

Performance Report of Distribution Licensees

2016

Public Utilities Commission of Sri Lanka

Nomenclature

CEB	-	Ceylon Electricity Board
DL	-	Distribution Licensee
DL1	-	Distribution Licensee DL1 – Ceylon Electricity Board
DL2	-	Distribution Licensee DL2 – Ceylon Electricity Board
DL3	-	Distribution Licensee DL3 – Ceylon Electricity Board
DL4	-	Distribution Licensee DL4 – Ceylon Electricity Board
DL5	-	Distribution Licensee DL5 – Lanka Electricity Company Private Limited
FAC	-	Fuel Adjustment Charge
G.P.	-	General Purpose
GWh	-	Giga Watt hour
kVA	-	kilovolt ampere
kWh	-	kilowatt hour
LKR	-	Sri Lankan Rupee
Mil.	-	Million
MVA	-	Mega Volt Ampere
PUCSL	-	Public Utilities Commission of Sri Lanka
TL	-	Transmission Licensee

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1 Introduction

Performance of each distribution licensee for the year 2016 was analyzed with the aid of data submitted by each licensee. This report produces comparative illustration of all five DLs on their purchases, sales, revenue, consumer base and energy losses for the year 2016. Facts and figure given in this report based on the data submissions by each DL through Licensee Information Submission System.

Total of **12.6 billion units** have been consumed by the **6.3 million** consumer accounts connected to distribution network. DLs have purchased electricity from Transmission licensee spending about **167.4 billion Rupees**, and distributed to consumers consist of five main categories namely Domestic, Religious, Industrial, Hotel and General Purpose. Revenue obtained from distribution business amounts to **215.6 billion Rupees** for the year 2016.

Numbers of consumers belong to each consumer category and each distribution region is depicted in below table 1-1 and graphically illustrated in figure 1-1.

Table 1-1 : Number of Consumers (Category and Region Wise)

Distribution Region	Consumer Category					Total
	Domestic	Religious	Industrial	Hotel	General Purpose	
DL1	1,415,509	9,288	26,621	124	178,272	1,629,813
DL2	1,746,271	12,073	14,371	193	209,736	1,982,644
DL3	1,037,997	6,325	8,283	51	114,666	1,167,321
DL4	878,777	5,030	6,153	127	93,997	984,082
DL5	453,968	2,529	3,436	58	82,296	542,287
Total	5,532,521	35,244	58,863	552	678,968	6,306,147

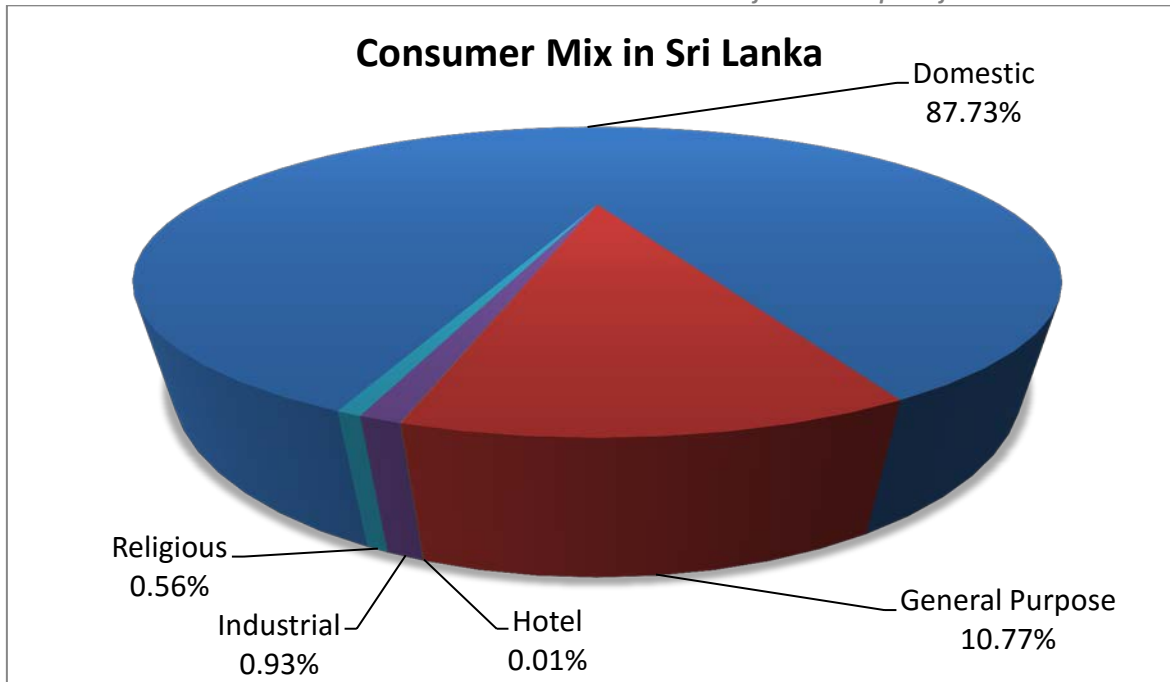


Figure 1-1 : Consumer Mix in Sri Lanka

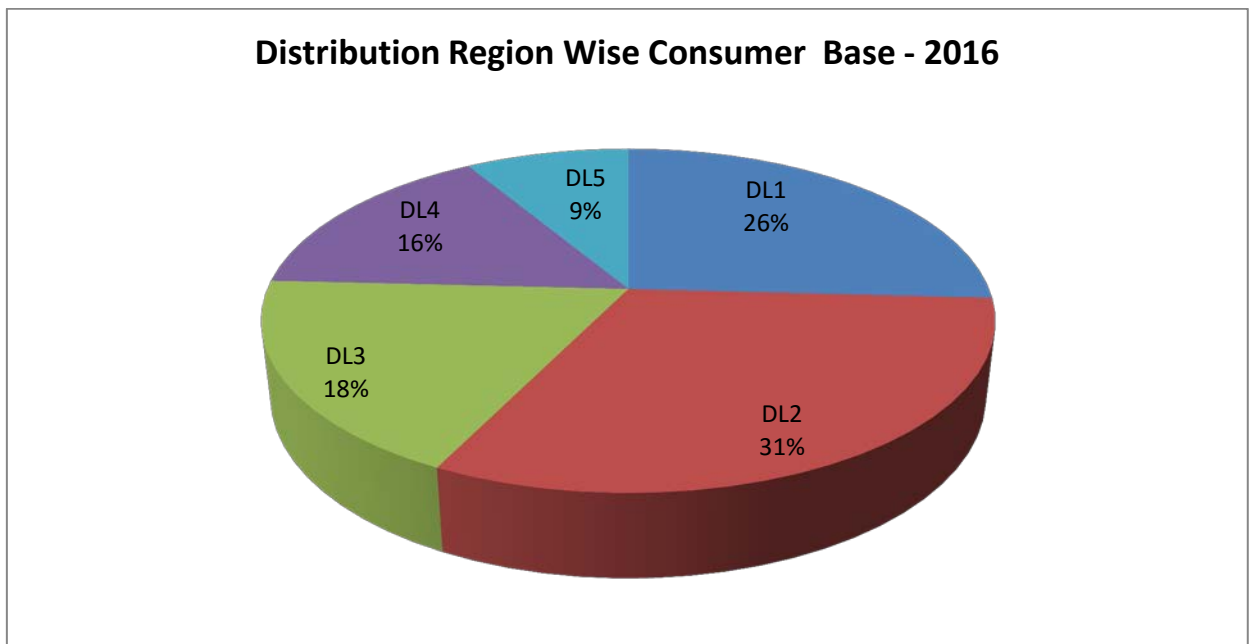


Figure 1-2 : Distribution Region Wise Consumer Accounts Base

Total consumer growth is depicted in figure 1-3 and it shows approximately 4%* of average consumer growth in each year. Further, figure 1-4, figure 1-5, figure 1-6 and figure 1-7 illustrate average consumer growth in each year for Religious, Hotel, Industrial and General Purpose consumer categories respectively.

