

**EASTERN POWER DISTRIBUTION COMPANY OF A.P. LIMITED  
CORPORATE OFFICE :: VISAKHAPATNAM**

**From**

The Chief General Manager,  
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**To**

The Secretary,  
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Red Hills, Hyderabad-04.

Lr No. CGM/Plg, PPA & RA/EPDCL/VSP/RAC/D.No. 253 /2017 dt. 31 -08-2017

Sir,

Sub:- APEPDCL/VSP - Business Plan for FY 2017-18 to FY 2023-24 of APEPDCL Submitted for approval of Hon'ble Commission-Regarding

Ref:- 1) Lr.No. APERC/JD(PPP)/F.No.301B/D.No 347/2017 dt. 29.04.2017.

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The Business Plan for FY 2017-18 to FY 2023-24 of APEPDCL is here with submitted for kind consideration and arranging approval of the Hon'ble Commission please.

Yours faithfully,

  
Chief General Manager  
Planning, PPA & RA  
APEPDCL::VISAKHAPATNAM



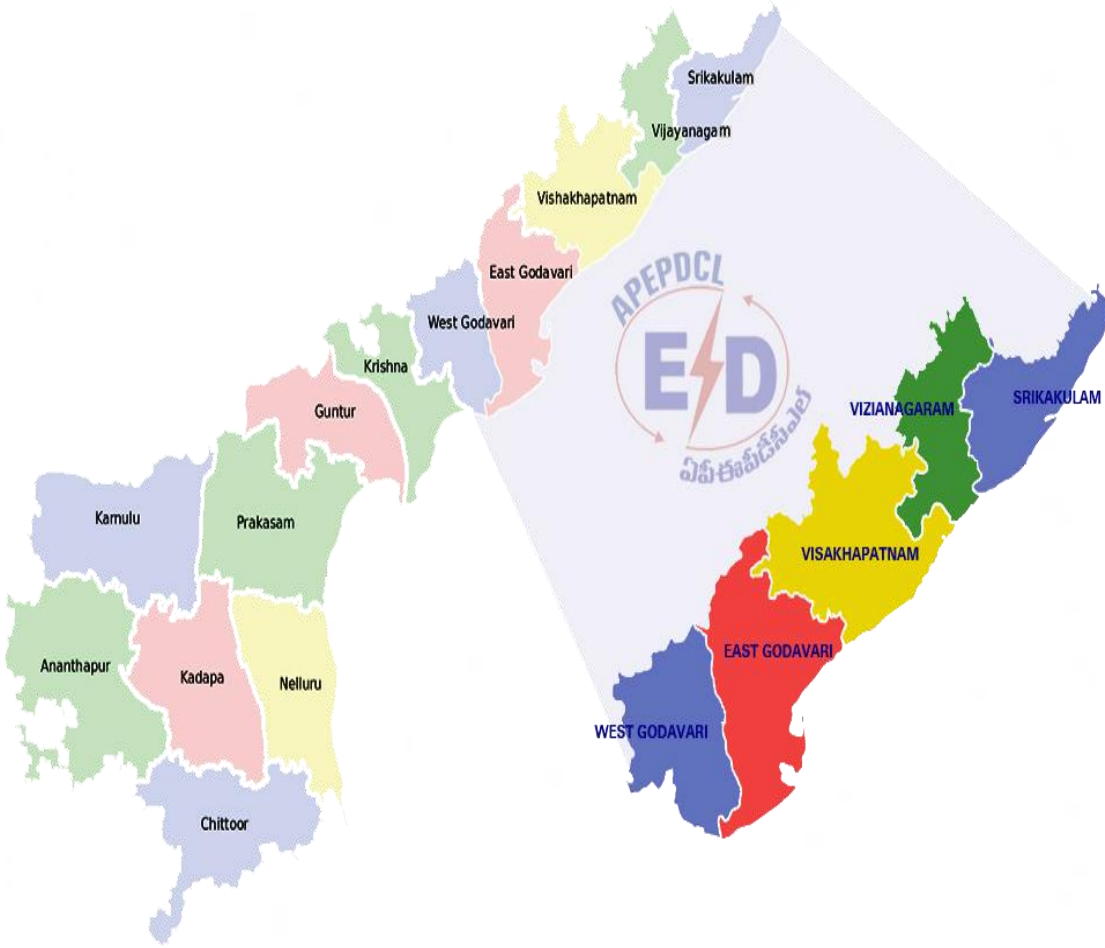
  
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# Eastern Power

Distribution Company of A.P. Ltd  
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**Business Plan**

**August, 2017**

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## **1 Business Plan for APEPDCL for the 3<sup>rd</sup> and 4<sup>th</sup> Control Period**

The Andhra Pradesh Electricity Regulatory Commission (APERC), Regulation 10 of 2013 directs the licensees to submit a Business Plan for Hon'ble Commission's approval. The Business Plan shall contain the following

- Year Wise Load Growth
- Year Wise Distribution Loss Reduction with Specific Action Plan
- Metering Plan for Metering Interface Points
- Treatment of Previous Losses
- Cost Reduction Plan
- Other important Financial analysis or parameters

The Guidelines as per Regulation 39 of Regulation 10 of 2013 state that the distribution licensee shall submit a Business Plan for such period as the Commission may direct and shall update plan annually.

The licensee herewith submits the Business Plan for FY 2017-18 to FY 2023-24 for the review and approval of the Hon'ble Commission.

The Business Plan as submitted by the Licensee consists of the following sections

- Year Wise Load Growth
- Year Wise Distribution Loss Reduction with Specific Action Plan
- Metering Plan for Metering Interface Points
- Treatment of Previous Losses
- Cost Reduction Plan
- Other important Financial analysis or parameters

## **2 Context of the Business Plan**

The business plan for the distribution licensee is based on a few set of assumptions. The assumptions cover the key items such as losses, capital expenditure, O&M Costs, etc.

The summary of these Load Forecast Plan and Power Procurement Plan is given below.

## 2.1 Load Forecast Plan Summary

### 2.1.1 Historical Sales Summary

The below table captures the historical sales for the licensee and the 5-year annual growth rate (CAGR) as presented in Discom Resource Plan.

LT Category	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	2 year CAGR	5 year CAGR
LT-I Domestic	3,142	3,207	3,435	3,709	4,420	4,607	11.46%	7.96%
LT-II Non-domestic/Commercial	670	636	647	685	831	898	14.52%	6.03%
LT-III Industrial	485	435	495	622	770	891	19.63%	12.94%
LT-IV Cottage Industries	2	3	2	2	2	2	3.60%	-1.00%
LT-V Agriculture	1,821	1,528	1,752	2,167	2,149	2,399	5.23%	5.68%
LT-VI Street Lighting & PWS	260	268	236	224	232	214	-2.22%	-3.83%
LT-VII General Purpose	36	36	37	39	47	54	17.21%	8.04%
LT-VIII Temporary Supply	1	1	1	0	2	0	-4.27%	-14.35%
<b>LT Total (Restricted)</b>	<b>6,418</b>	<b>6,115</b>	<b>6,605</b>	<b>7,448</b>	<b>8,454</b>	<b>9,066</b>	<b>10.33%</b>	<b>7.15%</b>
<b>LT Total (Unrestricted)</b>	<b>6,640</b>	<b>6,776</b>	<b>6,852</b>	<b>7,710</b>	<b>8,467</b>	<b>9,077</b>	<b>8.50%</b>	<b>6.45%</b>
HT Category								
HT-I Industry	2,973	2,683	2,688	3,244	3,916	3,866	9.18%	5.39%
HT-I (B) Ferro-Alloys	799	1,194	1,372	1,307	856	1,417	4.13%	12.15%
HT-II Others (Commercial)	426	446	496	517	644	567	4.69%	5.88%
HT-III Public Infrastructure and Tourism	0	1	14	14	14	41	74.31%	0.00%
HT - IV Agriculture	89	56	60	103	108	262	59.40%	23.95%
HT-V Railway Traction	566	565	620	628	652	634	0.49%	2.31%
HT-VI Townships and Residential Colonies	29	29	28	28	32	32	7.41%	2.44%
HT-VII Green Power	0	0	0	0	0	0	0.00%	0.00%
HT-VIII RESCOs	212	212	235	229	294	290	12.54%	6.44%
HT-VIII Temporary Supply	13	0	0	0	0	3	0.00%	-27.24%
<b>HT Total (Restricted)</b>	<b>5,107</b>	<b>5,185</b>	<b>5,514</b>	<b>6,069</b>	<b>6,516</b>	<b>7,113</b>	<b>8.25%</b>	<b>6.85%</b>
<b>HT Total (Unrestricted)</b>	<b>5,468</b>	<b>5,909</b>	<b>5,923</b>	<b>6,302</b>	<b>6,516</b>	<b>7,113</b>	<b>6.24%</b>	<b>5.40%</b>
<b>LT+HT Total (Restricted)</b>	<b>11,524</b>	<b>11,300</b>	<b>12,119</b>	<b>13,517</b>	<b>14,969</b>	<b>16,178</b>	<b>9.40%</b>	<b>7.02%</b>
<b>LT+HT Total (Unrestricted)</b>	<b>12,108</b>	<b>12,685</b>	<b>12,775</b>	<b>14,012</b>	<b>14,983</b>	<b>16,190</b>	<b>7.49%</b>	<b>5.98%</b>

## 2.1.2 Sales Forecast

### 2.1.2.1 Category wise sales projection

As per the Resource Plan submitted, the licensee has projected the category-wise growth rates for each circle for the balance 3<sup>rd</sup> Control Period and 4<sup>th</sup> Control Period.

