

# STATE ELECTRICITY PLAN (FY 2019 – FY 2029)



July 2018

State Electricity Plan for 4<sup>th</sup> Control Period  
(FY 2019-20 to FY 2023-24) and 5<sup>th</sup> Control  
Period (FY 2024-25 to FY 2028-29)

## Contents

1.0	Introduction .....	4
1.1	APERC Guidelines .....	4
1.2	Power for All.....	6
1.3	Andhra Pradesh Power Sector at a glance .....	7
1.4	Installed Capacity .....	7
1.5	Position of Transmission and Distribution .....	7
1.6	Power Supply Position.....	8
2.0	Load Forecast .....	8
2.0.1	Short Term load forecast from FY2018-19 to FY2023-24 .....	8
2.0.2	Electric Vehicles .....	9
2.1	Long Term Load Forecast from FY 2024-25 to FY 2028-29 .....	11
2.2	19th EPS (Electric Power Survey) by CEA .....	14
2.3	Comparison of Load Forecasts .....	14
3.0	Generation Plan .....	16
3.1	Energy Availability from various sources .....	16
3.1.1	APGENCO .....	16
3.1.2	APGENCO Capacity Additions/ Contract Expiry .....	17
3.1.2	Central Generating Stations.....	18
3.1.2	3.1.3 APGPCL & APDISCOM gasIPPs.....	19
3.1.2	3.1.4 New IPPS .....	19
3.1.5	Non-Conventional Energy Sources (NCE).....	20
3.1.2	Other Sources.....	22
3.3	Coal Requirement by APGENCO .....	24
3.4	Fuel Wise Capacity Addition FY 2019 – FY 2024 .....	25
3.5	Expected Installed Capacity by 31st March 2024 .....	26
3.6	Reserve margin and Hydro thermal mix .....	26
3.7	Sector wise capacity addition from FY 2023-24 to FY 2028-29 .....	27
3.8	Fuel wise Capacity addition FY 2024-25 to FY 2028-29 .....	28
3.9	Expected installed capacity by March 2029.....	29
3.10	Coal Requirement by APGENCO by FY 2028-29.....	29
3.11	Different Technologies adopted by APGENCO for efficient generation .....	30

3.12	Fuel choice based on Economy, energy security and environmental conditions by APGENCO.....	30
3.13	R&M programs, Plans to meet new environmental norms issued by MOEF .....	30
4.1	Criteria for Load Flow Studies.....	34
4.1.1	Standard Transformer sizes.....	34
4.1.2	Standard Conductor types.....	34
4.1.3	Operating Limits under normal conditions .....	35
4.1.4	Thermal Limits of Transmission Lines at Rated Voltage .....	35
4.1.5	Contingency criteria: .....	37
4.2	Transmission Plan for Short Term and Long Term.....	38
4.2.1	Capacity Addition in Transmission during Short Term i.e., FY 2019-24 .....	38
4.2.2	District wise Load Forecast. ....	39
4.2.3	Generation Evacuation.....	40
4.2.4	System Improvements: .....	40
5	Details of Transmission Expansion Plan FY 2018 to 2019.....	41
5.1.1	Transmission Plan Programmed for Load Growth, System Improvement and Generation expansion.41	
6	Capacity Addition in Transmission Plan Short Term (FY 2019 to 2024).....	49
6.1.1	Capacity Addition in Transmission for during Short Term (FY 2019 to 2024). (400kV, 220kV & 132kV). 49	
7	Details of Transmission Expansion Plan for Short Term i.e. FY 2019 to 2024.....	50
7.1.1	400kV, 220kV & 132kV Substations programmed during FY 2019-24.....	50
7.1.2	400kV , 220 kV and 132 kV lines Programmed during FY 2020-24: .....	57
8	Capacity Addition in Transmission Plan Long Term (FY 2025 to 2029).....	71
8.1.1	Capacity Addition in Transmission for during Long Term (FY 2025 to 2029). (400kV, 220kV & 132kV). 72	
9	Details of Transmission Expansion Plan for Long Term i.e. FY 2024 to 2029.....	72
9.1.1	400kV, 220kV & 132kV Substations programmed during FY 2014-29.....	72
9.1.2	400kV lines Programmed during FY 2024-29:.....	76
9.1.3	132kV Lines programmed during FY 2024-29:.....	81

## **1.0 Introduction**

The State Electricity Plan (SEP) for Andhra Pradesh from FY 2018-19 to FY 2023-24 considers the projections of energy demand for the said period. Various factors like historical trends, new capital city, PCPIR (Petroleum, Chemicals and Petrochemical Investment Region) corridor, Vizag Chennai Industrial Corridor (VCIC), Sri City SEZ, new airports, new sea ports etc. have been considered for projecting the energy demand for the state up to FY 2028-29. The energy demand is projected to grow at a CAGR of about 8.7% in the said period as per the resource plan submitted by DISCOMs.

The availability of energy from various sources (long term and medium term) and the addition of generation capacity of various fuel types (coal, gas, hydel, nuclear and Renewables) in order to meet the increasing demand. Addition of around 11823 MW of thermal capacity, 3,833 MW of renewable energy capacity 5136 MW of hybrid and around 960 MW of Hydel capacity are projected to be added from FY 2019-20 to FY 2028-29. Retirement of thermal stations has been considered . Accordingly, the SEP also considers the projected additions of substations and Transmission lines by APTRANSCO up to FY 2023-24. Around 178 Nos. of substations and 7,059 Ckm of Transmission lines are projected to be added from FY 2018-19 to FY 2023-24.

### **1.1 APERC Guidelines**

The Andhra Pradesh Electricity Regulatory Commission (APERC), directs that APTRANSCO has to formulate State Electricity Plan in co-ordination with Discoms and APGENCO for the promotion of generation, Transmission, distribution and supply of electricity and notify the same once in the Control Period under consideration for tariff review.

APTRANSCO, in preparing the State Electricity Plan, shall publish the draft State Electricity Plan and invite suggestions and objections thereon from licensees,

generating companies, the Commission and the public within such time as may be specified by the Commission:

Provided that APTRANSCO shall:

- (a) notify the plan after considering the comments of the Commission and all stakeholders, and obtaining the approval of the State Coordination Forum; and
- b) revise the plan incorporating therein the directions, if any, given by the State Coordination Forum while granting approval under (a) above.

The State Electricity Plan would be for a short-term framework of a period equal to Control Period under consideration for tariff review while giving a perspective for two (2) Control Periods (Control Period under consideration for tariff review and subsequent Control period) and shall include:

- Short-term and long-term demand forecast, with inputs from the last approved Load Forecast;
- Suggested areas/locations for capacity additions in generation and Transmission keeping in view the economics of generation and Transmission, losses in the system, load centre requirements, grid stability, security of supply, quality of power including voltage profile etc. and environmental considerations including rehabilitation and resettlement;
- Integration of such possible locations with Transmission system and development of state grid including type of Transmission systems and requirement of redundancies;
- Different technologies available for efficient generation, Transmission and distribution ; and
- Fuel choices based on economy, energy security and environmental considerations.

The State Electricity Plan would be used as a reference document by all

stakeholders and also assist CEA in planning the National Electricity Plan or any other Plan requiring inputs from the State.

## **1.2 Power for All**

Andhra Pradesh is one of the state in the country selected for implementation of “Power for All” - flagship program of Govt. of India.

The objective of the above program is to supply 24x7 quality, reliable and affordable power supply to all domestic, commercial and industrial consumers within a fixed timeframe. This program covers the entire gamut of power sector, including generation, Transmission, distribution, consumer initiatives, renewable energy, energy efficiency measures, financial health of the utilities and support required from Govt. of India to achieve the objectives of the program.

The program would be implemented jointly by Govt. of India & Govt. of Andhra Pradesh as partners. The various ministries of Central Govt. which would be involved in this program are Ministry of Power, Ministry of Coal, Ministry of Petroleum & Natural Gas, Ministry of New & Renewable Energy, Ministry of Environment & Forests and Ministry of Railways.

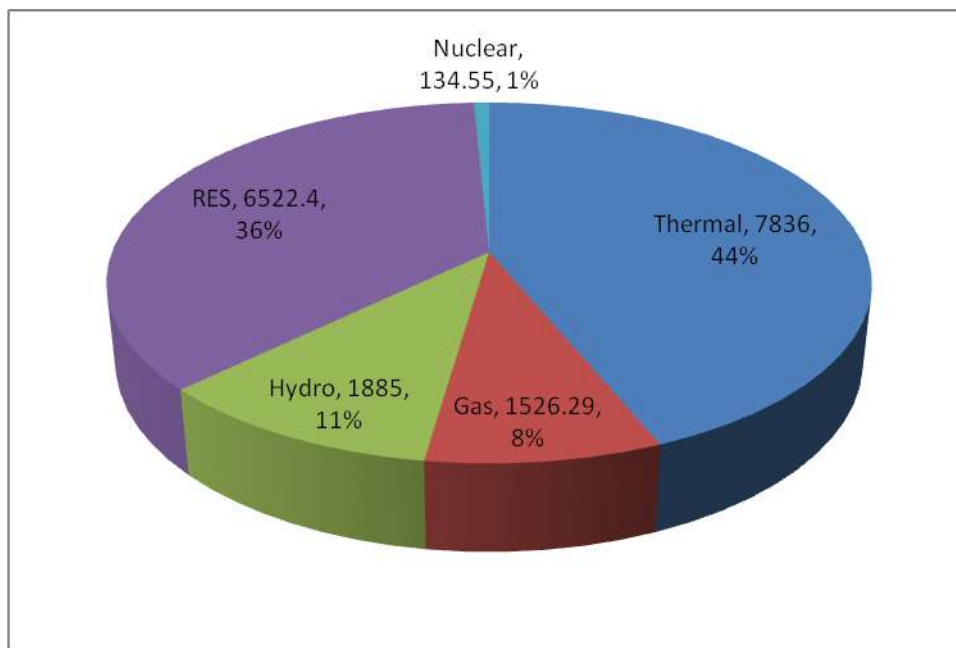
CEA would be functioning as the nodal authority for implementation & monitoring of the program. The Central PSUs namely NTPC, CIL, MCL, WCL, SCCL, PFC, REC, NHPC, NPCIL, PGCIL, BHEL, EESL, BEE, SECI, ONGC, GAIL, NVVNL along-with the State PSUs APGENCO, APTRANSCO, APDISCOMS, NREDCAP and SECM would be partners in the implementation of the program.

### 1.3 Andhra Pradesh Power Sector at a glance

The total installed capacity of Andhra Pradesh is 17,905 MW as per power allocation after state bifurcation as on 31-03-2018. The total number of consumers in the state is 178.11 lakhs which includes 143.38 lakhs of domestic, 13.49 lakhs of commercial, 1.55 lakhs of industrial, 17.20 lakhs of agricultural categories as on 31.3.2018. The total energy consumption (at utility periphery) in Andhra Pradesh during FY 2017-18 was 58,793 MU and the peak demand was 8,983 MW.

### 1.4 Installed Capacity

The present installed capacity as on 31-03-2018 in the state is 17,905 MW , comprising 5,010 MW of APGenco thermal, 1,798 MW of APGenco hydel, 251 MW of APGPCL & APDiscom Gas, 2,330 MW of CGS Share, 1905 MW of IPP's & others and 6,522 MW of NCE's.



### 1.5 Position of Transmission and Distribution

The Transmission infrastructure as on 31-03-2018 consists of 11 Nos. of 400 kV substations, 91 Nos. of 220 kV substations, 206 Nos. of 132 kV substations and 26,315 Ckm of EHT lines. The Transmission losses during FY 2017-18 was 3.17%.

There are 2,898 Nos. of 33/11 kV substations, 834877 nos Distribution Transformers and 25,827 ckm of 33 KV lines as on 31<sup>st</sup> March 2018.

## **1.6 Power Supply Position**

Power is being supplied to Domestic, Commercial & Industrial consumers along with Agricultural consumers in rural areas through mixed feeders. There are 706 Nos. of dedicated/express industrial feeders. 7 hours three phase power supply is being given to agricultural consumers mostly in single/two spells and supply timings are rotated every 7 days.

Three phase supply to rural areas for Domestic, Commercial & Industrial consumers is along with 7 hrs Agricultural supply only. Whereas, balance 17 hrs supply is given to rural areas through single phase power supply. As a result, most of the consumers, other than Agricultural in rural areas on mixed feeders get 24 hours of supply every day.

Agricultural feeders have been separated from Domestic feeders in 14 mandals on a pilot basis during 2011. In these mandals, domestic consumers are being extended 3 phase supply depending upon availability of power. However, there is a system in Andhra Pradesh which enables single phase supply to be extended to all domestic consumers through suitable control mechanism at the substations.

Since 2014, all rural areas have been extended 24 hours single phase/ three phase power supply to all Domestic, Commercial & Industrial consumers. The segregation of Agricultural feeders would enable extension of 24x7, reliable 3 phase supply to all domestic, commercial & industrial consumers.

## **2.0 Load Forecast**

### **2.0.1 Short Term load forecast from FY2018-19 to FY2023-24**

The consolidated Sales and Load forecast is prepared using **Trend method**, keeping in view demand expected to come up due to new capital city Amaravathi



, PCPIR (Petroleum, Chemicals and Petrochemical Investment Region) corridor, Vizag Chennai Industrial Corridor (VCIC), Sri City SEZ , new airports, new sea ports. Special package to Andhra Pradesh state would further stimulate the Industrial sales.

New lift irrigation schemes i.e. Purushottampatnam , Krishnavaram under Polavaram LI Scheme, Chintalapudi, Kondaveeti Vaagu etc, will further contribute in increasing demand.

## 2.0.2 Electric Vehicles

GoI has set an ambitious target of 100% incremental EV sales by 2030 which is estimated to result in oil imports savings of \$ 60-70 billion annually. In lines with efforts made by GoI, AP State government has also signed MoU with EESL for procurement of 1 lakh electric vehicles with operational investment of Rs 2,000 crore per year for 1 lakh electric vehicles. In FY 2018-19, demand for Electrical Vehicles in AP is very low as it is still in nascent phase, but is expected to grow gradually in 4<sup>th</sup> and 5<sup>th</sup> control period. For forecasting the sales to EVs, it has been assumed that mostly the existing vehicles shall be replaced with the EVs. The Electric Vehicles estimated to be added in the State and corresponding Sales in the state and for the Licensee are mentioned below:

**Table 1 – Projections for EV installations**

Number of Conventional Vehicles (000's)		FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Stage Carriages	<b>APSRTC / Hire with APSRTC</b>	10	10	10	10	10	10	10	10	10	10	10
	<b>Private</b>	5	5	5	5	6	6	6	6	6	7	7
Goods Carriage	<b>3 Wheel Goods Vehicles</b>	90	103	118	136	152	171	192	213	236	262	291
Cabs	<b>Maxi cabs</b>	29	32	35	39	42	46	50	54	59	63	68
	<b>Other than Maxi Cabs</b>	66	70	74	78	82	86	90	94	98	102	107
Auto Rickshaw	<b>Auto Rickshaw</b>	637	718	810	914	1,013	1,123	1,244	1,363	1,494	1,637	1,794
Passenger Vehicles	<b>Private Service vehicles</b>	2	2	2	3	3	3	3	3	3	3	4
2 Wheelers	<b>Motor Cycles</b>	9,559	10,695	11,966	13,389	14,742	16,232	17,872	19,465	21,201	23,091	25,150
4 Wheelers	<b>Jeep</b>	11	11	11	11	11	11	11	11	11	12	12
	<b>Motor Cars</b>	725	808	901	1,005	1,103	1,211	1,329	1,443	1,568	1,703	1,850
Total EVs required (Nos.)		11,134	12,455	13,934	15,589	17,164	18,898	20,809	22,665	24,688	26,891	29,292

**Table 2 - Projections for EV Sales**

EV Consumption Points		FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Stage Carriages	<b>APSRTC / Hire with APSRTC</b>	1	21	60	120	189	268	357	625	1,074	1,702	2,510
	<b>Private</b>	-	-	1	3	5	7	11	17	28	43	63

EV Consumption Points	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	
Goods Carriage												
	<b>3 Wheel Goods Vehicles</b>	-	1	8	17	28	42	59	110	206	354	565
Cabs	<b>Maxi cabs</b>	-	-	2	5	10	17	27	42	64	94	133
	<b>Other than Maxi Cabs</b>	-	-	2	6	11	19	29	43	64	91	126
Auto Rickshaw	<b>Auto Rickshaw</b>	-	4	24	69	134	230	363	571	885	1,322	1,904
Passenger Vehicles	<b>Private Service vehicles</b>	-	-	-	-	-	1	1	2	2	3	4
2 Wheelers	<b>Motor Cycles</b>	1	9	54	155	300	512	804	1,257	1,937	2,879	4,124
4 Wheelers	<b>Jeep</b>	-	-	-	-	-	-	-	-	-	1	1
	<b>Motor Cars</b>	-	3	21	40	58	78	122	242	455	777	1,225
Total EVs Consumption (MUs)		<b>2</b>	<b>39</b>	<b>173</b>	<b>416</b>	<b>736</b>	<b>1,174</b>	<b>1,771</b>	<b>2,909</b>	<b>4,713</b>	<b>7,264</b>	<b>10,654</b>
50% available for consumption consideration		1	20	86	208	368	587	886	1,455	2,356	3,632	5,327
50% sales to Licensee		1	10	43	104	184	293	443	727	1,178	1,816	2,664

APDiscoms prepared a detailed **Resource Plan** so as to submit to the Honourable Commission in July 2018. The sales and energy forecast as per the Tariff Filings, and Resource Plan are provided in the following table:

LT Category	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
LT-I Domestic	13,198	14,522	16,073	17,793	19,703	21,824	24,181
LT-II Non-domestic/Commercial	2,729	2,856	3,142	3,481	3,879	4,329	4,847
LT-III Industrial	3,321	3,776	4,306	4,922	5,639	6,476	7,451
LT-IV Cottage Industries	42	45	49	52	56	61	65
LT-V Agriculture	10,828	10,883	11,157	11,439	11,726	12,019	12,317
LT-VI Street Lighting & PWS	926	963	1,002	1,043	1,087	1,132	1,180
LT-VII General Purpose	155	164	176	189	204	218	235
LT-VIII Temporary Supply	2	2	2	2	2	2	2
<b>LT Total (Restricted)</b>	<b>31,201</b>	<b>33,211</b>	<b>35,907</b>	<b>38,921</b>	<b>42,297</b>	<b>46,062</b>	<b>50,279</b>
<b>LT Total (Unrestricted)</b>	<b>31,212</b>	<b>33,211</b>	<b>35,907</b>	<b>38,921</b>	<b>42,297</b>	<b>46,062</b>	<b>50,279</b>
<b>HT Category</b>							