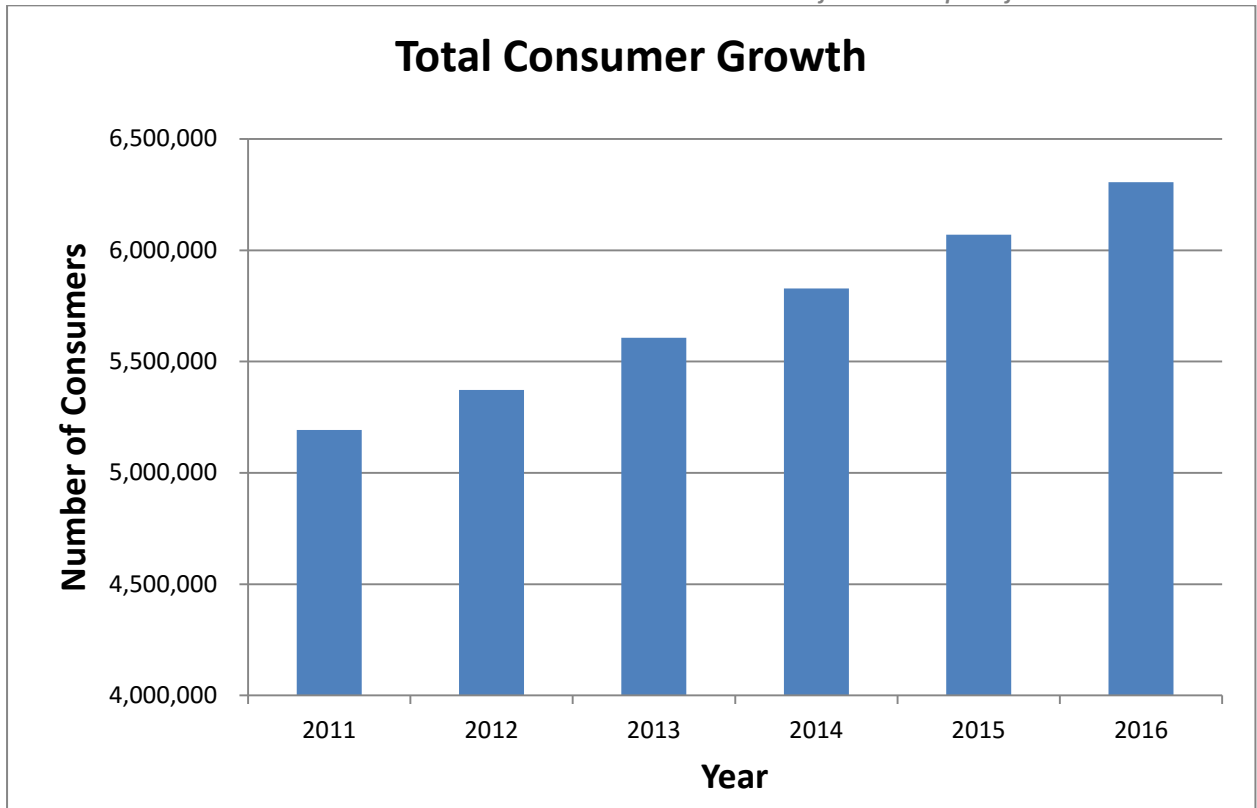


Figure 1-3: Total Consumer Growth

**considering year 2011, 2012, 2013, 2014, 2015 and 2016 only*

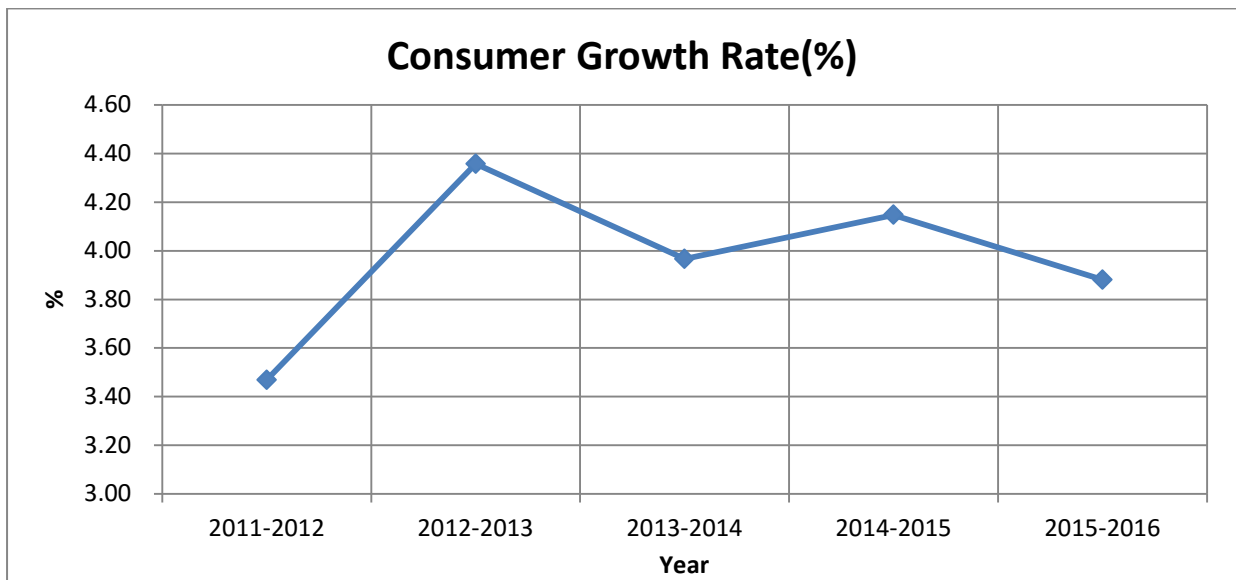


Figure 1-4 : Total Consumer Growth Rate

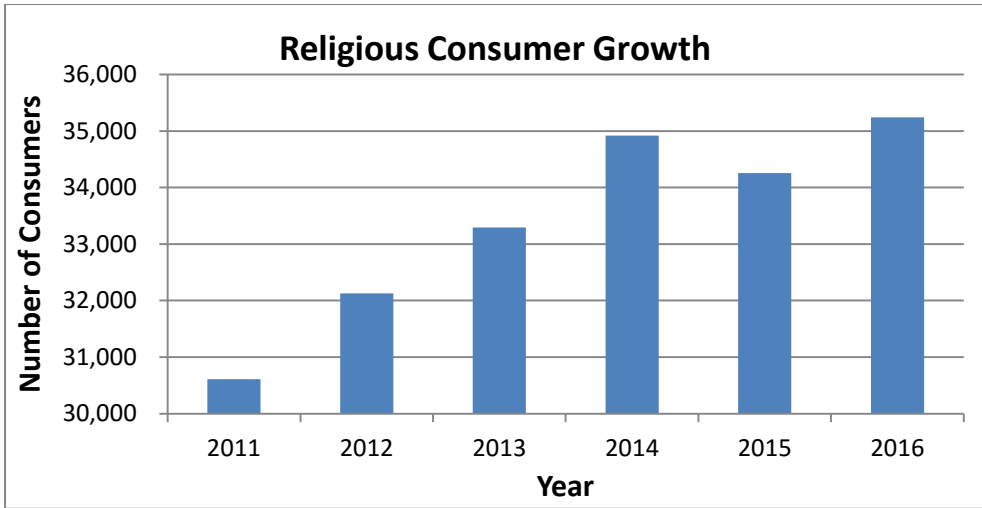


Figure 1-5 : Religious Consumer Growth

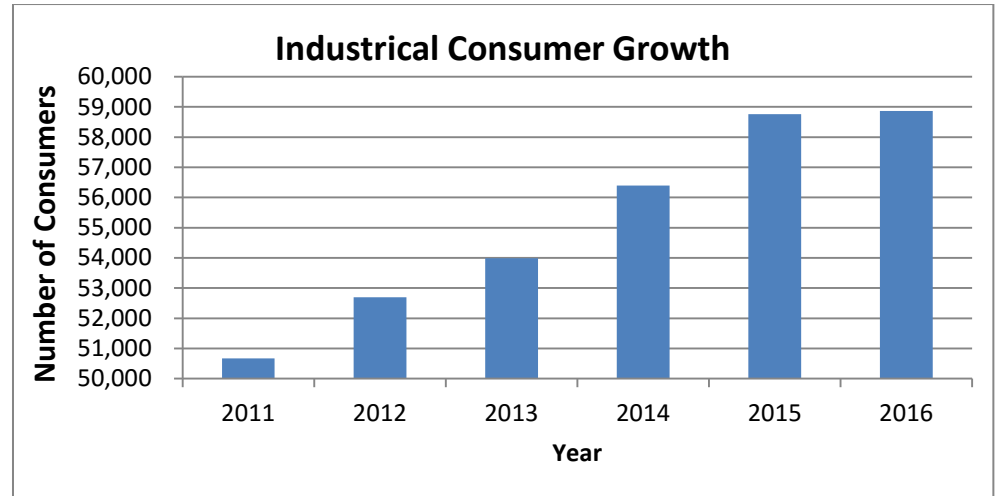


Figure 1-7 : Industrial Consumer Growth

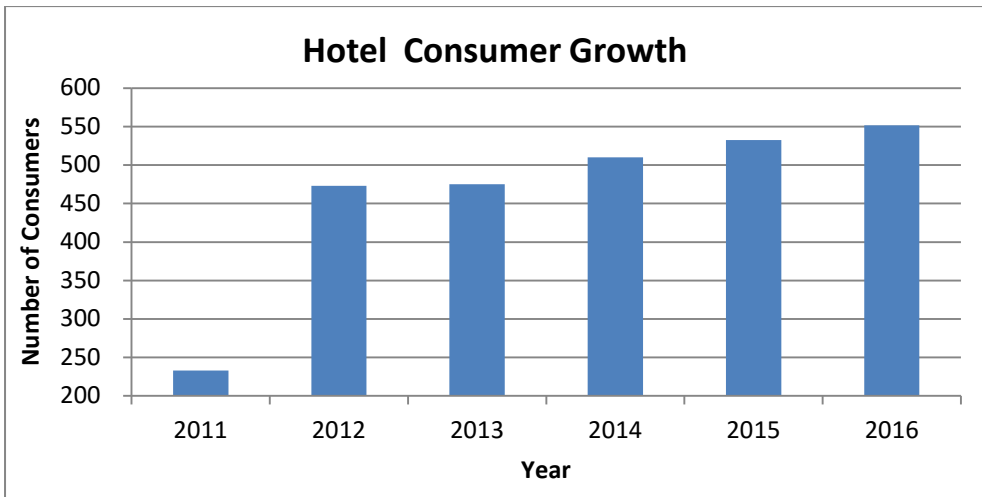


Figure 1-6 : Hotel Consumer Growth

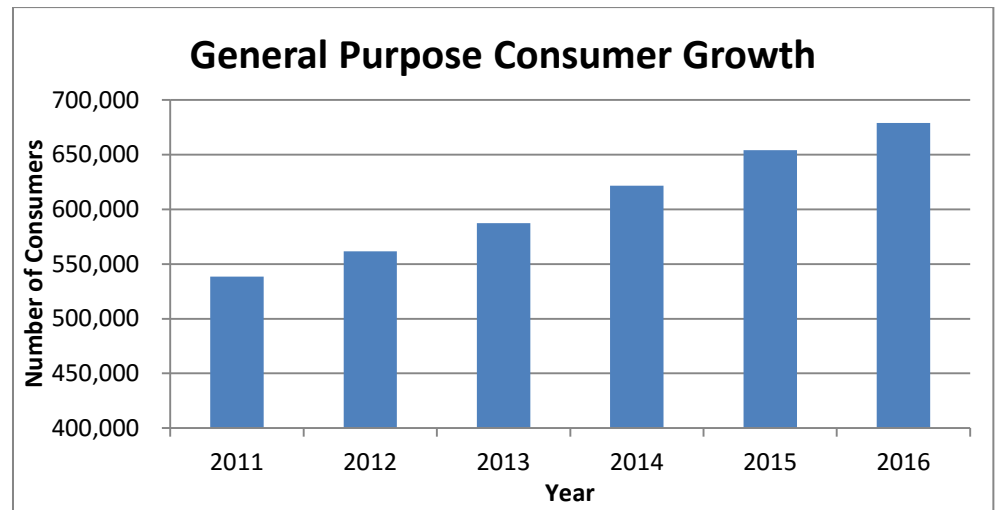


Figure 1-8 : General Purpose Consumer Growth

2 Energy /Capacity Purchased

Each DL purchases their electricity from the Transmission Licensee who is doing the bulk supply operation business. Table 