MINISTRY OF ENERGY AND PUBLIC UTILITIES

Energy
Efficiency
Management
Office

ENERGY OBSERVATORY REPORT 2017

NOVEMBER 2018

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Note:

- All data in this report refer to the Republic of Mauritius, unless otherwise specified and may be subject to revision in subsequent issues. The figures for Republic of Mauritius include those for the Island of Mauritius and the Island of Rodrigues.
- Rounding of error may be present on certain totals.

Disclaimer:

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1 ENERGY SUPPLY

1.1 Introduction

The energy supply of Mauritius is divided into:

- imports of primary energy (*Fossil fuels: Heavy Fuel Oil. Liquefied Petroleum Gas, Gasolene, Diesel, Kerosene, Aviation fuel, Coal*);
- production of primary energy (*Local resources: Bagasse, hydro, wind, landfill gas, fuelwood, photovoltaic*);
- primary energy re-exports; and
- variation of stocks.

1.2 Imports

The imports of energy sources in 2017 totalled 2531 ktoe, as shown in Table 1.1

Table 1.1 - Imports of energy sources

Fossil Energy Imports 2017	ktonne	ktoe
Coal	1430.6	886.9
Gasolene	172.2	186.0
Diesel oil	346.7	350.1
Aviation fuel	309.7	322.1
Kerosene	2.0	2.1
Fuel oil	648.7	622.7
Liquefied Petroleum Gas (LPG)	149.4	161.4
TOTAL	**3059.2**	**2531.3**

