new consumers Re-location of DTR at load center Consumer Indexing and its updating in billing software 	<p>To the Consumers:</p> <ul style="list-style-type: none"> 24 hours power supply in abadi areas Improvement in living condition in rural areas on account of 24 hours access to electricity resulting in local employment generation through new rural industrial and commercial activities in villages Reduction in failure of Agriculture pumps due to improved voltage Judicious use of ground water resources through regulated supply of power for irrigation purpose.

<ul style="list-style-type: none"> Asset mapping of HT & LT network using GPS Certification of Distribution Loss from Distribution Transformer to Consumer Premises 	<ul style="list-style-type: none"> Overall increase in consumer satisfaction <p>Benefits of the project</p> <ul style="list-style-type: none"> Better quality & reliability of power supply due to System strengthening Prevention of theft/Direct hooking from LT network catering to non-agricultural load. Reduction in AT&C losses Reduction in Equipment failure. Flexibility in load management Increase in Consumer base
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Table: Physical and Financial Outlay of Feeder Separation Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	4	6	0	0	10.00
2	Addl PTR	4	4	0	0	8.00
3	Aug PTR	19	0	0	0	19.00
4	33 KV line	16	39	0	0	55.00
5	11 KV line	0	0	0	0	0.00
6	LT line	0	0	0	0	0.00
7	DTR	0	0	0	0	0.00
8	TC TO PC	0	0	0	0	0.00
9	Installation meter on Predominant Agri. DTRs					0.00
10	Transformer failure reduction Scheme					0.00
	Total Amount (Rs in lacs)	54.16	4.38	0.00	0.00	58.54

2.7. New Agricultural Pumps

2.7.1. Mukyamantri Sthai Krishi Pump Connection Scheme – Physical and Financial

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> In accordance to Sankalp of GoMP agriculture business is to make profit. To promote the farmers to take permanent connection. To establish easy procedure for new pump connections where extension of line is required. Govt is sharing a part of the cost of the estimate, to encourage the cultivators. 	<ul style="list-style-type: none"> An amount of Rs. 7000/- per HP in case of small and seemant farmers and Rs. 11,000/- per HP in case of other formers will be deposited by the farmer in advance. Balance cost of the estimate will be borne by GoMP and petitioner (40:60 ratio).
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Providing 11 KV line, distribution transformers and LT line on cable if required. Capacity of transformer should not be below 25 KVA. No supervision charges will be levied to the beneficiary. Centages in the estimate is reduced to 2.5%. 	<ul style="list-style-type: none"> The cost of the estimate will be shared by GoMP and petitioner, as such cost burden on the former will be reduced as a result more formers will motivated to take permanent connections. Quality power may be provided to the farmers.

Table: Physical and Financial Outlay of Mukyamantri Sthai Krishi Pump Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	0	0	0	0	0
2	Addl PTR	0	0	0	0	0
3	Aug PTR	0	0	0	0	0
4	33 KV line	0	0	0	0	0
5	11 KV line	1687	4053	5948	3600	15288

6	LT line	389	606	709	240	1945
7	DTR	6214	12815	16866	9600	45495
8	TC TO PC	91937	83043	59611	12000	246591
9	Installation meter on Predominant Agri. DTRs					0.00
10	Transformer failure reduction Scheme					0.00
	Total Amount (Rs in lacs)	184.99	281.17	278.80	57.71	802.66

2.8. RAPDRP

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> Ministry of Power, Govt. of India, has launched the Restructured Accelerated Power Development and Reforms Program (R-APDRP) in the XI Five year Plan. Power Finance Corporation Limited (PFCL) has been designated by GoI as the Nodal Agency for the program. The program spans from data acquisition at distribution level till monitoring of results of steps taken to provide an IT backbone and strengthening of the Electricity Distribution system across the Country under the program. The objective of the program is base lining of the AT&C loss data with the help of Meter Data Acquisition, and Billing in project areas. To Achieve the target of AT&C loss upto15% at utility level: <ul style="list-style-type: none"> - Utilities having AT&C loss above 30%: Reduction by 3% per year - Utilities having AT&C loss below 30%: Reduction by 1.5% per year To commit a time frame for introduction of measures for better accountability at all levels in the project area. 	<ul style="list-style-type: none"> PFC is the funding agency for the RAPDRP Scheme. The fund received under the scheme as loan may be converted to grant based on the successful implementation of IT project awarded to IT Implementation Agency (M/s TCS) within the stipulated period. GoI has been sanctioned 25% Loan for Part B of the schemes through Nodal Agency PFC New Delhi. The counterpart fund has been sanctioned by REC up to 75% cost of the Project.
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Project includes establishment of baseline data and IT applications like Meter Data Acquisition, Meter Reading, Billing, Collections, GIS, MI5, Energy Audit, New 	<ul style="list-style-type: none"> Increase consumer satisfaction.