The below table gives the circle wise growth rates considered for each consumer category

Category	Srikakulam	Vizianagaram	Visakhapatnam	Rajahmundry	Eluru
<b>LT Category</b>					
LT-I Domestic	10.74%	10.77%	11.80%	9.38%	10.87%
LT-II Non-domestic/Commercial	9.91%	10.17%	10.00%	9.59%	10.73%
LT-III Industrial	15.00%	15.00%	16.00%	15.00%	15.00%
LT-IV Cottage Industries	-6.57%	2.39%	1.75%	2.67%	0.75%
LT-V Agriculture	2.00%	2.00%	2.00%	2.00%	2.00%
LT-VI Street Lighting & PWS	-2.00%	-2.00%	-2.00%	-2.00%	-2.00%
LT-VII General Purpose	9.77%	8.90%	10.00%	6.08%	8.00%
LT-VIII Temporary Supply	10.00%	10.00%	10.00%	10.00%	10.00%
<b>HT Category at 11 KV</b>					
HT-I Industry Segregated	4.00%	4.00%	7.00%	7.00%	3.00%
Lights & Fans	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Colony consumption	5.00%	3.00%	5.00%	5.00%	4.00%
Seasonal Industries	0.00%	0.00%	0.00%	0.00%	-10.09%
HT-I (B) Ferro-Alloys	0.00%	0.00%	5.00%	0.00%	0.00%
HT-II Others (Commercial)	5.00%	4.00%	7.00%	5.00%	8.08%
HT-III Airports, Bus Stations and Railway Stations	0.00%	0.00%	10.00%	0.00%	0.00%
HT-IV(A) Govt. Lift Irrigation Schemes	0.00%	0.00%	0.00%	0.00%	3.67%
HT-IV(B) Agriculture	0.00%	0.00%	-100.00%	-29.71%	0.00%
HT-IV(C) CPWS	4.00%	5.00%	5.00%	5.00%	4.00%
HT-VI Townships and Residential Colonies	5.00%	5.00%	5.00%	5.00%	5.00%
HT-VII Green Power	0.00%	0.00%	0.00%	0.00%	0.00%
RESCOs	0.00%	10.00%	10.00%	0.00%	0.00%
HT-VIII Temporary Supply	0.00%	0.00%	5.00%	0.00%	0.00%
HT-New LI Schemes	0.00%	0.00%	0.00%	0.00%	0.00%
<b>HT Category at 33 KV</b>					
HT-I Industry Segregated	3.00%	4.00%	15.86%	14.14%	11.13%
Lights & Fans	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Colony consumption	0.00%	0.00%	20.28%	15.29%	-10.89%
Seasonal Industries	0.00%	0.00%	0.00%	-100.00%	-25.89%
HT-I (B) Ferro-Alloys	0.00%	5.00%	0.00%	0.00%	0.00%
HT-II Others (Commercial)	5.00%	7.00%	5.89%	5.00%	10.51%
HT-III Airports, Bus Stations and Railway Stations	0.00%	0.00%	15.00%	0.00%	0.00%
HT-IV(A) Govt. Lift Irrigation Schemes	0.00%	0.00%	0.00%	0.00%	0.00%

Category	Srikakulam	Vizianagaram	Visakhapatnam	Rajahmundry	Eluru
HT-IV(B) Agriculture	0.00%	0.00%	0.00%	0.00%	0.00%
HT-IV(C) CPWS	0.00%	0.00%	0.00%	0.00%	0.00%
HT-VI Townships and Residential Colonies	0.00%	0.00%	7.86%	0.00%	0.00%
HT-VII Green Power	0.00%	0.00%	0.00%	0.00%	0.00%
RESCOs	0.00%	0.00%	0.00%	0.00%	0.00%
HT-VIII Temporary Supply	0.00%	0.00%	0.00%	0.00%	0.00%
HT-New LI Schemes	0.00%	0.00%	0.00%	0.00%	0.00%
<b>HT Category at 132 KV</b>					
HT-I Industry Segregated	3.00%	4.00%	4.00%	2.72%	5.53%
Lights & Fans	0.00%	-100.00%	-100.00%	-100.00%	-100.00%
Colony consumption	0.00%	-100.00%	-9.13%	-100.00%	1.81%
Seasonal Industries	0.00%	0.00%	0.00%	0.00%	0.00%
HT-I (B) Ferro-Alloys	8.00%	6.00%	12.00%	0.00%	0.00%
HT-II Others (Commercial)	0.00%	0.00%	5.00%	5.00%	0.00%
HT-III Airports, Bus Stations and Railway Stations	0.00%	0.00%	0.00%	0.00%	0.00%
HT-IV(A) Govt. Lift Irrigation Schemes	3.00%	3.00%	3.00%	7.00%	4.00%
HT-IV(B) Agriculture	0.00%	0.00%	0.00%	0.00%	0.00%
HT-IV(C) CPWS	0.00%	0.00%	0.00%	0.00%	0.00%
HT-V Railway Traction	2.05%	1.81%	1.57%	2.30%	4.75%
HT-VI Townships and Residential Colonies	0.00%	0.00%	0.00%	0.00%	0.00%
HT-VII Green Power	0.00%	0.00%	0.00%	0.00%	0.00%
RESCOs	0.00%	0.00%	0.00%	0.00%	0.00%
HT-VIII Temporary Supply	0.00%	0.00%	0.00%	0.00%	0.00%
HT-New LI Schemes	11.50%	11.50%	11.50%	15.00%	15.00%

- The forecasts thus arrived at have been looked at as a guiding value for modification to the trend based forecasts. The growth rates adopted for all the categories is based on the circle wise CAGR obtained from FY 2011-12 to FY 2016-17.
- The growth rates are applied on unrestricted sales considering the actual sales during FY 2016-17.



- The table below summarizes the category-wise sales projection for the period FY 2017-18 to FY 2023-24.

LT Category	FY 2016-17 (Actual)	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	CAGR
LT-I Domestic	4,607	5,097	5,640	6,241	6,906	7,643	8,458	9,362	10.66%
LT-II Non-domestic/Commercial	898	988	1,088	1,197	1,318	1,450	1,596	1,757	10.06%
LT-III Industrial	891	1,025	1,179	1,357	1,562	1,797	2,068	2,379	15.07%
LT-IV Cottage Industries	2	2	2	2	2	2	2	2	2.00%
LT-V Agriculture	2,399	2,447	2,496	2,546	2,597	2,649	2,702	2,756	2.00%
LT-VI Street Lighting & PWS	214	210	206	202	198	194	190	186	-2.00%
LT-VII General Purpose	54	58	62	68	73	79	85	93	8.14%
LT-VIII Temporary Supply	0	1	1	1	1	1	1	1	10.00%
<b>LT Total (Restricted)</b>	<b>9,066</b>	<b>9,828</b>	<b>10,674</b>	<b>11,613</b>	<b>12,656</b>	<b>13,814</b>	<b>15,102</b>	<b>16,536</b>	<b>8.97%</b>
<b>LT Total (Unrestricted)</b>	<b>9,077</b>	<b>9,828</b>	<b>10,674</b>	<b>11,613</b>	<b>12,656</b>	<b>13,814</b>	<b>15,102</b>	<b>16,536</b>	<b>8.95%</b>
<b>HT Category</b>									
HT-I Industry	3,866	4,123	4,406	4,718	5,061	5,441	5,862	6,328	7.29%
HT-I (B) Ferro-Alloys	1,417	1,545	1,685	1,840	2,010	2,198	2,406	2,635	9.26%
HT-II Others (Commercial)	567	601	638	677	719	763	811	861	6.16%
HT-III Public Infrastructure and Tourism	41	45	49	53	58	63	69	76	9.10%
HT - IV Agriculture	262	469	507	516	559	568	577	587	12.24%
HT-V Railway Traction	634	649	665	680	696	713	730	748	2.38%
HT-VI Townships and Residential Colonies	32	34	36	38	41	43	46	48	5.99%
HT-VII Green Power	0	0	0	0	0	0	0	0	0.00%
HT-VIII RESCOs	290	290	300	323	359	412	483	576	10.29%
HT-VIII Temporary Supply	3	3	3	3	3	3	3	3	1.62%
<b>HT Total (Restricted)</b>	<b>7,113</b>	<b>7,759</b>	<b>8,288</b>	<b>8,847</b>	<b>9,506</b>	<b>10,204</b>	<b>10,986</b>	<b>11,863</b>	<b>7.58%</b>
<b>HT Total (Unrestricted)</b>	<b>7,113</b>	<b>7,759</b>	<b>8,288</b>	<b>8,847</b>	<b>9,506</b>	<b>10,204</b>	<b>10,986</b>	<b>11,863</b>	<b>7.58%</b>
<b>LT+HT Total (Restricted)</b>	<b>16,178</b>	<b>17,588</b>	<b>18,963</b>	<b>20,460</b>	<b>22,161</b>	<b>24,019</b>	<b>26,089</b>	<b>28,398</b>	<b>8.37%</b>
<b>LT+HT Total (Unrestricted)</b>	<b>16,190</b>	<b>17,588</b>	<b>18,963</b>	<b>20,460</b>	<b>22,161</b>	<b>24,019</b>	<b>26,089</b>	<b>28,398</b>	<b>8.36%</b>

## 2.2 Loss Trajectory Summary

The licensee has taken various steps to reduce the losses like strengthening of the network infrastructure, addition of network elements, and vigorously undertaking the Energy Audit visit to keep a close tab on the losses.

The actual losses for the period for FY 2011-12 to FY 2016-17 when compared with APERC targets is summarized below.

Voltage Level	FY 2011-12		FY 2012-13		FY 2013-14		FY 2014-15		FY 2015-16		FY 2016-17	
	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual
<b>LT</b>	5.2%	5.0%	5.1%	5.9%	5.0%	6.9%	5.0%	5.4%	5.0%	3.8%	4.7%	2.45%
<b>11 KV</b>	4.3%	5.1%	4.3%	4.6%	4.2%	4.2%	4.2%	2.1%	4.0%	2.6%	3.8%	2.38%
<b>33 KV</b>	3.5%	2.6%	3.5%	4.3%	3.4%	3.4%	3.4%	5.3%	3.4%	2.0%	3.2%	2.73%

The licensee has considered the losses for FY 2017-18 as per Retail ARR filings of FY 2017-18 which is 10% lower from APERC approved losses for FY 2016-17. Based on the historical performance and the loss reduction measures carried out in the state, the licensee has projected the loss reduction of 2% YOY for the period FY 2018-19 to FY 2023-24.

APEPDCL Consolidated	FY 2017-18*	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
<b>Annual LT Loss %</b>	4.27%	4.18%	4.10%	4.02%	3.94%	3.86%	3.78%
<b>Annual 11 kV Loss %</b>	3.42%	3.35%	3.28%	3.22%	3.15%	3.09%	3.03%
<b>Annual 33 kV Loss %</b>	2.90%	2.84%	2.79%	2.73%	2.67%	2.62%	2.57%

*\*Distribution loss in % as approved by the Honorable commission in Retail Tariff Order of FY 2017-18*

### 2.2.1 Load Forecast (MU)

The sales forecast output has been considered for projecting the load requirements for the next two control periods. The sales forecast output is adjusted for the LT losses, 11 kV losses, 33 kV losses and 132 kV losses to arrive at the final load requirement of the licensee.