2.1 given below provides the energy purchased according to the time of use. “Day”, “Peak” and “Off-Peak” periods span for 13 hours, 4 hours and 7 hours respectively.

Table 2-1 : DL Wise Energy Purchased According to Time of Use (GWh)

Licensee	Day	Peak	Off Peak	Total	Percentage (%)
DL1	2,288.44	748.67	799.92	3,837.02	27
DL2	2,435.10	884.27	981.57	4,300.93	31
DL3	1,409.20	517.66	508.65	2,435.50	17
DL4	1,071.02	408.19	431.84	1,911.05	14
DL5	897.74	299.76	358.69	1,556.20	11
Total	8,101.50	2,858.55	3,080.66	14,040.71	100

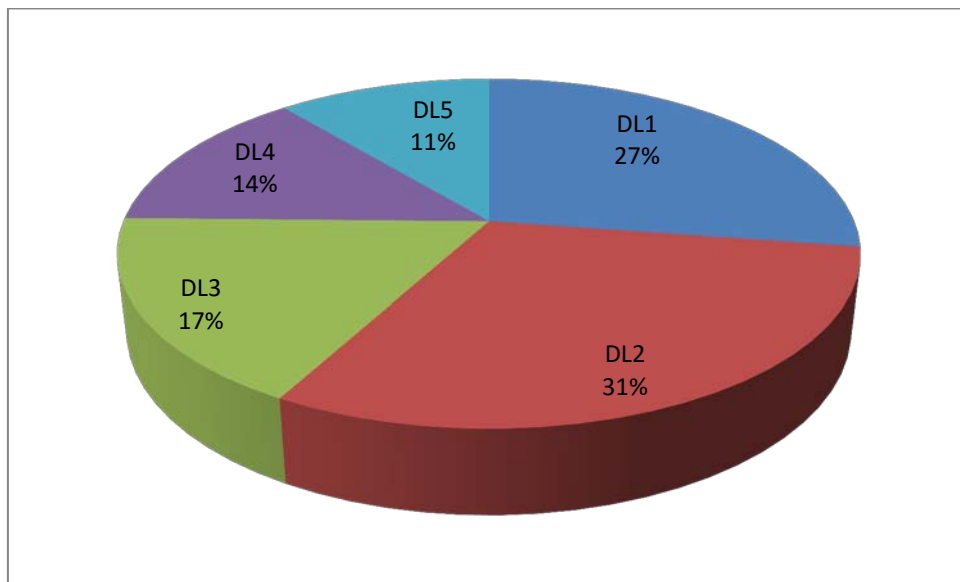


Figure 2-1 : DL Wise Energy Purchased (GWh)

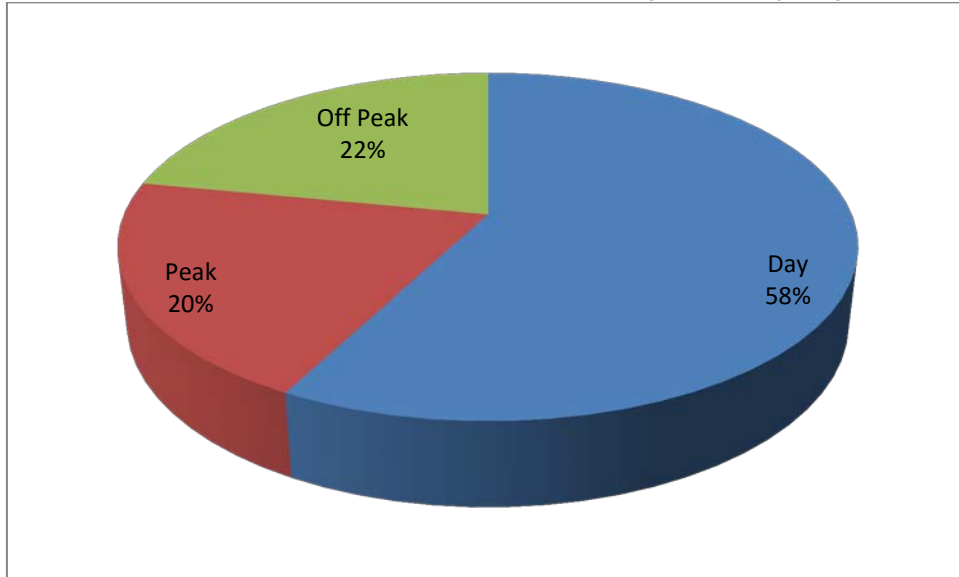


Figure 2-2 : Time of Use Wise Energy Purchased (GWh)