Data Source: Statistics Mauritius

The distribution of fossil energy imports in 2017 is shown in Figure 1.1

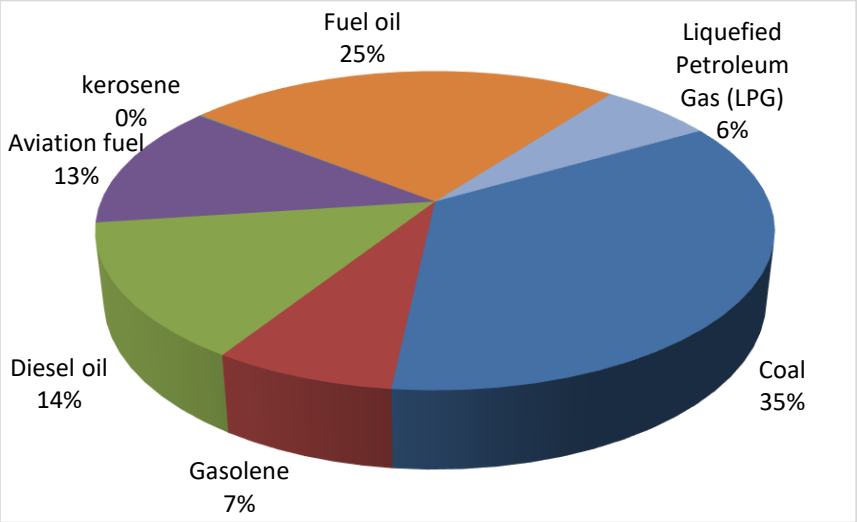
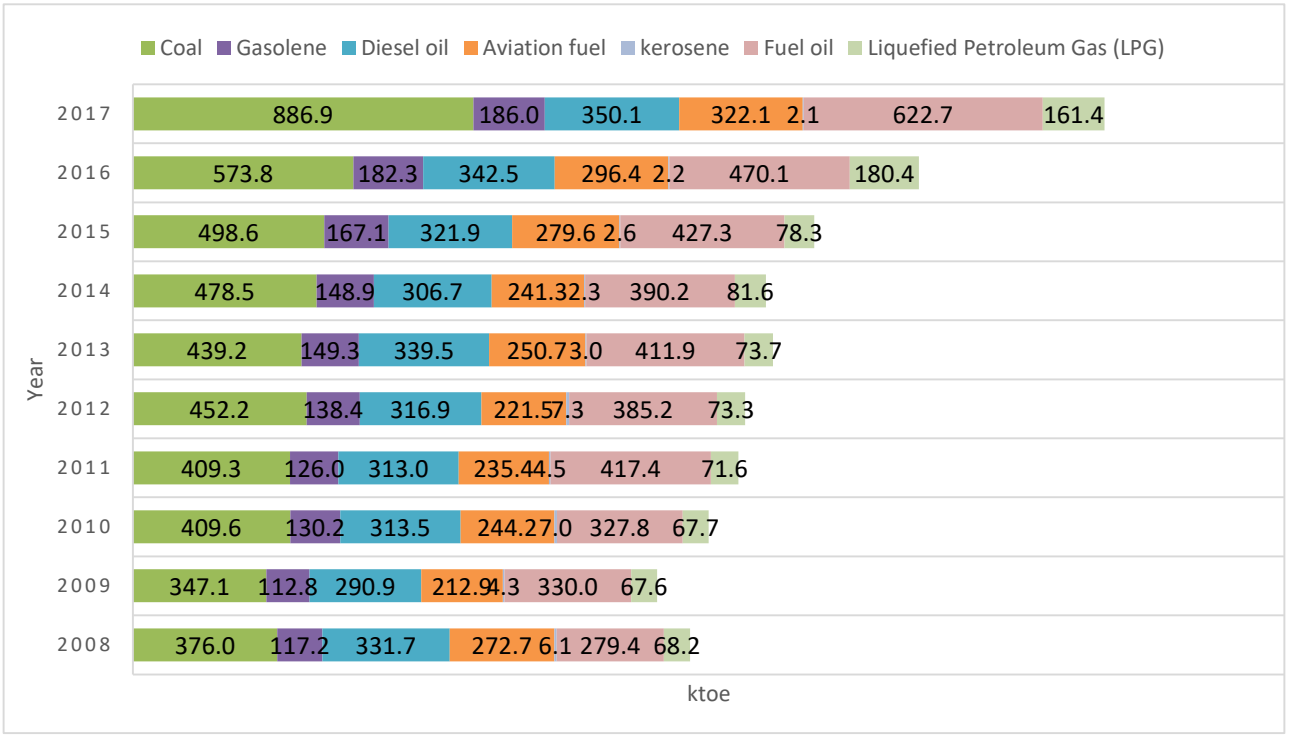


Figure 1.1 - Fossil energy imports, 2017

Petroleum products are intended mostly for the sectors of transport, electricity generation, manufacturing as well as in the household, commercial and agriculture sectors. Coal is used primarily for power generation from thermal coal/bagasse power plants with a small fraction being used in the manufacturing sector. Liquefied Petroleum Gas (LPG) is used mainly as cooking and water heating fuel, to a lesser extent as fuel for vehicles. Fig 1.2 shows the trend of fossil fuel import for the period 2008-2017.



Data Source: Statistics Mauritius

Figure 1.2 - Trend of fossil fuel imports

In 2017, the amount of fossil fuels imported increased by 23.6% compared to 2016. The total import bill of energy sources for 2017 amounted to Rs 29,406 M compared to Rs 21,610 M in 2016, representing an increase of 36%. , due to increases in the average imports price of petroleum products as follows: gasolene (+15.9%), diesel oil (+13.5%), dual purpose kerosene (+17.1%), fuel oil (+34.9%) and LPG (+43.6%). On the other hand, there was a slight decrease in the average imports price of coal by 2.3%.

1.3 Primary energy requirement

The primary energy requirements are met from imported sources and from local renewable sources as shown in Table 1.2.