The circle wise sales output from the sales projection sheet for the next two control period was taken and the sales figure were adjusted for the losses as per the loss trajectory to arrive at the load requirement for the next two control periods.

Energy Requirement (MU)							
	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
<b>APEPDCL Consolidated</b>							
<b>Annual LT Loss %</b>	4.27%	4.18%	4.10%	4.02%	3.94%	3.86%	3.78%
<b>Energy Requirement at 11KV level (MU)</b>	<b>12,338</b>	<b>13,323</b>	<b>14,423</b>	<b>15,650</b>	<b>17,020</b>	<b>18,549</b>	<b>20,258</b>
<b>Annual 11 kV Loss %</b>	3.42%	3.35%	3.28%	3.22%	3.15%	3.09%	3.03%
<b>Energy Requirement at 33 kV level (MU)</b>	<b>14,444</b>	<b>15,628</b>	<b>16,952</b>	<b>18,432</b>	<b>20,087</b>	<b>21,939</b>	<b>24,013</b>
<b>Annual 33 kV Loss %</b>	2.90%	2.84%	2.79%	2.73%	2.67%	2.62%	2.57%
<b>Energy Requirement at 132 kV level (MU)</b>	<b>18,895</b>	<b>20,348</b>	<b>21,932</b>	<b>23,729</b>	<b>25,692</b>	<b>27,878</b>	<b>30,315</b>

Losses	FY2017-18	FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23	FY2023-24
<b>Transmission losses (%)</b>	2.90%	2.87%	2.85%	2.83%	2.80%	2.77%	2.74%
<b>External losses (%)</b>	3.57%	3.50%	3.43%	3.36%	3.29%	3.23%	3.16%
<b>Total DISCOM Energy Requirement (Inclusive of 132 kV and External losses)</b>	<b>19,603</b>	<b>21,095</b>	<b>22,734</b>	<b>24,575</b>	<b>26,554</b>	<b>28,792</b>	<b>31,287</b>

## 2.2.2 Load Forecast (MW)

The licensee has aggregated the actual Demand met at the respective circles as well as at the DISCOM level on the first day of each month. Based on this, the licensee has projected the Demand for the period FY 2017-18 to FY 2023-24 assuming the same load factor.

The demand required at circle level for the period FY 2017-18 to FY 2023-24 is summarized in the table below.

DEMAND FORECAST (MW)							
Circle Name	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
<b>Circle 1: Srikakulam</b>	201	215	230	247	265	285	307
<b>Circle 2: Vizianagaram</b>	296	317	339	363	390	418	450
<b>Circle 3: Visakhapatnam</b>	909	987	1,075	1,175	1,288	1,416	1,561
<b>Circle 4: Rajahmundry</b>	654	704	760	821	889	964	1,046
<b>Circle 5: Eluru</b>	942	1,010	1,078	1,160	1,244	1,337	1,440
<b>Total DISCOM</b>	<b>2,572</b>	<b>2,770</b>	<b>2,986</b>	<b>3,231</b>	<b>3,498</b>	<b>3,795</b>	<b>4,127</b>

## 2.3 Power Procurement Plan Summary

The power procurement plan was submitted to Honourable APERC by taking into account all the available and possible generation sources and to meet out the additional power required to meet the future energy demand. The licensees submitted the power procurement plan for the remaining two years of the 3<sup>rd</sup> control period, i.e., FY 2017-18 & FY 2018-19 and the 4<sup>th</sup> control period i.e. FY 2019-20 to FY 2023-24.

### 2.3.1 Consolidated Power Procurement as per the procurement plan

The following table lists down the consolidated energy availability from various Energy sources:

State	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
<b>Energy Source</b>	<b>MU</b>	<b>MU</b>	<b>MU</b>	<b>MU</b>	<b>MU</b>	<b>MU</b>	<b>MU</b>
APGENCO Coal	30,439	32,410	32,499	42,894	42,894	42,894	43,012
APGENCO Hydel	2,579	2,579	2,586	2,579	2,579	4,860	4,924
APGPCL	862	850	852	850	850	850	852
CGS	14,255	14,660	16,017	15,974	15,974	15,974	16,017
IPPs	2,397	2,397	2,403	2,397	2,397	2,397	2,403
IPPs - Others	7,757	11,569	11,601	11,569	8,976	8,976	9,001
NCE Sources	11,474	14,310	16,641	16,622	16,622	16,622	16,650
<b>Energy Availability</b>	<b>69,763</b>	<b>78,775</b>	<b>82,599</b>	<b>92,884</b>	<b>90,291</b>	<b>92,572</b>	<b>92,859</b>
<b>Energy Requirement</b>	<b>57,490</b>	<b>61,938</b>	<b>66,818</b>	<b>72,200</b>	<b>78,030</b>	<b>84,584</b>	<b>91,854</b>
<b>Surplus/(Deficit)</b>	<b>12,272</b>	<b>16,837</b>	<b>15,781</b>	<b>20,683</b>	<b>12,261</b>	<b>7,987</b>	<b>1,005</b>

### 2.3.2 Allocation of Energy Availability

As per the final transfer scheme, the allocation percentages for each DISCOMS from all the generation sources except NCEs (as per geographical location), LVS (APEPDCL only) and Srivastha (APEPDCL only) is being done as per the final transfer scheme as follows:

S. No.	Name of the Distribution Company	Allocation Percentage
1	APEPDCL	34.27%
2	APSPDCL	65.73%

### 2.3.3 Power Procurement by APEPDCL

<b>APEPDCL</b>	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>FY 2019-20</b>	<b>FY 2020-21</b>	<b>FY 2021-22</b>	<b>FY 2022-23</b>	<b>FY 2023-24</b>
	MU	MU	MU	MU	MU	MU	MU
APGENCO Coal	10,430	11,106	11,136	14,698	14,698	14,698	14,738
APGENCO Hydel	884	884	886	884	884	1,665	1,687
APGPCL	295	291	292	291	291	291	292
CGS	4,885	5,024	5,488	5,473	5,473	5,473	5,488
IPPs	821	821	823	821	821	821	823
IPPs - Others	2,696	4,002	4,013	4,002	3,113	3,113	3,122
NCE Sources	1,378	1,752	2,732	2,727	2,727	2,727	2,735
<b>Energy Availability</b>	<b>21,389</b>	<b>23,879</b>	<b>25,371</b>	<b>28,897</b>	<b>28,008</b>	<b>28,790</b>	<b>28,887</b>
<b>Total Sales</b>	<b>17,588</b>	<b>18,963</b>	<b>20,460</b>	<b>22,161</b>	<b>24,019</b>	<b>26,089</b>	<b>28,398</b>
<b>Losses (including external losses)</b>	<b>2,015</b>	<b>2,132</b>	<b>2,274</b>	<b>2,414</b>	<b>2,536</b>	<b>2,703</b>	<b>2,888</b>
<b>Energy Requirement</b>	<b>19,603</b>	<b>21,095</b>	<b>22,734</b>	<b>24,575</b>	<b>26,554</b>	<b>28,792</b>	<b>31,287</b>
<b>Surplus/(Deficit)</b>	<b>1,786</b>	<b>2,784</b>	<b>2,637</b>	<b>4,322</b>	<b>1,454</b>	<b>(2)</b>	<b>(2,400)</b>

### 2.4 Investment Plan Summary

The licensee submits the details regarding the actual Capital expenditure spent in FY 2013-14 to FY 2016-17.

The below table provides the consolidated summary of the Capital Expenditure of APEPDCL for 3<sup>rd</sup> Control period.

Sl. No.	Item	Amount Invested (in Rs. Cr.)					
		FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
		Actuals			Projected		
1	Substations Unit Additions (Indoor)	36.42	63.04	128.04	83.65	134.53	205.39
2	Substations Unit Additions (Outdoor)	-	-	20.72	82.44	197.83	153.11
3	Power Transformers Additions	9.64	8.64	11.69	11.82	27.71	17.60
4	Feeder Additions	3.13	5.04	6.46	37.93	118.44	74.50
5	Distribution Transformer Additions	11.65	25.38	25.64	20.39	89.93	107.13
6	AT&C Loss Reduction	35.97	34.26	26.70	41.85	139.00	56.90
7	Reliability Improvement & Contingency Schemes	2.16	1.10	7.28	1.11	3.00	2.50
8	Renovation & Modernisation	-	-	3.16	30.95	65.69	74.02

Sl. No.	Item	Amount Invested (in Rs. Cr.)					
		FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
		Actuals			Projected		
9	Technology Upgradation	0.26	0.82	1.09	21.42	353.17	513.04
10	New Consumer Capex	167.67	171.68	257.96	276.70	263.38	242.92
11	Civil Infrastructure Development	50.55	68.01	92.72	68.86	107.13	111.77
12	Land Norm for SS	-	-	-	-	-	-
13	Road Cutting Norm (Cables for SS)	-	-	0.25	-	-	-
<b>Total</b>		<b>317.45</b>	<b>377.97</b>	<b>581.71</b>	<b>677.12</b>	<b>1,499.81</b>	<b>1,558.88</b>
14	<b>Approved Investments as per Wheeling Order</b>	-	<b>418.0</b>	<b>429.0</b>	<b>482.00</b>	<b>515.00</b>	<b>590.00</b>

The table below provides the projected Capital Expenditure of APEPDCL from FY 2019-20 to FY 2023-24.

Particulars	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Capital Expenditure Projected (Rs. Crore)	957	1,043	1,137	1,239	1,350

The rationale for capital expenditure projections is provided in the subsequent sections.

### 3 Metering plan for Metering Interface Points

The distribution licensee has achieved 100% metering of feeders and consumers (excluding agricultural consumers) in its licensee area. As per the MoU signed under UDAY, the licensee is required to achieve 100% DTR metering by 30<sup>th</sup> September, 2017. The licensee is taking steps to ensure that the above targets as follows:

Description	Existing DTRs as on 31 <sup>st</sup> March 2016	DTRs Metered by 31 <sup>st</sup> May 2017	Balance
Urban Area	29,388	20,438	8,950
Rural Area	133,587	64,451	69,136
<b>Total</b>	<b>162,975</b>	<b>84,889</b>	<b>78,086</b>

All new DTRs whether in Urban or Rural areas are being commissioned with metering only.

Process has been initiated for procuring 30,000 DTR Meters and the same will be fixed in Urban & Rural areas by 31<sup>st</sup> March 2018.