Licensee	Energy Purchased from Transmission Licensee (GWh)				
	2012	2013	2014	2015	2016
DL1	3,137.02	3,197.18	3,362.10	3,532.28	3,837.02
DL2	3,292.43	3,507.76	3,757.28	4,101.77	4,300.93
DL3	2,184.44	2,036.28	1,993.54	2,269.72	2,435.50
DL4	1,447.64	1,531.59	1,607.08	1,759.14	1,911.05
DL5	1,301.66	1,307.70	1,352.39	1,446.36	1,556.20
Total	11,363.19	11,580.51	12,072.39	13,109.25	14,040.71

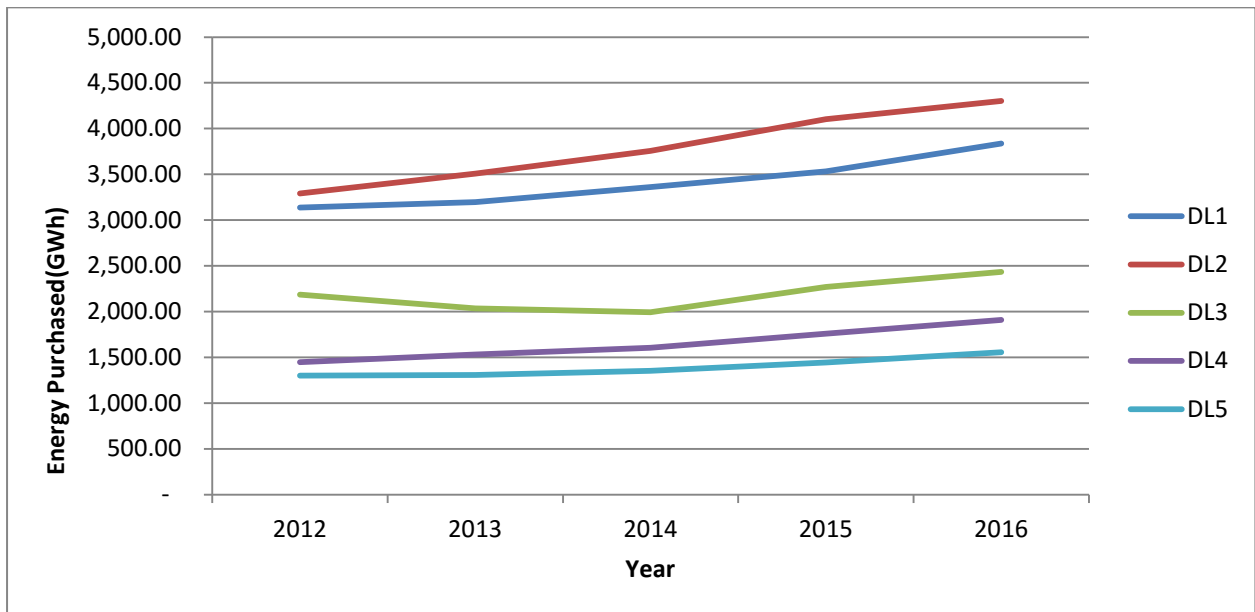


Figure 2-3: Energy Purchased by DLs

Figure 2-3, illustrates the energy purchased by each DLs during past five years. Table 2-2 shows per hour energy demand made by each DL from TL. It can be seen that highest average demands for all three time periods have been recorded from DL2 and lowest values are from DL5. Figure 2-4, shows the graphical representation of these data.

Table 2-2 : Average Demand by DLs (MW)

Licensee	Day	Peak	Off Peak	Total
DL1	482.28	512.78	313.08	1,308.15
DL2	513.19	605.66	384.18	1,503.03
DL3	296.99	354.56	199.08	850.62
DL4	225.72	279.58	169.02	674.32
DL5	189.20	205.32	140.39	534.90
Total	1,707.38	1,957.91	1,205.74	4,871.02

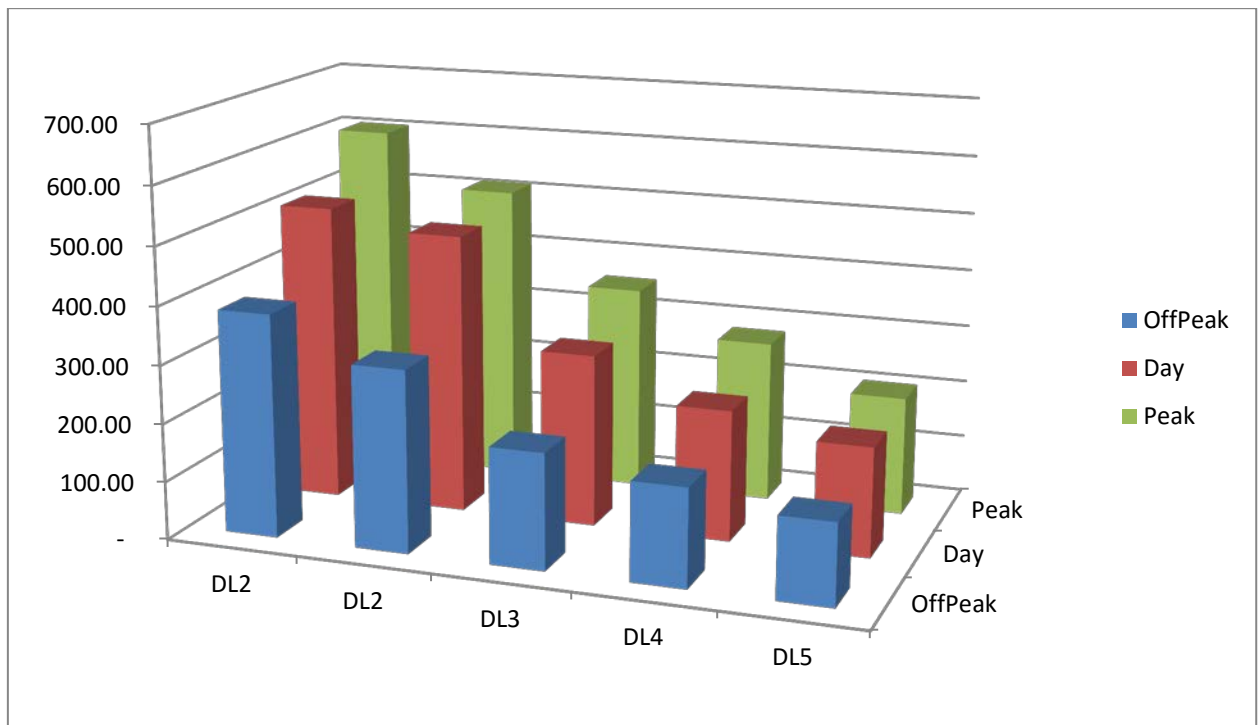


Figure 2-4 : Average Demand by DLs in MW

Coincident maximum demand given in following table 2-3, describes the demand claimed by each DL during the occurrence of national peak demand.

Table 2-3 : Monthly Coincident Maximum Demand (MW)

	January	February	March	April	May	June	July	August	September	October	November	December
DL1	575	586	602	605	578	567	581	597	608	611	601	617
DL2	624	648	629	648	683	687	690	690	727	709	705	670
DL3	351	357	349	364	341	358	391	367	370	369	381	365
DL4	309	314	315	318	311	310	301	308	312	299	303	317
DL5	238	235	243	245	232	232	232	234	241	239	237	246
Total	2,096	2,141	2,138	2,180	2,144	2,155	2,194	2,197	2,259	2,227	2,227	2,216

3 Cost of Purchases

TL sells energy to all DLs. DLs have to pay the cost of kWh units according to the time of use, i.e. Day (0530 to 1830 hrs), Peak (1830 to 2230 hrs) and Off peak (2230 to 0530 hrs). Further DLs have to pay a coincident maximum demand charge, which is the demand (MW) by DL coincide with national peak demand.

3.1 Cost of Energy Purchased

Table 3-1 : DL Wise Cost of Energy Purchased (LKR Mil.)