HT-I Industry	10,487	11,090	11,760	12,492	13,294	14,173	15,141
HT-I (B) Ferro-Alloys	2,865	3,168	3,505	3,881	4,299	4,765	5,286
HT-II Others (Commercial)	1,365	1,411	1,522	1,646	1,785	1,944	2,125
HT-III Public Infrastructure and Tourism	98	103	109	114	120	127	134
HT - IV Agriculture	1,490	3,045	3,967	4,172	4,388	4,619	4,864
HT-V Railway Traction	1,414	1,441	1,470	1,500	1,530	1,561	1,592
HT-VI Townships and Residential Colonies	57	58	60	62	64	66	68
HT-VII Green Power	0	0	0	0	0	0	0
HT-VII RESCOs	700	766	838	918	1,005	1,102	1,206
HT-VIII Temporary Supply	9	8	8	9	9	9	9
<b>HT Total (Restricted)</b>	18,484	21,090	23,239	24,794	26,494	28,366	30,425
<b>HT Total (Unrestricted)</b>	18,484	21,090	23,239	24,794	26,494	28,366	30,425
<b>LT+HT Total (Restricted)</b>	49,686	54,302	59,147	63,716	68,791	74,428	80,704
<b>LT+HT Total (Unrestricted)</b>	49,720	54,302	59,147	63,716	68,791	74,428	80,704

Energy Input (MUs)	FY 18 (Actual)	FY 19	FY20	FY21	FY22	FY23	FY24
<b>Energy Input @ EPDCL</b>	19,678	21,976	24,508	26,443	28,576	30,968	33,565
<b>Energy Input @ SPDCL</b>	34,328	39,593	42,473	45,711	49,343	53,401	57,956
<b>Transmission Losses</b>	1,768	2,001	2,131	2,261	2,430	2,609	2,788
<b>PGCIL Losses</b>	436	460	460	460	460	460	460
<b>Less: Procurement at 33 kV</b>		0	966	1,663	1,663	1,663	1,663
<b>Total Energy Input at State Level (MU)</b>	56,209	64,030	68,606	73,212	79,146	85,776	93,106
<b>State Peak Demand (MW)</b>	8983	10532	11450	12219	13209	14315	15539

## 2.1 Long Term Load Forecast from FY 2024-25 to FY 2028-29

The consolidated Sales and Load forecast is prepared using trend method, in view of demand expected to come up due to new capital city Amaravathi, PCPIR (Petroleum, Chemicals and Petrochemical Investment Region) corridor,

Vizag Chennai Industrial Corridor (VCIC), Sri City SEZ, new airports, new sea ports. Special package to Andhra Pradesh state would further stimulate the Industrial sales.

New lift irrigation schemes i.e Purushottampatnam , Krishnavaram under Polavaram LI Scheme, Chintalapudi, Kondaveeti Vaagu etc, 24x7 power supply to all consumers and 7 hrs supply to agriculture consumers will further contribute in increasing demand.

Transmission losses will be reduced from 3.0% in FY2023-24 to 2.75% by FY 2028-2029. T & D losses will follow similar trends from 11.02% in FY 2017-18 to 10.1% by FY2023-24 and further come down 7.97% by FY2028-29 due to efficiency gains and measures like HVDS (High voltage distribution system) undertaken by AP Discoms.

The category wise sales forecast and state level energy and peak demand forecast from FY2024-25 to FY2028-29 as submitted in the Resource plan to APERC is as below:

LT Category	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29
LT-I Domestic	26,799	29,709	32,945	36,545	40,549
LT-II Non-domestic/Commercial	5,447	6,227	7,226	8,467	9,979
LT-III Industrial	8,589	9,919	11,474	13,293	15,424
LT-IV Cottage Industries	72	78	84	91	99
LT-V Agriculture	12,619	12,925	13,234	13,544	13,855
LT-VI Street Lighting & PWS	1,230	1,282	1,338	1,397	1,458
LT-VII General Purpose	253	272	292	314	339
LT-VIII Temporary Supply	2	2	3	3	3
<b>LT Total (Restricted)</b>	55,011	60,414	66,595	73,653	81,705
<b>LT Total (Unrestricted)</b>	55,011	60,414	66,595	73,653	81,705

HT Category					
HT-I Industry	16,206	17,382	18,683	20,124	21,687
HT-I (B) Ferro-Alloys	5,865	6,512	7,235	8,041	8,941
HT-II Others (Commercial)	2,335	2,579	2,867	3,212	3,627
HT-III Public Infrastructure and Tourism	141	149	158	167	178
HT - IV Agriculture	5,124	5,399	5,693	6,005	6,336
HT-V Railway Traction	1,624	1,656	1,689	1,723	1,754
HT-VI Townships and Residential Colonies	70	72	74	76	80
HT-VII Green Power	0	0	0	0	0
HT-VII RESCOs	1,321	1,447	1,584	1,735	1,900
HT-VIII Temporary Supply	9	10	10	10	10
<b>HT Total (Restricted)</b>	32,695	35,206	37,993	41,093	44,513
<b>HT Total (Unrestricted)</b>	32,695	35,206	37,993	41,093	44,513
<b>LT+HT Total (Restricted)</b>	87,706	95,620	1,04,588	1,14,746	1,26,218
<b>LT+HT Total (Unrestricted)</b>	87,706	95,620	1,04,588	1,14,746	1,26,218

Energy Input (MUs)	FY25	FY26	FY27	FY28	FY29
<b>Energy Input @ EPDCL</b>	36,440	39,558	43,212	47,339	51,950
<b>Energy Input @ SPDCL</b>	63,085	69,001	75,835	83,715	92,788
<b>Transmission Losses</b>	2,984	3,205	3,458	3,744	4,064
<b>PGCIL Losses</b>	460	460	460	460	460
<b>Less: Procurement at 33 kV</b>	1,663	1,663	1,663	1,663	1,663
Total Energy Input at State Level	1,01,306	1,10,561	1,21,302	1,33,594	1,47,599
<b>State Demand (MW)</b>	16,907	18,452	20,245	22,296	24,633

## 2.2 19th EPS (Electric Power Survey) by CEA

CEA prepared 19<sup>th</sup> EPS in fulfillment of CEAs obligation under section 73(a) of the electricity act 2003. The load forecast published by Central Electricity Authority (CEA) in 19<sup>th</sup> Electric Power Survey is tabulated below.

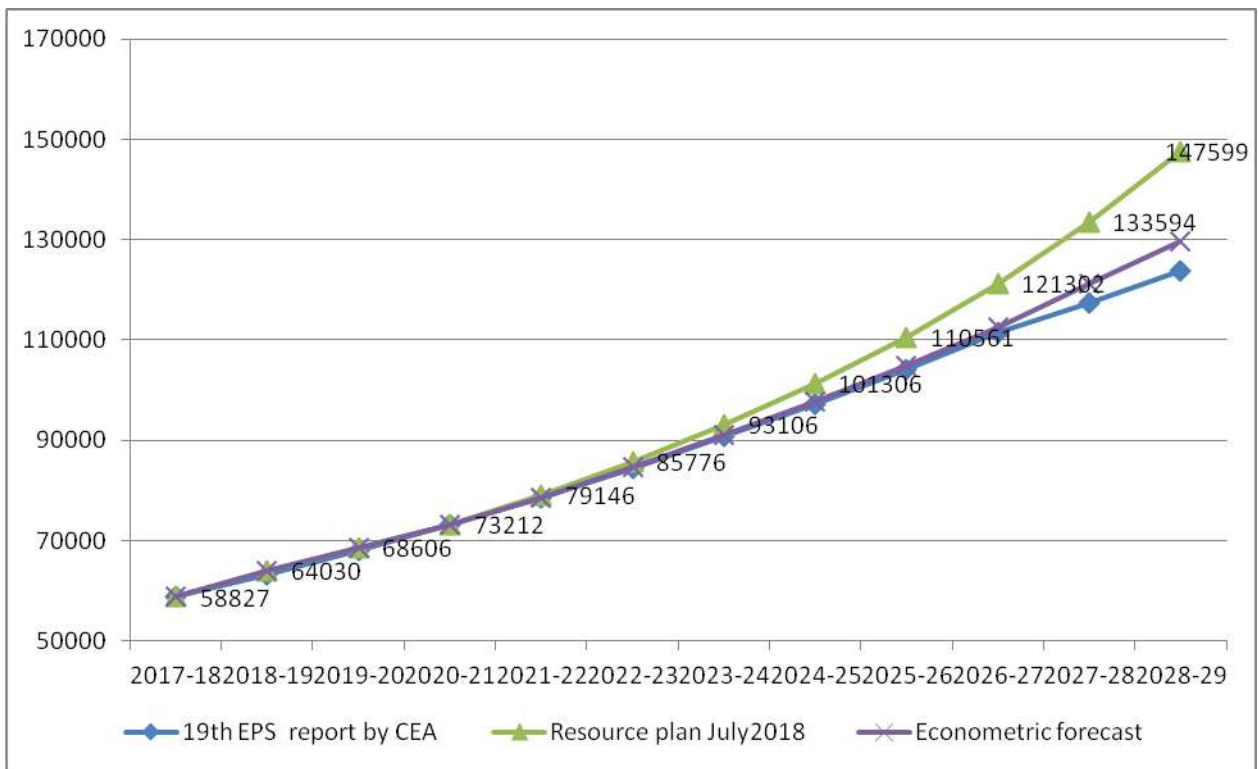
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	CAGR
<b>ENERGY CONSUMPTION - Mus</b>											
1. Domestic	13873	15060	16290	17557	18910	20354	21894	23536	25286	27149	7.7%
2. Commerical	4726	5165	5644	6165	6732	7349	8020	8550	9115	9715	8.3%
3.Public lighting	337	351	366	381	397	411	425	440	456	472	3.8%
4.Public Water Works	709	737	766	796	827	859	892	926	961	997	3.9%
5.Irrigation	13101	13674	14276	14907	15570	16266	16997	17779	18600	19462	4.5%
6.Industries LT	2737	2972	3226	3501	3799	4120	4467	4842	5247	5685	8.5%
7. Industries HT	14651	16118	17727	19493	21432	23576	25946	28319	30927	33796	9.7%
8.Railway traction	1577	1640	1706	1774	1845	1919	1995	2075	2179	2288	4.2%
Bulk Supply	911	969	1032	1098	1169	1246	1327	1394	1465	1539	6.0%
<b>Total(Energy Consumption)</b>	<b>52622</b>	<b>56686</b>	<b>61033</b>	<b>65672</b>	<b>70681</b>	<b>76100</b>	<b>81963</b>	<b>87861</b>	<b>94236</b>	<b>101103</b>	<b>7.5%</b>
T&D losses-MU	5974	6336	6715	7110	7528	7974	8446	8908	9397	9912	5.8%
T&D losses - %	10.2	10.05	9.91	9.77	9.63	9.48	9.34	9.21	9.07	8.93	
<b>Energy Requirement-MU</b>	<b>58597</b>	<b>63022</b>	<b>67746</b>	<b>72781</b>	<b>78207</b>	<b>84072</b>	<b>90410</b>	<b>96769</b>	<b>103631</b>	<b>111013</b>	<b>7.4%</b>
<b>Annual Load Factor-%</b>	<b>75.38</b>	<b>75.38</b>	<b>75.38</b>	<b>75.38</b>	<b>75.39</b>	<b>75.39</b>	<b>75.39</b>	<b>75.37</b>	<b>75.36</b>	<b>75.35</b>	
<b>Peak Electricity Demand-MW</b>	<b>8874</b>	<b>9544</b>	<b>10259</b>	<b>11021</b>	<b>11843</b>	<b>12731</b>	<b>13690</b>	<b>14656</b>	<b>15698</b>	<b>16820</b>	<b>7.4%</b>
<b>Energy Requirement(Ex Bus) - MU</b>	<b>58846</b>	<b>63290</b>	<b>68034</b>	<b>73090</b>	<b>78540</b>	<b>84429</b>	<b>90794</b>	<b>97181</b>	<b>104072</b>	<b>111485</b>	<b>7.4%</b>
T&D losses (Ex Bus)-%	10.58	10.43	10.29	10.15	10.01	9.87	9.73	9.59	9.45	9.31	

## 2.3 Comparison of Load Forecasts

Comparison of Energy (MU) forecast projected by Discoms to 19<sup>th</sup> EPS are shown in below table and figure 1. The slight change in Discoms load forecast (as filed in the Discoms Resource plan) compared to 19<sup>th</sup> EPS report by CEA is due to expected higher industrial sales growth, 9hrs supply to Agriculture, Energy efficiency initiatives like Domestic Efficient Lighting Programme (DELP), Domestic Efficient Fans Programme (DEFP) etc. Econometric

forecast which takes into account GDP growth , Population growth and other demographic factors is also prepared and compared with Resource plan forecast.

Energy Requirement (MU)	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	CAGR 2018-29
19th EPS report by CEA	58846	63290	68034	73090	78540	84429	90794	97181	104072	111485	117505	123850	7.0%
Resource plan July2018	58827	64030	68606	73212	79146	85776	93106	101306	110561	121302	133594	147599	8.7%
Econometric forecast	58828	64029	68599	73298	78597	84629	91168	97722	104958	112657	121111	129559	7.4%



### 3.0 Generation Plan

#### 3.1 Energy Availability from various sources

This section discusses the methodology and assumptions considered for estimating the quantum of power purchase of the Licensee for the next two control periods - FY 2019-20 to FY 2023-24 and FY 2024-25 to FY 2028-29. In the following sections, the capacities and availability from various existing and upcoming generating sources along with their expected date of Commissioning have been described.

##### 3.1.1 APGENCO

The below table shows the projected capacities of the existing Thermal and Hydel generating stations of APGENCO including its share in the interstate projects. The APDISCOMs would purchase the 100% share from the existing APGENCO stations.

Source	Project Installed Capacity (MW)	Contracted Capacity -AP Share (MW)
<b>THERMAL</b>		
Dr. NTTPS ( I, II, III)	1,260	1,260
RTPP-I	420	420
RTPP-II	420	420
RTPP- III	210	210
RTPP VI	600	600
Dr. NTTPS – IV	500	500
SDSTPS – I	800	800
SDSTPS – II	800	800
<b>TOTAL THERMAL</b>	<b>5,010</b>	<b>5,010</b>
<b>HYDEL</b>		
<b>Interstate projects:</b>		
Machkund, Orissa	84	38.7



Source	Project Installed Capacity (MW)	Contracted Capacity -AP Share (MW)
T.B. Station, Karnataka	57.6	26.6
<b>State projects:</b>		
Donkarayi	25	25
Upper Sileru	240	240
Lower Sileru	460	460
Srisailam right bank PH	770	770
Nagarjunsagar right canal PH	90	90
PABM	20	20
Mini hydro	1	1
Nagarjunsagar Tail Pond	50	50
<b>TOTAL HYDEL</b>	<b>1,798</b>	<b>1,721</b>
<b>TOTAL APGENCO</b>	<b>6,808</b>	<b>6,731</b>

### 3.1.2 APGENCO Capacity Additions/ Contract Expiry

The following table captures the expected capacity addition of APGENCO Thermal and Hydel stations from FY 2018-19 to FY 2023-24:

Source	Project Installed Capacity (MW)	Expected COD
<b>THERMAL</b>		
VTPS - V	800	Apr-20
SDSTPS Unit-3	800	Apr-20
<b>TOTAL THERMAL</b>	<b>16,00</b>	
<b>HYDEL</b>		
<b>Interstate projects:</b>		
Polavaram - 12 Units	960	Apr-22
<b>TOTAL HYDEL</b>	<b>960</b>	
<b>TOTAL APGENCO</b>	<b>2,560</b>	

*\*Based on the latest information, data has been updated with respect to Resource Plan*

An additional 25,60 MW of capacity is expected to be added by APGENCO by the completion of the fourth control period.

The Power purchase agreements of the VTPS Stage I, Stage II and Stage II plants and RTPP Stage I plant are going to expire in FY2018-19. However, licensee has assumed the availability of these plants up to as below:

— RTPP Stage I - FY2019-20

- VTPS Stage I and Stage II - FY2020-21
- VTPS Stage III - FY 2021-22

### 3.1.2 Central Generating Stations

The Discoms have Power Purchase Agreements (PPA) with the Central Generating Stations to purchase power from NTPC (SR), NTPC (SR) Stage-III, NTPC -Talcher-II, NTPC Simhadri-I and Simhadri Stage-II, Neyveli Lignite Corporation Ltd (“NLC”), Madras Atomic Power Station (“MAPS”) and Kaiga Atomic Power Station (“KAPS”) NTECL Vallur and NTPL Tuticorn (JV of NLC and TNEB). The share of the DISCOMs in the total capacity of the stations is as mentioned below for FY 2018-19.

Sr. No.	Source of Power	COD Date	AP Share MW	Aux Consumption %	PLF %
1	NTPC (SR)	3/1/1984	435	6.68%	85%
2	NTPC (SR) Stage III	3/25/2005	108	5.75%	85%
3	Talcher Stage 2	8/1/2003	233	5.75%	85%
4	NLC Stage-I	9/29/1986	48	10.00%	85%
5	NLC Stage-II	1/25/1992	87	10.00%	85%
6	NPC-MAPS	1/27/1984	18	0.00%	85%
7	NPC-Kaiga unit I &II	11/16/2000	56	0.00%	85%
8	NPC-Kaiga unit III & IV	5/6/2007	60	0.00%	85%
9	NTPC Simhadri Stage I	9/1/2002	461	5.25%	85%
10	NTPC Simhadri Stage II	9/16/2011	267	5.25%	85%
11	Bundled power under JVNSM (or western region)	9/16/2011	539	5.25%	85%
12	Vallur Thermal Power Plant	8/31/2012	88	6.69%	85%
13	Kudigi	1/31/2017	272	5.75%	85%
14	Tuticorin joint venture plant	6/18/2015	123	6.25%	85%
15	NNTPS	7/1/2018	52	6.50%	85%

Apart from the existing CGS stations, no new CGS stations are expected to come up with which the Discoms are expected to enter into PPA.