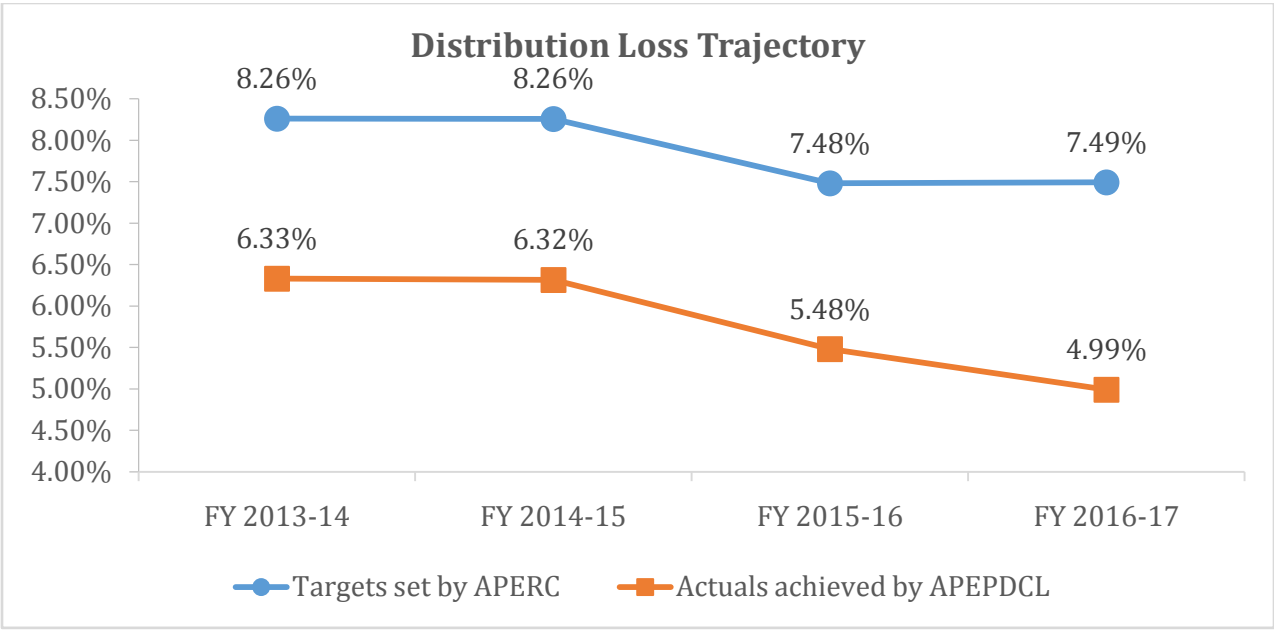
# 4 Treatment of previous losses

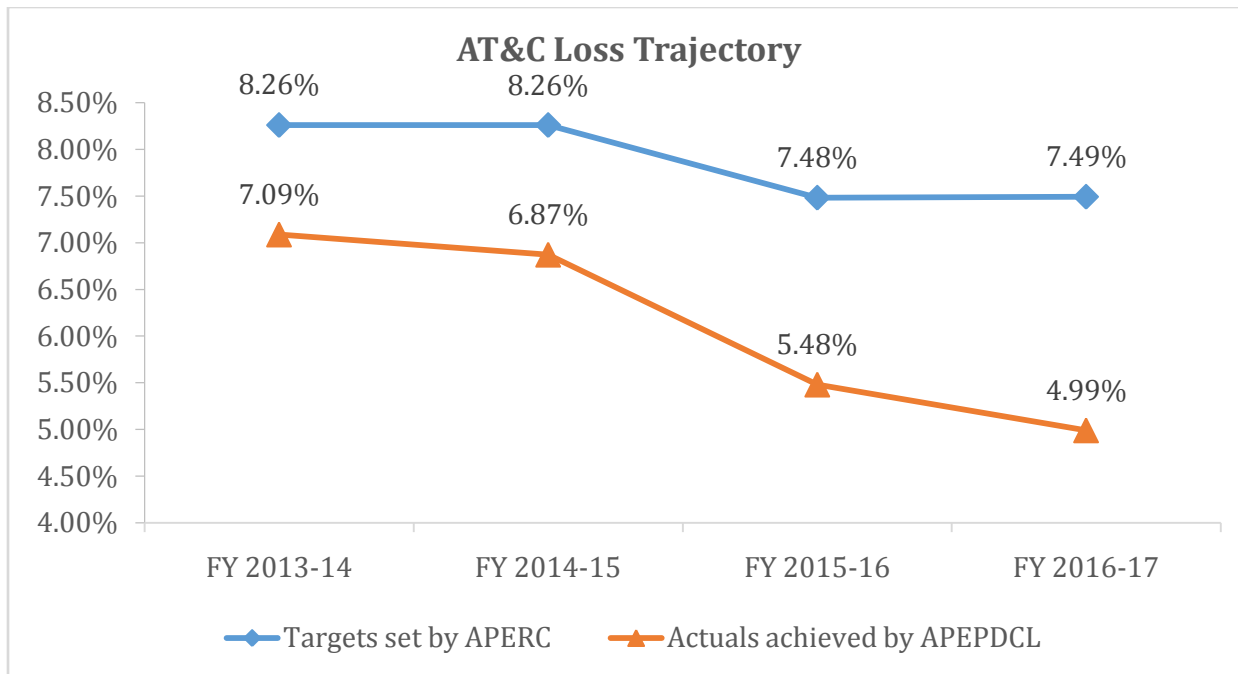
As per the prevailing regulations, i.e., Regulation 4 of 2005 and Regulation 1 of 2014, certain items such as variation in sales and sales mix, variation in agricultural sales, variation in revenue from tariff and variation in non-tariff income which are not in the control of the licensee are treated as controllable items, which leads to losses that cannot be true-up. In order to avoid further accumulation of losses, a detailed petition has been filed before the Commission to suitably amend the current regulations.

# 5 Performance of APEPDCL as Distribution Licensee over the past 3 years

## 5.1 Improved the Operational Performance by reducing the Distribution Loss of previous years

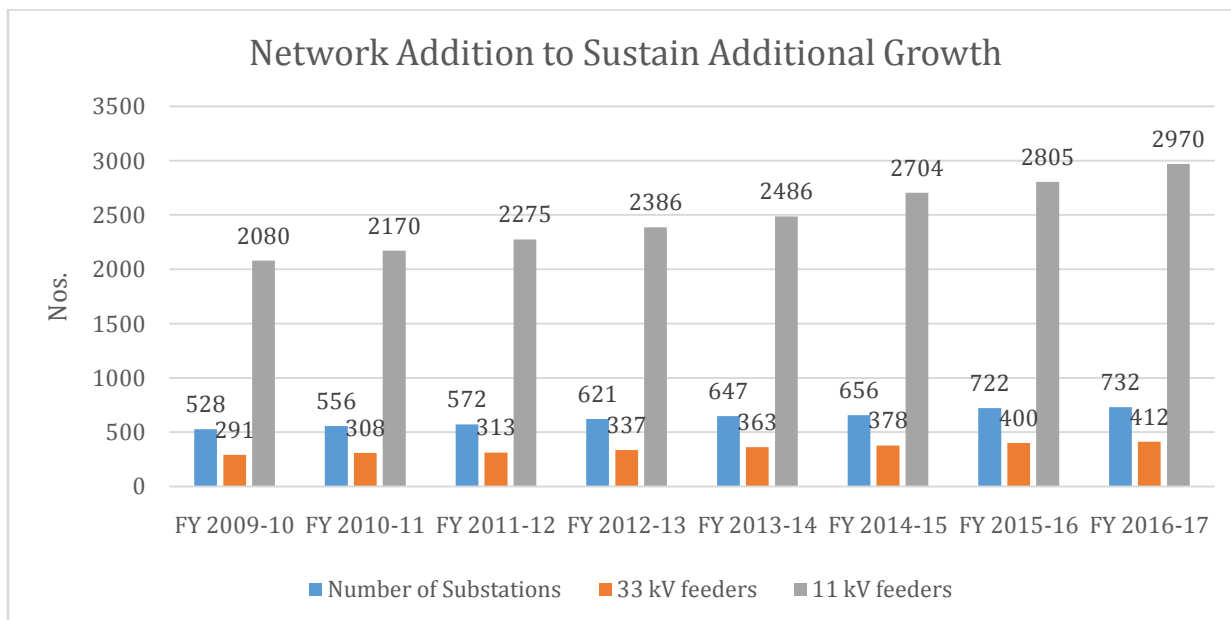
The distribution loss has been decreasing steadily over the years. The reduction in AT&C losses, increasing collection efficiency and the Distribution loss trajectory have been highlighted in the figure below.