DL	Energy Cost(LKR in M)	Percentage (%)
DL1	31,385.00	33
DL2	28,654.00	30
DL3	9,925.00	11
DL4	9,395.00	10
DL5	15,092.00	16
Total	94,451.00	100

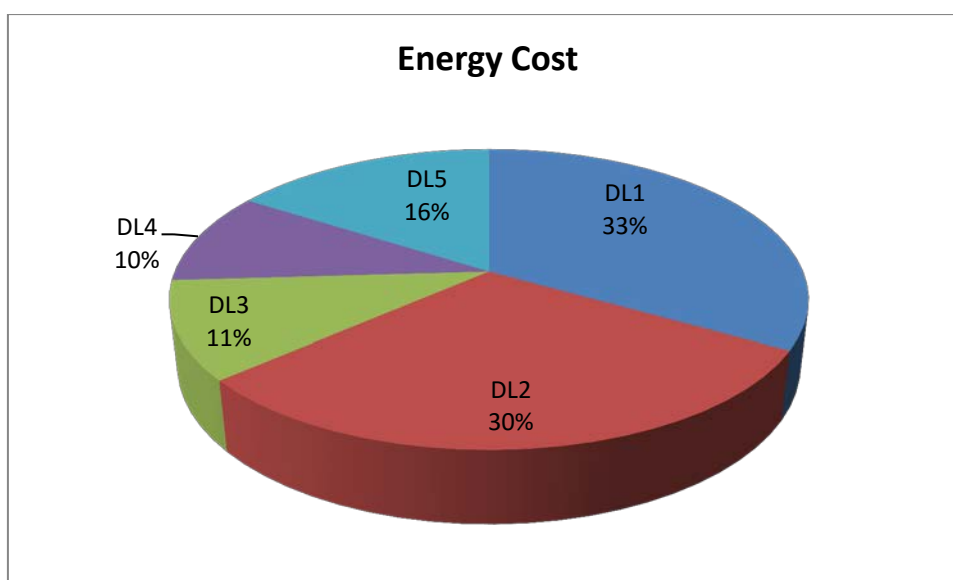


Figure 3-1 : DL Wise Cost of Energy Purchased (LKR Mil.)

3.2 Cost of Coincident Maximum Demand

Table 3-2 : DL Wise Cost of Coincident Maximum Demand (LKR Mil.)

DL	Capacity cost(LKR in M)	Percentage (%)
DL1	19,872.00	27
DL2	22,652.00	31
DL3	12,177.00	17
DL4	10,372.00	14
DL5	7,953.00	11
Total	73,026.00	100

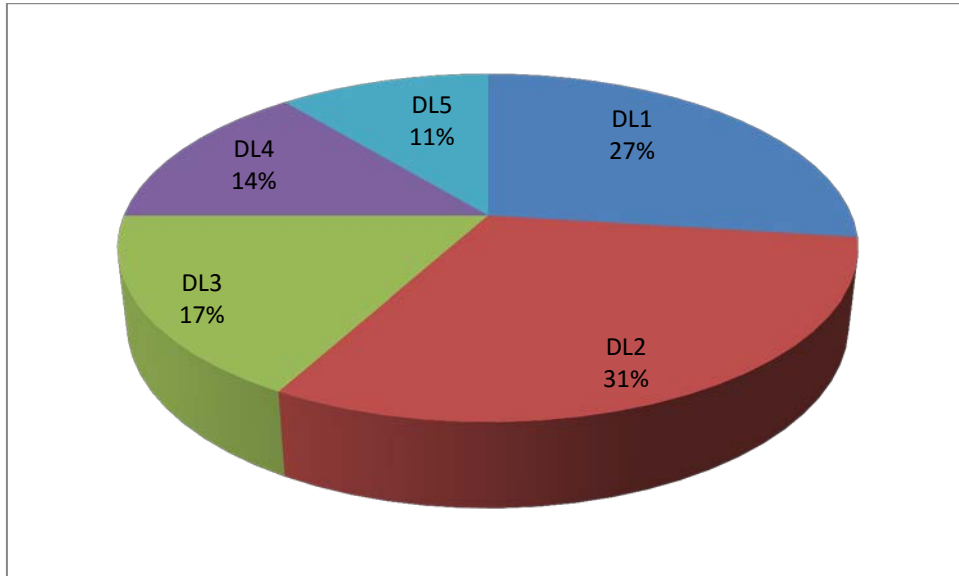


Figure 3-2 : DL Wise Cost of Coincident Maximum Demand (LKR Mil.)

3.3 Total Costs of Energy and Capacity Purchased

Table 3-3 : Total Costs of Energy and Capacity Purchased by each DL (LKR Mil.)

DL	Total (LKR in M)	Percentage (%)
DL1	51,257.00	31
DL2	51,306.00	31
DL3	22,102.00	13
DL4	19,767.00	12
DL5	23,045.00	14
Total	167,477.00	100

From Table 3.3, it can be seen that DL1 and DL2 have paid the highest amount for distribution business to TL, while DL4 has paid the lowest to TL during 2016.

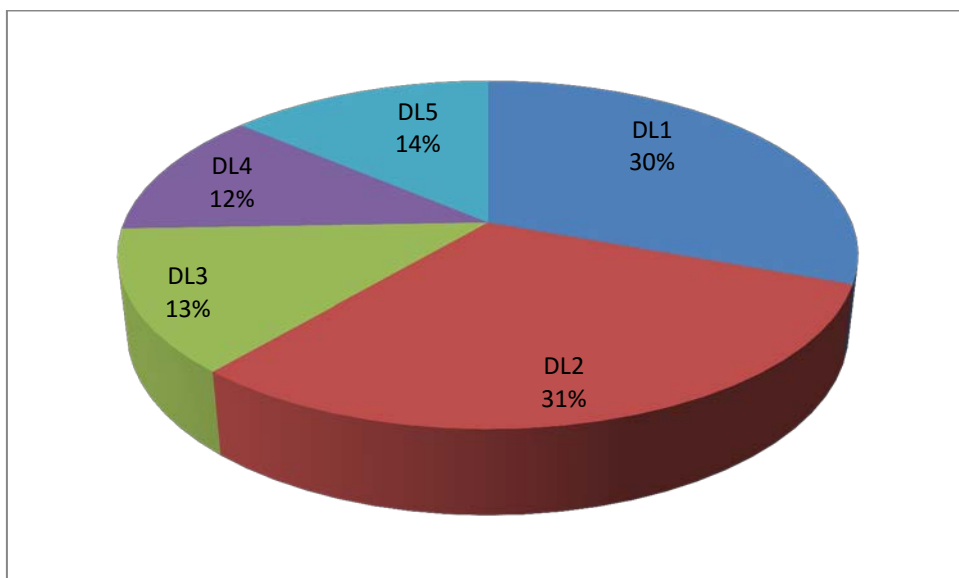


Figure 3-3 : Total Costs of Energy and Capacity Purchased by each DL (LKR Mil.)

4 Energy Sales

Total energy consumed by each consumer category is given below. Energy sales depend on consumer mix and the number of consumers, where these parameters vary among DLs. Therefore it is worthwhile to look at the distribution business with respect to consumer mix.

Table 4-1 : Total Energy Consumed by Each Consumer Category DL wise (GWh)

DL	Domestic	General Purpose	Hotel	Industrial	Religious	Total
DL1	1,226.42	1,302.88	102.36	833.29	29.46	3,494.41
DL2	1,426.29	670.75	65.27	1,650.72	23.48	3,836.51
DL3	806.67	409.38	6.35	897.69	10.20	2,130.28
DL4	732.61	359.08	72.30	473.84	10.85	1,648.67
DL5	603.17	499.92	56.97	275.94	10.14	1,446.14
Total	4,795.16	3,241.99	303.25	4,131.47	84.14	12,556.01