<p>Connection, Disconnection, Customer Care Services, Web self service, etc. to get verified baseline AT&C losses. Part-B will include distribution strengthening projects.</p> <ul style="list-style-type: none"> Renovation, modernization and strengthening of 11 kV level Substations, Transformers/Transformer Centres, Re-conductoring of lines at 11 kV level and below Load Bifurcation, Load Balancing, HVDS (11kV), Aerial Bunched Conductors in populated areas, Strengthening at 33 kV level, Shifting of Meters at Call-bell location with replacement of service lines. 	<ul style="list-style-type: none"> Transparency in overall working of the Discoms and to make the accountability of Discoms' officer toward general public. Reduce outages & interruptions, thus to ensure regular supply to consumers Compilation of a comprehensive data base of consumers, assets, network etc., thus redressal of Consumer complaint immediately. Identification of T&D Losses at feeder level and DT level. Monitoring the 33/11 KV substation under SCADA Scheme. Reduction of AT&C losses upto 15%. Bring about Commercial viability. Improvement in efficiency and transparency due to IT Implementation, Potential Loss reduction, Effective Field Asset Tracking and Management, More effective and informed decision making related to electrical network in distribution area, Potential Improvement in Quality of Service.
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Table: Physical and Financial Outlay of RAPDRP Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss		0.00	0.00	0.00	0.00
2	Addl PTR		0.00	0.00	0.00	0.00
3	Aug PTR		0.00	0.00	0.00	0.00
4	33 KV line		0.00	0.00	0.00	0.00
5	11 KV line	5	0.00	0.00	0.00	5.00
6	LT line		0.00	0.00	0.00	0.00
7	DTR	108	0.00	0.00	0.00	108.00
8	TC TO PC		0.00	0.00	0.00	0.00
9	Installation meter on Predominant Agri. DTRs		0.00	0.00	0.00	0.00
10	Transformer failure reduction Scheme		0.00	0.00	0.00	0.00
Total Amount (Rs in lacs)		34.14	0.00	0.00	0.00	34.14

2.9. RGGVY

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> • Electrifying all villages and habitations as per new definition • Providing access to electricity to all rural households • Providing electricity Connection to Below Poverty Line (BPL) families free of charge 	<ul style="list-style-type: none"> • Under the programme 90% grant is provided by Govt. of India and 10% as loan by REC to the State Governments. • Release of funds linked to achievement of pre-determined milestones. • Electronic transfer of funds right up to the contractor level.
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> • Rural Electricity Distribution Backbone (REDB) • Decentralized Distributed Generation (DDG) and Supply • Creation of Village Electrification Infrastructure (VEI): <ul style="list-style-type: none"> - Electrification of un-electrified villages - Electrification of un-electrified habitations - Provision of distribution transformers of appropriate capacity in electrified villages / habitation(s). 	<ul style="list-style-type: none"> • Rural Household Electrification of Below Poverty Line Household • Electrification of un-electrified Below Poverty Line (BPL) households are financed with 100% capital subsidy as per norms of KutirJyotiProgramme in all rural habitations. • Households above poverty line are to pay for their connections at prescribed connection charges and no subsidy would be available for this purpose. • REDB, VEI and DDG would indirectly facilitate power to the requirement of agriculture and other activities including, irrigation pumpsets, small and medium industries, khadi and village industries, cold chains, healthcare, education and IT. • This would facilitate overall rural development, employment generation and poverty alleviation.

Table: Physical and Financial Outlay of RGGVY Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	0	0	0	0	0
2	Addl PTR	7	0	0	0	7
3	Aug PTR	2	0	0	0	2
4	33 KV line	0	0	0	0	0

5	11 KV line	1819	615	62	0	2,496
6	LT line	2570	1365	295	0	4,230
7	DTR	1834	642	301	0	2,777
8	TC TO PC	0	0	0	0	0
9	Installation meter on Predominant Agri. DTRs	0	0	0	0	0
10	Transformer failure reduction Scheme	0	0	0	0	0
	Total Amount (Rs in lacs)	139.28	65.57	12.26	0.00	217.11

2.10. DDUGVY

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> Ministry of Power, Govt. of India, has launched the Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY) in Dec-2014. Rural Electrification Corporation Ltd., New Delhi (REC) has been designated by GoI as Nodal Agency of the program. Objective of program is rural electrification in villages and its habitations and creation of adequate electrical infrastructure under the villages, strengthening and augmentation of sub-transmission and distribution infrastructure in rural areas to address critical gaps including metering of distribution transformers/feeders/consumers and separation of agriculture and non-agriculture feeders facilitating judicious rostering of supply to agriculture and non-agriculture consumers in rural areas 	<ul style="list-style-type: none"> REC is funding agency for DDUGJY Scheme on behalf of Govt. of India. Under this scheme 60% grant will be provided by the Govt. of India, 10% of the sanction amount has to be arranged by the DISCOM by their own resources and rest 30% is loan component under the scheme. In addition to that additional grant by Govt. of India for 50% of the loan component (30%) i.e. 15% may be considered on achievement of prescribed milestone. Govt. of India has sanctioned Rs.934.64 crs. Including PMA charges for MPPKVCL, Indore for implementation of DDUGJY scheme in 15 districts of DISCOM.
Key Features of Project	Expected benefits from the project