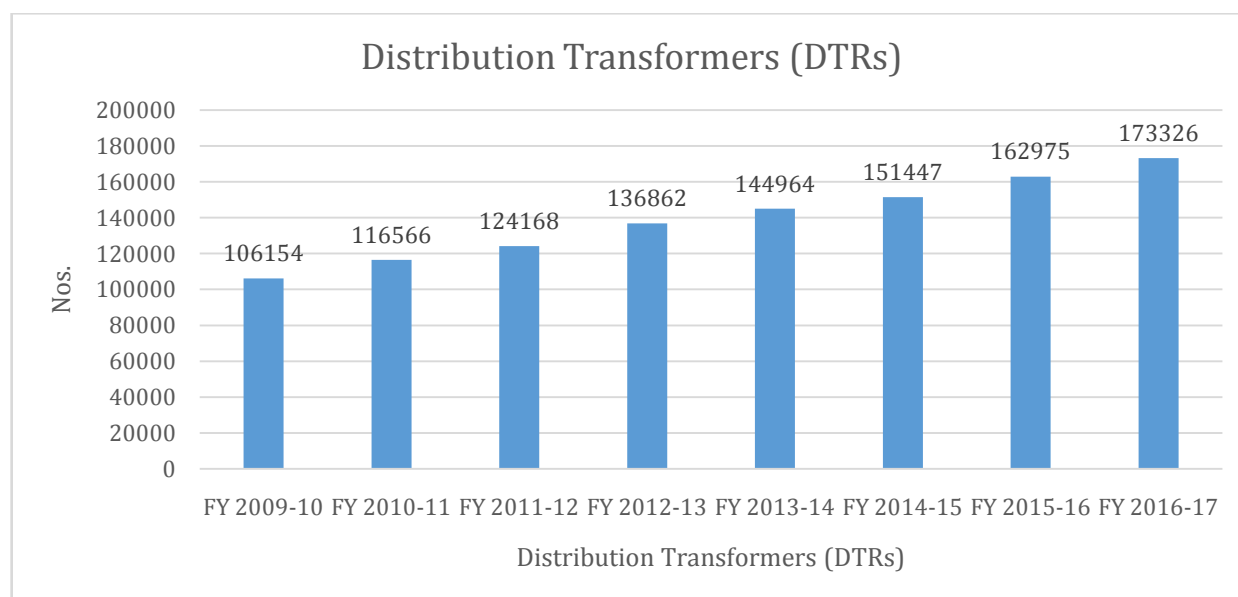
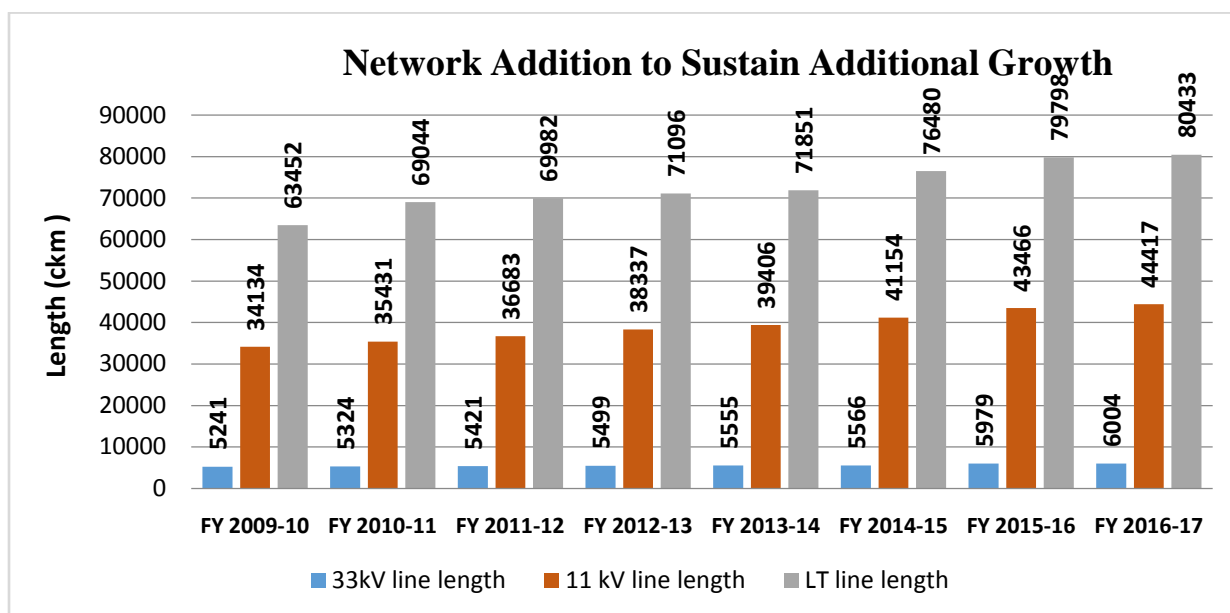


## 5.2 Network Additions to sustain Load growth

The licensee have significantly added Substations, DTR's and Lines (33kV, 11kV and LT) to meet the growing demand



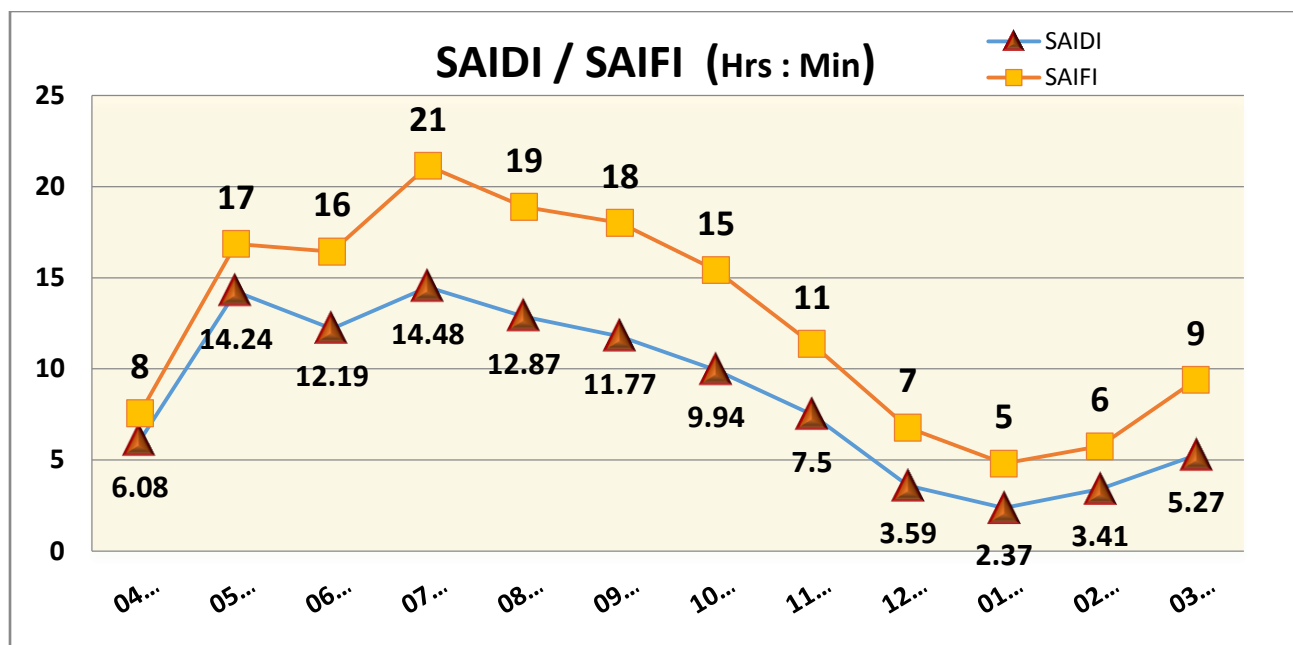




### 5.3 Increased the reliability of power supply

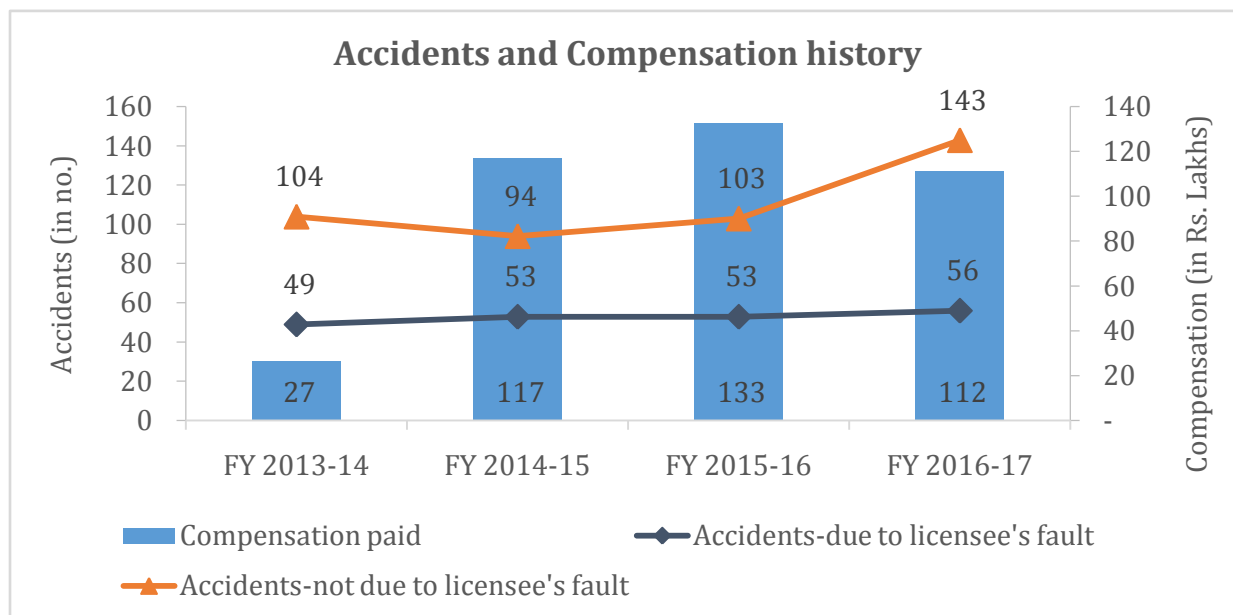
The licensee have taken many measures to improve the reliability of power supply. There has been significant reduction in the SAIDI / SAIFI indices in FY 2016-17.

The SAIDI / SAIFI trajectory have been highlighted in the figure below.



#### 5.4 Taken measures to increase the safety and reduce the accidents

The details of the accidents occurred over the last four years and the compensation paid by the distribution licensee is as below:



## 5.5 Energy Efficiency Initiatives

- APEPDCL comprises of 5 districts namely Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and West Godavari with approximately 55.23 lakhs consumers having an average demand of 1500MW per day.
- As part of Energy Conservation week APEPDCL organized the following activities to create awareness on Energy Conservation, Energy Efficiency and Renewable Energy Sources i.e. Solar etc.,
  - Rally is conducted for creating awareness
  - Painting Competitions were conducted for School going children in Sub Junior, Junior & Senior Categories on the Topic Energy Conservation & Solar Energy.
  - Technical quiz conducted for school going children to create awareness on Energy Resources and Energy Conservation.
  - Solar Expo conducted from 22nd to 24th August 2015 with Solar panel vendors and other energy efficient devices suppliers to promote Roof top solar Energy.
  - Work shop conducted for creating awareness on Energy Conservation for general public and Engineering College Students.

### 5.5.1 Energy Conservation Initiatives taken by APEPDCL

- As part of Loss Reduction and Energy Conservation Measures the following initiatives are taken
  - a. Erected BEE 5 Star rated DTRs**
    - APEPDCL is the first power utility in procurement of DTRs with BEE 5 star rating among all power utilities in India. So far 87,402 Nos BEE Star rated DTRs have been provided.
  - b. Erected Capacitor Banks**
    - 119 No's of 1MVAR and 03 No's 2MVAR Capacitor Banks totalling to 125 MVAR were erected.
    - 184Nos. 600 KVAR capacitor banks totalling 110.4 MVAR erected on 11 kV Agriculture feeders for improving power factor and consequent reduction of load current on the feeders.
  - c. Distribution of LED Bulbs to each domestic consumer**
    - Implemented DELP (DSM Based Efficient Lighting Programme) scheme in APEPDCL
    - 2 Nos. LED Bulbs are distributed to each domestic consumer at the rate of Rs.10/- per each bulb and about 75.41lakh bulbs were distributed. Expected energy savings per month is 48.92MU.