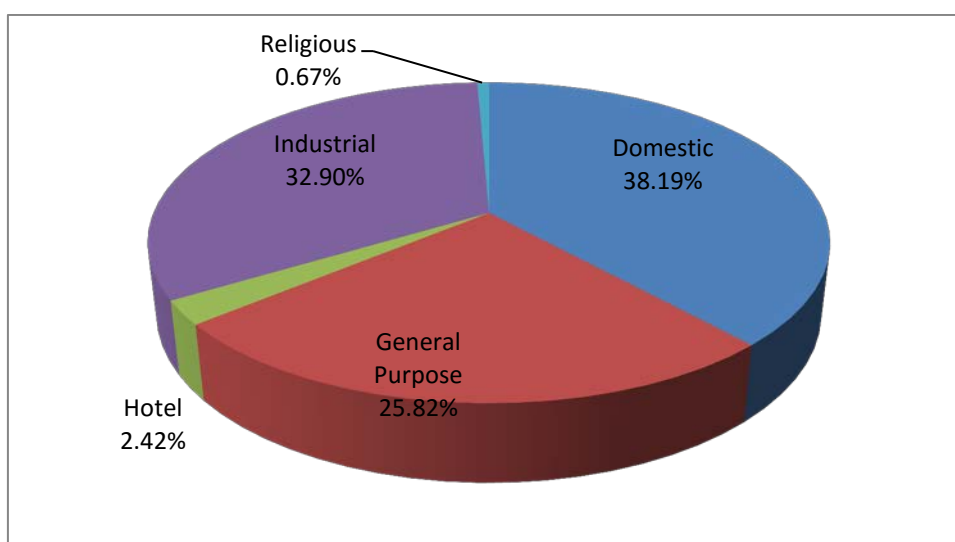


Figure 4-1 : Total Electricity Energy Consumed by each Consumer Category

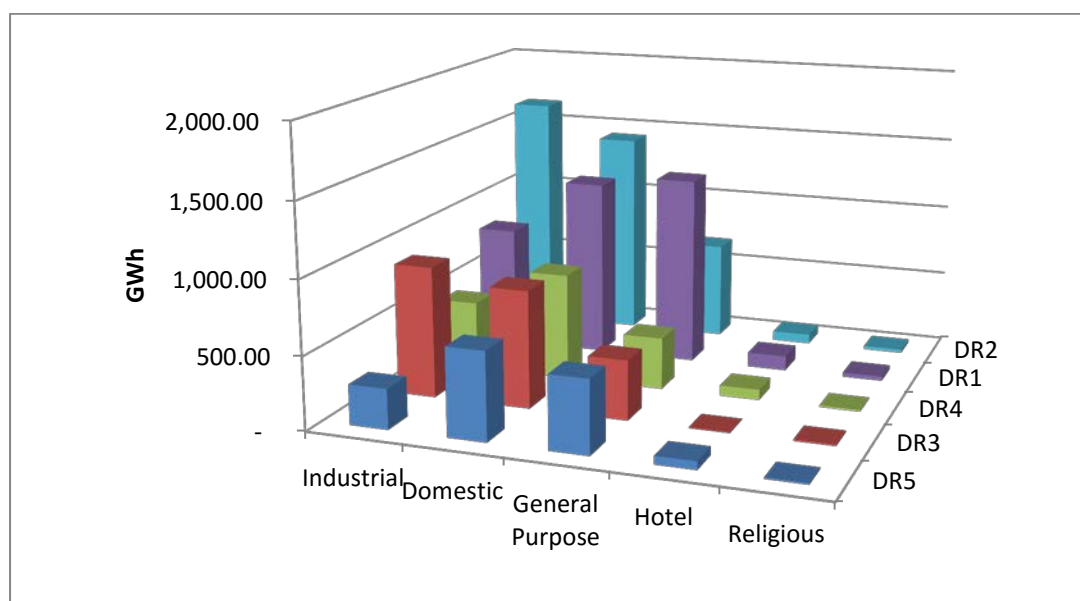


Figure 4-2 : Consumer Category and DL wise Electricity Consumption (GWh)

4.1 Electrical Energy Demand per Consumer Account

Table 4-2 : Average Units (kWh) Consumed per Month per Consumer Account

Per Month Per Consumer Energy Consumption (kWh per Consumer per month)					
Consumer Category	Domestic	General Purpose	Hotel	Industrial	Religious
DL1	72	609	68,882	2,609	264
DL2	68	267	28,244	9,572	162
DL3	65	298	10,476	9,032	134
DL4	69	318	47,595	6,418	180
DL5	111	506	81,623	6,692	334
Total	72	398	45,808	5,849	199

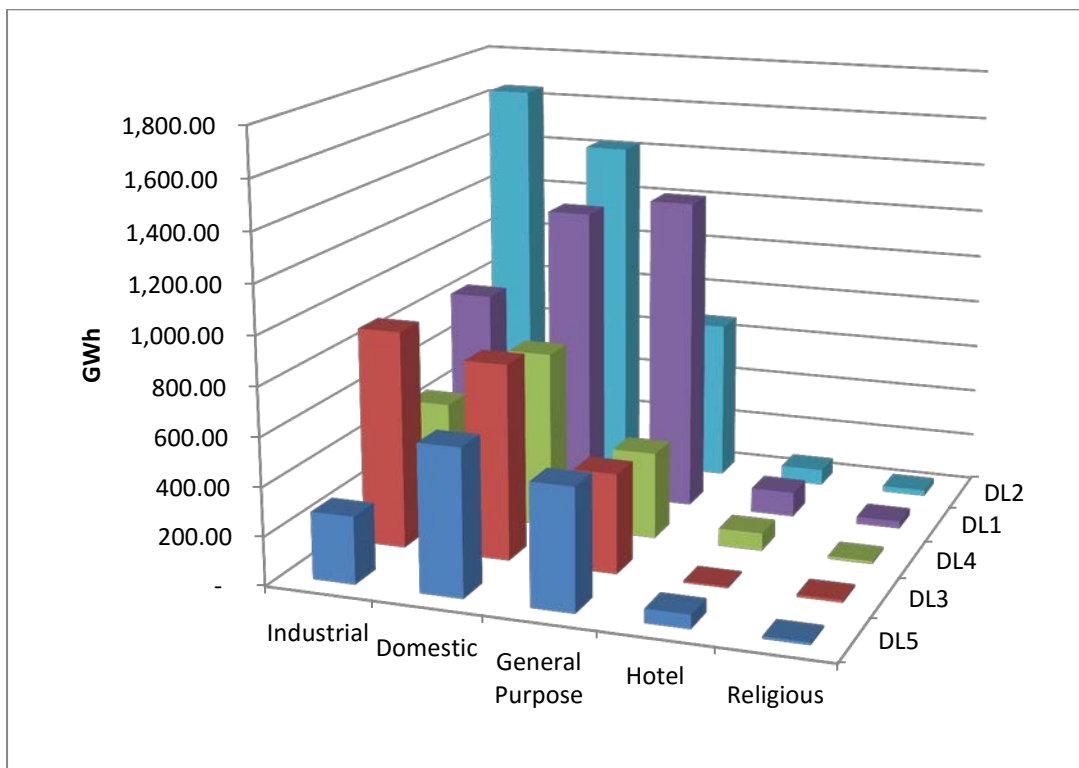


Figure 4-3 : Average Unit (kWh) Consumed per Month per Consumer Account

5 Revenue

Revenue from electricity distribution business consists of following components.

- Energy (kWh) charge
- Maximum demand charge
- Fixed charge

5.1 Revenue from Electrical Energy Sales

Following table depicts the energy charge distributed among each category. DL1 had the highest share of revenue from all DLs.

Table 5-1 : Revenue from Energy Charge (LKR Mil.)

Licensee	Domestic	General	Hotel	Industrial	Religious	Total
DL1	15,505	27,481	1,488	9,536	201	54,212
DL2	15,959	15,108	1,074	20,185	159	52,484
DL3	8,366	8,596	101	10,176	60	27,298
DL4	8,337	7,569	1,081	5,386	70	22,443
DL5	9,957	10,922	857	3,182	77	24,994
Total	58,125	69,676	4,601	48,463	567	181,431

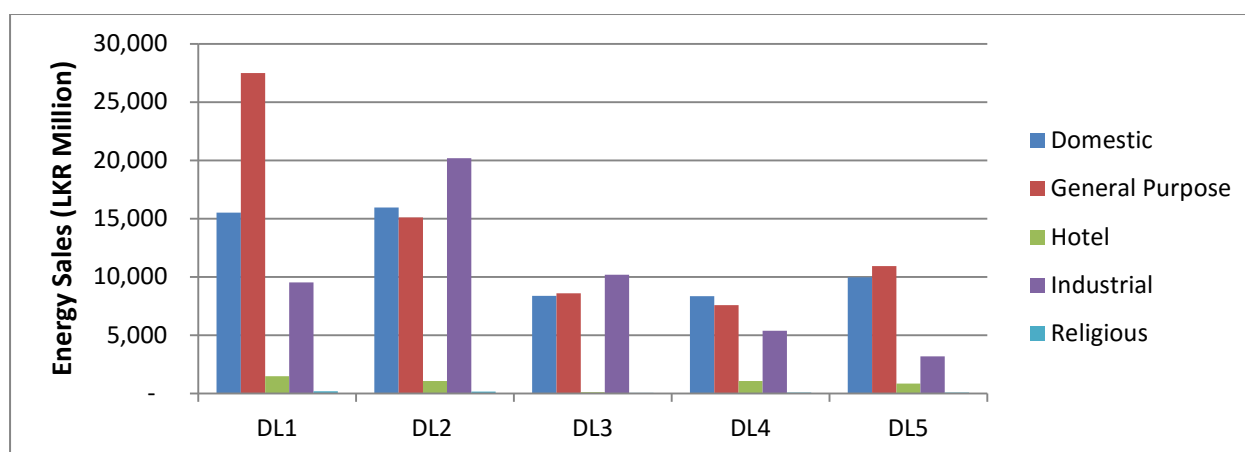


Figure 5-1 : Revenue from Energy Charge

As it can be seen clearly from figure 5.1, the General Purpose consumers dominate the revenue of DL1, for DL2 it is the revenue from Industrial consumers and for DL4 it is the revenue from Domestic consumers.