### 3.1.2 3.1.3 APGPCL & APDISCOM gasIPPs

The share of APDISCOMs in the APGPCL stations is **34 MW**. APDISCOMs bought out the erstwhile GVK Phase-I (now known as Godavari Gas Power Plant) on April 22<sup>nd</sup> 2016. Hence, the entire **216.82 MW** capacity of Godavari Gas Power Plant is now being scheduled for APDISCOMs. In Gas IPP's, Lanco's PPA with the licensee expired on 01.01.2016; Spectrum's PPA with the license expired on 18.04.2016 and BSES's PPA with the licensee expired in Dec 2017. After the expiry of PPA with Lanco, Spectrum and BSES, Discoms are purchasing power from Lanco and Spectrum on short term basis.

Sr. No.	Source of Power	COD	AP Share	Aux Consumption	PLF	Proposed PPA Expiry Date
		Date	MW	%	%	
1	APGPCL I - Allocated capacity	3/1/2018	9	3.00%	25.0%	3/1/2030
2	APGPCL II - Allocated capacity	3/1/2018	25	3.00%	29.0%	3/1/2030
3	Godavari Gas Power Plant	6/20/1997	217	3.97%	80.0%	3/1/2030
4	Spectrum	4/19/1998	205	3.0%	68.5%	
5	Kondapalli (Lanco)	1/1/2001	362	3.0%	80.0%	

### 3.1.2 3.1.4 New IPPS

The following IPP's are under commercial operation in the State:

Project Name	Installed Capacity (MW)	AP Share (MW)
GVK Extension	220	101
Vemagiri	370	171
Gautami	464	214
Konaseema	444	205
<b>Total</b>	<b>1,498</b>	<b>691</b>

Since gas is not available the availability from these new CCPPs is not considered .

### 3.1.5 Non-Conventional Energy Sources (NCE)

The expected capacity addition of NCE projects in the state from FY 2017-18 to FY 2023-24 is given below:

<b>Capacity addition from NCE Sources(MW)</b>							
Energy Source	FY 2017-18(Existing)	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
NCE - Bio-Mass	155						
NCE - Bagasse	120						
NCE - Municipal Waste to Energy	6		24	20	15		
NCE - Industrial Waste based power project	22		8				
NCE - Wind Power	3,905	1,047	40				
NCE - Mini Hydel	85	6	13				
NCE - NCL Energy Ltd	8						
NCE - Solar	595						
<u>NCE - Solar Parks</u>	1,550	805	1,120	750			
<b>Total</b>	<b>6,446</b>	<b>1,858</b>	<b>1,205</b>	<b>770</b>	<b>15</b>	<b>0</b>	<b>0</b>

\*Based on the latest information, data has been updated with respect to Resource Plan

# Wind energy capacity has been limited to the capacity envisaged by the State Wind Policy

### 3.1.6 Solar Power Projects

- In order to promote Solar Power Projects in the State of AP, GoAP vide G.O Ms. No.8, dated: 12.02.2015 has issued a new solar policy - 2015 applicable for a period of 5 years targeted minimum solar capacity addition of 5000 MW by FY 2019-2020.
- To achieve above target, GoAP directed APDISCOMs for procurement of 1000 MW Solar Power through competitive bidding process and APDISCOMs entered PPAs for a capacity of 619 MW with consent of APERC. Out of 619 MW, 512 MW has been Commissioned.
- GoAP also targeted to set up 4000 MW solar capacity through Solar Parks in Kurnool, Kadapa and Ananthapur districts with the support of GoI.
- Out of targeted capacity of 4000 MW, 1100 MW Commissioned so far (250 MW at N.P. Kunta, Anantapur District and 850 MW at Gani, Kurnool District)
- The solar parks coming up in the AP State are as follows:

S.No.	Name of the Project	Location of Project	Capacity (in MW)
1	Ananthapuram- I Ultra Mega Solar park (1500 MW) (1000 MW for NTPC and 500 MW for SECI VGF scheme)	NP Kunta, Ananthapur District	1000MW
		Galiveedu Mandal, Kadapa district	500 MW
2	Kurnool Ultra Mega solar park (1000 MW NTPC through developers)	Gani, Kurnool	1000MW
3	Ananthapuram- II Ultra Mega Solar Park (500 MW through APGENCO)	Talaricheruvu(V), near Tadipatri, Ananthapur(Dist)	500 MW
4	Kadapa Ultra Mega Solar Park	Mylavaram	1000 MW

- The installed capacity of Solar Power Projects in the AP state as on 31.03.2018 is 2145 MW.

- Andhra Pradesh stood first in India both in the Solar capacity addition as well in the cumulative capacity as on 31<sup>st</sup> March 2018.
- The Solar Park at Gani, Kurnool District, is the largest solar power capacity Commissioned at single location in the world.

### 3.1.2 Other Sources

#### 3.1.2.1 Case-I Medium Term:

AP Discoms have signed the PPA with KSK Mahanadi for 400 MW for 100% of its share from 15<sup>th</sup> June 2016 to March 31<sup>st</sup> 2021. However power from this unit is not procured from FY2018-19 due to pending legal issues .

#### 3.1.2.2 Hinduja

Power from hinduja (1040MW) was not considered due to pending legal issues

#### 3.1.2.3 Simhapuri

Power from Simhapur (400MW) was not considered due to pending legal issues

#### 3.1.2.4 Case-I Long Term

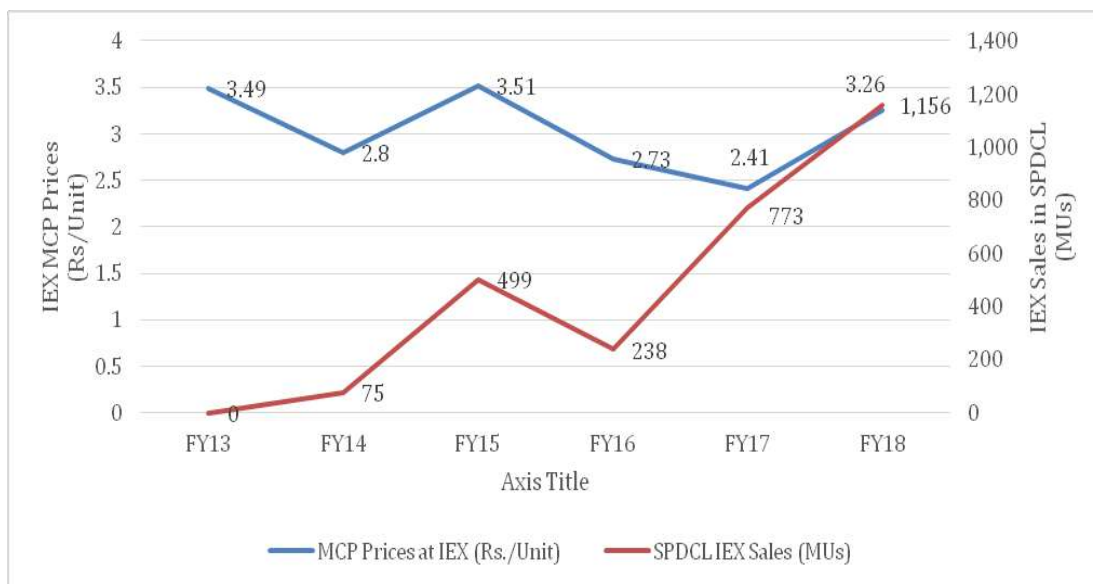
The licensees have signed PPA with Thermal Power Tech for 500 MW. This project is operating from 1-4-2015. Out of which 46.11% share i.e. 231MW was considered for AP.

Project Name	Installed Capacity (MW)	AP Share (MW)
Sri vatsa	17	17
Case-1 Medium term	400	0
Thermal Powertech	231	231
<b>Total</b>	<b>648</b>	<b>648</b>

#### 3.1.2.5 Short term purchases from IEX

From FY 2014-15 onwards, whenever there is a short term requirement of power due to exigency conditions or operational constraints, the shortages are being met from Power Exchanges.

**IEX Sales by OA:** The trend of growth from FY2013 to FY2018 in IEX sales of open access consumers vis a vis Average MCP (Market clearing price) is shown below:



### 3.1.2.5 Hybrid systems

Hybrid system consists of The following configuration

- Solar,wind and gas
- Solar ,wind and Pumped storage
- Solar,wind and battery.

## 3.4 Sector wise Capacity Addition FY 2018-19 to FY 2023-24

The below table captures the expected capacity addition of APGENCO Thermal and Hydel stations, IPPS, CGS and Renewable energy sources during FY2018-19 to FY2023-24.

Type of projects	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
<b>APGENCO</b>							
<b>Hydro Plants</b>							
Polavaram (12x80MW)					480	480	960
<b>Thermal Plants</b>							0
Vijayawada TPS Stage V (1x800 MW)			800				800

Krishnapatnam TPP (JVP) Stage II (1x800 MW)			800				800
VTPS stage-1 Retirement				-420			-420
VTPS stage-2 & 3 Retirement				-420	-420		-840
RTPP stage-1 Retirement			-420				-420
<b>APGENCO Total</b>							0
<b>Medium / Case-1 Bid</b>							0
KSK Mahanadi (MT) (184+216 MW)	-400						-400
<b>Private Projects</b>							0
New thermal (80% plf)		1665		737	1105	1032	4539
Hybrid (60%plf)		714	-	316	474	442	1946
<b>Central Generating Stations</b>							0
Bundled Power NTPC							0
<b>Wind and NCE</b>	1053	85	20				1158
<b>Solar</b>	805	1120	750				2675
<b>Total</b>	<b>1458</b>	<b>3584</b>	<b>1950</b>	<b>213</b>	<b>1639</b>	<b>1954</b>	<b>10798</b>

\* Data has been updated with respect to DISCOMs' Resource Plan-July 2018

### 3.3 Coal Requirement by APGENCO

The total expected availability of coal by APGENCO is 24.342 MTPA against the requirement of 26 MTPA to generate 37182.3 MU. The coal is mainly supplied by CIL and SCCL the details are tabulated below for FY 2018-19.

Sl. No.	Description	Units	2018-19
1	Coal Based Generation programme during 2018-19 (Target)	MU	37,182
1.1	Coal based generation achieved during 2017-18 (Actual)	MU	26,964
2	Coal Requirement		
2.1	For plants designed for domestic coal	MT	23.99
2.2	For plants designed on imported coal	MT	2.018
2.3	Total Coal requirement	MT	26.0
3	Coal availability from indigenous sources		
3.1	From CIL	MT	17.962
3.2	From SCCL	MT	3.88
3.3	From captive mines	MT	-
3.4	From e-auction/stock	MT	2.5
3.5	Total domestic coal availability	MT	24.342
3.6	Requirement of imported coal for blending	MT	1.667



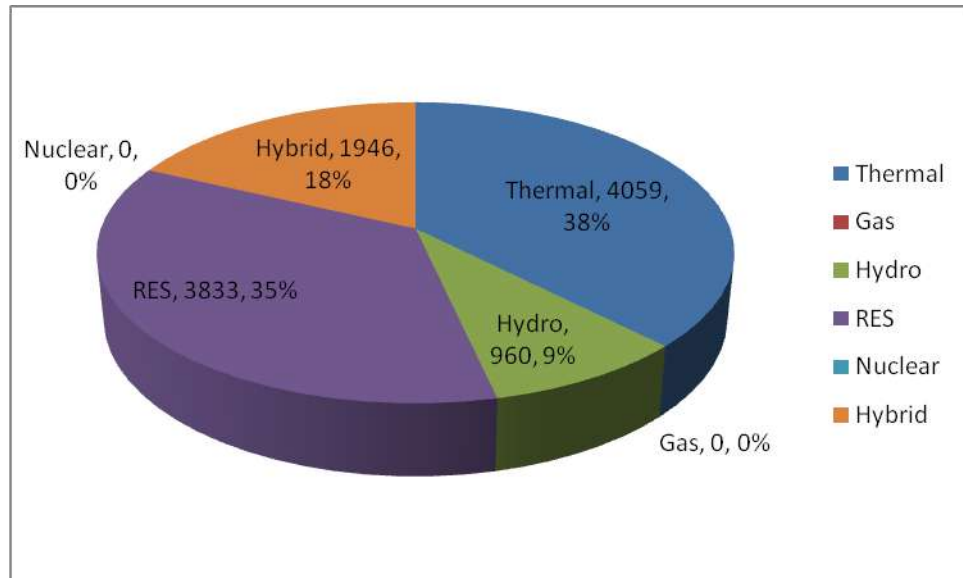
The above details pertain to Dr. NTTPS (1,760 MW), RTPP (1,050 MW) and Krishnapatnam Stg-I (1,600 MW). And RTPP-IV 600 MW

The coal required by APGENCO is 33.19 MTPA to generate 49218 MU by FY 2023-24 and the details are tabulated below for FY2023-24.

SI No	Description	Units	2023-24
1	Coal Requirement	MT	33.19
1.1	Coal based generation	MU	49218
1.2	Hydro based generation	MU	5501
1.3	Total coal based generation	MU	49218
2	Coal Requirement	MT	33.19
2.1	Imports by plants designed on imported coal	MT	2.14
2.2	Domestic coal requirement	MT	31.05

### 3.4 Fuel Wise Capacity Addition FY 2019 - FY 2024

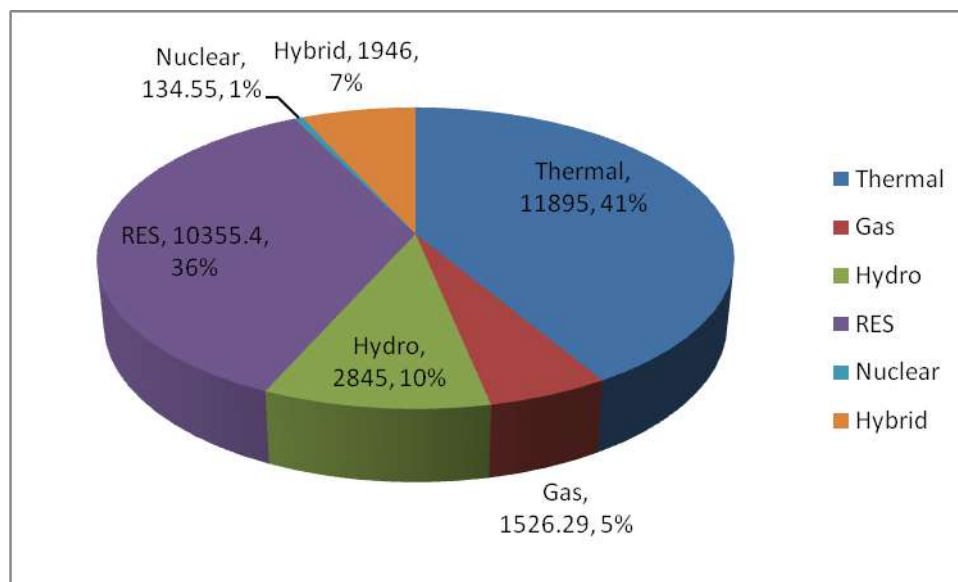
The expected total capacity addition from FY2018-19 to FY 2023-24 is 10798 MW which comprises of 4059 MW thermal, 960MW Hydro hybrid 1946 MW and 3833 MW Renewable Energy Sources.



The major chunk i.e 35% capacity addition is from Renewable energy sources in the 4<sup>th</sup> control period.

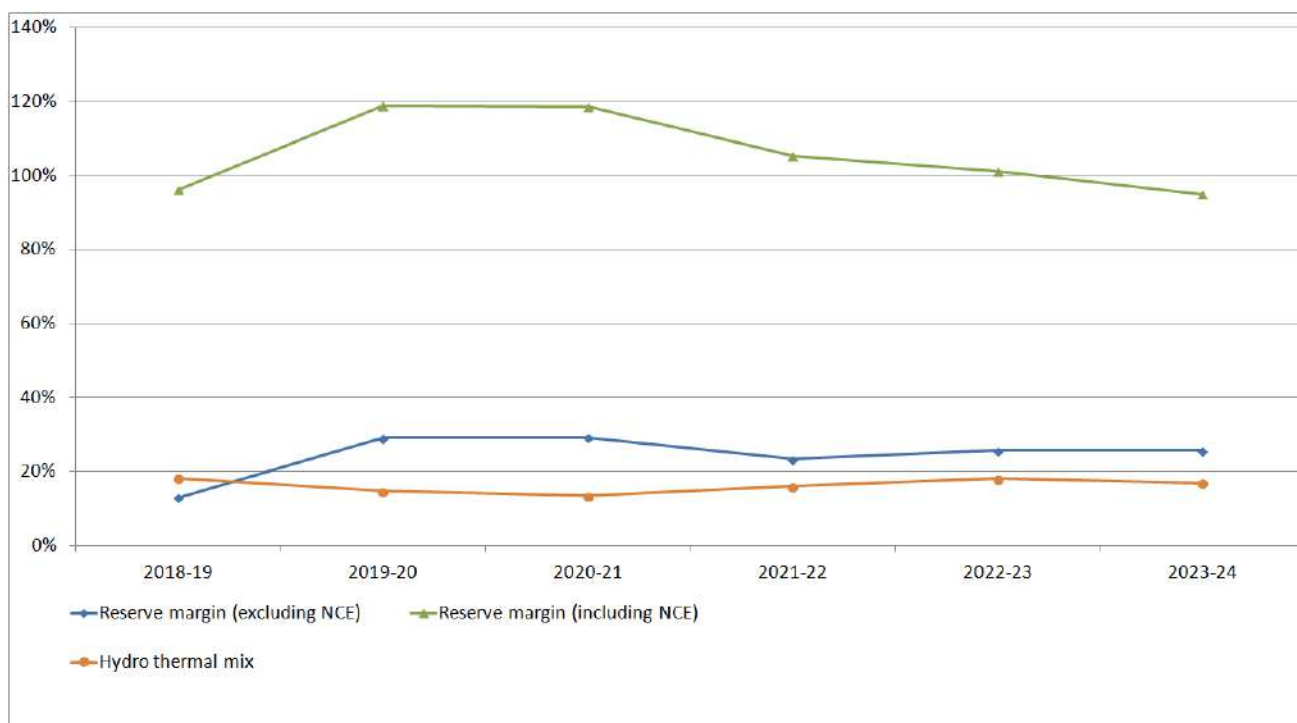
### 3.5 Expected Installed Capacity by 31st March 2024

The expected installed capacity by 31<sup>st</sup> March 2024 would be 26756 MW comprises of 11895 MW thermal, 1526 MW gas, 2845 MW Hydro, 135 MW Nuclear ,1946 MW Hybrid and 10355 MW Renewable Energy Sources.