<ul style="list-style-type: none"> Project covers work relating to feeder separation, strengthening of sub-transmission and distribution system including metering of distribution transformers/ feeders/consumers and rural electrification. 	<ul style="list-style-type: none"> Improvement in supplying power in rural areas of the DISCOM, which includes villages their habitations, reliability in supplying power in both agricultural and non-agricultural consumers through feeder separation and strengthening of sub-transmission and distribution network in rural areas which further leads to potential improvement in quality of service in rural areas.
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Table: Physical and Financial Outlay of DDUGVY Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	2	6	42	14	64
2	Addl PTR	4	5	12	8	29
3	Aug PTR	4	33	43	9	89
4	33 KV line	8	108	264	89	469
5	11 KV line	230	1877	3552	356	6015
6	LT line	0	2918	5080	710	8708
7	DTR	0	1733	4066	2689	8487
8	TC TO PC	0	0	0	0	0
9	Installation meter on Predominant Agri. DTRs	0	0	0	0	0
10	Transformer failure reduction Scheme	0	0	0	0	0
Total Amount (Rs in lacs)		7.28	200.37	561.43	165.57	934.65

2.11. IPDS

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> The Scheme was launched by Ministry of Power, GoI with the objectives of strengthening of sub transmission and distribution network in urban areas, metering of distribution transformers/feeders/consumers in urban areas and IT enablement of distribution sector 	<ul style="list-style-type: none"> Sanctioned Cost of IPDS project is INR 523.67Cr
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Scheme will help in reduction in AT&C losses Establishment of IT enabled energy accounting/auditing system Improvement in billed energy based on metered consumption and improvement in collection efficiency 	<ul style="list-style-type: none"> IPDS is being implemented in 111 statutory towns of 15 circles under the jurisdiction of MPPKVCL-Indore.

Table: Physical and Financial Outlay of IPDS Scheme

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss	0	2	0	0	2
2	Addl PTR	0	0	0	0	0
3	Aug PTR	0	0	0	0	0
4	33 KV line	0	0	12	0	12
5	11 KV line	0	18	356	269	643
6	LT line	0	41	1394	1423	2858
7	DTR	0	60	744	352	1156
8	TC TO PC	0	0	0	0	0
9	Installation meter on Predominant Agri. DTRs	0	0	0	0	0
10	Transformer failure reduction Scheme	0	0	0	0	0
Total Amount (Rs in lacs)		0.00	15.61	206.17	304.51	526.29

2.12. Transformer Failure Reduction Scheme – Physical and Financial

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> Reduction in failure of DTR Revenue Saving Quality power supply to consumers Reliability of Supply 	<ul style="list-style-type: none"> Under transformer failure reduction scheme, GoMP provide funds as equity
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Earthing of DTRs wherever required Replacement of D.O Sets Replacement of lightning arrestors Replacement of Main and Feeder Cable of DTR Replacement of LT and HT Bi-metallic clamps Replacement of robust fuse unit Oil Topping Maintenance of LT line 	<ul style="list-style-type: none"> Quality and Reliable power supply. Reduction in transformers failure. Saving of Expenditures. Reduction in Consumer Complaints and increase in satisfaction of consumer.

Table: Physical and Financial Outlay of Transformer Failure Reduction Scheme

Transformer failure reduction Scheme						
S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss					0.00
2	Addl PTR					0.00
3	Aug PTR					0.00

4	33 KV line						0.00
5	11 KV line						0.00
6	LT line						0.00
7	DTR						0.00
8	TC TO PC						0.00
9	Installation meter on Predominant Agri. DTRs						0.00
10	Transformer failure reduction Scheme				15000		15,000
	Total Amount (Rs in lacs)	0.00	0.00	0.00	42.00		42.00

2.13. Smart Metering

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> As per provisions of National Tariff Policy, 2016, smart meters are to be provided on all the consumers with Monthly Consumption of 500 units and above latest by 31.12.2017 and for the consumer with monthly consumption of 200 units and above are to be provided with Smart Meters latest by 31.12.19. 	<ul style="list-style-type: none"> Energy department has conveyed Budget Allocation vide letter no F 05-05/2016/Terah dated 06.04.2016 & accordingly, Rs.20.00 Crs has been allocated for the project of Smart Metering. Out of Rs. 20.00 Crs budget Rs. 15.00 Crs will be used for installation of smart meters having consumers having their consumption 200kwh or more and Rs. 5.00 Crs will be used for Head End System (AMI).
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> In West Discom, there are 96174 No. consumers with average monthly consumption of more than 500 units. Out of these 96174 consumers, AMR compatible meters with GSM/GPRS compatible modems are already installed on 36816 LT consumers and balance 59358 consumers will have to be provided with SMART Meters by December 2017. 	<ul style="list-style-type: none"> Installing smart meters in the premises of consumers Promoting the concept of prosumers where the consumers can sell the electricity (produced from self-generation) back Promoting Automatic Meter Infrastructure (remote metering data recording, ToD/ToU metering, prepaid functionality, net metering/billing, alarm event detection, remote connection/disconnection)

- Further, there are 312605 No. consumers with average monthly consumption between 200-500 units and out of these 312605 consumers, AMR compatible meters along with GSM/GPRS compatible modems have already been installed in 6618 consumers and balance 305987 consumers will have to be provided with Smart Meters by the end of December 2019.