- The GoAP has also initiated distribution of more LED bulbs across the counter to the desired consumers at bulk procurement price of Rs. 70/- per each bulb.

**d. Implemented Domestic Efficient Fan Programme (DEFP) in Narasapuram**

- APEPDCL implemented the Domestic Efficient Fan Programme (DEFP) in Narasapuram revenue division in West Godavari District through M/s. EESL for distribution of 1,00,000 Nos. BEE 5 star rated fans on upfront basis @ Rs1100/- per fan and in Instalment basis @Rs.1250/- per fan with 24 instalments. The estimated energy savings per annum is 14.70 MU.
- APEPDCL filed a petition for extending the program in all areas of APEPDCL in similar method for distribution of 12 Lakh fans. The Hon'ble APERC accorded approval for implementation of the programme in APEPDCL area. The estimated energy savings per annum is 126 MU.

**e. Installed Ag DSM Project**

- APEPDCL has initiated implementation of Ag DSM based project at Rajanagaram Mandal in East Godavari District on ESCROW model with M/s EESL. Under this project 2496 Nos inefficient agricultural Pump sets are being replaced with energy efficient pumps (EEPS) and the total estimated energy savings per annum is about 21.37 MU.
- So far 973 Nos old pumpsets were replaced with energy efficient pumpsets.
- Further APEPDCL has initiated implementation of Ag DSM programme of replacement of 35,000 Nos old conventional pumpsets with most energy efficient pumpsets in 5 districts of APEPDCL. Expected Energy savings to DISCOM per annum is 113.12 MU.

Due to the above and various other activities the Energy loss of APEPDCL has got reduced to 5.48%. If it is further reduced by 1%, approx. 170MU of power can be saved annually cost of which is Rs 70/- crores and hence loss reduction activities are being continuously monitored.

**5.6 Solar Roof Top Project**

- APEPDCL is encouraging the development of Non-Renewable energy and accepting the Gross/Net Metering options from the eligible developers as per the Policy, 2015
- For promotion of Solar Roof Top Projects, APEPDCL has conducted many awareness programme with channel partners, public, Bankers, NREDCAP officials, Residential welfare associations. APEPDCL has conducted training programmes to its staff for promotion of Solar Roof Top and nominated district wise, division wise nodal officers.

- 10KW Roof top Solar Project were installed at ATC building Visakhapatnam during the year 2012 and 10KW Roof top Solar Project were installed at Govt Circuit House Visakhapatnam during the year 2015
- Recently it is approved by APEPDCL management to sanction loans to the employees of APEPDCL who wish to install Solar Rooftops up to a capacity of 3 KWp. The orders are yet to be issued.
- The Solar Rooftops are being installed on all office buildings of APEPDCL and collector offices covering all five districts of APEPDCL by adding a capacity of 1.28MW.
- During a recent meeting with MD/NREDCAP, Channel Partners of Solar Rooftop and Andhra Bank Officials, it was approved to install 1 KWp Solar Rooftop systems to the interested consumers of low income group by providing upfront subsidy and loan for the balance amount, in Visakhapatnam city in the first phase, and allowing the EMIs of the loan in the monthly CC bills of the consumer by entering MOU with Andhra Bank. Due to this innovative idea, nearly 600 Nos applications have been registered and 150 Nos applicants have already processed their applications for bank loans. Synchronization completed for 100Nos. Solar Rooftops
- So far 595 Nos., Solar Rooftop Systems with 10313 KWp capacity have been synchronized with the grid.

### **5.7 Solar Agriculture Pump sets**

As a measure to reduce power purchase cost especially in Agriculture which is the highest loss potential pocket ,5206 Nos. solar Agriculture Pump sets were installed and about 2214 No's works are under progress.

### **5.8 IT Initiatives**

APEPDCL is exploring various modes to utilize technological developments for improving operational efficiency and customer care. Some of the highlights of the areas in which the basic work is completed and is expected to Go-Live by mid of next financial year are as follows:

- In order to provide better consumer service, to improve customer satisfaction at their convenience and enhance more number of Service delivery points, APEPDCL has migrated all Services which are extended from existing Customer Service Centres to Meeseva from 15-Aug-2016. APEPDCL is providing 46 Nos. services to its customers through Meeseva centres spread across the five districts (around 2600 centers).

- Implemented EoDB (Ease of Doing Business) as per the instructions of the state Govt of AP which has enabled the consumers to get the Demand Note (Estimate charges) at the counter itself i.e at MeeSevacounters or Single desk portal of industries department.
- SAP logins have been given up to the cadre of AEs and a module for closing of work orders has been developed with a dashboard. Closing of Work orders can be monitored at different levels so that they are closed immediately after work completion for capitalization of Assets
- In view of increasing cashless transactions, APEPDCL has adopted the Bharat QR in the Bill desk payment gateway.
- As a part of cashless transactions implementation, APEPDCL has increased the payment avenues such as Paytm, PayUmoney, BHIM App, Easternpower mobile App, Andhra Bank ATM, Any Time Payment Machines etc.
- 3 Nos. services viz., Name change, category change and load change are rectified at the MeeSevacounter itself.
- Development and implementation of Estimate module in SAP for all the improvement works such that from creation of estimate >> work order generation >> Drawl of material through e-stores >> creation of assets >> work order closing is done in a single application (SAP).
- Development of DTR tracking module in SAP by duly integrating with Centralized Call Centre (CCC) 1912 and Vehicle Tracking System.
- Application was developed for applying new service connection for both LT & HT through online without any physical touch point.
- SMS are being sent to all the customers after generating the bills and payment/ receipt of the CC bills.
- APEPDCL has distributed 4880 Nos. Tabs upto field level (JLM) and developed the following Mobile apps on Android Platform and are being used.
  - 'Eastern Power' app for consumers
  - PMI for DTRs, LT Lines, 11KV Feeders, 33KV Feeders and Substations
  - D List Operation
  - AP VidyutPravah
  - App for resolving complaints received through Command Control Centre, Online and mobile app
  - Release of New services duly capturing the photo and GPS co-ordinates
- Development of the Project Monitoring System (PMS) for monitoring the status of different projects in the DISCOMs.
- Implemented E-Office and E-stores successfully.
- Generated Daily Defaulters list and provided facility for updation of the action taken and developed various reports on the same.

- Developed a module for release of services under Rural Electrification (RE) Component under DDUGJY Scheme and developed reports for monitoring the progress.
- Development of Application for monitoring the replacement of failed Distribution Transformers using Vehicle Tracking System (VTS).
- **Development of LMC dashboard** with the following features:
  - 11 KV feeder interruptions with cause-wise analysis.
  - Loads and Power factor of all 11 KV feeders.
  - DTR Loads in all R-APDRP towns.
  - SAIDI-SAIFI Analysis with graphical representation up to section level.
  - Load Curve indicating Schedules Vs Actuals
  -
- **Development of Online Energy Audit System** with the following features:
  - Circle, Division, Subdivision, Section wise Energy audit analysis.
  - 11KV feeder losses analysis
  - Financial year wise 11KV Cumulative feeder losses
  - TOP 20 high loss feeders.
  - Metered sales report with fixed target metered sales.
  - 11KV Feeder input report
  - MDAS Input status
  - Daily feeder meter readings report
  - Daily feeder Import \_Export report
- **Smart Meter pilot project:** M/s. Gram Power has been awarded LoI for implementing Smart Metering Solution along with supporting smart grid infrastructure for one 11KV Feeder i.e. 11KV Defence Quarter feeder of 33/11KV Pedawaltair substation with 1,608 Nos. services and 27 Nos. Distribution Transformers in Visakhapatnam city as a pilot project with a Project cost of Rs.44.88 lakhs.
- **Smart Energy Meter Project through AP Fiber net communication:** Installation of 1100 meters with a project cost of Rs.18.25 lakhs by M/s Tera Software Pvt Ltd to Establishing Smart Metering Network duly utilizing the communication infrastructure of AP Fiber Grid in Visakhapatnam Town.

## **5.9 Focus on Industrial Consumers**

In order to maintain growth rates in the HT category, certain action points were taken by the Licensee:

- Sustained initiatives by the GoAP to attract investments into the state
- Continue to provide separate feeders and monitor them regularly to minimize interruptions, thereby supplying quality power
- Real Time Feeder Monitoring System was launched

## **6 Performance Improvement Plan of APEPDCL for FY 2017-18 to FY 2023-24**

### **6.1 Loss Reduction Initiatives**

- In order to bring down Distribution losses to a sustainable level, Discoms plan to carry on the following key action points :
  - Continue to invest in schemes which would bring down losses, especially schemes like HVDS and System Improvement
  - Continue metering drive across the state by replacing defective meters and bringing in electronic meters for high value consumers
  - Improve energy audit by the following:
    - Segregation of industrial and town feeders
    - Recording accurate data for each circle related to transformers (33kV/11kV, DTR); distribution line lengths (33kV, 11kV, LT) and; number and capacity of substations (33/11 kV) in order to obtain a correct picture of losses
    - Monitor and record this data on a regular basis and take corrective and preventive measures wherever possible
    - Carry out sustained vigilance initiatives especially related to theft detection and employ tools such as Consumer Analysis Tool (CAT) and Monitoring and Tracking System (MATS) more effectively to enable theft detection
    - Bring about further accountability in the DISCOMs by strict monitoring of Energy Input, Billed and Collected at section level and measure employees against Key Performance Indicators (KPIs) related to the same.



## 7 Financial Parameters

The key financial parameters of APEPDCL are detailed below.

### 7.1 Capital Expenditure

Capital expenditure (CAPEX) is defined as the expenditure incurred by DISCOM on but not limited to acquire or upgrade physical assets such as property, buildings or equipment. It may be noted that the scope of expenditure is limited to physical, immovable assets only.

For financial analysis, the licensee has considered the actual capital expenditure from FY 2014-15 to FY 2016-17 in the projection of capital expenditure for the balance period and the same is presented below.

Particulars (Rs. Cr)	FY 2014-15	FY 2015-16	FY 2016-17
Capital Expenditure (Actual)	378	582	677
Peak Demand Met (MW)	2,300	2,488	2,674

The licensee has done a broad level estimation of capital expenditure for the purpose of Business Plan. Detailed capital expenditure plan with the number of substations, feeders, DTRs planned in APEPDCL will be presented in the Distribution Multi-Year tariff Order for the 4<sup>th</sup> control period.