### 3.6 Reserve margin and Hydro thermal mix

Reserve margin of a system is defined as the difference between the Installed Capacity and the peak load met as a percentage of the peak load met. This factor depends on a number of parameters, major ones being the mode of power generation i.e. hydro, thermal, renewable and the availability of the generating stations which primarily is a function of forced and planned shutdown of the generating units, capacity of the Discoms to procure power. The Reserve margin and hydro thermal mix from FY2017-18 to FY2023-24 is tabulated below.



Hydro thermal mix increased from 18.2% in FY2018-19 to 17.9% by FY2023-24 in terms of installed capacity. However, Reserve margin (Excluding NCE) increased from 13% in FY2018-19 to 26% in FY2023-24.

### 3.7 Sector wise capacity addition from FY 2023-24 to FY 2028-29

The state will be in deficit in the 5<sup>th</sup> control period as there is no significant project proposals. Hence, generic projects with least cost are proposed to meet the state energy and Demand needs in 5<sup>th</sup> control period.

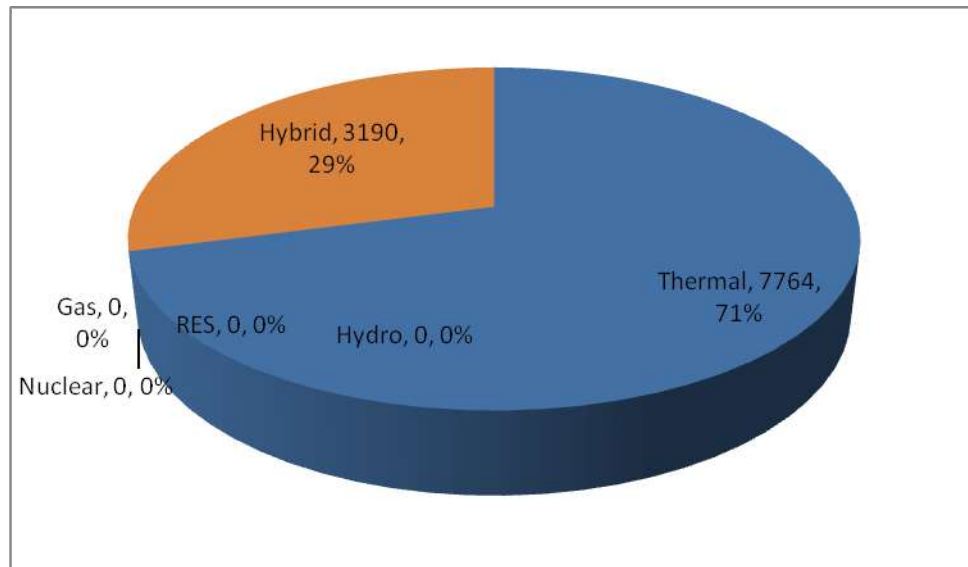
The below table depicts the expected capacity addition of IPPS/public sector, Central Generating stations and Renewable Energy Sources during FY 2023-24 to FY 2028-29.

Type of projects	2024-25	2025-26	2026-27	2027-28	2028-29	5th CP Total
<b>APGENCO</b>						
<b>Private Projects</b>						
New thermal (80% PLF)	1105	1105	1326	1768	2137	7441
Hybrid (60%Plf)	474	474	568	758	916	3190
<b>Private +case 1 bid Total</b>						<b>10631</b>
<b>Central Generating Stations</b>						
Bundled Power NTPC						0
Sirkali		323				323
<b>CGS Total</b>						<b>323</b>
<b>Wind and NCE</b>						0
<b>Solar</b>						0
<b>Totals</b>	<b>1579</b>	<b>1902</b>	<b>1894</b>	<b>2526</b>	<b>3053</b>	<b>10954</b>

\* Data has been updated with respect to DISCOMs' Resource Plan-July 2018

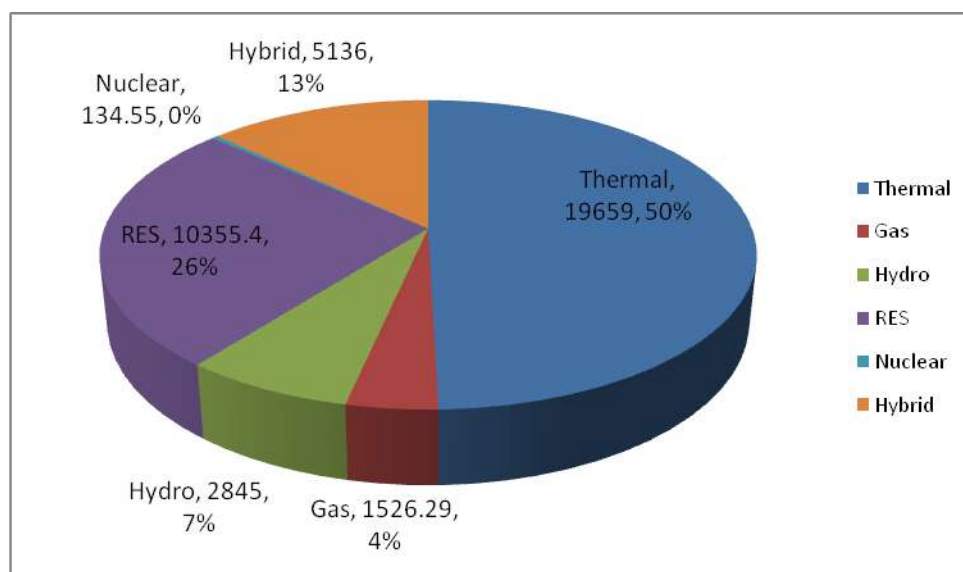
### 3.8 Fuel wise Capacity addition FY 2024-25 to FY 2028-29

The total capacity addition from FY2023-24 to FY2028-29 is 10954 MW which comprises of 7764 MW thermal and 3190 MW hybrid



### 3.9 Expected installed capacity by March 2029

The expected Installed capacity by 31-03-2029 is 39656 MW which comprises of 19659 MW thermal, 1526 MW gas, 2,845 MW hydro, 135 MW Nuclear ,5136 MW hybrid and 10355 MW Renewables.



### 3.10 Coal Requirement by APGENCO by FY 2028-29

33.19 MTPA (Million tons per annum) of coal is required by APGENCO thermal plants by FY 2028-29 out of which 31.05 MTPA of domestic coal and balance 2.14 MTPA of coal needs to be imported to generate 49,218 MU and the details are tabulated below for FY2028-29.

Sl No	Description	Units	2028-29
1	Coal Requirement	MT	33.19
1.1	Coal based generation	MU	49218
1.2	Hydro based generation	MU	5351.57
1.3	Total coal based generation	MU	49218
2	Coal Requirement	MT	33.19
2.1	Imports by plants designed on imported coal	MT	2.14

2.2	Domestic coal requirement	MT	31.05
-----	---------------------------	----	-------

The above details pertain to Dr. NTPPS (1760MW), RTPP (1050MW) and Stg-I (1600MW) and RTPP-IV (600MW) Dr. NTPPS-V (800MW), SDSTPS Stg-2 (800MW).

### **3.11 Different Technologies adopted by APGENCO for efficient generation**

APGENCO has adopted Super Critical technology as it offers advantages in terms of improved efficiency, reduced emissions and low operating costs. Using this technology ,two units of 800 MW at SDSTPS stage-I, Nellore were already commissioned. Another two units of 800 MW at Dr NTPPS Stage-V and SDSTPS stage -II are under construction.

### **3.12 Fuel choice based on Economy, energy security and environmental conditions by APGENCO**

Adoption of super critical Technology for reduced emissions, improved efficiency and economic generation, and use of wash coal is preferred for thermal power plants to reduce ash content.

Due to limited availability of fossil fuel fuels and promotion of use of renewable energy sources to ensure energy security, APGENCO ventured into solar power generation and commissioned 5.426 MWp in west Godavari district and has taken up 500MW at Thalaricheruvu in Ananthapuram district.

Further LOI was issued by APGENCO for implementation of 960 MW (12X80) Polavaram Hydro electric project at Anguluru, near Rajahmundry to utilize the surplus monsoon flows of Godavari.

### **3.13 R&M programs, Plans to meet new environmental norms issued by MOEF**

The R&M programme is primarily aimed at generation sustenance and overcoming problems due to:

- a) Generic defects
- b) Design deficiencies /modifications
- c) Avoidance of inefficient operation

- d) Non-availability of spares because of obsolescence of equipment/components.
- e) Poor quality of coal
- f) Major replacements of equipment arising due to unforeseen failures and /or generation sustenance not covered under regular O&M
- g) Stringent environmental regulation
- h) Safety requirements etc.

The current and New emission standards by Ministry of Environment, Forest & Climate Change (MoEF&CC) in respect of Particular matter (PM), Sulphur Dioxide(SO<sub>2</sub>), NO<sub>x</sub> and Mercury are tabulated below.

**Standards (In g/Nm<sup>3</sup>)**

	PM	SO <sub>2</sub>	Nox	Mercury
Current standards	150-350	none	none	none
<b>New standards</b>				
Units installed till 2003	100	<500MW--600 >=500MW-- 200	600	>=500MW-- 0.03
Units installed till 2004 and 2016	50	<500MW--600 >=500MW-- 200	300	0.03
Units installed after Jan 2017	30	100	100	0.03

FGD installation may cost Rs 40 to Rs 50 lakhs per MW .

To meet new environmental norms issued by MOEF ,APGenco has taken up feasibility study on the installation of FGD for the reduction of SPM, NO<sub>x</sub> and Mercury.

## 4 Introduction of Transmission Plan

---

Transmission Planning is a continuous process of identification of Transmission system additional requirement, their timing and need. The Transmission requirement could arise from

- i) New generation addition in the system
- ii) Increase in demand
- iii) System strengthening that may become necessary to achieve reliability as per the planning criteria under change load scenario.

The Transmission requirement are identified, studied and firmed through the Transmission planning process.

The Transmission system consists of Inter state Transmission system (ISTS) and Intra state Transmission system (Intra STS). ISTS is mainly owned by and operated by PGCIL which is also Central Transmission Unit whereas Intra -State Transmission system are mainly owned by the state.

The Intra-STs serves the following purposes.

- i) Evacuation power from the state's generating stations (both under state and private sector) having beneficiaries in the state.
- ii) Onward Transmission within the state from ISTS boundary up to the various substations of the state grid network.
- iii) Transmission within the state grid for delivery of power to the load centers within the state.

There has been a consistent increase in Transmission network and transformation capacity in the state. This increase is in consonance with increase in generation and demand of electricity in the state. This as part of growth in Transmission highlights requirements of Transmission network to carry bulk



power over longer distances and then at the same time optimize ROW, minimize losses and to improve grid stability.

The objective of the Transmission Planning is to develop Transmission Expansion Plan based on the load forecast and generation supply scenario developed as part of the Load forecast and Resource plan for the state of Andhra Pradesh with the inputs of DISCOMs and GENCO. The purpose of this report was to present a comprehensive summary of the process, assumptions, methodology, Transmission network expansion plan required to ensure the Transmission system which would be capable transmitting the planned generation to meet the forecast loads up to FY 2029. The proposed Transmission system was evaluated for the load and generation conditions for FY 2024.

The system studies were carried out for the Peak Load Scenario and analyzed the Transmission system required from FY 2019-20 to FY 2023-24 which comes under short term plan. The tentative Transmission expansion plan for the period FY 2020-24 is also presented based on the load requirement which comes under Long term plan.

This report envisages the various assumptions & standards adopted for conducting load flows followed for preparation of Transmission Resource plan from FY2020 to FY2024. After conducting load flow studies and contingency analysis under maximum thermal generation scenario as the peak demand occurs in March various generation evacuation schemes at 765KV, 400KV are depicted. The Transmission expansion plan which includes 400KV and 220 KV lines and Substations are also depicted. Sub Transmission plan comprises of 132KV network is also prepared and depicted.

## 4.1 Criteria for Load Flow Studies

The assumptions and standards adopted while conducting Load Flow studies for UHV (200KV and above) are shown below.

### 4.1.1 Standard Transformer sizes

The utility's standard Transformer Sizes

Voltage	ONAN Rating (MVA)	OFAF Rating (MVA)
765/400 kV	900	1500
400 / 220 kV	300	500
400 / 220 kV	190	315
220 / 132 kV	96	160
220 / 132 kV	60	100

### 4.1.2 Standard Conductor types

Sl. No	Line Voltage	Conductor Type	Configuration
1	765 kV	Quad Bersimis	ACSR Bersimis, 4/PH, 42/4.57 mm Al + 7/2.54 mm Steel
2	400 kV	Twin Moose	ACSR Moose, 2/PH, 61/3.53mm
3	400 kV	Quad Moose	ACSR Moose, 4/PH, 61/3.53mm
4	220 kV	Single Moose	ACSR Moose, 1/PH, 61/3.53mm
5	220 kV	Twin Moose	ACSR Moose, 2/PH, 61/3.53mm
6	132 kV	Panther	ACSR Panther, 37/3.00mm

### 4.1.3 Operating Limits under normal conditions

The operating limits as in practice for system studies are adopted as follows:

Sl. No	Item	Operating Limit during normal conditions
1	765/400 KV 1500 MVA Transformer*	900MVA
2	400 / 220 kV 315 MVA Transformer	190 MVA
3	220 / 132 kV 100 MVA Transformer	60 MVA
4	765 KV Quad Bersimis Line*	2250MVA
5	400 kV Twin Moose Line	555 MVA
6	220 kV Single Moose / Zebra Line	178 MVA
7	132 kV Panther Line	67 MVA

### 4.1.4 Thermal Limits of Transmission Lines at Rated Voltage

Thermal limit of the Transmission line shall be its thermal loading limit. The thermal loading limit of a line is determined by design parameters based on ambient temperature, maximum permissible conductor temperature, wind speed , solar radiation , absorption coefficient , emissivity coefficient etc. The maximum permissible thermal line loadings for different types of line configurations and different type of conductors are taken as per revised CEA guide lines.

Notes:

75 °C is the normal maximum operating conductor temperature

100 °C is the maximum emergency operating conductor temperature, permitted for short duration of periods, during emergencies in the system.

(A) Number of transformers in 765/400KV ,400/220 kV and 220/132 kV Sub-Stations: Based on the standard transformer sizes adopted, transformer loading limits adopted and the CEA specified sub-station

loading limits, the utility has adopted the maximum number of transformers in 765/400KV, 400/220 kV and 220/132 kV Sub-Stations as 4. In Uravakonda, Uravakonda - 2, Hindupur and Manubolu 400/220KV SS maximum number of Transformers adopted are four.

(B) The Transformer augmentation in 220/132kV substations will be carried out in the long term planning studies considering minimum of 2 numbers PTRs to meet the N-1 contingency. The additional PTR will be provided whenever the substation load reaches 90 MVA.

(C) Capacity of Substation

As per CEA revised planning criteria, the capacity of any single substation at different voltage levels shall not normally exceed:

<b>SS Voltage</b>	<b>SS MVA(Max Capacity)</b>
765 KV	9000MVA
400 KV	2000 MVA
220KV	500 MVA
132 KV	250 MVA

(D) Voltage Limits

Permitted voltage limits, as per CEA guidelines

<b>Nominal Voltage in kV</b>	<b>Maximum Voltage in kV</b>	<b>Minimum Voltage in kV</b>
765	800	728
400	420	380
220	245	198
132	145	122

(H) Power Factor of the Loads: All the loads power factor at 220kV and

132kV voltage levels are assumed to be 0.95 lag during peak load condition and 0.98 lag during light load condition as per Transmission Planning criteria specified by CEA.

#### **4.1.5 Contingency criteria:**

The system is planned to supply loads during normal conditions and the following contingency conditions without the need for rescheduling of generation and to maintain voltage and line loading criteria.

a) All the equipments in the transmission system shall remain within their normal thermal and voltage ratings after a disturbance involving loss of any one of the following elements (called single contingency or 'N-1' condition), but without load shedding / rescheduling of generation:

- Outage of a 132kV or 110kV single circuit,
- Outage of a 220kV or 230kV single circuit,
- Outage of a 400kV single circuit,
- Outage of a 400kV single circuit with fixed series capacitor(FSC),
- Outage of an Inter-Connecting Transformer(ICT),
- Outage of a 765kV single circuit
- Outage of one pole of HVDC bipole.

b) The angular separation between adjacent buses under ('N-1') conditions shall not exceed 30 degree.

(Prior to such contingency, all elements shall be considered to be in service)

#### **Criteria for single contingency (N-1):**

The Transmission planning was based on a deterministic approach using the single contingency (or N-1) criterion. This is the most common approach used

world-wide, and it requires the system to be able to operate satisfactorily with one element out of service (Generator, Transmission Line or Transformer), and to survive the transition from the normal state to the contingency state without any operator intervention.

An exception to the above criteria, is that the system shall survive a 400kV DC line outage evacuating a power plant located in the coastal area, because damage caused by cyclones are of great concern to APTRANSCO.

## **4.2 Transmission Plan for Short Term and Long Term**

### **4.2.1 Capacity Addition in Transmission during Short Term i.e., FY 2019-24**

The state is at present handling 58,793 MU (FY 2017-18) of energy & maximum demand reached in FY 2017-18 is 8983 MW. This is likely to increase to 87364 MU of energy & 15978 MW of peak demand by FY 2023-24. To meet this demand, robust & reliable Transmission network is required for Transmission (inter-state & intra state) of required energy.

For handling the above energy, PGCIL (CTU) has drawn up the following plans:

Inter Regional Lines (ER-SR corridor): PGCIL constructed Anugul-Srikakulam-Vemagiri 765 kV double circuit lines. Vemagiri-Chilakaluripeta line will be operationalized by June'19. These double circuit 765 kV lines will be able to transmit 3,000 MW power.

APTRANSCO can import power from other Regions through this ER-SR corridor, by getting linkage through a 400 kV substations at Srikakulam (Palasa).

APTRANSCO has planned of Transmission system addition during the period FY 2019-20 to FY 2023-24 which includes 5104 ckm of 400 KV, 4950 ckm of 220 kV ,1751 ckm of 132 kV lines and 18 numbers 400 kV substations, 44 numbers 220 kV substations and 60 numbers 132 kV substations.