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Proposal for installation of Smart Meters

- The smart meters based on Radio Frequency (RF) mesh in license free band / Communication can be installed in major cities like Indore & Ujjain covering high consumption / high loss area (High Loss Feeder) or new upcoming Townships. All the consumers irrespective of consumption in the selected Zone or Feeder are proposed to be covered in deployment of Smart Meters.
- In the first stage, 7-8 feeders can be selected from Indore City area & 4-5 feeders can be selected from Ujjain City.
- Selection of feeders will be based on criteria of average specific consumption of consumers on particular feeder, commercial area, gated colonies, Residential/Commercial Complexes, Malls, Market area etc.
- In Indore City, feeders from residential area like Vijay Nagar Zone of North City Division & another area like Rajwada area where commercial consumers are located. In Ujjain City, commercial area can be selected on basis average specific consumption.
- For the balance LT consumers i.e. consumers having monthly consumption more than 500 units and consumers having monthly consumption between 200-500 Units located in other small towns of the Company, it is proposed to install GSM/GPRS/2G/3G/4G compatible modems on the existing AMR compatible LT 3 phase 10-40 Amp DLMS compliant meters and their reading be taken through AMR at Central Station.
- It is also proposed to consider AMR compatible Meters with Modem as already installed on 43400 No. LT High Value consumers having connected load more than 10 KW may be taken as substitute in place of Smart Meters.

Table: Physical and Financial Outlay of Smart Metering

Smart Meters						
S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss					0.00
2	Addl PTR					0.00
3	Aug PTR					0.00
4	33 KV line					0.00
5	11 KV line					0.00
6	LT line					0.00
7	DTR					0.00
8	TC TO PC					0.00
9	Installation meter on Predominant Agri. DTRs					0.00
10	Transformer failure reduction Scheme					0.00
Total Amount (Rs in lacs)		0.00	0.00	0.00	70.00	70.00

2.14. Saubhagya

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> Pradhan Mantri Sahaj Bijli Har Ghar Yojana – ‘Saubhagya’ a new scheme was launched by the Hon’ble Prime Minister on 25th September, 2017. Under Saubhagya free electricity connections to all households (both APL and poor families) in rural areas and poor families in urban areas will be provided. There are around 4 Crore un-electrified households in the country and they are targeted for providing electricity connections by December 2018. 	<ul style="list-style-type: none"> Projects under the scheme would be sanctioned based on the Detailed Project Reports (DPRs) to be submitted by the States. There is no upfront allocation of fund under the scheme.
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Poor households would be provided electricity connections free of cost. Other households would also be provided electricity connections under the scheme on payment of Rs.500 only which shall be recovered by the DISCOMs/Power Departments in ten (10) instalments along with electricity bills. There is no provision in the scheme to provide free power to any category of consumers. The cost of electricity consumption shall have to be paid by the respective consumers as per prevailing tariff of the DISCOM 	<ul style="list-style-type: none"> Soubhagya has been launched to plug such gaps and comprehensively address the issues of entry barrier, last mile connectivity and release of electricity connections to all un-electrified households in rural and urban areas.

Table: Physical and Financial Outlay of Sauhagya

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss			0.00		0.00
2	Addl PTR			0.00		0.00
3	Aug PTR			0.00		0.00
4	33 KV line			0.00		0.00
5	11 KV line			1832		1,832.14
6	LT line			3652		3,652.23
7	DTR			1070		1070.00
8	TC TO PC					0.00
9	Installation meter on Predominant Agri. DTRs					0.00

10	Transformer failure reduction Scheme					0.00
	Total Amount (Rs in lacs)	0.00	0.00	319.88	0.00	319.88

2.15. Installation of meter at agriculture pre- dominant DTR

Project Details

Key Objectives	Funding Mechanism
<ul style="list-style-type: none"> As per Point no. 7.1(C) Tariff order, MPERC has given directive to submit the time line for 100 % meterization of predominant agriculture DTRs for Energy accounting. In compliance of MPERC, West Discom has planned to install on meter pre dominant agriculture DTRs and others unmetered DTRs also as per fund availability. 	<ul style="list-style-type: none"> In the annual work plan there is a provision Rs.3.25 Crs for meterization of predominant agriculture DTRs for Energy accounting.
Key Features of Project	Expected benefits from the project
<ul style="list-style-type: none"> Under the West Discom meeting of Standing committee was held on 20/03/2019 to take decision on various matters, in this meeting it was decided that installation of 100% DTR Meter on Agriculture pre dominant DTR will be Highly expensive and arrangement of amount for 100% DTR meterization of agriculture pre-dominant DTR will not be easy. So the Standing committee recommended a plan for sampling of DTR on Agriculture feeders. Further, as per recommendation West Discom has identified 42 Nos Agricultures feeders having connected 1300 Nos DTR which are catering agriculture load. Therefore the West Discom has prepared a plan for meterization of 1300 Nos of Agriculture DTR of 42 Feeders. For installation of 1300 No. of Agriculture DTR approx. cost will be around Rs. 3.25 Crore. 	<ul style="list-style-type: none"> Proper Energy Accounting. Reduce the AT&C Loss. Increase the Revenue of the company.

