

## White Paper on the Electrical Load demand in Goa for the last ten years.

As promised last week while speaking on the Goa Tamnar Transmission Project Limited (GTTPL), the Undersigned is pleased to present a paper containing therein the complete details of the actual increase in Electrical consumers in various tariff categories in Goa for the last ten years and the consequent increase in network assets of the Goa Electricity Department for the corresponding period to cater to the said increase in load.

The following below mentioned details are of all a) Domestic Consumers, b) Commercial Consumers and c) Industrial Consumers:

- A. Load of Consumers in Kilo Watt (KW) as per the categories mentioned above from Financial Year 2010-11 upto September 2020.
- B. Consumer count details as per the categories mentioned above from Financial Year 2010-11 upto September 2020.
- C. Network Assets updation annually from Financial Year 2010-11 upto September 2020 for giving power supply/ load to consumers as per the categories mentioned above.

### 1. Load of Consumers in Kilo Watt (KW)

During the last ten years i.e. from the Financial Year 2010-11 upto September 2020, the total load of consumers in Kilo Watt (KW) across the categories mentioned above increased as follows:

#### a) Domestic Consumers (All types of residential and agricultural connections) :

Sr. No	Financial Year	Load of Consumers in KW	% of increase in load over the previous year
1.	2010-11	1000555	0
2.	2011-12	1053318	5%
3.	2012-13	1102081	4%
4.	2013-14	1153556	4%
5.	2014-15	1195798	4%
6.	2015-16	1235943	3%
7.	2016-17	1288132	4%
8.	2017-18	1566837	18%
9.	2018-19	1688566	7%
10.	2019-20	1800894	6%
11.	April'2020 – Sept'2020	1822961	1%

#### b) Commercial Consumers (Shops, Offices and other small commercial establishments drawing Low Tension supply) :

Sr. No	Financial Year	Load of Consumers in KW	% of increase in load over the previous year
1.	2010-11	270864	0
2.	2011-12	284546	5%
3.	2012-13	298495	5%
4.	2013-14	313454	5%
5.	2014-15	323579	3%
6.	2015-16	336104	4%
7.	2016-17	348033	3%

8.	2017-18	373780	7%
9.	2018-19	401688	7%
10.	2019-20	431021	7%
11.	April'2020 – Sept'2020	435465	1%

**c) Industrial Consumers (All types of Industries, Hotels and High Tension Commercial units):**

Sr. No	Financial Year	Load of Consumers in KW	% of increase in load over the previous year
1.	2010-11	336765	0
2.	2011-12	352198	4%
3.	2012-13	375099	6%
4.	2013-14	403105	7%
5.	2014-15	435793	8%
6.	2015-16	471155	8%
7.	2016-17	585527	20%
8.	2017-18	616877	5%
9.	2018-19	639590	4%
10.	2019-20	656298	3%
11.	April'2020 – Sept'2020	671082	2%

**2. Consumer Count Details**

During the last ten years i.e. from the Financial Year 2010-11 upto September 2020, the total number of consumers across the categories mentioned above are as follows:

**a) Domestic Consumers (All types of residential and agricultural Connections):**

Sr. No	Financial Year	Number of Consumers	% of increase in consumers over the previous year
1.	2010-11	371228	0
2.	2011-12	390730	5%
3.	2012-13	408523	4%
4.	2013-14	427474	4%
5.	2014-15	443071	4%
6.	2015-16	457665	3%
7.	2016-17	472934	3%
8.	2017-18	496041	5%
9.	2018-19	521477	5%
10.	2019-20	545100	4%
11.	April'2020 – Sept'2020	549386	1%

**b) Commercial Consumers (Shops, Offices and other small commercial establishments drawing Low Tension supply):**

Sr. No	Financial Year	Number of Consumers	% of increase in consumers over the previous year
1.	2010-11	68851	0
2.	2011-12	72512	5%

3.	2012-13	76525	5%
4.	2013-14	80839	5%
5.	2014-15	83703	3%
6.	2015-16	85942	3%
7.	2016-17	87913	2%
8.	2017-18	92256	5%
9.	2018-19	96612	5%
10.	2019-20	100324	4%
11.	April'2020 – Sept'2020	101017	1%