The 400 kV network enhancements also cover a 400 kV Transmission ring

network around the new capital city Amaravathi and cities of Vijayawada & Guntur with 4 numbers 400 kV substations and 7 numbers 220KV substations.

#### 4.2.2 District wise Load Forecast.

Discoms have projected their circle wise Demand forecast and submitted to honorable APERC in Discoms Resource plan. District wise demand forecast from FY 2018 to FY 2024 is shown in the below table.

<b>EPDCL - Circles</b>	<b>FY18* (Actuals)</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>FY23</b>	<b>FY24</b>
<b>Srikakulam</b>	264	248	295	321	349	381	417
<b>Vizianagaram</b>	369	431	478	532	592	660	736
<b>Visakhapatnam</b>	1,036	1,157	1,268	1,391	1,528	1,681	1,850
<b>Rajahmundry</b>	718	781	829	909	1,000	1,102	1,216
<b>Eluru</b>	986	977	1,180	1,271	1,373	1,486	1,614
<b>SPDCL-Circles</b>	<b>FY18* (Actuals)</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>FY23</b>	<b>FY24</b>
<b>Vijayawada</b>	893	1,030	1,142	1,268	1,411	1,572	1,755
<b>Guntur</b>	781	863	950	1,050	1,164	1,293	1,442
<b>Ongole</b>	622	688	733	784	839	900	967
<b>Nellore</b>	687	751	814	886	969	1,063	1,172
<b>Tirupati</b>	975	1,292	1,374	1,464	1,562	1,668	1,785
<b>Kadapa</b>	793	938	981	1,029	1,083	1,143	1,210
<b>Anantapur</b>	985	1,185	1,234	1,288	1,348	1,414	1,486
<b>Kurnool</b>	756	1,029	1,083	1,143	1,208	1,280	1,358
<b>DISCOM</b>	<b>FY18* (Actuals)</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>FY23</b>	<b>FY24</b>
<b>EPDCL</b>	3,038	3,251	3,825	4,176	4,573	5,020	5,523
<b>SPDCL</b>	5,864	6,909	7,618	8,200	8,863	9,610	10,455

The circle level peaks are monthly peaks & may be arriving with discom peak in the same month

#### 4.2.2.1 Capacity Addition in Transmission for Load Type (400kV, 220kV & 132kV).

Due to increase in the district wise load FY 2019 the load scheduling is being done and Transmission expansion programme is prepared . The following plan is the abstract of the lines and Substations proposed to meet the additional load in the FY 2018-19.

FY	Sub-Stations			Lines		
	(Nos.)			Ckm		
	400	220	132	400	220	132
2018-19	2	8	26	6	602.3	1069
<b>Total</b>	<b>2</b>	<b>8</b>	<b>26</b>	<b>6</b>	<b>602.3</b>	<b>1069</b>

#### 4.2.3 Generation Evacuation

For evacuation of power from Power projects Transmission system is to be planned which includes lines and Substations. The abstract of generation evacuation plan programmed FY2018-19 which includes lines and Substation are shown below:

##### 4.2.3.1 Capacity Addition in Transmission for Generation type (400kV, 220kV & 132kV).

FY	Sub-Stations			Lines		
	( Nos.)			Ckm		
	400	220	132	400	220	132
2019	1	1	0	255	12.5	0
<b>Total</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>255</b>	<b>12.5</b>	<b>0</b>

#### 4.2.4 System Improvements:

In case of overloading of the existing line/substation new system is to be proposed for next higher voltage. This also includes re conductor of existing Transmission system



with higher ampacity conductors. These are categorized under system improvement for strengthening the system. The following plan is the abstract shown for system strengthening FY 2018-19.

**4.2.4.1 Capacity Addition in Transmission for System Improvement type (400kV, 220kV & 132kV).**

FY	Sub-Stations			Lines		
	( Nos.)			Ckm		
	400	220	132	400	220	132
2019	1	0	0	400	0	0
<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>0</b>

**5 Details of Transmission Expansion Plan FY 2018 to 2019.**

**5.1.1 Transmission Plan Programmed for Load Growth, System Improvement and Generation expansion.**

**5.1.1.1 Substations programmed during FY 2018-19 (400kV, 220kV & 132kV).**

**400kV Substations:**

Sl. No	District	Name of the SS	Voltage	Type
1	Prakasam	Podili	400	S
2	Anantapuramu	Hindupur	400	G
3	Chittoor	Kalikiri	400	L
4	West Godavari	Guddigudem	400	L

**220kV Substations:**

1	Kadapa	Tirumalaipally	220	G
2	Guntur	Guntur	220	L
3	Srikakulam	Pydibhimavaram	220	L
4	Krishna	Nuziveedu	220	L
5	Nellore	Atmakur	220	L
6	Prakasam	Kandukur	220	L
7	Nellore	Racharlapadu	220	L
8	West Godavari	Thadipudi	220	L
9	Anantapuramu	Mutyalacheruvu	220	L

**132kV Substations:**

Sl. No	District	Name of the SS	Voltage Ratio (kV/kV)
1	Guntur	Ponnuru	132/33
2	Guntur	AIIMS/Mangalagiri	132/33
3	Visakhapatnam	Kapuluppada	132/33
4	Vizianagaram	G Chodavaram	132/33
5	Krishna	Narasapuram	132/33
6	Krishna	GIS at Moghalrajpuram	132/33
7	Guntur	Yadavalli	132/33

8	Chittoor	V.Kota	132/33
9	YSR Kadapa	C.Orampadu	132/33
10	YSR Kadapa	Kalasapadu	132/33
11	YSR Kadapa	T.Sundupalli	132/33
12	YSR Kadapa	Satellite City	132/33
13	YSR Kadapa	Brahmamgarimattam	132/33
14	Anantapur	33kV features at 132 kV Switching station Nagalapuram	132/33
15	Anantapur	33kV features at 220 kV Boksampalli Substation	132/33
16	Prakasam	Chinnarikatla	132/33
17	Prakasam	East Gangavaram	132/33
18	East Godavari	Jaggampeta	132/33
19	Krishna	Mylavaram	132/33
20	Anantapur	33kV features at 132 kV LIS Madakasira	132/33
21	West Godavari	Reddyganapavaram	132/33
22	West Godavari	Routhugudem	132/33
23	Nellore	Marripadu	132/33
24	Chittor	Musalikunta	132/33
25	Guntur	Undavalli	132/33
26	Chittor	Kalicherla	132/33

**5.1.1.2 Lines programmed during FY 2018-19 (400kV, 220kV & 132kV).**

**400kV Lines:**

Sl.No	Name of the Transmission Line	IC	Conductor Type	Ckt	Length in Ckt KM
1	LILo of 400kV Uravakonda - Jammalamadugu to Thalaricheruvu SS	G	Quad Moose	LILo	2

2	400 kV Sattenapalli SS - 400 kV Podili SS	S	Twin Moose	D/C	215.28
3	400 kV Vemagiri SS - 400 kV Kamavarapukota SS	S	Twin Moose	D/C	184.942
4	400 kV Uravakonda SS to 400 kV Hindupur SS	G	Quad Moose	D/C	252.56
5	400 kV LILO of HNPCL - Kamavarapukota SS at proposed 400 kV Guddigudem SS.	L	Quad Moose	LILO	6

### 220kV Lines:

Sl.No	Name of the Transmission Line	IC	Conductor Type	Ckt	Length in Ckt KM
1	Proposed Jammalmadugu 400 kV SS To Proposed Tirumalaipally SS	G	Single Moose	D/C	108
2	220 kV DC line from 400/220 kV Sattenapalli to proposed 220 kV Guntur SS	L	Single Moose	D/C	110
3	400/220 kV Garividi SS to proposed 220/132 kV Pydibhimavaram SS DC line	L	Single Moose	D/C	100
4	220 kV DC Line for LILO of existing one circuit of 220kV VTS - Kamavarapukota line at proposed 220kV SS Nuzivedu.	L	Single Moose	LILO	24
5	220kV DC Line for LILO of existing one circuit of 220kV VTS-Kamavarapukota at 400/220kV SS Kamavarapukota	L	Single Moose	LILO	8
6	220kV DC line from 220kV SS Gunadala to 220kV SS Nunna in the same corridor of existing SC line with Monopoles (6.0 with Monopole & 1.0 with MC)	L	Single Moose	D/C	14
7	220kV Line With Four (4) Circuits on Multi - Circuit towers for LILO of Circuit - I & 2 of 220 kV Podili - Nellore DC Line at proposed 220 kV SS, Atmakur	L	Single Moose	LILO	80
8	220kV DC line from the proposed 400/220kV Podili SS to the 220/132kV Kandukur SS	L	Single Moose	D/C	96

9	220kV DC Line for making LILO of existing 220kV Nellore-Ongole line at proposed 220/132kV SS Racharlapadu	L	Single Moose	LILO	18
10	220 kV DC line from 400/220 kV Guddigudem to proposed 220/11 kV Thadipudi SS	L	Single Moose	D/C	36
11	220 kV DC line from Pulivendula to Muthyalacheruvu	L	Single Moose	D/C	109.4
12	220 kV LILO of Nannur-Regumanugadda line to 220 kV Brahmanotkur SS	L	Single Moose	LILO	6.902

### 132kV Lines:

Sl. No	Name of Transmission line	Length in Ckt kM
1	132 kV DC Line with XLPE Cable from proposed Up-gradation of 132/33 kV SS Tadepalli to 220/132/33 kV SS to proposed 132 kV SS AIIMS/Mangalagiri	9
2	132 kV DC Line with XLPE UG Cable from 220 kV Dairy Farm to the proposed 132 kV GIS SS at Kapuluppada.	14
3	33 kV 400sqmm 1 core copper XLPE Cable with terminal blocks (for 2 LVs)	2
4	Stringing of 2nd circuit on 132 kV Parchur - Chirala line	25
5	Stringing of 2nd circuit from 220 kV SS Markapur to 132 kV SS Kesinenipally	19
6	2nd circuit stringing on existing 132 kV Markapur - Cumbum	32

7	132 kV DC Line with XLPE UG Cable from proposed 220/132/33 kV SS Amaravati to the proposed 132/33 kV SS Amaravati	5
8	Stringing of 2nd circuit on 132 kV Uravakonda - Guntakal DC/SC Line	30
9	LILO of one circuit of 132 kV Uravakonda - Guntakal Line to 220 kV SS Vajrakarur	6
10	132 kV DC line with XLPE UG Cable from 132 kV SS Vijayawada to the proposed 132/33 kV GIS SS Moghalrajpuram	6
11	132 kV DC/SC line from tapping point to the proposed 132/33 kV Yernagudem Substation	1
12	2nd circuit stringing on 132 kV Nidadavolu - kV Kota line from 220 kV SS Kamavarapukota to the proposed 132 kV SS Yernagudem	38
13	132 kV DC/SC line from proposed 220/132 kV Pydibhimavaram Substation to the proposed 132/33 kV G.Chodavarm Substation	9
14	132 kV DC radial line from proposed 220/132 kV SS Nuzividu to the proposed 132/33 kV SS Narsapuram	25
15	132 kV DC radial line(UG Cable) from 220/132 kV Gunadala Substation to the proposed 132/33 kV GIS substation Moghalrajpuram	8
16	33 kV 400sqmm 1 core copper XLPE Cable with terminal blocks (for 2 LVs)	2
17	2 nd circuit on 132 kV DC/SC line from Parchur 220/132 kV Substation to the Martur 132/33 kV Substation	19.28

18	132 kV DC/SC line from 132/33 kV Martur substation to the proposed 132/33 kV Yadavalli substation	18
19	132 kV DC/SC line from 220/132/33 kV Palamaneru Substation to the proposed 132/33 kV V.Kota Substation	42
20	132 kV DC/SC line from 220/132 kV Rajampet substation to the proposed 132/33 kV C. Orampadu substation	22
21	132 kV DC radial line from proposed 220/132 kV Porumamilla to the proposed 132/33 kV Kalasapadu substation	36
22	132 kV DC radial line from 132/33 kV SS Rayachoti to the proposed 132/33 kV SS T. Sundupalli	20
23	132 kV DC radial line from 220/132 kV SS Chinakampalli to the proposed 132/33 kV SS Satellite city	30
24	132 kV DC radial line from proposed 220/132 kV SS Porumamilla to the proposed 132/33 kV SS Brahmamgarimattam	15
25	132 kV DC Radial line from 220/132 kV SS Podili to proposed 132 kV SS Chinnarikatla	26
26	132 kV DC radial line from 220/132 kV SS Podili to the proposed 132/33 kV SS at East Gangavaram	21
27	132 kV DC radial line from 220/132 kV SS Samarlakota to the proposed 132/33 kV SS at Jaggampet	20
28	132 kV DC radial line from 220/132 kV SS Kondapalli to the proposed 132/33 kV SS at Mylavaram	25
29	Stringing of 2nd circuit from 220 kV SS Gollapuram to 132 kV SS Lepakshi	15

30	132 kV DC line from 132 kV SS Lepakshi to the proposed 132 kV SS Palasamudram	20
31	132 kV DC Line with XLPE UG Cable from proposed 220/132/33 kV SS Amaravati to the proposed 132/33 kV SS Achampeta	32
32	132 kV DC/SC Line with XLPE UG Cable from proposed 220/132/33 kV SS Amaravati to the proposed 132/33 kV SS Dondapadu	15
33	132 kV DC/SC Line with XLPE UG Cable from proposed 220/132/33 kV SS Malkapuram to the proposed 132/33 kV SS Dondapadu	11
34	132 kV DC line from 220 /132 kV kV Kota SS to proposed 132/11 kV Reddyganapavaram SS.	60
35	132 kV DC line from Reddyganapavaram SS to proposed 132/11 kV Routhugudem SS.	8
36	132 kV DC/SC Line from 220/132 kV Atmakuru SS to proposed 132/11 kV Marripadu SS	45
37	132 kV DC/SC line from 220/132 kV Timmapuram SS to proposed 132 kV Musalikunta SS.	40
38	132 kV DC line from 132/33 kV Tadepalli SS to Proposed 132/11 kV Undavalli LIS SS	10
39	132 kV line with four Circuits on Multi Circuit Towers to make LILO of both circuits of 132 kV Guntur-Tenali DC line at proposed 220 kV Guntur Substation	80
40	Proposed 220/132 kV Pydibhimavaram SS to the Tap point of 132 kV LILO line going to the existing 132/33 kV Pydibhimavaram SS	4



41	Proposed 220/132 kV Pydibhimavaram SS - 132 kV Chilakapalem SS DC line	80
42	132 kV DC line for LILO of existing 132 kV Nellore - Atmakur line at proposed 220/132 kV SS Atmakur	6.00
43	132 kV DC line for LILO of existing 132 kV Atmakur - Udayagiri line at proposed 220/132 kV SS Atmakur	4.00
44	LILO of 132 kV SC line from 132 kV existing Kavali - Kandukur SS to the proposed 220 kV Substation at Kandukur	15
45	132 kV DC Line for making LILO of existing 132 kV NTS - Allur line at proposed 220/132 kV SS Racharlapadu	2.40
46	132 kV DC Line for making LILO of existing 132 kV Kavali - Allur line at proposed 220/132 kV SS Racharlapadu	48.00
47	132 kV DC Line to proposed Dagadarthi SS from proposed 220/132 kV SS Racharlapadu	48.00

## 6 Capacity Addition in Transmission Plan Short Term (FY 2019 to 2024)

Tentative Transmission expansion plan for the short term i.e from FY 2019-20 to FY 2023-24 is also done as per the load requirement. This includes 1201 ckm of 400 KV, 3696.4 ckm of 220 kV lines and 2162 ckm of 132 kV lines towards transmission expansion and 10 numbers of 400 kV substations, 42 numbers of 220kV substations and 126 numbers of 132kV substations towards Transmission expansion.