Table: Physical and Financial Outlay of meter at agriculture pre- dominant DTR

S. No.	Particulars	2016-17 (Actual)	2017-18 (Actual)	2018-19 (Actual)	2019-20 (Projected)	TOTAL
1	33/11 KV ss					0.00
2	Addl PTR					0.00

3	Aug PTR					0.00
4	33 KV line					0.00
5	11 KV line					0.00
6	LT line					0.00
7	DTR					0.00
8	TC TO PC					0.00
9	Installation meter on Predominant Agri. DTRs				1300	1300
10	Transformer failure reduction Scheme					0.00
Total Amount (Rs in lacs)		0.00	0.00	0.00	3.25	3.25

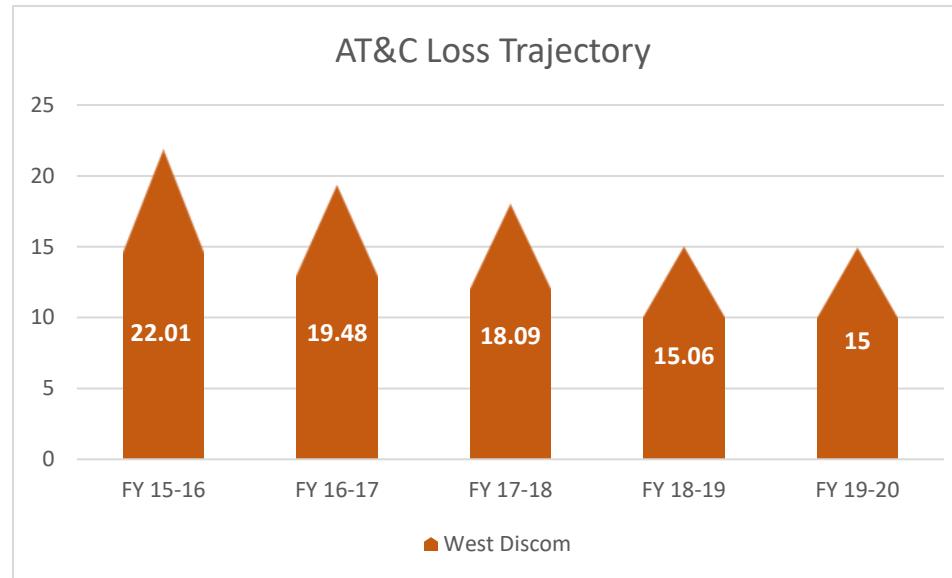
3. Conclusion

It is of utmost importance for a power distribution utility to plan its capital expenditure to reduce its technical losses to keep up with the industry standards. The growth is not only loss but also the asset creation. Following activities are carried out in the Capital investment schemes:

- Creation of new Sub-station
- Augmentation of Sub-station
- Shifting/Augmentation and addition of transformers (DTRs/PTRs)
- Installation of new HT/LT line
- Bifurcation of feeders

S. No.	NAME OF THE PROJECT / SCHEME / PROGRAMME	2016-17	2017-18	2018-19	2019-20	TOTAL
1	33/11 KV ss	40	45	66	60	211
2	Addl PTR	63	31	57	65	216
3	Aug PTR	67	44	91	78	280
4	33 KV line	731	450	451	418	2,050
5	11 KV line	4,749	7,079	12,416	6,011	30,254
6	LT line	3,607	5,170	8,100	3,337	20,214
7	DTR	10,448	16,250	24,282	13,798	64,778
8	TC TO PC	91,937	83,043	59,611	12,000	246,591
9	Installation meter on Predominant Agri. DTRs	0	0	0	1,300	1,300
10	Transformer failure reduction Scheme	0	0	0	15,000	15,000
	TOTAL (WZ)	715.60	718.34	1,607.20	910.26	3,951.40

The energy saving by implementation of capital investment schemes has been transferred to the monetary saving. Due to Capital Investment schemes, theft can be prevented which directly reduces the input energy of the Discoms, due to which direct monetary benefits can be assumed. The West Discom envisages to achieve the below described AT&C Loss trajectory through investment in the various schemes mentioned above.



3.1. 100% Meterisation target

100% Meterisation is also main moto of this Capex plan. In various scheme such as RAPDRP, DDUGJY, IPDS scope of Meterisation part is also carried out. Also irrigations connections, distribution transformers replacement, defective meters replacement activities are also part of the schemes that are described in this investment plan.

3.2. 24x7 supply of electricity to all

24x7 Power for All (24x7 PFA) is a Joint Initiative of Government of India (GoI) and State Governments with the objective to provide 24x7 power for all households, industry, commercial businesses, public needs, any other electricity consuming entity and adequate power to agriculture sector by FY 19. This roadmap document aims to meet the above objectives for the State of Madhya Pradesh.

Madhya Pradesh is one of the largest States of India. From 544 kWh in FY 11 to 745 kWh in FY 16, the per capita consumption of electricity in the State has been growing at a CAGR of 7.95%. However, it remains well below the national average of 1023 kWh per capita in FY 16. The major reason for low per capita consumption is huge tribal region in the State. There are 3 Discoms in the Madhya Pradesh i.e. East Discom (MPPoKVVCL), Central Discom (MPMKVVCL), West Discom (MPPaKVVCL). The per capita consumption of West Discom consumers has been found to be 796 kWh in FY 16, observed being higher than state per-capita consumption.