For the period from FY 2017-18 to FY 2018-19, the licensee has estimated the expected peak demand for these years and has accordingly projected the capital expenditure needed to meet that demand.

Particulars	FY 2017-18	FY 2018-19
Expected Peak Demand (MW)	2,892	3,127
Capital Expenditure (Rs. Cr)	660	785

For the period from FY 2019-20 to FY 2023-24, the licensee has projected the capital expenditure at a growth rate of 9.0%, which is the 5-year historical growth rate of capital expenditure as approved in the Distribution tariff order for FY 2014-15 to FY 2018-19.

The projected capital expenditure for the period from FY 2019-20 to FY 2023-24 is given below.

Particulars (Rs. Cr)	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Capital Expenditure	856	933	1,017	1,109	1,208
IDC	32	35	38	42	46
Expenses Capitalized	68	74	81	88	96

## 7.2 Asset Base

Asset base is defined as the total value of capitalized assets at the end of the year. The licensee has computed the asset base at the end of year by adding investments to be capitalized against the approved investments to asset base at the beginning of the year.

The asset base of APEPDCL is presented below. From FY 17-18, it is assumed that the closing CWIP of previous year and 50% of the investment during the current year is capitalized.

Particulars (Rs. Cr)	FY 16-17 (Actual)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Opening balance of CWIP	467	368	361	428	478	521	568	619
Base Capital expenditure	482	515	590	856	933	1,017	1,109	1,208
Expenses capitalised	39	41	47	68	74	81	88	96
IDC	19	20	23	32	35	38	42	46
Additional CAPEX	195	145	195	-	-	-	-	-
<b>Total investment during the year</b>	<b>735</b>	<b>721</b>	<b>855</b>	<b>957</b>	<b>1,043</b>	<b>1,137</b>	<b>1,239</b>	<b>1,350</b>
Capitalisation	834	728	788	906	1,000	1,090	1,188	1,295
<b>Closing balance of CWIP</b>	<b>368</b>	<b>361</b>	<b>428</b>	<b>478</b>	<b>521</b>	<b>568</b>	<b>619</b>	<b>675</b>

Considering that the licensees have not done the detailed capital expenditure and capitalisation projections, asset breakup for the purpose for depreciation calculations is considered similar to the historical category-wise asset additions. Category-wise capitalized assets of APEPDCL from FY 17-18 to FY 23-24 is given in the table given below.

Capitalized Assets (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Land and Land rights	0	0	0	0	0	0	0
Buildings	27	30	34	38	41	45	49
Other civil works	8	8	10	11	12	13	14
Plant and Machinery	298	322	370	409	446	486	529
Lines and Cable Network	273	296	340	375	409	446	486
Meters & Metering Equipment	97	104	120	133	144	157	172
Vehicles	-	-	-	-	-	-	-
Furniture and Fixtures	3	3	3	3	4	4	4
Office Equipment	3	3	4	4	5	5	5
Computers	20	21	24	27	29	32	35
<b>Total</b>	<b>728</b>	<b>788</b>	<b>906</b>	<b>1,000</b>	<b>1,090</b>	<b>1,188</b>	<b>1,295</b>

### 7.3 Investment

Of the investment required, 75% is funded through debt and 25% through consumer contribution. The following shows the additional debt and consumer contribution required for investment.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Investment required	721	855	957	1,043	1,137	1,239	1,350
Debt	541	642	718	782	852	929	1,013
Consumer Contribution	180	214	239	261	284	310	338

Of the additional long term debt needed for investment in distribution business, 70% is assumed to be funded through REC loans and 30% through PFC loans.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Debt	541	642	718	782	852	929	1,013
REC	379	449	502	547	597	650	709
PFC	162	192	215	235	256	279	304

With these additional loans, the outstanding REC and PFC loans for the period from FY 17-18 to FY 23-24 is presented below.

Loans Outstanding (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
REC	1,149	1,515	1,904	2,299	2,703	3,114	3,535
PFC	456	622	797	976	1,158	1,343	1,532

### 7.4 O&M Expense

As per regulation 4 of 2005, the operation and maintenance costs include employee related costs, repair & maintenance costs and administrative & general costs, estimated for the base year and the year prior to the base year in complete detail, together with the forecast for each year of the control period based on the norms proposed by the distribution licensee including indexation and other appropriate mechanisms in terms of the principles enunciated in this regulation for O&M cost allowance.

#### 7.4.1 Employee Expense

For employee expense projection, salary is escalated by 5% year-on-year. Pay revision of 10% is considered in FY 2018-19 and FY 2022-23. Because of this pay revision, employee expenses increase sharply in these two years. Similar to salary, pension benefits and employee welfare benefits are escalated by 5%. Based on the historical data, 5% of the sum of salary, pension and employee welfare expenses is assumed to be capitalized.

The employee expense of APEPDCL from FY 2017-18 to FY 2023-24 is presented in the table below.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Salary	608	728	791	859	932	1,110	1,202
Pension and Terminal Benefits	275	318	334	350	368	425	446
Employee Welfare Expenses	133	153	160	168	177	204	214
Less: Employee Cost Capitalized	48	57	61	66	70	83	89
<b>TOTAL</b>	<b>967</b>	<b>1,142</b>	<b>1,224</b>	<b>1,312</b>	<b>1,406</b>	<b>1,656</b>	<b>1,773</b>

#### 7.4.2 R&M Expenses

R&M Expense has been calculated based on the gross fixed assets in the distribution business. As approved in the Distribution MYT Tariff Order for the period FY 2014-15 to FY 2018-19, the R&M has been projected for FY 2019-20 to FY 2023-24 as 2.05% of the gross fixed assets.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Gross Fixed Assets	6,415	7,204	8,110	9,109	10,199	11,387	12,681
R&M Expense	132	148	166	187	209	233	260

#### 7.4.3 A&G Expenses

Based on the historical trend, Administrative and General (A&G) expense has been projected by escalating the A&G expense of FY 2016-17 by 4% YoY.

Particulars (Rs. Cr)	FY 16-17 (Actual)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
A&G Expense	89	93	97	101	105	109	113	118

### 7.5 Depreciation

Depreciation is a method of reallocating the cost of a tangible asset over its useful life span of it being in motion. For each year of the control period, depreciation shall be calculated on the amount of original cost of the fixed assets included in the RRB at the beginning of each year of the control period provided that depreciation on assets funded by consumer/user contributions or through any capital subsidy/grant etc. shall not be allowed in the revenue requirement of the distribution licensee.

Estimated gross fixed assets in APEPDCL from FY 17-18 to FY 23-24 is presented in the table given below.

<b>Gross Fixed Assets (Rs. Cr)</b>	<b>FY 17-18</b>	<b>FY 18-19</b>	<b>FY 19-20</b>	<b>FY 20-21</b>	<b>FY 21-22</b>	<b>FY 22-23</b>	<b>FY 23-24</b>
Land and Land rights	83	83	83	83	83	83	83
Buildings	160	190	224	262	303	347	396
Other civil works	44	52	62	72	84	97	111
Plant and Machinery	2,544	2,867	3,237	3,646	4,092	4,577	5,107
Lines and Cable Network	2,830	3,126	3,467	3,842	4,251	4,697	5,183
Meters & Metering Equipment	606	711	831	964	1,108	1,265	1,437
Vehicles	2	2	2	2	2	2	2
Furniture and Fixtures	25	27	30	34	38	42	46
Office Equipment	23	26	30	34	39	44	49
Computers	99	120	144	171	201	233	268
<b>Total</b>	<b>6,415</b>	<b>7,204</b>	<b>8,110</b>	<b>9,109</b>	<b>10,199</b>	<b>11,387</b>	<b>12,681</b>

The licensee has calculated depreciation considering the capitalization schedules. The projected depreciation schedule from FY 2017-18 to FY 2023-24 is given in the table below.

<b>Depreciation (Rs. Cr)</b>	<b>FY 17-18</b>	<b>FY 18-19</b>	<b>FY 19-20</b>	<b>FY 20-21</b>	<b>FY 21-22</b>	<b>FY 22-23</b>	<b>FY 23-24</b>
Buildings	4	5	6	7	9	10	11
Other civil works	1	1	2	2	2	3	3
Plant and Machinery	188	212	239	270	303	340	380
Lines and Cable Network	142	157	174	193	213	236	260
Meters & Metering Equipment	71	84	98	115	132	152	173
Vehicles	-	-	-	-	-	-	-
Furniture and Fixtures	3	3	4	4	5	5	6
Office Equipment	3	3	4	4	5	5	6
Computers	11	14	17	20	24	28	32
<b>Total</b>	<b>424</b>	<b>480</b>	<b>544</b>	<b>615</b>	<b>693</b>	<b>778</b>	<b>870</b>

Accumulated Depreciation in APEPDCL from FY 17-18 to FY 23-24 is presented in the table given below.

<b>Accumulated Depreciation (Rs. Cr)</b>	<b>FY 17-18</b>	<b>FY 18-19</b>	<b>FY 19-20</b>	<b>FY 20-21</b>	<b>FY 21-22</b>	<b>FY 22-23</b>	<b>FY 23-24</b>
Land and Land rights	-	-	-	-	-	-	-
Buildings	29	34	40	48	56	66	77
Other civil works	6	7	9	11	13	16	19
Plant and Machinery	1,277	1,489	1,729	1,998	2,302	2,642	3,021
Lines and Cable Network	1,474	1,631	1,805	1,998	2,211	2,447	2,707
Meters & Metering Equipment	364	448	546	661	793	945	1,117
Vehicles	2	2	2	2	2	2	2
Furniture and Fixtures	16	19	23	27	31	36	42
Office Equipment	16	19	23	27	32	37	43
Computers	42	56	72	93	116	144	176
<b>Total</b>	<b>3,225</b>	<b>3,705</b>	<b>4,249</b>	<b>4,863</b>	<b>5,556</b>	<b>6,334</b>	<b>7,204</b>

Based on the accumulated depreciation, the net fixed assets in APEPDCL from FY 17-18 to FY 23-24 is presented in the table below.