### 6.1.1 Capacity Addition in Transmission for during Short Term (FY 2019 to 2024). (400kV, 220kV & 132kV).

FY	Sub-Stations			Lines		
	(Nos.)			Ckm		
	400	220	132	400	220	132
2019-20	3	14	32	221	1036.4	841
2020-21	2	9	28	230	596	500
2021-22	2	7	23	440	898	241
2022-23	2	6	22	270	860	115
2023-24	1	6	21	40	306	465
<b>Total</b>	<b>10</b>	<b>42</b>	<b>126</b>	<b>1201</b>	<b>3696.4</b>	<b>2162</b>

## 7 Details of Transmission Expansion Plan for Short Term i.e. FY 2019 to 2024.

### 7.1.1 400kV, 220kV & 132kV Substations programmed during FY 2019-24

Sl. No	District	Name of the SS	Voltage	Target year of Commissioning
<b>400 kV Substations</b>				
1	Guntur	Thallayapalem GIS	400	2019-20
2	Chittoor	Rachaganneru	400	2019-20
3	Kadapa	Mylavaram	400	2019-20
4	Nellore & Visakhapatnam	Augmentation at Manubolu and Kalpaka	400	2019-20
1	West Godavari	Eluru	400	2020-21
2	Anatapur	Uravakonda-2	400	2020-21
1	Krishna	Gudivada	400	2021-22
2	Kurnool	Aspiri	400	2021-22
1	Guntur	Chilakaluripeta	400	2022-23
2	Eest Godavari	Konaseema	400	2022-23
1	Eest Godavari	Kakinada SEZ	400	2023-24

220 kV Substations				
1	Kurnool	Betamcherla	220	2019-20
2	Anantapur	Penukonda	220	2019-20
3	Visakhapatnam	Koruprolu (Chandanada/ Nakkapalli)	220	2019-20
4	Nellore	Naidupeta(Menakuru)	220	2019-20
5	Chittoor	Chervi	220	2019-20
6	Visakhapatnam	Achutapuram	220	2019-20
7	East Godavari	Kakinada SEZ	220	2019-20
8	Guntur	220/33 kV GIS SS Lingayapalem (CRDA)	220	2019-20
9	Guntur	Upgradation of 132 kV SS Piduguralla To 220 kV SS	220	2019-20
10	Visakhapatnam	Upgradation of 132 kV SS Simhachalam to 220/132 kV SS	220	2019-20
11	East Godavari	132 kV & 33 kV Features at 220/11 kV LIS SS Ramavaram	220	2019-20
12	East Godavari	220/33 kV SS Chinturu	220	2019-20
13	Guntur	220/33 kV GIS SS Nelapadu (CRDA)	220	2019-20
14	Anantapur	Pampanur Thanda	220	2019-20
1	East Godavari	Korukonda	220	2020-21
2	West Godavari	220/33 kV SS Akiveedu	220	2020-21
3	Vizianagaram	Vizianagaram	220	2020-21
4	Anantapur	Dharmavaram	220	2020-21
5	East Godavari	Amalapuram (Siripalli)	220	2020-21
6	Guntur	Upgradation of 132 kV SS Tadepalli to 220 kV SS	220	2020-21
7	Guntur	Thulluru	220	2020-21
8	Guntur	Rayapudi	220	2020-21
9	Guntur	Velagapudi	220	2020-21

1	Nellore	Kothapalem	220	2021-22
2	East Godavari	Ramachandrapuram	220	2021-22
3	Guntur	Repalle	220	2021-22
4	Kurnool	Adoni	220	2021-22
5	Krishna	Gannavaram	220	2021-22
6	East Godavari	Machilipatnam	220	2021-22
7	Prakasam	Kanigiri	220	2021-22
1	Nellore	Kavali	220	2022-23
2	Anantapur	Kadiri	220	2022-23
3	East Godavari	Prattipadu	220	2022-23
4	Kurnool	Dhone 132 kV Features	220	2022-23
5	East Godavari	Editha	220	2022-23
6	West Godavari	Tanuku	220	2022-23
1	Kadapa	Rayachoti	220	2023-24
2	West Godavari	Penugonda	220	2023-24
3	Prakasam	Podalakuru	220	2023-24
4	Nellore	Sarvepalli	220	2023-24
5	Visakhapatnam	Anandapuram	220	2023-24
6	Visakhapatnam	Commom Point	220	2023-24

### 132kV Substations programmed during FY 2020-24

Sl. No	District	Name of the SS	Target year of Commissioning
1	Prakasam	Anumalapalle	2019-20
2	Nellore	Kallurpalli	2019-20
3	Nellore	Vinjamur	2019-20
4	Nellore	Koruturu	2019-20
5	East Godavari	Mummidivaram	2019-20
6	East Godavari	Gollapalem	2019-20
7	Chittoor	Kothapalli (Gudipala)	2019-20
8	Chittoor	Penumur	2019-20
9	Nellore	Kadivedu	2019-20

10	Anantapur	Palasamudram	2019-20
11	Krishna	Bantumilli	2019-20
12	Chittoor	Mangalam	2019-20
13	Nellore	Gottiprolu	2019-20
14	East Godavari	Vepakayaladibba	2019-20
15	Visakhapatnam	APMTZ, Nadupuru	2019-20
16	Vizianagaram	Alamanda	2019-20
17	West Godavari	Vatluru/ Hanuman Junction	2019-20
18	West Godavari	TR Palem/ Gunnampalli	2019-20
19	West Godavari	Attili (Pippara)	2019-20
20	West Godavari	Palakollu	2019-20
21	West Godavari	Dharmajigudem	2019-20
22	Srikakulam	Veeraghattam	2019-20
23	Srikakulam	Sarubujjili (Amadalavalasa)	2019-20
24	Kurnool	33kV features at Nansuralla LIS SS	2019-20
25	Visakhapatnam	Jamathulapalem	2019-20
26	Visakhapatnam	Tida	2019-20
27	Visakhapatnam	Bhudevi Tank	2019-20
28	Vizianagaram	Veeranarayanapuram	2019-20
29	Vizianagaram	Tatipudi	2019-20
30	Vizianagaram	Kondagandrelu	2019-20
31	Vizianagaram	GM Valasa	2019-20
32	Vizianagaram	Burjavalasa	2019-20

1	East Godavari	Annavaram	2020-21
2	Prakasam	Chinnaganjam	2020-21
3	Krishna	Gunadala	2020-21
4	Krishna	Mukthyala	2020-21
5	Krishna	Gampalagudem	2020-21

6	Krishna	Vuyyuru	2020-21
7	Prakasam	Kothapatnam	2020-21
8	Prakasam	Pallamalli	2020-21
9	Prakasam	Singarayakonda	2020-21
10	Prakasam	Mekalavaripalli	2020-21
11	Prakasam	Ulavapadu	2020-21
12	Prakasam	Pullalacheruvu	2020-21
13	Prakasam	Komarole	2020-21
14	Prakasam	Elchuru (V), Santhamaguluru (M)	2020-21
15	Prakasam	Siddannapalem (V), Pullalacheruvu (M)	2020-21
16	Kurnool	Near Ayyaluri Metta (Nandyal)	2020-21
17	Chittoor	Kakalamitta	2020-21
18	Chittoor	Gudipadu	2020-21
19	Chittoor	Vijalapuram	2020-21
20	Kurnool	Gondiparla (E.Thandrapadu)	2020-21
21	Srikakulam	Sompeta	2020-21
22	Srikakulam	Hiramandalam	2020-21
23	Krishna	Kabela	2020-21
24	Vizianagaram	Chipurupalli	2020-21
25	Vizianagaram	Nellimarla	2020-21
26	Vizianagaram	GajapathiNagaram	2020-21
27	Guntur	Nekarikallu	2020-21
28	Kurnool	Kosgi	2020-21

1	Nellore	Chintavaram	2021-22
2	Krishna	Jakkampudi	2021-22
3	Krishna	Mallavalli	2021-22
4	Krishna	Devanakonda	2021-22
5	Krishna	Kalluru	2021-22

6	Chittoor	Gandhipuram	2021-22
7	Kurnool	Gajulapalli	2021-22
8	Anantapur	Kuderu	2021-22
9	Guntur	Bhattiprolu	2021-22
10	Guntur	Bellamkonda	2021-22
11	Kurnool	33kV features at Krishnagiri LIS SS	2021-22
12	Chittoor	Satyavedu	2021-22
13	Chittoor	Poothalapattu	2021-22
14	Chittoor	BN Kandriga	2021-22
15	Prakasam	Kaligiri	2021-22
16	Prakasam	Veligandla	2021-22
17	Prakasam	Ponnaluru	2021-22
18	Krishna	Penamaluru	2021-22
19	Krishna	Kankipadu	2021-22
20	Krishna	Challapalle	2021-22
21	Srikakulam	Gara	2021-22
22	Srikakulam	Polaki	2021-22
23	Srikakulam	Vajrapukothuru	2021-22
1	Vizianagaram	Pusapathirega	2022-23
2	Vizianagaram	Kurupam	2022-23
3	Vizianagaram	Mentada	2022-23
4	Nellore	Duttalur	2022-23
5	Nellore	Buchireddypalem	2022-23
6	Nellore	Somasila	2022-23
7	Nellore	Dakkili	2022-23
8	Nellore	Jonnawada	2022-23
9	Nellore	Vidavaluru	2022-23
10	Visakhapatnam	Madugula	2022-23
11	Visakhapatnam	Sabbavaram	2022-23
12	Visakhapatnam	Nathavaram	2022-23

13	West Godavari	Unguturu	2022-23
14	West Godavari	Undrajavaram	2022-23
15	West Godavari	Veeravasarevu	2022-23
16	Guntur	Peddakakani	2022-23
17	Guntur	Gurazala	2022-23
18	Guntur	Edlapadu	2022-23
19	YSR Kadapa	Galiveedu	2022-23
20	YSR Kadapa	Nandaluru	2022-23
21	YSR Kadapa	Pullampeta	2022-23
22	YSR Kadapa	Lakkireddipalle	2022-23

1	Kurnool	Jupadu	2023-24
2	Kurnool	Miduthur	2023-24
3	Kurnool	Chagalamarri	2023-24
4	Nellore	Mallam	2023-24
5	Nellore	Varagali	2023-24
6	Vizianagaram	Govada	2023-24
7	Visakhapatnam	K.Kotapadu	2023-24
8	Visakhapatnam	Vaddadhi	2023-24
9	Visakhapatnam	Bhimili	2023-24
10	Visakhapatnam	Rambili (Lalam Koduru)	2023-24
11	Visakhapatnam	Auto Nagar	2023-24
12	Visakhapatnam	East Point Colony	2023-24
13	East Godavari	Hamsavaram	2023-24
14	East Godavari	Panasapadu, Kakinada Rural	2023-24
15	East Godavari	Teki	2023-24
16	East Godavari	Uppalaguptam	2023-24
17	East Godavari	Mamidikuduru	2023-24
18	East Godavari	Gokavaram	2023-24
19	East Godavari	Dwarapudi or Mukkinada	2023-24



20	East Godavari	Atreyapuram	2023-24
21	East Godavari	Addathigala	2023-24

### 7.1.2 400kV , 220 kV and 132 kV lines Programmed during FY 2020-24:

Sl.No	Name of the Transmission Line	IC	Conductor Type	Ckt	Length in Ckt KM	Target year of Commissioning
-------	-------------------------------	----	----------------	-----	------------------	------------------------------

#### 400 kV Lines

1	400 kV LILO of 400 kV Chittoor SS - 400 kV APGENCO Krishnapatnam to proposed 400/220/132kV Rachagunneri SS	L	Quad Moose	LILO	180	2019-20
2	Diversion of 400 kV Lines in CRDA	S			37	2019-20
3	400kV LILO of existing - 400kV VTS - Sattenapalli DC line at proposed 400/220kV Thallayapalem GIS	L	Twin Moose	LILO	2	2019-20
4	400 kV Jammalamdugu SS to 400 kV Mylavaram	G	Quad Moose	D/C	2	2019-20

**221**

1	LILO of 400 kV Vemagiri - Sattenpalli DC twin lines at Eluru 400 kV substation	L	Twin Moose	LILO	40	2020-21
2	400 kV Existing Urvakonda SS to proposed 400 kV Urvakonda 2 SS	G	Quad Moose	D/C	50	2020-21
3	400 kV Kamavarapukota SS to Polavaram Generating Station	G	Quad Moose	D/C	140	2020-21

**230**

1	400 kV Eluru SS to 400 kV Gudivada SS	L	Quad Moose	D/C	80	2021-22
2	400 kV Jammalamdugu SS to 400 kV Gani SS	G	Quad Moose	D/C	180	2021-22
3	400 kV Narnoor to 400 kV Aspiri SS	G	Quad Moose	D/C	180	2021-22

**440**

1	765 kV PGCIL Chilakaluripeta SS to 400 kV APTRANSCO Chilakaluripeta SS	L	Quad Moose	D/C	64	2022-23
2	400 kV Chilakaluripeata SS to 400 kV Gudivada SS	L	Quad Moose	D/C	206	2022-23

**270**

1	400kV LILO of existing 400 kV HNPCL - Kamavarapukota at proposed 400/220 kV Kakinada SEZ SS	L	QuadMoose	LILO	40	2023-24
---	---	---	-----------	------	----	---------

**220 kV Lines**

1	Jammalmadugu 400 kV SS To proposed Betamcherla SS	G	SM	DC	136	2019-20
2	220 kV DC line with Moose ACSR on Galvanised towers for LILO of 220 kV Parwada - Samalkota SC line at the proposed 220 kV SS, Koruprolu	L	SM	LILO	32	2019-20
3	220kV DC line for LILO of 220 kV VSS - Kakinada SC Line at the proposed 220 kV SS, Koruprolu	L	SM	LILO	32	
4	Hindupur 400 kV SS to proposed Penukonda SS	G	SM	DC	70	2019-20
5	220kV DC Line from proposed 400/220/132kV SS Rachagunneri to the proposed 220 kV Menakuru/ Naidupeta SS	L	SM	DC	80	2019-20
6	Rachagunneri 400 kV SS To proposed Chervi 220 kV SS	L	SM	DC	100	2019-20
7	Sullurpet 220 kV SS To proposed Chervi 220 kV SS	L	SM	DC	60	
8	220kV DC Line from 220kV SS Brandix to the proposed 220kV GIS Atchutapuram SS on Multi-circuit Towers	L	SM	DC	16	2019-20
9	220kV DC Line from 220kV SS Samarlakota Switching Station to the proposed 220 kV Kakinada SEZ Sub-Station (10.00Km MC +50.00 Km OH Line)	L	SM	DC	120	2019-20
10	220kV DC Line for making LILO of existing VTS - Podili line at proposed 220 kV GIS SS Lingayapalem (One circuit) 2 (OH) + 1.8 (Cable)	L	SM	LILO	7.6	2019-20

11	220kV DC Line for making LILO of existing VTS - Narasaraopet line at proposed 220/33 kV GIS SS Lingayapalem 2 (OH) + 1.8 (Cable)	L	SM	LILO	7.6	
12	Erection of 220kV DC line for making LILO of existing 220kV VTS-Thallapalli 3rd circuit to proposed 220/132/33kV SS Piduguralla on Narrow based towers	L	SM	LILO	4	2019-20
13	Erection of 220kV DC line for making LILO of existing 220kV VTS-Thallapalli 4th circuit to proposed 220/132/33kV SS Piduguralla on Narrow based towers	L	SM	LILO	4	
14	220kV DC line for making LILO of 220kV Kalapaka - Dairyfarm to proposed 220/132/33kV SS Simhachalam on MC Towers	L	SM	LILO	8	2019-20
15	LILO of 220kV Tadikonda - Ongole SC line to 220kV SS Guntur (Prathipadu) under construction on NMD towers	L	SM	LILO	4.2	2019-20
16	220 kV LILO of Kalpaka - Brandix to 220 kV Simhachalam SS	L	SM	LILO	105	2019-20
17	LILO of 220kV Lower Sileru - KTS-II (Old stage) to proposed 220kV SS Chinturu	L	SM	LILO	6	2019-20
18	220kV DC XLPE 1000 Sq.mm UG Cable from proposed 400/220kV GIS SS Tallayapalem to proposed 220/33 kV GIS SS Nelapadu	L	XLPE CABLE	DC	20	2019-20
19	Hindupur 400 kV SS to proposed Pampanur Thanda SS	G	SM	DC	180	2019-20
20	220kV DC line from 400/220kV SS Kamavarapukota to 220kV SS Bhimadole in West Godavari district	L	SM	DC	44	2019-20
					<b>1036.4</b>	
1	220kV DC line for making LILO of 2nd circuit from proposed 220kV Korukonda Switching Station - Rampachodavaram to 220kV SS Lower Sileru	G	SM	LILO	164	2020-21

2	Erection of 2nd circuit from proposed 220kV Korukonda Switching Station to 220kV SS Rampachodavaram	G	SM		78	
3	220kV LILO of one circuit of 220kV Bhimavaram-Eluru line to proposed 220kV SS Akiveedu	L	SM	LILO	2	2020-21
4	220kV DC line for making LILO of 220 kV Garividi- Pendurthy line to proposed 220/132kV SS Vizianagaram	L	SM	LILO	20	2020-21
5	Tirumalayapalli To proposed Dharmavaram SS	L	SM	DC	168	2020-21
6	220kV DC Line for LILO of existing one circuit of 220kV Vemagiri - Undi DC Line at proposed 220kV SS Siripalli ( Amalapuram)	L	SM	LILO	48	2020-21
7	LILO of VTS-Tallapalli Ckt2 to proposed Tadepalli 220 kV SS	L	SM	LILO	40	2020-21
8	Lingayapalem 220 kV SS To proposed Tadepalli 220 kV SS (Cable)	L	XLPE CABLE	DC	24	2020-21
9	Inavolu / Thullur 400 kV SS to Proposed Tadepalli 220 kV SS (Cable)	L	XLPE CABLE	DC	22	2020-21
10	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Borupalem to proposed 220/33 kV GIS SS Thulluru	L	XLPE CABLE	DC	12	2020-21
11	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Borupalem to proposed 220/33 kV GIS SS Rayapudi	L	XLPE CABLE	DC	6	2020-21
12	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV SS Tallayapalem to proposed 220/33 kV GIS SS Velagapudi	L	XLPE CABLE	DC	12	2020-21
					<b>596</b>	
1	220kV DC line from 400kV Manubolu to proposed 220kV SS Kothapalem	L	SM	DC	50	2021-22
2	220kV DC line from 220kV Amalapuram to proposed 220kV SS Ramachandrapuram	L	SM	DC	80	2021-22

3	Parchuru To proposed Repalle 220 kV SS	L	SM	DC	200	2021-22
4	Guntur To proposed Repalle 220 kV SS	L	SM	DC	120	2021-22
5	Gooty 400 kV SS To proposed Adoni SS	L	SM	DC	128	2021-22
6	Gudivada 400 kV SS To proposed Gannavaram 220 kV SS	L	SM	DC	70	2021-22
2	220kV DC line from 220kV SS Nunna to Proposed 220kV SS Gannavaram in Krishna District	L	SM	DC	50	2021-22
7	Gudivada 400 kV SS To proposed Machilipatnam 220 kV SS	L	SM	DC	80	2021-22
8	Proposed Podili 400 kV SS To proposed Kanigiri(Prksm) 220 kV SS	L	SM	DC	120	2021-22
					<b>898</b>	
1	Manubolu 400 kV SS To proposed Kavali 220 kV SS	L	SM	DC	360	2022-23
2	N P Kunta To proposed Kadiri 220 kV SS	L	SM	DC	160	2022-23
3	Koruprolu 220 kV SS To proposed Prattipadu 220 kV SS	L	SM	DC	140	2022-23
4	Vemagiri 400 kV SS To proposed Editha 220 kV SS	L	SM	DC	80	2022-23
5	Nidadavolu 220 kV SS To proposed Tanuku 220 kV SS	L	SM	DC	120	2022-23
					<b>860</b>	
1	220kV DC line from 400kV SS Kalikiri to Proposed 220kV SS Rayachoti in Y.S.R Kadapa District	L	SM	DC	100	2023-24
2	220 kV SS Tanuku to proposed 220 kV SS Penugonda in West Godavary District	L	SM	DC	26	2023-24
3	220 kV SS Nellore To 220 kV SS Podalakuru	L	SM	DC	80	2023-24
4	400 kV Manubolu To 220 kV SS Sarvepalli	L	SM	DC	50	2023-24
5	220 kV Diary Farm To proposed 220 kV Anandapuram	L	SM	DC	30	2023-24

6	220 kV Gajuwaka To Common Point	L	SM	DC	20	2023-24
---	---------------------------------	---	----	----	----	---------