West Discom is already supplying 24 hours power to all its consumers except agricultural which are given adequate supply of 10 hours. These supply hours shall be maintained by the West Discom for future years as well.

In order to achieve the objective of 24 x 7 power for all, West Discom would need to fully meet the increase in connected load demand from 8899.8 MW (Total of HT and LT load for FY 16) to 10641.2 MW in FY 19 with corresponding increase in energy requirement from 16,908.13 MU in FY 16 to 24,190.26 MU in FY 19.

The demand for future has been worked out by estimating the urban and rural household consumption after taking into account the growth in number of electrified households on one hand and the growth in average consumption per day per household on the other. Individual category-wise growth rate equal to the past years' CAGR has been considered for all non-domestic consumer categories.

With the connected load demand projected to rise to 10641.2 MW and energy requirement projected at 24,190.26 MU by FY 19, commensurate capacity addition in the inter-state and intra-state transmission systems have been planned.

PGCIL has planned to increase the transformation capacity at 765/400 kV voltage level from 8,000 MVA to 9,200 MVA and at 400/220 kV voltage level from 1878 MVA to 2987 MVA. MPPTCL is planning to double its transformation capacity at 400/220 kV level.

Keeping in view that the capacity at 220 kV level and below is used entirely to meet the demand within the Discom operated region, which is projected to grow from the existing level of 8899.8 MW to 10641.2 MW projected in FY 19, an increase of 16.3%.The existing distribution network with planned additions is considered adequate to meet the projected connected load conditions. But its implementation depends heavily on the timely availability of funding support to the State. The State will take necessary steps to complete the planned works within their respective scheduled time frames.

West Discom is showing a net loss of Rs 1238.87 Crores during FY 16. With added investment in the capital assets, the West Discom would be able to achieve profit by reducing Technical and Distribution Losses and achieve operational profitability.

3.3. PRAYER

In view of the aforesaid facts and circumstances, the Applicants request that the Hon'ble Commission may be pleased to:

- (a) Invoke the power conferred to it under section 181 of electricity Act-2003 to be read with MPERC Regulation 2004 and to admit the petition seeking approval of investment plan for FY 2016-17 to FY 2019-20.
- (b) Take the accompanying petition of the petitioner on record and treat it as complete;
- (c) The MPPaKVCL, Indore is undertaking various projects in next four years for system strengthening, reduction of losses, of the network which mainly includes, creation of new 33/11 kV S/s, Bifurcation of overloaded 33 kV feeders, Addl/Aug of PTR, installation of DTR, conversion of LT line with AB Cable, DTR metering and replacement of service lines etc. with a total financial commitment of **Rs. 3951.40 Cr.** The projects will be funded through GOI/GoMP and other sources. In view of above objective MPPaKVCL, Indore hereby submits the CAPEX plan of next four years for various schemes for approval of MPERC.
- (d) Pass any order as the Hon'ble Commission may deem fit and appropriate under the circumstances of the case and in the interest of justice.
- (e) Condone any inadvertent omissions/ errors/ shortcomings and permit the petitioners to add/ change/ modify/ alter portion(s) of this filing and make further submissions as may be required at a later stage; and
- (f) Pass such an order as the Hon'ble Commission deems fit and proper as per the facts and circumstances of the case.

Deponent

Date: - May, 2019

Notes: In this Petition:

- All currency figures used in this Petition, unless specifically stated otherwise, are in Rs Cr and energy figures are in Million Units (MUs) unless otherwise stated.
- For the purpose of presentation, figures given in the tables are shown as rounded off. However for calculation purpose, actual figures have been considered.

Appendix



पावर फाइनेंस कॉर्पोरेशन लिमिटेड
POWER FINANCE CORPORATION LTD.
 (A Govt. of India Undertaking)
 Speed Post/ Courier

No. 03:22:MP:MPPaKVVCL:Vol-I:20806003

Loan No.20806003

24/01/2014

To
The Managing Director,
 Madhya Pradesh Paschim Kshetra Vidyut Vitaran co. Ltd. (MPPaKVVCL)
 G.P.H. Compound, Ploground,
 Indore – 452003 (MP)

Sub: MPPaKVVCL: Loan No.20806003 – Financial Assistance of Rs.74.13 crore to
 MPPaKVVCL as Counterpart funding of ADB III Financing Facility to MP Discosms.
 Corrigendum in sanction letter.

- Ref: 1) MPPaKVVCL's request for financial assistance vide letter No.
 CMD/WZ/02/F&A/Count.part Funding/22700 Indore dated 07/11/2013.
 2) PFC sanction letter no. 03:22:MP:MPPaKVVCL:Vol-I:20806003:016792 dated
 16/01/2014.

Dear Sir,

The name of the project, for which financial assistance has been sanctioned to MPPaKVVCL may be read as follows:

"MPPaKVVCL - Financial assistance of Rs. 74.13 crore as Counterpart funding of ADB III Project for assistance in construction of Substations, laying 33 KV lines and 11 KV lines and other related works in the areas of Paschim (West) Discom."

All other Terms & Conditions of Sanction will remain same.

Thanking you,

Yours faithfully,
 for POWER FINANCE CORPORATION LTD.