5.2 Revenue from Maximum Demand Charge

In present tariff structure, maximum demand charge is applicable for following categories only.

Industrial; in I-2 and I-3 sub categories

Hotel; in H-2 and H-3 sub categories

General Purpose; in GP-2 and GP-3 sub categories

Table 5-2: Revenue from Maximum Demand Charge (LKR Mil.)

	General Purpose	Hotel	Industrial	Total
DL1	3,068	247	2,677	5,992
DL2	915	204	5,412	6,531
DL3	686	24	2,781	3,491
DL4	538	202	1,667	2,408
DL5	948	154	1,035	2,137
Total	6,155	831	13,573	20,559

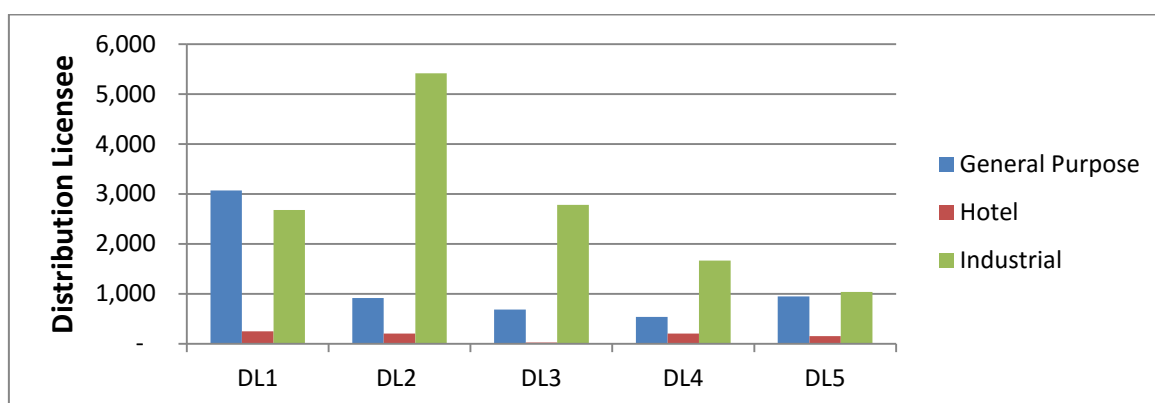


Figure 5-2: Category wise Revenue from Maximum Demand charge (LKR Mil.)

5.3 Revenue from Fixed Charge

Table 5-3: Revenue from Fixed Charge (LKR Mil.)

	Domestic	General Purpose	Hotel	Industrial	Religious	Total
DL1	2,675	627	3	242	19	3,565
DL2	3,257	649	4	154	18	4,083
DL3	1,777	361	1	90	9	2,238
DL4	1,636	295	4	68	8	2,011
DL5	1,593	82	2	19	5	1,702
Total	10,937	2,015	14	574	59	13,598

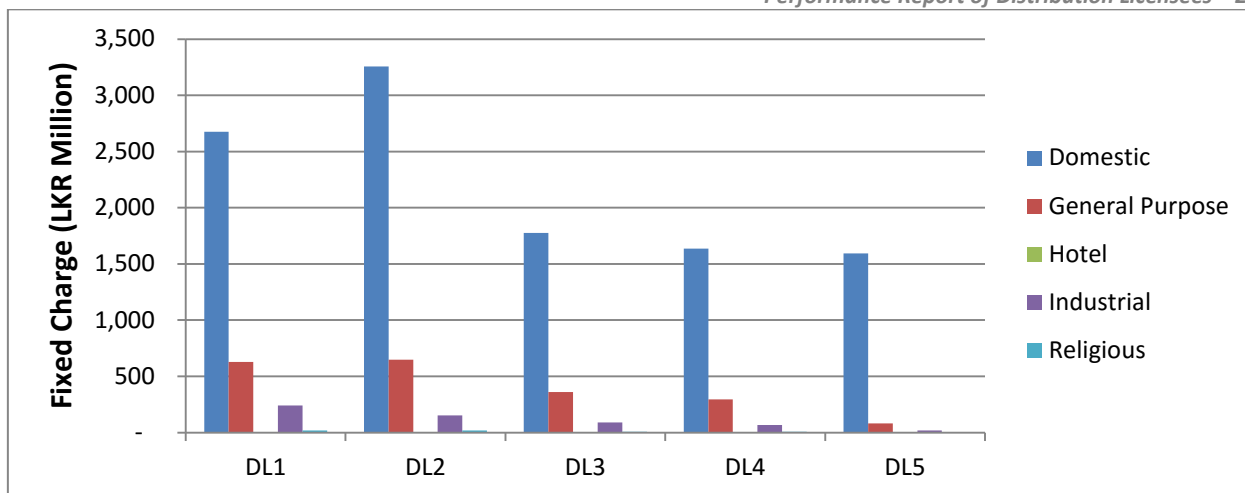


Figure 5-3: Revenue from Fixed Charge

5.4 Total Revenue

Table 5-4 : Total Revenue from Distribution Business (LKR Mil.)

Licensee	Domestic	Religious	Industrial	Hotel	General	Total
DL1	18,180	219	9,785	4,407	31,177	63,769
DL2	19,216	177	20,393	6,640	16,672	63,098
DL3	10,143	69	10,200	2,973	9,643	33,027
DL4	9,973	78	5,592	2,816	8,402	26,862
DL5	11,550	82	3,338	1,911	11,952	28,833
Total	69,062	626	49,308	18,747	77,846	215,589

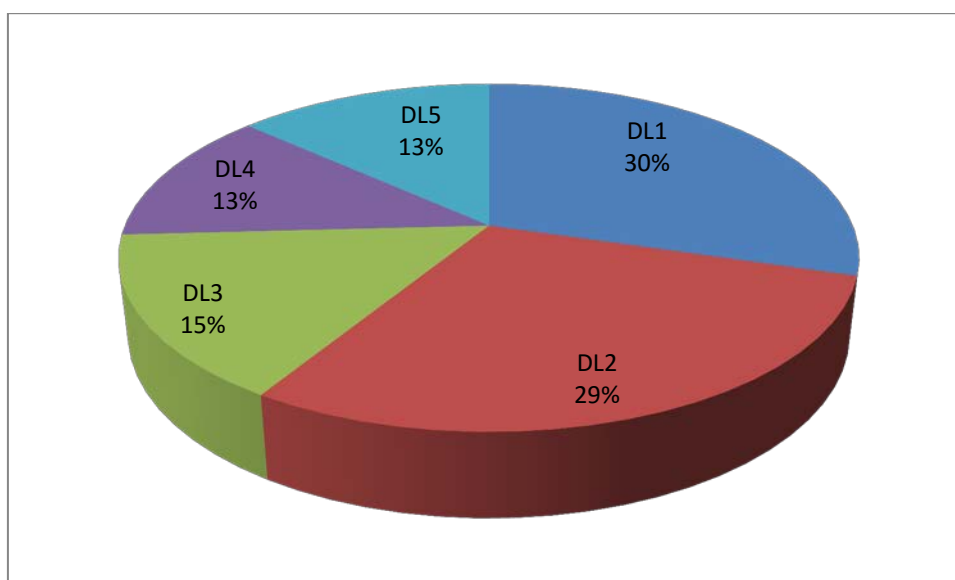


Figure 5-4 : DL wise Share of Total Revenue

5.5 Revenue per Unit of Energy Sold

Table 5-5 : Category wise Revenue per Unit of Energy Sold(LKR/unit)

Licensee	Domestic	Religious	Industrial	Hotel	General Purpose	Average
DL 1	14.82	7.43	11.74	43.05	23.93	18.25
DL 2	13.47	7.54	12.35	101.73	24.86	16.45
DL 3	12.57	6.76	11.36	468.19	23.56	15.50
DL 4	13.61	7.19	11.80	38.95	23.40	16.29
DL5	19.15	8.09	12.10	33.54	23.91	19.94
Average	14.40	7.44	11.93	61.82	24.01	17.17

6 Distribution Energy Loss

Following table depicts the energy loss in each DL and the allowed loss. Total energy losses amounts to 1184.7 GWh.