### 132kV Lines programmed during FY 2019-24

Sl. No	Name of Transmission line	Length in Ckt kM	Target year of Commissioning
1	Stringing of 2nd circuit on 132 kV Cumbum - Giddalur DC/SC Line	37.5	2019-20
2	132 kV DC Line for LILO of 2nd circuit of 132 kV Cumbum - Giddalur line to proposed 132/33 kV Substation at Anumalapalle	17	
3	132 kV DC/SC radial line from 220/132 kV Nellore Substation to the proposed 132/33 kV Kallurpalli substation	5	2019-20
4	132 kV DC/SC line from proposed 220/132 kV SS Atmakur to the proposed 132 kV SS Vinjamur	25	2019-20
5	132 kV DC radial line from proposed 132/33 kV Kallurpalli Substation to the proposed 132/33 kV Koruturu substation	25	2019-20
6	132 kV DC radial line from proposed 220/132 kV Amalapuram SS to the proposed 132/33 kV Mummidivaram SS	15	2019-20
7	132 kV DC Line for making LILO of 132 kV Ramachandrapuram - Amalapuram radial line to proposed 132/33 kV Mummidivaram SS	8	
8	Stringing of 2nd circuit on existing 132 kV Kakinada - Yanam DC/SC Line	42	2019-20

9	Erection of 132 kV DC line for making LILO of 2nd circuit of 132 kV Kakinada - Yanam line to the proposed 132/33 kV Gollapalem SS	6	
10	132 kV DC radial line from 132 kV Noonegundlapalli switching station to the proposed 132/33 kV Kothapalli substation	25	2019-20
11	132 kV DC radial line from proposed 132/33 kV Pachikapallam to the proposed 132/33 kV Penumur substation	20	2019-20
12	2nd circuit stringing on 132 kV DC/SC Line from 220/132 kV SS Nagari to 132 kV SS Pachikapallam	40	
13	132 kV DC radial line from 400/220/132 kV SS Manubolu to the proposed 132/33 kV Kadivedu substation	25	2019-20
14	Stringing of 2nd circuit on existing 132 kV DC/SC Line from 220/132 kV SS Gudivada to 132 kV SS Chigurukota	23	2019-20
15	132 kV DC line from 132 kV SS Chigurukota to the proposed 132/33 kV SS Bantumilli	18	
16	132 kV DC line from 220/132 kV SS Rachagunneri to the proposed 132/33 kV SS Mangalam	30	2019-20
17	132 kV DC line from proposed 220/132 kV SS Naidupet to the proposed 132/33 kV SS Gottiprolu	30	2019-20
18	132 kV LILO of existing 132 kV Kanumolu - Pamarru at proposed 400/220/132 kV SS Gudivada	4	2019-20
19	132 kV LILO of existing 132 kV Chilakaluripet - Nallapadu at proposed 220/132 kV SS Chilakaluripet	10.5	2019-20

20	132 kV LILO of existing 132 kV Chilakaluripet - Mairipalem at proposed 220/132 kV SS Chilakaluripet	10.5	2019-20
21	132 kV DC/SC Line with XLPE UG Cable from proposed 220/132/33 kV SS Amaravati to the proposed 132/33 kV SS Peddaparimi	19	2019-20
22	132 kV DC/SC Line with XLPE UG Cable from proposed 220/132/33 kV SS Malkapuram to the proposed 132/33 kV SS Navuluru	12	2019-20
23	132 kV DC/SC Line with XLPE UG Cable from proposed 132/33 kV SS Peddaparimi to the proposed 132/33 kV SS Navuluru	16	2019-20
24	132 kV DC/SC Line from 220/132 kV SS Brandix to the proposed 132/33 kV Substation APMTZ	30	2019-20
25	132 kV DC Line by making LILO of 132 kV Gajuwaka - Parawada line at proposed 132 kV SS APMTZ	3	
26	220 kV SS Bommur to 132 kV SS Vepakayaladibba	7	2019-20
27	220 kV SS Undi to 132 kV SS Akiveedu	15	2019-20
28	220 kV SS Kamavarapukota to 132 kV SS Dharmajigudem	25	2019-20
29	220 kV SS Undi to 132 kV SS Attili	25	2019-20
30	220/132/33 kV SS Duvva to the proposed 132/33 kV SS Palakollu	20	2019-20
31	132 kV SS Rajam to 132 kV SS Veeraghattam	35	2019-20
32	132 kV SS Palakonda to 132 kV SS Sarubujili	20	2019-20



33	132 kV DC line 220/132 kV Anrak Sw.Station to Jamathulapalem	40	2019-20
34	132 kV DC line 220/132 kV Anrak Sw.Station to Teeda	20	2019-20
35	132 kV TB vara to VN Puram DC/SC line	8	2019-20
36	132 kV TB vara to Thatipudi DC/SC line	8	2019-20
37	132 kV Garividi to Kondaganredu DC/SC line	9	2019-20
38	132 kV Parvathipuram to GM vasa DC/SC line	18	2019-20
39	132 kV BGC to Burjavalasa	5	2019-20
40	132 kV DC line from 220/132 kV SS Penukonda to 132 kV SS Penukonda	20	2019-20
41	132 kV DC Line for making LILO of existing 132 kV Naidupeta-Gudur line to proposed 220 kV SS Menakuru/ Naidupeta	30.00	2019-20
42	132 kV DC Line from proposed 220 kV SS Menakuru/ Naidupeta to 132 kV SS Menakuru	16.00	2019-20
43	132 kV 630sqmm XLPE Cable with terminal blocks (for 2 LVs) for 220 kV Atchutapuram SS	3.00	2019-20
44	33 kV 400sqmm 1 core copper XLPE Cable with terminal blocks (for 2 LVs) for 220 kV Atchutapuram SS	2.00	2019-20

45	132 kV DC line at the existing 132 kV Simhachalam - Nakkavanipalem & 132 kV Simhachalam - Commonpoint corridor with 132 kV XLPE UG Cable	2.00	2019-20
46	132 kV DC line for making LILO of both the lines from existing 132 kV Peddapuram - Prathipadu line to 220/11 kV LIS SS Ramavaram	16.00	2019-20
		<b>841</b>	
1	132 kV DC/SC Line with XLPE UG Cable from proposed 220/132/33 kV SS Malkapuram to the proposed 132/33 kV SS Uddandrayanipalem	3	2020-21
2	132 kV DC/SC Line with XLPE UG Cable from proposed 132/33 kV SS Dondapadu to the proposed 132/33 kV SS Uddandrayanipalem	7	2020-21
3	132 kV DC/SC Line with XLPE UG Cable from proposed 220/132/33 kV SS Malkapuram to the proposed 132/33 kV SS Krishnayanipalem	6	2020-21
4	132 kV DC/SC Line with XLPE UG Cable from proposed 132/33 kV SS Navuluru to the proposed 132/33 kV SS Krishnayanipalem	3	2020-21
5	132 kV SS Pithapuram to 132 kV SS Annavaram	30	2020-21
6	220 kV SS Garividi to 132 kV SS Nelimarla	30	2020-21
7	220 kV SS Kondapalli to 132 kV SS Kabela	25	2020-21
8	132 kV SS Palasa to 132 kV SS Sompeta	35	2020-21
9	220 kV SS Garividi to 132 kV SS Chipurupalli	10	2020-21
10	132 kV TB Vara - 220 kV Garividi LILO to Gajapathinagaram	36	2020-21

11	220 kV SS Kandukur to 132 kV SS Singarayakonda	30	2020-21
12	Proposed 132 kV SS Chinnarikatla to 132 kV SS Mekalavaripalli	25	2020-21
13	220 kV SS Ongole to 132 kV SS Kothapatnam	30	2020-21
14	220 kV SS Kandukuru to proposed 132 kV SS Ulavapadu	10.5	2020-21
15	220/132 kV SS Gudivada to the proposed 132/33 kV SS Vuyyuru	20	2020-21
16	220/132 kV Narasaraopeta to the proposed 132/33 kV SS Elchuru	25	2020-21
17	Proposed 132 kV SS Kalasapadu to 132 kV SS Komarole	30	2020-21
18	220 kV SS Gunadala to 132 kV SS Gunadala	25	2020-21
19	220 kV SS Chillakallu to 132 kV SS Mukthyala	30	2020-21
20	LILO of 132 kV Kondapalli-Nuzividu line to 132 kV SS Gampalagudem	40	2020-21
21	132 kV SS Irala to 132 kV SS Kakalamitta	20	2020-21
22	132 kV SS Shanthipuram to 132 kV SS Vijalapuram	25	2020-21
23	132 kV DC Line for LILO of existing one circuit of 132 kV R.C Puram - Amalapuram DC line at proposed 220/132 kV SS Siripalli (Amalapuram)	2.00	2020-21
24	132 kV LILO of 132 kV Amalapuram- Kothapeta to proposed 220/132 kV Siripalli (Amalapuram)	2.00	2020-21
		<b>500</b>	
1	132 kV Renigunta-Chandragiri line LILO to 132 kV SS Gandhipuram	5	2021-22
2	132 kV SS Kesinenipalli to 132 kV SS Pullalacheruvu	35	2021-22

3	132 kV Nandyala-Allagadda LILO to 132 kV SS Gajulapalli	20	2021-22
4	220 kV SS Cherivi to 132 kV SS Satyavedu	24	2021-22
5	132 kV SS Penumur to 132 kV SS Poothalapattu	20	2021-22
6	220 kV SS Atmakuru to 132 kV SS Kaligiri	30	2021-22
7	132 kV SS Repalle to Bhattiprolu	17	2021-22
8	132 kV SS Piduguralla to Bellamkonda	19	2021-22
9	132 kV SS Kanigiri to Veligandla	26	2021-22
10	220 kV SS Kandukuru to Ponnaluru	20	2021-22
11	220 kV SS Rachagunneri to BN Kandriga	25	2021-22
		<b>241</b>	
1	132 kV SS Vinjamuru to 132 kV SS Duttaluru	30	2022-23
2	132 kV SS NTS to 132 kV SS Buchireddypalem	10	2022-23
3	132 kV SS Rapur to 132 kV SS Somasila	25	2022-23
4	132 kV SS Rapur to 132 kV SS Dakkili	30	2022-23
5	132 kV Nellore - Atmakuru LILO to 132 kV SS Jonnawada	5	2022-23
6	220 kV SS Racharlapadu to 132 kV SS Vidavalur	15	2022-23
		<b>115</b>	
1	220 kV SS Meenakuru to 132 kV SS Mallam	40	2023-24
2	220 kV SS Manubolu to 132 kV SS Varagali	20	2023-24
3	132 kV SS Chodavaram to 132 kV SS K.Kotapadu	10	2023-24

4	Kasimkota - Pendurthy LILO to Govada	15	2023-24
5	Anrak SS to 132 kV SS Vaddadhi	20	2023-24
6	132 kV SS Kapuluppada to 132 kV SS Bhimili	15	2023-24
7	Brandix to 132 kV SS Rambili	15	2023-24
8	Dairy Farm to 132 kV SS NSTL	10	2023-24
9	Gajuwaka to 132 kV SS Auto nagar	10	2023-24
10	Peddawaltair to East Point colony	5	2023-24
11	Proposed 220 kV SEZ SS to Hamsavaram	25	2023-24
12	Proposed 220 kV SS Gollaprolu to Hamsavaram	30	2023-24
13	Proposed 220 kV SS Prathipadu to Hamsavaram	40	2023-24
14	LILO of 132 kV Kakinada - Peddapuram line to Panasapadu	2	2023-24
15	Proposed 220 kV Ramachandrapuram to Teki	15	2023-24
16	Proposed 132 kV SS Mummdivaram to Uppalaguptam	15	2023-24
17	LILO of 132 kV Amalapuram-Razolu line to Mamidikuduru	3	2023-24
18	Proposed 220 kV SS Korukonda to Gokavaram	10	2023-24
19	132 kV SS Biccavolu to Dwarapudi or Mukkinada	12	2023-24
20	Proposed 220 kV Ramachandrapuram to Dwarapudi or Mukkinada	20	2023-24
21	220 kV SS Nidadavolu to Atreyapuram	20	2023-24
22	132 kV LILO of Bommuru-Nidadavolu to Atreyapuram	15	2023-24

23	Proposed 132 kV SS Gokavaram to Addathigala	35	2023-24
24	Proposed 132 kV SS Jaggampeta to Addathigala	40	2023-24
25	132 kV SS Palakonda to Hiramandalam	23	2023-24

**Augmentation of PTR Capacities at 400kV & 220 kV Substations during FY2019-20 to FY2023-24**

Sl.No	Substation	Existing PTR Capacity in MVA	Proposed PTR Capacity in MVA	Estimated Cost Rs Lakhs	Target year of Commissioning
1	Tekkali	2X100	2X160+1X100	754	2019-20
2	Garividi	2X100+1X160	3X160	754	2019-20
3	Bhimadole	1 x 160 + 2 x 100	2 x 160 + 1 x 100	377	2019-20
4	Gunadala	1 x 160 + 2 x 100	2 x 160 + 1 x 100	377	2019-20
5	Narasaraopeta	3 X 100	1X160+2 X 100	377	2019-20
6	Nunna	2X100	2X100 + 1X160	377	2019-20
7	Bommuru	1X160+2X100	2X160+1X100	377	2019-20
8	Maradam	3X315	2X315+1X500	2916	2019-20
9	Vemagiri	3X315	4X315	2726	2019-20

**9035**

1	Nidadavole	3 X 100	2 x 160 + 1 x 100	754	2020-21
2	Bobbili	2x100	2 x 160 + 1 x 100	754	2020-21
3	Renigunta	1 x 160 + 2 x 100	2 x 160 + 1 x 100	377	2020-21
4	A P Carbides	1X160 +2X100	2 x 160 + 1 x 100	377	2020-21
5	Kuppam	2X100	1 x 160 + 2 x 100	377	2020-21
6	Gudivada	1X160+2X100	2X160+1X100	377	2020-21
7	Narnoor	2X315	3X315	2726	2020-21

**5742**

1	Rentachintala	2X100	1X160+2 X 100	377	2021-22
---	---------------	-------	---------------	-----	---------

2	Kamavarapukota	3X100	3 x 160	1131	2021-22
3	Kondapally	1X160+2 X 100	2 x 160 + 1 x 100	377	2021-22
4	Brandix	2X100	2X100+1X160	377	2021-22
5	Dairy Farm	2X100	2X100 + 1X160	377	2021-22

**2639**

1	Parwada	3X100	2X100+1X160	<b>377</b>	2022-23
2	Samalkota	3X100	1X100 + 2X160	754	2022-23
3	Nagari	3 x 100	2 x 160 + 1 x 100	754	2022-23
4	Rachaganneru	2X100	1 x 160 + 2 x 100	377	2022-23
5	Undi	3 X 100	2 x 160 + 1 x 100	754	2022-23

**3016**

1	Chillakallu	3 X 100	2 x 160 + 1 x 100	754	2023-24
2	Kalikiri	3 X100	2X160+1X 100	754	2023-24
3	Palamaneru	1X160+1 X 100	2 x 160 + 1 x 100	377	2023-24
4	Thimmapuram	2X100	1 x 160 + 1 x 100	377	2023-24
5	Parchur	3X100	2X100 + 1X160	377	2023-24

## **8 Capacity Addition in Transmission Plan Long Term (FY 2025 to 2029)**

Tentative Transmission expansion plan for the long term i.e from FY 2024-25 to FY 2028-29 is also done as per the load requirement. This includes 310 ckm of 400 KV, 2822 ckm of 220 kV lines and 2348 ckm of 132 kV lines towards transmission expansion and 7 numbers of 400 kV substations, 44 numbers of 220kV substations and 44 numbers of 132kV substations towards Transmission expansion.

**8.1.1 Capacity Addition in Transmission for during Long Term (FY 2025 to 2029).  
(400kV, 220kV & 132kV).**

FY	Sub-Stations			Lines		
	(Nos.)			Ckm		
	400	220	132	400	220	132
2024-25	1	10	11	20	500	650
2025-26	2	11	11	40	1008	554
2026-27	2	8	10	170	416	550
2027-28	1	6	6	40	296	284
2028-29	1	9	6	40	602	310
<b>Total</b>	<b>7</b>	<b>44</b>	<b>44</b>	<b>213</b>	<b>2822</b>	<b>2348</b>

**9 Details of Transmission Expansion Plan for Long Term i.e. FY 2024 to 2029.**

**9.1.1 400kV, 220kV & 132kV Substations programmed during FY 2014-29**

Sl. No	District	Name of the SS	Voltage	Target year of Commissioning
<b>400 kV Substations</b>				
1	Guntur	Borupalem GIS	400	2024-25
1	Visakhapatnam	Vizag - 2 SS	400	2025-26
2	Eest Godavari	GVK Bus extension for 400/220 KV SS	400	2025-26
1	Guntur	Nidamarru GIS	400	2026-27
2	Krishna	Nandigama	400	2026-27
1	Nellore	Nellore - 2	400	2027-28
1	Srikakulam	Srikakulam	400	2028-29



220 kV Substations				
1	Vizianagaram	T B Vara	220	2024-25
2	Kurnool	Nandikotkur	220	2024-25
3	Srikakulam	Srikakulam	220	2024-25
4	YSR Kadapa	Proddatur	220	2024-25
5	Guntur	Uddandrayunipalem	220	2024-25
6	Guntur	Inavolu	220	2024-25
7	Guntur	Nagarjuna University	220	2024-25
8	Kurnool	Banaganapalli	220	2024-25
9	Krishna	Gunadala Extn	220	2024-25
10	Guntur	Sakhamuru	220	2024-25
1	Kurnool	Atmakur(KNL)	220	2025-26
2	Anantapur	Guntakal	220	2025-26
3	Visakhapatnam	Autonagar/NSTL	220	2025-26
4	Visakhapatnam	JNPC Pharma city	220	2025-26
5	Chittoor	Gurramkonda	220	2025-26
6	Kadapa	Sambepalli	220	2025-26
7	Guntur	Dondapadu	220	2025-26
8	Guntur	Nidamarru	220	2025-26
9	Guntur	Mandadam	220	2025-26
10	Srikakulam	Palakonda	220	2025-26
11	Guntur	Bapatla	220	2025-26
1	Chittoor	Srikalahasti	220	2026-27
2	Guntur	Nowluru	220	2026-27
3	Guntur	Kuragallu	220	2026-27
4	Guntur	Krishnayapalem	220	2026-27
5	Visakhapatnam	Upgradation of 220 kV Anrak Switching Station to Substation	220	2026-27
6	Nellore	Kavali	220	2026-27
7	Prakasam	Giddalur	220	2026-27