<b>Net fixed Assets (Rs. Cr)</b>	<b>FY 17-18</b>	<b>FY 18-19</b>	<b>FY 19-20</b>	<b>FY 20-21</b>	<b>FY 21-22</b>	<b>FY 22-23</b>	<b>FY 23-24</b>
Land and Land rights	83	83	83	83	83	83	83
Buildings	131	156	184	214	246	281	319
Other civil works	38	45	53	62	71	81	92
Plant and Machinery	1,267	1,377	1,509	1,648	1,790	1,936	2,085
Lines and Cable Network	1,356	1,495	1,662	1,844	2,040	2,251	2,476
Meters & Metering Equipment	243	263	285	303	315	321	320
Vehicles	-	-	-	-	-	-	-
Furniture and Fixtures	9	8	8	7	6	5	4
Office Equipment	7	7	7	7	7	7	6
Computers	57	64	72	79	85	89	92
<b>Total</b>	<b>3,190</b>	<b>3,498</b>	<b>3,861</b>	<b>4,246</b>	<b>4,643</b>	<b>5,053</b>	<b>5,477</b>

The consolidated net fixed asset statement of APEPDCL is presented in the table below.

<b>Particulars (Rs. Cr)</b>	<b>FY 17-18</b>	<b>FY 18-19</b>	<b>FY 19-20</b>	<b>FY 20-21</b>	<b>FY 21-22</b>	<b>FY 22-23</b>	<b>FY 23-24</b>
Gross Fixed Assets	6,415	7,204	8,110	9,109	10,199	11,387	12,681
Depreciation	424	480	544	615	693	778	870
Accumulated Depreciation	3,225	3,705	4,249	4,863	5,556	6,334	7,204
<b>Net Fixed Assets</b>	<b>3,190</b>	<b>3,498</b>	<b>3,861</b>	<b>4,246</b>	<b>4,643</b>	<b>5,053</b>	<b>5,477</b>

## 7.6 Interest & Finance Charges

For the projection of interest charges, the long term loans in APEPDCL, given their current scenario, are assumed to have an interest rate of 10%. Interest cost capitalized is assumed as a proportion of interest on long term loans based on the historical values.

The interest and finance charges on the long term loans of APEPDCL are projected as follows.

<b>Particulars (Rs. Cr)</b>	<b>FY 17-18</b>	<b>FY 18-19</b>	<b>FY 19-20</b>	<b>FY 20-21</b>	<b>FY 21-22</b>	<b>FY 22-23</b>	<b>FY 23-24</b>
Interest on REC loans	94	127	162	200	238	276	316
Interest on PFC loans	36	51	67	84	101	119	137
<b>Total Interest on Long Term loan</b>	<b>130</b>	<b>178</b>	<b>230</b>	<b>284</b>	<b>339</b>	<b>395</b>	<b>452</b>

## 7.7 Regulated Rate Base

RRB is the Regulated Rate Base (asset base) approved by the Commission for each year of the Control Period on which the Distribution Licensee shall be entitled to earn a return based on the Commission approved Weighted Average Cost of Capital (WACC).

For the calculation of RRB, approved RRB of APEPDCL for FY 2016-17 is considered as the base. RRB and is calculated as per Regulation 4 of 2005 for FY 2017-18 to FY 2023-24.

$$RRB_i = RRB_{i-1} + \Delta RAB_i + WC_i$$

Where  $WC_i$  is  $1/12^{th}$  of the O&M costs

And

$$\Delta RAB_i = (\text{Investment}_i - \text{Depreciation}_i - \text{Consumer Contribution}_i)/2$$

Approved RRB of APEPDCL in FY 2016-17 is Rs. 1,055 Cr. Based on this, RRB is calculated for APEPDCL from FY 2017-18 to FY 2023-24.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Working Capital	99	116	124	134	144	167	179
Investments to be capitalized	721	855	957	1,043	1,137	1,239	1,350
Depreciation	424	480	544	615	693	778	870
Consumer Contributions	180	214	239	261	284	310	338
<b>Regulated Rate Base</b>	<b>1,213</b>	<b>1,409</b>	<b>1,621</b>	<b>1,838</b>	<b>2,062</b>	<b>2,304</b>	<b>2,555</b>

## 7.8 Return on Capital Employed

Return on Capital Employed (RoCE) for the RRB for the year 'i' shall be computed in the following manner:

$$RoCE = WACC * RRB_i$$

Where, WACC is the Weighted Average Cost of Capital as fixed by the Commission for the Control period and expressed in terms of Percentage. Approved WACC as per Multi-year Distribution order is 12.5% and the same has been considered in the calculations.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Regulated Rate Base	1,213	1,409	1,621	1,838	2,062	2,304	2,555
<b>RoCE</b>	<b>152</b>	<b>176</b>	<b>203</b>	<b>230</b>	<b>258</b>	<b>288</b>	<b>319</b>



## 7.9 Taxes on Income

Return of equity of 16% is assumed on the equity part of RRB (25% of RRB). Tax rate of 33.33% has been assumed for the calculations.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Regulated Rate Base	1,213	1,409	1,621	1,838	2,062	2,304	2,555
Taxes on Income	16	19	22	25	27	31	34

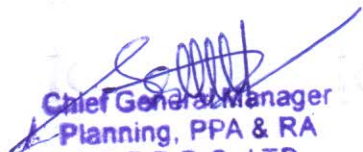
## 8 Aggregate Revenue Requirement

Aggregate revenue requirement of APEPDCL from FY 2017-18 to FY 2023-24 is presented below.

Particulars (Rs. Cr)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	6-Year CAGR
Return on Capital	152	176	203	230	258	288	319	13.2%
O&M Expenses	1,192	1,386	1,491	1,604	1,724	2,003	2,151	10.3%
Depreciation	424	480	544	615	693	778	870	12.7%
Taxes on Income	16	19	22	25	27	31	34	13.2%
Other Expenses	3	3	4	4	4	5	5	10.6%
ARR	1,786	2,065	2,262	2,476	2,706	3,104	3,380	11.2%

In the profit and loss account presented in the table below, the following assumptions are made.

- 1) For the balance 3<sup>rd</sup> control period (FY 2017-18 to FY 2018-19), approved distribution revenue, as per the Multi-year Distribution Tariff Order, is assumed as the revenue from wheeling of power. For the 4<sup>th</sup> control period (FY 2019-20 to FY 2023-24), net aggregate revenue requirement is assumed as the total revenue.
- 2) Non-tariff income is projected as a proportion of the revenue from wheeling of power based on the historical values.
- 3) Other expenses are assumed to grow at a rate of 4% YoY, similar to the assumption used in estimating Administrative and General (A&G) expenses.
- 4) The effective tax rate that is considered is 33.33%.


  
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## 9 Financial Statements of APEPDCL for FY 2017-18 to FY 2023-24


Based on the above discussions, the Profit and Loss Statement of APEPDCL for FY 2017-18 to FY 2023-24

Particulars	FY 16-17 (Provisional)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
<b>Income</b>								
Revenue from Wheeling of Power	1,382	1,565	1,772	1,954	2,139	2,337	2,682	2,920
Other Income	218	247	279	308	337	368	423	460
<b>Total Income</b>	<b>1,600</b>	<b>1,812</b>	<b>2,052</b>	<b>2,262</b>	<b>2,476</b>	<b>2,706</b>	<b>3,104</b>	<b>3,380</b>
<b>Expenditure</b>								
O&M Cost	978	1,192	1,386	1,491	1,604	1,724	2,003	2,151
Employee Benefits	772	967	1,142	1,224	1,312	1,406	1,656	1,773
R&M Charges	117	132	148	166	187	209	233	260
A&G Expenses	89	93	97	101	105	109	113	118
Depreciation	366	424	480	544	615	693	778	870
Interest & Finance Charges	144	130	178	230	284	342	400	460
Other Expenses	10	3	3	4	4	4	5	5
<b>Total Expenditure</b>	<b>1,498</b>	<b>1,748</b>	<b>2,047</b>	<b>2,268</b>	<b>2,507</b>	<b>2,763</b>	<b>3,860</b>	<b>3,487</b>
<b>Profit Before Tax (PBT)</b>	<b>102</b>	<b>64</b>	<b>4</b>	<b>(43)</b>	<b>(30)</b>	<b>(57)</b>	<b>(82)</b>	<b>(107)</b>
Less: Taxes	35	22	1	-	-	-	-	-
<b>Profit After Tax</b>	<b>67</b>	<b>42</b>	<b>3</b>	<b>(43)</b>	<b>(30)</b>	<b>(57)</b>	<b>(82)</b>	<b>(107)</b>

  
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Based on the above discussions, the Balance Sheet of APEPDCL for FY 2017-18 to FY 2023-24

	Particulars (Rs. Cr)	FY 16-17 (Provisional)	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
<b>1</b>	<b>Shareholders' funds</b>								
	(a) Share capital	121	121	121	121	121	121	121	121
	(b) Reserves and surplus	(13)	626	522	443	346	486	280	158
<b>2</b>	<b>Non-current liabilities</b>								
	(a) Long-term borrowings	1,127	1,605	2,137	2,701	3,275	3,860	4,457	5,066
	(b) Long-term provisions	372	331	464	498	533	571	673	721
<b>3</b>	<b>Current liabilities</b>								
	(a) Trade payables	227	261	294	320	347	377	425	460
	(b) Other current liabilities	3,408	2,092	2,043	2,058	2,076	1,867	2,045	2,130
	(c) Short-term provisions	388	272	321	345	369	396	466	499
	(d) Short Term Loans against Losses	-	-	-	6	30	57	82	107
	<b>TOTAL Equity &amp; Liabilities</b>	<b>5,631</b>	<b>5,308</b>	<b>5,903</b>	<b>6,491</b>	<b>7,099</b>	<b>7,735</b>	<b>8,550</b>	<b>9,262</b>
<b>B</b>	<b>ASSETS</b>								
<b>1</b>	<b>Non-current assets</b>								
	(a) Fixed assets								
	(i) Tangible assets	2,886	3,190	3,498	3,861	4,246	4,643	5,053	5,477
	(ii) Capital work-in-progress	419	361	428	478	521	568	619	675
	(b) Non-current investments	165	165	165	165	165	165	165	165
	(c) Long-term loans and advances	1,927	1,320	1,496	1,647	1,799	1,963	2,254	2,451
	(d) Other non-current assets	32	28	32	35	38	41	47	51
<b>2</b>	<b>Current assets</b>								
	(a) Inventories	168	197	229	246	265	285	331	355
	(b) Cash and Cash Equivalents	-	-	-	-	-	-	-	-
	(c) Short-term loans and advances	10	16	19	21	22	24	28	30
	(d) Other current assets	24	31	35	39	42	46	53	57
	<b>TOTAL Assets</b>	<b>5,631</b>	<b>5,308</b>	<b>5,903</b>	<b>6,491</b>	<b>7,099</b>	<b>7,735</b>	<b>8,550</b>	<b>9,262</b>

  
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