(Signature)

(Mohan Lal)
 Addl. General Manager (Projects)
 & State In-charge (MP & HP)

Encl: As above

Copy for information to:

- 1) Principal Secretary Energy, GoMP, Mantralaya, Vallabh Bhawan, Bhopal – 462003 (MP)
 2) Chairman, MP Paschim Kshetra Vidyut Vitaran Co. Ltd. (MPPaKVVCL), Block no. 7, Shakti Bhawan, Rampur, Jabalpur – 482008.

पंजीकृत कार्यालय : "कुर्जानिधि", 1, वाराणसी लेन, कनोट प्लेस, नई दिल्ली - 110001 दूरभाष : 23456000 फैक्स : 011-23412545
 Regd. Office : "Urjanidhi", 1, Barakhamba Lane, Connaught Place, New Delhi-110001 Phones: 23456000 Fax: 011-23412545
 प्रैवर्साइट / Website : www.pfcindia.com

3) Chairman & Managing Director, MP Power Management Co. Ltd. (MPPMCL), Shakti Bhawan, Vidya Nagar, Rampur, Jabalpur – 482008 (MP)

4) Director (Finance), MP Paschim Kshetra Vidyut Vitaran Co. Ltd. (MPPaKVVCL), G.P.H. Compound, Ploground, Indore – 452003 (MP)

5) Joint Director (F&A), MP Paschim Kshetra Vidyut Vitaran Co. Ltd. (MPPaKVVCL), G.P.H. Compound, Ploground, Indore – 452003 (MP)

6) ED (EA & L&D), PFC

7) GM (TP), PFC

8) GM (LR), PFC

9) GM (LD), PFC

O.P.

S. S.

S. S.
 Joint Director (F & A)
 MPPKVV Co. Ltd., Indore

PCSS No.	PPR No.	Name of Agency	ADB Contract Amount				Discom Contract Amount				ADB Disbursed Amount				Amount Disbursed by Discom			ADB Undisbursed Balance				
			In US\$	In Rs.	In Rs. Cr.	In Rs. Cr. S+E	In US\$	In Rs.	In Rs. Cr.	In Rs. Cr. S+E	In Rs.	In Rs. Cr.	In Rs. Cr. S+E	In Rs. Cr.	In Rs. Cr. S+E	In Rs.	In Rs. Cr.	In Rs. Cr. S+E	In Rs.	In Rs. Cr.	In Rs. Cr. S+E	
16	PPR-41 Lot-I	M/s Bharat Electrical Contractors & Manufacture, Sangli	11,987,791.07	721143880.74	72.11	80.48	15,714,694.72	946,833,767.00	94.68	104.89	568,104,289.00	56.81	62.33	6.59	7.68	153,039,591.74	15.30	18.16				
17			1,391,393.92	83701426.20	8.37		1,694,147.49	102,074,910.00	10.21		55,169,620.00	5.52		1.09		28,531,806.20	2.85					
18	PPR-41 Lot-II	M/s Shri Ram Switchgears Pvt. Ltd., Ratlam	10,896,053.81	655468758.08	65.55	73.22	14,237,988.36	857,860,009.00	85.79	95.14	520,695,763.00	52.07	57.26	6.17	7.30	134,772,995.08	13.48	15.95				
19			1,274,841.28	76690024.40	7.67		1,552,234.15	93,524,420.00	9.35		51,922,111.00	5.19		1.13		24,767,913.40	2.48					
20	PPR-42 Lot-I	M/s Shri Ram Switchgears Pvt. Ltd., Ratlam	2,090,069.87	125731345.38	12.57	17.10	2,728,838.32	164,416,574.00	16.44	21.96	75,358,766.00	7.54	9.69	0.67	1.01	50,372,579.38	5.04	7.41				
21			752,780.08	45284635.30	4.53		916,577.59	55,225,165.00	5.52		21,525,047.00	2.15		0.34		23,759,588.30	2.38					
22	PPR-42 Lot-II	M/s Shri Ram Switchgears Pvt. Ltd., Ratlam	4,087,706.97	245902256.00	24.59	33.45	5,336,818.78	321,551,282.00	32.16	42.96	176,955,894.00	17.70	22.55	2.21	3.28	68,946,362.00	6.89	10.91				
23			1,473,090.83	88616028.96	8.86		1,793,620.85	108,068,328.00	10.81		48,494,732.00	4.85		1.07		40,121,296.96	4.01					
TOTAL			33,953,727.83	2,042,538,355.06	204.25	204.25	43,974,920.26	2,649,554,455.00	264.96	264.96	1,518,226,222.00	151.82	151.82	19.27	19.27	524,312,133.06	52.43	52.43				
Brief Details:-																						
			Amount Disbursed upto 31.03.2015			Rs. 30.80 Cr.			Amount Disbursed Upto Sep-17			Rs. 148.66 Cr.			Disbursed During FY 17-18			Rs. 36.74 Cr.				
			Amount Disbursed upto 31.03.2016			Rs. 62.01 Cr.			Amount Disbursed Upto Oct-17			Rs. 149.70 Cr.			Discom Payment FY 17-18			Rs. 6.60 Cr.				
			Amount Disbursed upto 31.03.2017			Rs. 115.08 Cr.			Amount Disbursed During Nov-17			Rs. 2.12 Cr.			ADB Disbursement CY 2017			Rs. 43.96 Cr.				
			Amount Disbursed upto April-17			Rs. 116.22 Cr.			Amount Disbursed Upto Nov-17			Rs. 151.82 Cr.			Bills under Pipe line			Rs. 0.50 Cr.				
			Amount Disbursed Upto May-17			Rs. 118.46 Cr.									Bills at CAAA							
			Amount Disbursed Upto June-17			Rs. 125.57 Cr.																
			Amount Disbursed Upto July-17			Rs. 136.72 Cr.																
			Amount Disbursed Upto August-17			Rs. 147.30 Cr.																