8	Guntur	Venkatapalem	220	2026-27
1	West Godavari	P T Palli	220	2027-28
2	Krishna	Kanumolu	220	2027-28
3	East Godavari	Upgradation of 132 kV Kothapet to 220 kV	220	2027-28
4	Guntur	Thallayapalem	220	2027-28
5	Visakhapatnam	Papayyapalem	220	2027-28
6	Guntur	Anathavaram	220	2027-28
1	Krishna	Jakkampudi	220	2028-29
2	Chittoor	Panjani	220	2028-29
3	Chittoor	Penumur	220	2028-29
4	Nellore	Adurupalli	220	2028-29
5	Kurnool	Gopavaram Upgradation of 132 kV SS Rudravaram	220	2028-29
6	Krishna	Machilipatnam	220	2028-29
7	Visakhapatnam	VSEZ	220	2028-29
8	Nellore	Krishnapatnam Port	220	2028-29
9	Guntur	Neerukonda	220	2028-29

### 9.1.2 132kV Substations programmed during FY 2024-29

Sl. No	District	Name of the SS	Target year of Commissioning
1	Anantapur	Yadiki	2024-25
2	Chittoor	Ramakuppam	2024-25
3	East Godavari	Eleswaram	2024-25
4	Guntur	Durgi	2024-25

5	Krishna	Kollipara	2024-25
6	Kurnool	Nandipadu	2024-25
7	Nellore	Pellakuru	2024-25
8	Prakasam	Ardaveedu	2024-25
9	Srikakulam	Kasibugga	2024-25
10	Visakhapatnam	Rayavaram	2024-25
11	Vizianagaram	Duggeru	2024-25

1	Anantapur	Singanamala	2025-26
2	Chittoor	Putala Pattu	2025-26
3	East Godavari	Rajavommangi	2025-26
4	Guntur	Ipuru	2025-26
5	Krishna	Kanchikacherla	2025-26
6	Kurnool	Uyyalavada	2025-26
7	Nellore	Chintaladevi	2025-26
8	Prakasam	Chundi	2025-26
9	Srikakulam	Srikurmam	2025-26
10	Visakhapatnam	Tallapalem	2025-26
11	Vizianagaram	Naguru	2025-26

1	Anantapur	Garladinne	2026-27
2	Chittoor	Vadamala	2026-27
3	East Godavari	Gokavaram	2026-27
4	Guntur	Achampeta	2026-27
5	Krishna	Janardanavaram	2026-27
6	Kurnool	Devanakonda	2026-27
7	Nellore	Dugarajapatnam	2026-27
8	Prakasam	Pedda alvalapadu	2026-27
9	Srikakulam	Chatram	2026-27
10	Visakhapatnam	Kottakota	2026-27

1	West Godavari	Guntupalli	2027-28
2	West Godavari	Dwaraka Tirumala	2027-28
3	West Godavari	Koyyalagudem	2027-28
4	Vizianagaram	Bhogapuram	2027-28
5	Guntur	Nagulavaram	2027-28
6	Krishna	Challapalle	2027-28

1	YSR Kadapa	Payalakunta	2028-29
2	YSR Kadapa	Mogilipenta	2028-29
3	YSR Kadapa	Obalam	2028-29
4	Nellore	Bitragunta	2028-29
5	Prakasam	Kommalapadu	2028-29
6	West Godavari	Gopalapuram	2028-29

### 9.1.2 400kV lines Programmed during FY 2024-29:

Sl.No	Name of the Transmission Line	IC	Conductor Type	Ckt	Length in Ckt KM	Target year of Commissioning
<b>400 kV Lines</b>						
1	400kV LILO of 400kV VTS - Sattenapalli QM DC line at proposed 400/220kV Borupalem in CRDA	L	Quad Moose	LILO	20.00	2024-25
2	LILO of 400kV Maradam - Kalpaka QMDC Line to Vizag - 2 SS	L	Quad Moose	LILO	40.00	2025-26
3	400kV LILO of 400kV Chilakaluripeta - Sattenapalli QM DC line at proposed 400/220kV Nidamaru in CRDA	L	Quad Moose	LILO	40.00	2026-27
4	400kV LILO of 400kV VTPS - Suryapet TM DC line at proposed 400/220kV Nandigama SS.	L	Quad Moose	LILO	30.00	2026-27
5	400kV LILO of 400kV Vemagiri - Sattenapalli TM DC line at proposed 400/220kV Nandigama SS.	L	Quad Moose	LILO	100.00	2026-27

6	400kV LILO of 400kV Krishnapatnam - Nellore QM DC line at proposed 400/220kV Nellore - 2 SS.	L	Quad Moose	LILO	40.00	2027-28
7	400kV Maradam - Srikakulam QMDC Line	L	Quad Moose	DC	40.00	2028-29

### 220 kV Lines

1	220kV DC line from 220kV SS Vizianagaram to Proposed 220kV SS T.B Vara in Vizianagaram District	L	SM	DC	80	2024-25
2	220kV DC line from 400kV SS Nannur to Proposed 220kV SS Nandukotkur in Kurnool District	L	SM	DC	70	2024-25
3	220kV DC line from 220kV SS Paydibhimavarm to Proposed 220kV SS Srikakulam in Srikakulam District	L	SM	DC	70	2024-25
4	220kV DC line from 400kV SS Talamanchipatnam to Proposed 220kV SS Proddatur in Y.S.R Kadapa District	L	SM	DC	90	2024-25
5	220kV DC 1000Sq mm XLPE UG Cable from proposed 220/33 GIS kV SS Velagapudi to proposed 220/33 kV GIS SS Uddandarayunipalem	L	XLPE CABLE	DC	6	2024-25
6	220kV DC 1000Sq mm XLPE UG Cable from proposed 220 kV SS Lingayapalem to proposed 220/33 kV GIS SS Uddandarayunipalem	L	XLPE CABLE	DC	6	2024-25
7	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV SS Tallayapalem to proposed 220/33 kV GIS SS Inavolu	L	XLPE CABLE	DC	26	2024-25
8	220kV DC line from 220 kV SS Guntur to proposed 220 kV SS Nagarjuna University in Guntur District	L	SM	DC	28	2024-25
9	Panyam (Gani) 400 kV SS To proposed Banaganapalli 220 kV SS	L	SM	DC	80	2024-25
10	Gunadala 220 kV SS To proposed Gunadala Extn 220 kV	L	SM	DC	20	2024-25

11	220kV DC 1000Sq mm XLPE UG Cable from proposed 220 kV GIS SS Anathavaram to proposed 220/33 kV GIS SS Sakhamuru	L	XLPE CABLE	DC	16	2024-25
12	220kV DC 1000Sq mm XLPE UG Cable from proposed 220 kV GIS SS Ainavolu to proposed 220/33 kV GIS SS Sakhamuru	L	XLPE CABLE	DC	8	2024-25

**500.00**

1	220kV DC line from 220kV SS Nandyala to Proposed 220kV SS Atmakur in Kurnool District	L	SM	DC	100	2025-26
2	220kV DC line from 400kV SS Uravakonda to Proposed 220kV SS Guntakal in Anantapur District	L	SM	DC	70	2025-26
3	220kV DC line from 400kV SS Kalpaka to Proposed 220kV SS Autonagar (NSTL) in Visakhapatnam District	L	SM	DC	50	2025-26
4	220kV DC line from 220kV SS Parwada to Proposed 220kV SS JNPC Pharma city in Visakhapatnam District	L	SM	DC	20	2025-26
5	220kV DC line from 400kV SS Kalikiri to Proposed 220kV SS Gurramkonda Chittoor District	L	SM	DC	90	2025-26
6	220kV DC line from 400kV SS Maradam to Proposed 220kV SS Pappayapalem in Visakhapatnam District	L	SM	DC	100	2025-26
7	220kV DC line from 400kV Kalikiri to proposed 220kV SS Sambepalli	L	SM	DC	80	2025-26
8	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Borupalem to proposed 220/33 kV GIS SS Dondapadu	L	XLPE CABLE	DC	16	2025-26
9	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Nidamaru to proposed 220/33 kV GIS SS Nidamaru	L	XLPE CABLE	DC	10	2025-26
10	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Tallayapalem to proposed 220/33kV GIS SS Mandadam	L	XLPE CABLE	DC	12	2025-26

11	Chilakaluripeta 400 kV SS To proposed Bapatla SS	L	SM	DC	160	2025-26
12	Bobbili To proposed Palakonda SS	L	SM	DC	150	2025-26
13	Tekkali 400 kV SS To proposed Palakonda SS	L	SM	DC	150	2025-26

**1008.00**

1	220kV DC line from 400kV SS Rachagunneru to Proposed 220kV SS Srikalahasti in Chittoor District	L	SM	DC	30	2026-27
2	220kV DC 1000Sq mm XLPE UG Cable from proposed 220 kV GIS SS Mandadam to proposed 220/33 kV GIS SS Nowluru	L	XLPE CABLE	DC	14	2026-27
3	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Nidamaru to proposed 220/33 kV GIS SS Nowluru	L	XLPE CABLE	DC	16	2026-27
4	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Nidamaru to proposed 220/33 kV GIS SS Kuragallu	L	XLPE CABLE	DC	14	2026-27
5	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Tallayapalem to proposed 220/33 kV GIS SS Krishnayapalem	L	XLPE CABLE	DC	16	2026-27
6	220kV DC line from 400kV SS Maradam to Proposed 220kV SS Palakonda in Srikakulam District	L	SM	DC	90	2026-27
7	220kV DC line from 220kV SS Kandukur to Proposed 220kV SS Kavali in Nellore District	L	SM	DC	110	2026-27
8	220kV DC line from 220kV SS Porumamilla to Proposed 220kV SS Giddalur in Prakasam District	L	SM	DC	120	2026-27
9	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Tallayapalem to proposed 220/33 kV GIS SS Venkatapalem	L	XLPE CABLE	DC	6	2026-27

**416.00**

1	220kV DC line from 220kV SS Undi to Proposed 220kV SS P.T Palli in West Godavari District	L	SM	DC	50	2027-28
---	---	---	----	----	----	---------

2	220kV DC line from 220kV SS Nunna to Proposed 220kV SS Kanumolu in Krishna District	L	SM	DC	26	2027-28
3	220kV DC line from 220kV SS Amalapuram to Proposed 220kV SS Kothapeta in East Godavari District	L	SM	DC	80	2027-28
4	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Tallayapalem to proposed 220/33 kV GIS SS Tallayapalem	L	XLPE CABLE	DC	16	2027-28
5	220kV DC line from 400kV SS Maradam to Proposed 220kV SS Pappayapalem in Visakhapatnam District	L	SM	DC	100	2027-28
6	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Borupalem to proposed 220/33 kV GIS SS Anathavaram	L	XLPE CABLE	DC	24	2027-28

**296**

1	220kV DC line from 220kV SS Nunna to Proposed 220kV SS Jakkampudi in Krishna District	L	SM	DC	26	2028-29
2	220kV DC line from 220kV SS Palamaneru to Proposed 220kV SS Panjani in Chittor District	L	SM	DC	90	2028-29
3	220kV DC line from 220kV SS Nagiri to Proposed 220kV SS Penmur in Chittor District	L	SM	DC	90	2028-29
4	220kV DC line from 220kV SS Atmakur to Proposed 220kV SS Adurueupalli in Nellore District	L	SM	DC	100	2028-29
5	220kV DC line from 220kV Nandyala to proposed Upgradation of 132kV SS Rudravaram (Gopavaram)	L	SM	DC	60	2028-29
6	220kV DC line from 400kV SS Gudivada to Proposed 220kV SS Machilipatnam in Krishna District	L	SM	DC	82	2028-29
7	220kV DC line from 220kV SS Gajuwaka to Proposed 220kV SS VSEZ in Visakhapatnam District	L	SM	DC	62	2028-29



8	220kV DC line from 220kV SS Manubolu to Proposed 220kV SS Krishnapatnam Port in Nellore District	L	SM	DC	80	2028-29
9	220kV DC 1000Sq mm XLPE UG Cable from proposed 400/220 kV GIS SS Nidamaru to proposed 220/33 kV GIS SS Neerukonda	L	XLPE CABLE	DC	12	2028-29

### 9.1.3 132kV Lines programmed during FY 2024-29:

Sl. No	Name of Transmission line	Length in Ckt kM	Target year of Commissioning
1	132kV DC line from 220kV SS Tadipatri to Proposed 132kV SS Yadiki in Anantapur dist.	60	2024-25
2	132kV DC line from 220kV SS Kuppam to Proposed 132kV SS Ramakuppam in Chittoor dist.	50	2024-25
3	132kV DC line from 132kV SS Pitapuram to Proposed 132kV SS Eleswaram in East Godavari dist.	60	2024-25
4	132kV DC line from 132kV SS Veldurthi to Proposed 132kV SS Durgi Guntur dist.	40	2024-25
5	132kV DC line from 132kV SS Vuyyuru to Proposed 132kV SS Kollipara Krishna dist.	40	2024-25
6	132kV DC line from 132kV SS Koilakuntla to Proposed 132kV SS Nandipadu Kurnool dist.	80	2024-25
7	132kV DC line from 220kV SS Naidupeta to Proposed 132kV SS Pellakuru Nellore dist.	50	2024-25
8	132kV DC line from 132kV SS Cumbum to Proposed 132kV SS Ardaveedu Prakasam dist.	40	2024-25
9	132kV DC line from 220kV SS Tekkali to Proposed 132kV SS Kasibugga Srikakulam dist.	80	2024-25
10	132kV DC line from 132kV SS Kasimkota to Proposed 132kV SS Rayavaram in Visakhapatnam dist.	80	2024-25
11	132kV DC line from 132kV SS Saluruto Proposed 132kV SS Duggeru in Vizianagaram dist.	70	2024-25

650

1	132kV DC line from 220kV SS Anantapur to Proposed 132kV SS Singanamala in Anantapur dist.	50	2025-26
2	132kV DC line from 220kV SS Chittoor to Proposed 132kV SS Putalapattu in Chittoor dist.	40	2025-26
3	132kV DC line from 220kV SS Ramavaram to Proposed 132kV SS Rajavommangi East Godavari dist.	60	2025-26
4	132kV DC line from 132kV SS Vinukonda to Proposed 132kV SS Ipuru Guntur dist.	44	2025-26
5	132kV DC line from 132kV SS Nandigama to Proposed 132kV SS Kanchikacherla Krishna dist.	36	2025-26
6	132kV DC line from 220kV SS Betamcharla to Proposed 132kV SS Uyyalavada Kurnool dist.	50	2025-26
7	132kV DC line from 132kV SS Vinjamur to Proposed 132kV SS Chintaladevi Nellore dist.	60	2025-26
8	132kV DC line from 220kV SS Kandukur to Proposed 132kV SS Chundi Prakasam dist.	44	2025-26
9	132kV DC line from 132kV SS Srikakulam to Proposed 132kV SS Srikurmam in Srikakulam dist.	40	2025-26
10	132kV DC line from 220kV SS Parawada to Proposed 132kV SS Tallapalem in Visakhapatnam dist.	50	2025-26
11	132kV DC line from 220kV SS Bobbili to Proposed 132kV SS Naguru in Vizianagaram dist.	80	2025-26
<b>554</b>			
1	132kV DC line from 220kV SS Anantapur to Proposed 132kV SS Garladinne in Anantapur dist.	60	2026-27
2	132kV DC line from 220kV SS Renigunta to Proposed 132kV SS Vadamala in Chittoor dist.	40	2026-27
3	132kV DC line from 220kV SS Bommuru to Proposed 132kV SS Gokavaram East Godavari dist.	60	2026-27

4	132kV DC line from 132kV SS Piduguralla to Proposed 132kV SS Achampeta Guntur dist.	60	2026-27
5	132kV DC line from 220kV SS Nujiveedu to Proposed 132kV SS Janardhanavaram Krishna dist.	60	2026-27
6	132kV DC line from 132kV SS Pattikonda to Proposed 132kV SS Devanakonda Kurnool dist.	40	2026-27
7	132kV DC line from 132kV SS Chendodu to Proposed 132kV SS Dugarajapatnam Nellore dist.	50	2026-27
8	132kV DC line from 220kV SS Kandukur to Proposed 132kV SS Pedda Alvalapadu Prakasam dist.	70	2026-27
9	132kV DC line from 132kV SS Srikakulam to Proposed 132kV SS Chatram in Srikakulam dist.	70	2026-27
10	132kV DC line from 132kV SS Narsipatnam to Proposed 132kV SS Kottakota in Visakhapatnam dist.	40	2026-27
<b>550</b>			
1	132kV DC line from 132kV SS Chitalapudi to Proposed 132kV SS Guntupalli in West Godavari dist.	40	2027-28
2	132kV DC line from 220kV SS Bhimadole to Proposed 132kV SS Dwaraka Tirumala in West Godavari dist.	44	2027-28
3	132kV DC line from 132kV SS Tadepalli Gudem to Proposed 132kV SS Koyyalagudem in West Godavari dist.	70	2027-28
4	132kV DC line from 220kV SS Vizianagaram to Proposed 132kV SS Bhogapuram in Vizianagaram dist.	40	2027-28
5	132kV DC line from 220kV SS Vinukonda to Proposed 132kV SS Nagulavarm Guntur dist.	50	2027-28
6	132kV DC line from 132kV SS Avanigadda to Proposed 132kV SS Challapalle Krishna dist.	40	2027-28
<b>284</b>			

1	132kV DC line from 220kV SS Porumamilla to Proposed 132kV SS Payalakunta in Y.S.R Kadapa dist.	40	2028-29
2	132kV DC line from 132kV SS T. Sundupalli to Proposed 132kV SS Mogilipenta in Y.S.R Kadapa dist.	70	2028-29
3	132kV DC line from 132kV SS Badvel to Proposed 132kV SS Obalam in Y.S.R Kadapa dist.	50	2028-29
4	132kV DC line from 132kV SS Alluru to Proposed 132kV SS Bitragunta Nellore dist.	40	2028-29
5	132kV DC line from 132kV SS Martur to Proposed 132kV SS Kommalapadu Prakasam dist.	40	2028-29
6	132kV DC line from 220kV SS Nidadavolu to Proposed 132kV SS Gopalapuram in West Godavari dist.	70	2028-29