**c) Industrial Consumers (All types of Industries, Hotels and High Tension Commercial units):**

Sr. No	Financial Year	Number of Consumers	% of increase in consumers over the previous year
1.	2010-11	5561	0
2.	2011-12	5645	1%
3.	2012-13	5745	2%
4.	2013-14	5850	2%
5.	2014-15	5891	1%
6.	2015-16	5955	1%
7.	2016-17	6111	3%
8.	2017-18	6270	3%
9.	2018-19	6432	3%
10.	2019-20	6552	2%
11.	April'2020 – Sept'2020	6691	2%

**3. Network Assets Updation**

During the last ten years i.e. from the Financial Year 2010-11 upto September 2020, the network assets updation for supporting the consumers across the categories mentioned above are as follows:

**a) Low Tension (LT) and 11KV (For Domestic Consumers (All types of residential and agricultural) and Commercial Consumers (Shops, Offices and other small commercial establishments drawing Low Tension supply):**

**1) Number of 11 KV feeders:**

Sr. No	Financial Year	Number of Feeders	% increase of feeders over the previous year
1.	2010-11	280	0
2.	2011-12	283	1%
3.	2012-13	284	0.4%
4.	2013-14	286	1%
5.	2014-15	289	1%
6.	2015-16	291	1%
7.	2016-17	294	1%
8.	2017-18	299	2%
9.	2018-19	300	0.3%
10.	2019-20	308	3%



2) Length of Network 11KV feeders in KM:

Sr. No	Financial Year	Length of Network Feeders	% increase of length Network Feeders over the previous year
1.	2010-11	14056	
2.	2011-12	14282	2%
3.	2012-13	14482	1%
4.	2013-14	15050	4%
5.	2014-15	15260	1%
6.	2015-16	15356	1%
7.	2016-17	17912	17%
8.	2017-18	19503	9%
9.	2018-19	19608	1%
10.	2019-20	21187	8%

3) Number of LT Poles erected:

Sr. No	Financial Year	Number of Poles	% increase of Poles over the previous year
1.	2010-11	208057	0
2.	2011-12	213476	3%
3.	2012-13	219586	3%
4.	2013-14	225099	3%
5.	2014-15	230767	3%
6.	2015-16	236864	3%
7.	2016-17	242542	2%
8.	2017-18	248575	2%
9.	2018-19	249756	0.5%
10.	2019-20	284888	14%

4) Number of 11 KV RMU's:

Sr. No	Financial Year	Number of RMU	% increase of RMU's over the previous year
1.	2010-11	313	0
2.	2011-12	420	34%
3.	2012-13	760	81%
4.	2013-14	961	26%
5.	2014-15	1062	11%
6.	2015-16	1178	11%
7.	2016-17	1405	19%
8.	2017-18	1846	31%
9.	2018-19	2033	10%
10.	2019-20	2261	11%

5) Number of LT Feeder Pillars:

Sr. No	Financial Year	Number of Feeder Pillars	% increase of Feeder Pillars over the previous year
1.	2010-11	3261	0
2.	2011-12	3380	4%

3.	2012-13	3694	9%
4.	2013-14	3861	5%
5.	2014-15	4086	6%
6.	2015-16	4300	5%
7.	2016-17	4511	5%
8.	2017-18	4584	2%
9.	2018-19	4615	1%
10.	2019-20	4961	7%

6) Number of Distribution Transformers:

Sr. No	Financial Year	Number of Distribution Transformers	% increase of distribution transformers over the previous year
1.	2010-11	4244	0
2.	2011-12	4513	6%
3.	2012-13	4648	3%
4.	2013-14	4900	5%
5.	2014-15	5077	4%
6.	2015-16	5148	1%
7.	2016-17	6074	18%
8.	2017-18	6161	1%
9.	2018-19	6463	5%
10.	2019-20	6824	6%

**b) High Tension (HT) and Industrial Consumers (All types of Industries, Hotels and High Tension Commercial units):**

1) Number of 33 KV Feeders:

Sr. No	Financial Year	Number of 33KV Feeders	% increase in 33KV Feeder over the previous year
1.	2010-11	135	0
2.	2011-12	136	1%
3.	2012-13	136	0%
4.	2013-14	138	1%
5.	2014-15	138	0%
6.	2015-16	140	1%
7.	2016-17	145	4%
8.	2017-18	149	3%
9.	2018-19	154	3%
10.	2019-20	155	1%

2) Length of Network 33KV Feeders in KM:

Sr. No	Financial Year	Length of Network Feeder KM	% increase in Network feeder KM over the previous year
1.	2010-11	1006	0
2.	2011-12	1017	1%
3.	2012-13	1042	2%
4.	2013-14	1105	6%
5.	2014-15	1238	12%

6.	2015-16	1339	8%
7.	2016-17	1433	7%
8.	2017-18	1513	6%
9.	2018-19	1549	2%
10.	2019-20	1586	2%

3) Number of 33 KV Towers:

Sr. No	Financial Year	Number of 33 KV Towers	% increase in 33 KV Towers over the previous year
1.	2010-11	83	0
2.	2011-12	83	0%
3.	2012-13	85	2%
4.	2013-14	85	0%
5.	2014-15	85	0%
6.	2015-16	85	0%
7.	2016-17	85	0%
8.	2017-18	85	0%
9.	2018-19	85	0%
10.	2019-20	85	0%

4) Number of 33 KV Poles:

Sr. No	Financial Year	Number of 33 KV Poles	% increase in 33 KV Poles over the previous year
1.	2010-11	10062	0
2.	2011-12	10102	0.4%
3.	2012-13	10120	0.2%
4.	2013-14	10140	0.2%
5.	2014-15	10167	0.3%
6.	2015-16	10186	0.2%
7.	2016-17	10210	0.2%
8.	2017-18	10309	1%
9.	2018-19	10315	0.1%
10.	2019-20	10339	0.2%

6) Number of HTC installation Transformers:

Sr. No	Financial Year	Number of HTC Transformers	% increase in HTC Transformers over the previous year
1.	2010-11	542	0
2.	2011-12	575	6%
3.	2012-13	617	7%
4.	2013-14	651	6%
5.	2014-15	694	7%
6.	2015-16	775	12%
7.	2016-17	867	12%
8.	2017-18	945	9%
9.	2018-19	1027	9%
10.	2019-20	1104	7%



c) Number of Sub Station catering to all category of consumers i.e; Domestic Consumers (All types of residential and agricultural Connections), Commercial Consumers (Shops, Offices and other small commercial establishments drawing Low Tension supply) and Industrial Consumers (All types of Industries, Hotels and High Tension Commercial units):

Sr. No	Financial Year	Number of Sub Stations	% increase of Sub Stations over the previous year
1.	2010-11	40	0
2.	2011-12	41	3%
3.	2012-13	41	0%
4.	2013-14	42	2%
5.	2014-15	42	0%
6.	2015-16	42	0%
7.	2016-17	53	26%
8.	2017-18	54	2%
9.	2018-19	54	0%
10.	2019-20	55	2%

#### 4) Conclusions:

From the statistics seen above, it can be clearly concluded that historically the load requirement for domestic consumers in the State of Goa is more than double the load requirements of both, commercial consumers and industrial consumers put together. Considering that the demand for housing and agricultural connections is going to increase more and more, the demand for domestic connections is only going to increase further, in the years to come. During the last one year, more than 200 numbers of both 100KVA and 200KVA Distribution Transformer Centers (DTC's) have been sanctioned and work is on to erect the said DTC's which figures, have not been added to the list of statistics mentioned above. All these DTC's are mostly to cater to the ever increasing loads of domestic consumers.

The table given below will give an illustration of the percentage of the pattern of average Load consumption on per day basis by each category of consumers

Sr. No.	Average Load Demand in MW on per day basis	Financial Year	Percentage of daily load requirement of Domestic Consumers (All types of residential	Percentage of daily load requirement of Commercial Consumers (Shops, Offices and other small	Percentage of daily load requirement of Industrial Consumers (All types of Industries,

			and agricultural Connections)	commercial establishments drawing Low Tension supply)	Hotels and High Tension Commercial units)
1.	476	2010-11	63.5%	17%	19.5%
2.	471	2011-12	63.4%	17.1%	19.5%
3.	500	2012-13	63.5%	17.2%	19.3%
4.	540	2013-14	63.5%	17%	19.5%
5.	543	2014-15	62%	16%	22%
6.	576	2015-16	62.2%	16.4%	21.4%
7.	580	2016-17	60%	17%	23%
8.	590	2017-18	62%	16%	22%
9.	613	2018-19	62%	16%	22%
10.	612	2019-20	63%	16%	21%
11.	569	2020-21	63%	16.5%	20.5%

Hence, the general perception that more load in Goa is consumed by the Industrial and Commercial Consumers is wrong as seen above the domestic consumers consume more than 60% of the total load that Goa requires.



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