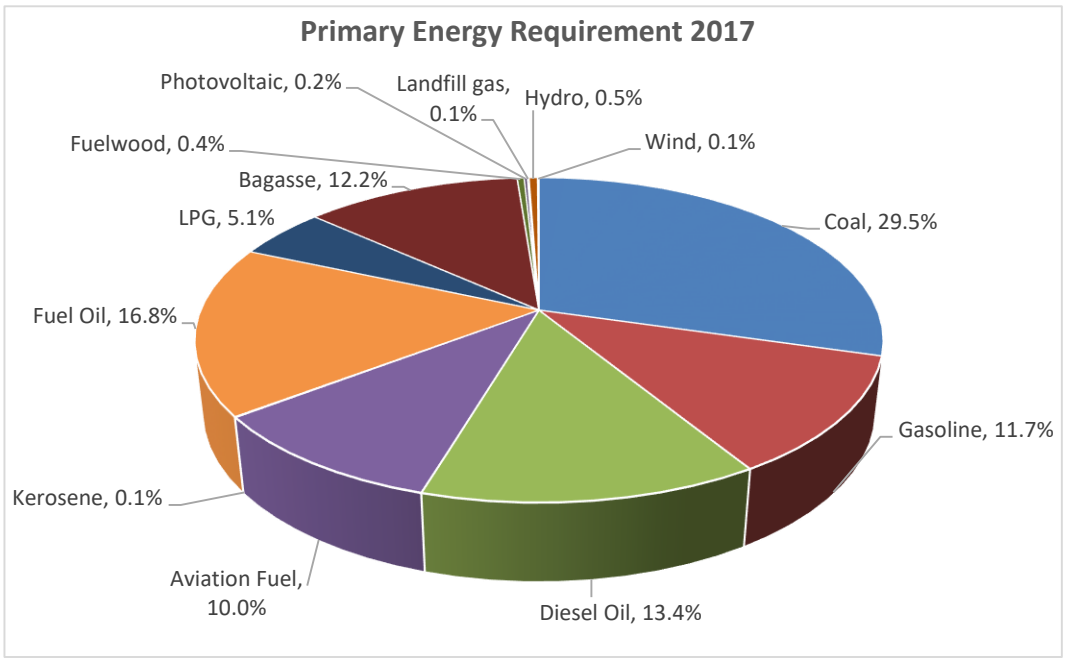
Table 1.2 - Primary energy requirement 2016 – 2017

	Energy source	Primary energy requirement (ktoe)		% change
		2016	2017	
Imported fuels	Coal	455.3	471.3	3.5 %
	Gasoline	178.9	187.7	4.9 %
	Diesel Oil	210.5	214.4	1.9 %
	Aviation Fuel	147.6	160.2	8.6 %
	Kerosene	0.8	1.0	25.3 %
	Fuel Oil	254.4	269.3	5.9 %
	LPG	80.9	81.3	0.5 %
	Sub Total	***1328.4***	***1385.3***	***4.3 %***
Local resources	Bagasse	206.1	194.3	-5.7 %
	Fuelwood	6.4	6.4	-1.1 %
	Photovoltaic	2.6	2.8	8.9 %
	Landfill gas	1.6	1.5	-9.5 %
	Hydro	8.6	7.7	-9.7 %
	Wind	1.5	1.3	-18.9 %
	Sub Total	***226.8***	***214.0***	***-5.7 %***
TOTAL		**1555.2**	**1599.2**	**2.8 %**

Data Source: Statistics Mauritius

In 2017, the primary energy requirement amounted to 1599.3 ktoe representing an increase of 2.8 % compared to 2016.