Table 6-1: Energy Loss in Distribution System

Licensee	Loss (GWh)	Loss Percentage (%)	Allowed Loss for year 2016 (%)
DL 1	292.39	7.62	8.20
DL 2	388.58	9.12	10.00
DL 3	285.18	11.75	8.20
DL 4	191.30	10.29	8.60
DL5	27.24	1.79	5.00
Total	1,184.70		

Highest loss is recorded from DL 3 and lowest loss is recorded from DL5.

7 Consumer Accounts

7.1 Consumer Mix

Total consumer base of the country in year 2016 is 6.3 million. DL2 accounts for the highest percentage of consumer accounts and DL5 is the lowest.

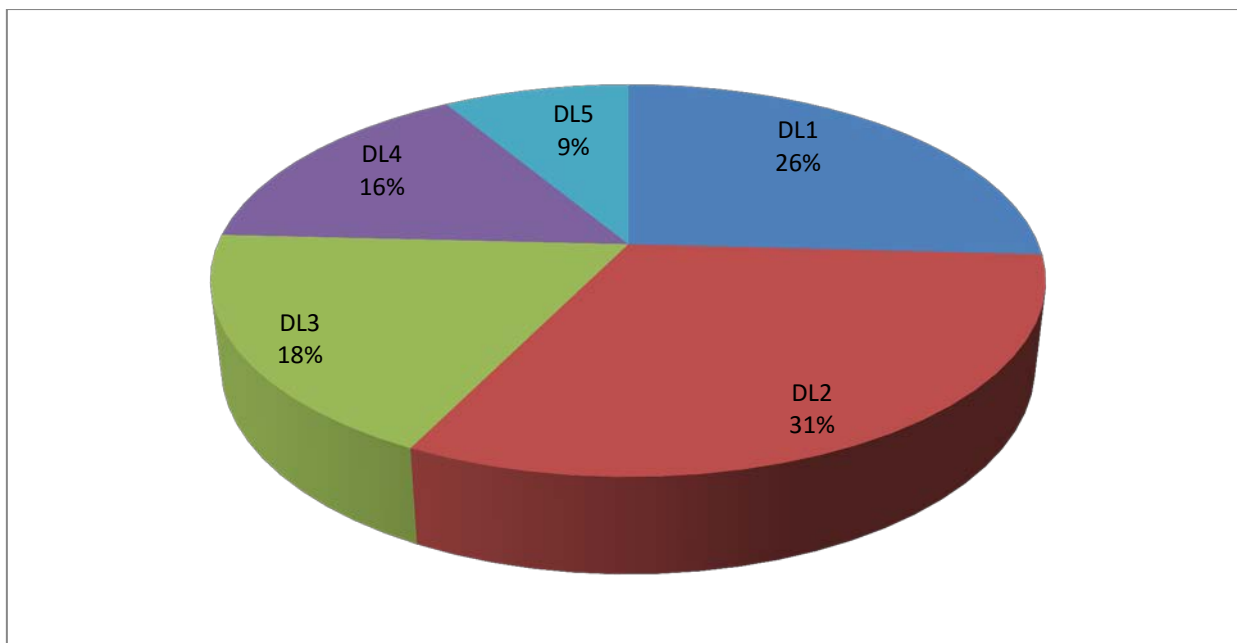


Figure 7-1 : Distribution Region Wise Consumer Base - 2016

Table 7-1 : Category wise Consumer Mix (Average)

	DL1	DL2	DL3	DL4	DL5	Total
Domestic	1,415,509	1,746,271	1,037,997	878,777	453,968	5,532,521
Religious	9,288	12,073	6,325	5,030	2,529	35,244
Industrial	26,621	14,371	8,283	6,153	3,436	58,863
Hotel	124	193	51	127	58	552
General Purpose	178,272	209,736	114,666	93,997	82,296	678,968
TOTAL	1,629,813	1,982,644	1,167,321	984,082	542,287	6,306,147

8 Summary

- Total electricity consumption 12.6 billion units
- Total consumer base 6.3 million
- Electricity purchased cost from TL 167.4 billion Rupees
- Total revenue by sales 216 billion Rupees
- Energy purchased from TL 14.04 billion units
- Total distribution loss 1184.7 GWh
- Total consumer growth 4% per year (based on data of year 2011 to 2016)

Table 2 : Summary table 1

Distribution Region	Number of Consumers	Energy Purchased from TL (GWh)	Coincident Maximum Demand(MW)	Average Demand by DL from TL (MW)	Energy Sales (GWh)	Total Revenue(LKR M)	Distribution Energy Loss (GWh)
DL1	1,629,813	3,837.02	7,128	1,308	3,494.41	63,769	292.39
DL2	1,982,644	4,300.93	8,110	1,503	3,836.51	63,098	388.58
DL3	1,167,321	2,435.50	4,364	851	2,130.28	33,027	285.18
DL4	984,082	1,911.05	3,718	674	1,648.67	26,862	191.30
DL5	542,287	1,556.20	2,853	535	1,446.14	28,833	27.24
Total	6,306,147	14,040.71	26,173	4,871	12,556.01	215,589	1,184.70

Table 3 : Summary table 2

Distribution Region	Percentage of Consumers (%)	Percentage of Energy Purchased from TL			Percentage of Energy Sales (%)	Percentage of Total Revenue (%)	Percentage of Energy Loss (%)
DL1	26	27			28	30	7.62
DL2	31	31			30	29	9.12
DL3	19	17			17	15	11.75
DL4	16	14			13	12	10.29
DL5	9	11			12	13	1.79

Table 4 : Summary table 03

Consumer Category	Number of Consumers	Percentage of number of Consumers (%)	Energy Sales (GWh)	Percentage of energy Sales (%)	Total Revenue (LKR M)	Percentage of Total Revenue (%)
Domestic	5,532,521	88	4,795	38.19	69,062	32.03
Religious	35,244	1	84	0.67	626	0.29
Industrial	58,863	1	4,131	32.90	49,308	22.87
Hotel	552	0	303	2.42	18,747	8.70
General Purpose	678,968	11	3,242	25.82	77,846	36.11
Total	6,306,147	100	12,556	100.00	215,589	100.00

9 Conclusion

Electricity distribution sector of Sri Lanka is handled by five distribution licensees. They are confronted with a consumer mix having 88% Domestic consumers consuming 38% of the total electricity distributed and 1% Industrial consumers consuming 33% of total electricity distributed by DLs.

According to the data, 4% of annual total consumer growth can be observed. Steady growth rate of 4.7% can be observed from General Purpose Consumer category and reduction of Industrial consumer Category growth rate during year 2016 is very significant which is 0.17 % in year 2016 and it was 4.2% at year 2015.

Total electricity sale during year 2016 is 12.6 billion of units and which was 11.6 in year 2015. It is 8.5% growth compare with year 2015. When considering the distribution energy losses DL1, DL2 and DL5 have performed well, as they have been able to keep their losses below the allowed losses, whereas DL3 and DL4 have been underperforming as they failed to keep their losses below the allowed losses. Altogether total distribution energy losses during year 2016 are 1,184.70 GWh whereas it was 1,055.54 GWh for year 2015. With the adjustment of estimated energy consumption by street lights, the national electricity distribution loss amounts to 8.1% in year 2016.

Below shows per hour energy demand (average) of each DL purchased from TL during year 2015 and year 2016. Accordingly energy demand at peak hours of all distribution licensees has been increased and totally it is around 5.7% growth in year 2016 compare with year 2015.

Table: Average Demand by DLs (MW)

Licensee	2015	2016
DL1	474.43	512.78
DL2	578.70	605.66
DL3	341.43	354.56
DL4	263.36	279.58
LECO	192.96	205.32
Total	1,850.88	1,957.91