INDIA NON JUDICIAL

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e-Stamp

Sarvamay Jayate

Certificate No. IN-DL26431412190215M
Certificate Issued Date 25-Feb-2014 10:15 AM
Account Reference IMPACC (IV) / dl716803 / DELHI/ DL-DLH
Unique Doc. Reference SUBIN-DLLDL71680350267682783306M
Purchased by POWER FINANCE CORPORATION LTD
Description of Document Article Others
Property Description Not Applicable
Consideration Price (Rs.) 0 (Zero)
First Party POWER FINANCE CORPORATION LTD
Second Party Not Applicable
Stamp Duty Paid By POWER FINANCE CORPORATION LTD
Stamp Duty Amount(Rs.) 100 (One Hundred only)

QR Code

Please write or type below this line

M Suresh
28/2

Loan No.20806003

This Stamp paper forms an Integral Part of **MEMORANDUM OF AGREEMENT** dated **25.02.2014**, between **Madhya Pradesh Paschim Kshetra Vidut Vitaran Company Limited** as Borrower and **POWER FINANCE CORPORATION LIMITED** as Lender

SANCHYA AMY SHARMA
Joint Director (F & A)
MPPKVV Co. Ltd., Indore

Shreyas
Joint Director (F & A)
MPPKVV Co. Ltd., Indore

संयोग अधिकारी/SANCHYA AMY SHARMA
संसदीय विधि/Law
प्राप्ति/Appointed
स्थानीय अधिकारी/Local Authority
1. The authenticity of this stamp/Certificate should be verified at www.stampit.com. Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legibility is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.

shall be subject to the terms and conditions set out in the said Letter of Sanction and as hereunder written.

AND WHEREAS the Borrower by its Resolution, dated 11th day of February,, 2014 passed in its 55th meeting of its Board has approved for availing a loan of Rs. 74.13 Crore from the Corporation on the terms & conditions conveyed vide sanction letter dated 16th January, 2014.

AND WHEREAS according to one of the conditions of the Letter of Sanction , the Borrower is required to furnish a State Government Guarantee or to create a first charge, by way of hypothecation, in favour of the Corporation of all the Borrower's movable assets (save and except book debts), including movable machinery, machinery spares, tools and accessories, fuel stock, spares and materials, as well as any other existing assets of the Borrower at the project site of the Project, present and future, in favour of the Corporation for due repayment by the Borrower of the Loan and payment of interest, interest tax, as may be applicable from time to time, commitment charges and penal interest, other expenses, etc. thereon and/or any additional amount(s) that become payable under the agreement.

AND WHEREAS the Borrower has agreed to secure the repayment of Loan and payment of interest, interest tax, as may be applicable from time to time, commitment charges and penal interest, other expenses, etc. thereon and/or any additional amount(s) that become payable under the agreement by creating a first charge, by way of hypothecation, of movable assets created to /be created under **ADB III Project for assistance in Strengthening of 33/ 11 kv Distribution network in the areas of West Discom in the state of M.P.** in favour of the Corporation (save and except book debts), its including movable machinery, machinery spares, tools and accessories, fuel stock, spares and materials, as well as any other existing assets of the Borrower at the project site of the Project, present and future.

NOW IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO as follows:-

1. The Corporation will lend and advance to the Borrower a sum Rs.74.13 Crore (Rupees Seventy Four Crore and Thirteen Lakh only) (hereinafter referred to "the Loan") for the purpose of execution and implementation of **ADB III Project for assistance in Strengthening of 33/ 11 kv Distribution network in the areas of West Discom in the state of Madhya Pradesh** on the terms and conditions contained in the Corporation's letter no. 03:22:MP:MPPAKVVCL:vol-I:20806003:016792, dated 16.01.2014 & dated 24.01.2014 (hereinafter together with the amendments made thereunder from time to time be referred to as "the Letter of Sanction"). The above said Letter of Sanction shall form part of this Agreement as Annexure-'I' as if fully set forth hereunder and all the terms and conditions set out in the said letter shall be binding on the Borrower.
2. The Borrower shall repay to the Corporation the amount of the said Loan with interest, interest tax, service charges, commitment charges, penal interest, interest on penal interest etc. thereon and costs, charges, expenses, losses and other moneys, etc. in accordance with the terms and conditions set out in that behalf in the said Letter of Sanction no. 03:22: MP: MPPAKVVCL:vol-

Suresh
28/2

Suresh
Joint Director (F & A)
MPPKVV Co. Ltd., Indore

विधि अधिकारी/Suresh
संसदीय विधि/Law
प्राप्ति/Appointed
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2. The onus of checking the legibility is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.