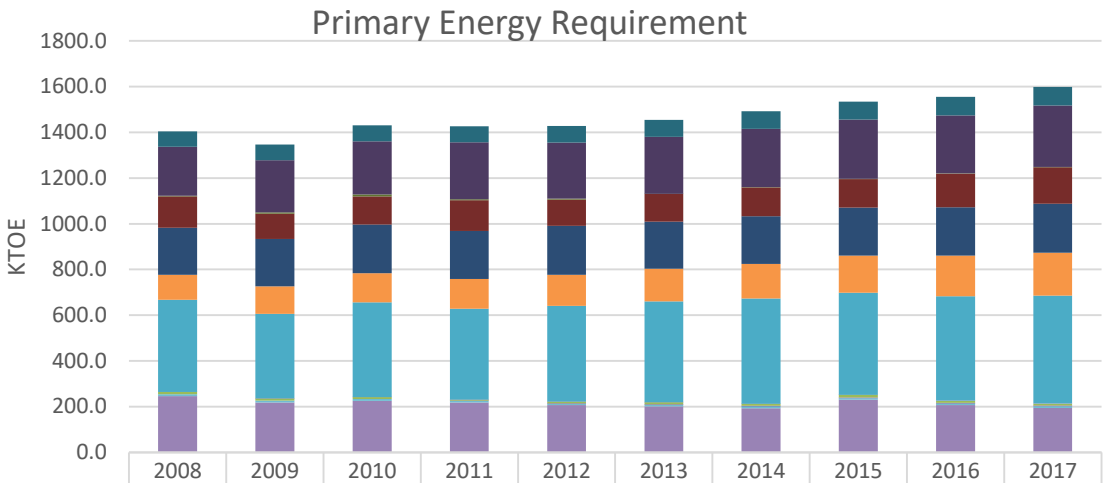
Figure 1.3 shows the share of fuel source in the primary energy requirement for year 2017.



Data Source: Statistics Mauritius

Figure 1.3 - Primary Energy Requirement (ktoe) 2017

The evolution of primary energy requirement over the period 2008 to 2017 is shown in Figure 1.4.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
LPG	67.9	68.9	70.2	71.1	72.6	74.9	76.7	79.2	80.9	81.3
Fuel oil	213.3	227.9	232.2	248.1	245.5	248.5	254.8	259.2	254.4	269.3
kerosene	4.0	6.7	8.0	4.3	3.8	0.9	0.9	0.9	0.8	1.0
Aviation fuel	136.9	110.5	123.3	134.3	115.0	120.7	126.8	124.3	147.6	160.2
Diesel oil	205.4	206.7	213.6	210.1	213.4	207.0	208.0	209.6	210.5	214.4
Gasoline	109.5	120.6	127.7	130.0	136.6	142.7	151.7	163.0	178.9	187.7
Coal	403.9	369.3	414.1	397.7	418.4	440.6	460.3	446.9	455.3	471.3
Wind	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.2	1.5	1.3
Hydro	9.3	10.5	8.7	4.9	6.4	8.2	7.8	10.5	8.6	7.7
Landfill gas	0.0	0.0	0.0	0.3	1.5	1.7	1.8	1.8	1.6	1.5
Photovoltaic	0.0	0.0	0.0	0.0	0.1	0.2	2.1	2.2	2.6	2.8
Fuelwood	7.7	7.7	7.7	7.6	7.5	7.3	6.9	6.5	6.4	6.4
Bagasse	246.4	218.0	225.0	218.1	206.5	201.7	193.4	230.1	206.1	194.3

Data Source: Statistics Mauritius

Figure 1.4 - Primary Energy Requirement, 2008 - 2017

1.4 Production of Primary Energy – Local Renewable Sources

Examples of renewable energy sources are wind, solar, geothermal, wave, tidal, hydro energy including energy derived from biomass, landfill gas, sewage gas, and biogas. In Mauritius, the main sources of renewable energy exploited are biomass, in the form of sugar cane bagasse, hydro, PV, wind, landfill gas and fuel wood. A total of 214.0 ktoe of local resources was tapped in 2017, as shown in Table 1.3.

Table 1.3 - Primary energy supply in 2017 – Local resources

Local Resources	ktonne	GWh	ktoe
Bagasse	1215.0		194.3
Fuelwood	16.7		6.4
Photovoltaic		33.0	2.8
Landfill gas		16.9	1.5
Hydro		89.8	7.7
Wind		14.6	1.3
Total	**1231.7**	**154.3**	**214.0**

Data Source: Statistics Mauritius

In 2017, primary energy from local resources decreased by 5.6%, compared to 2016.

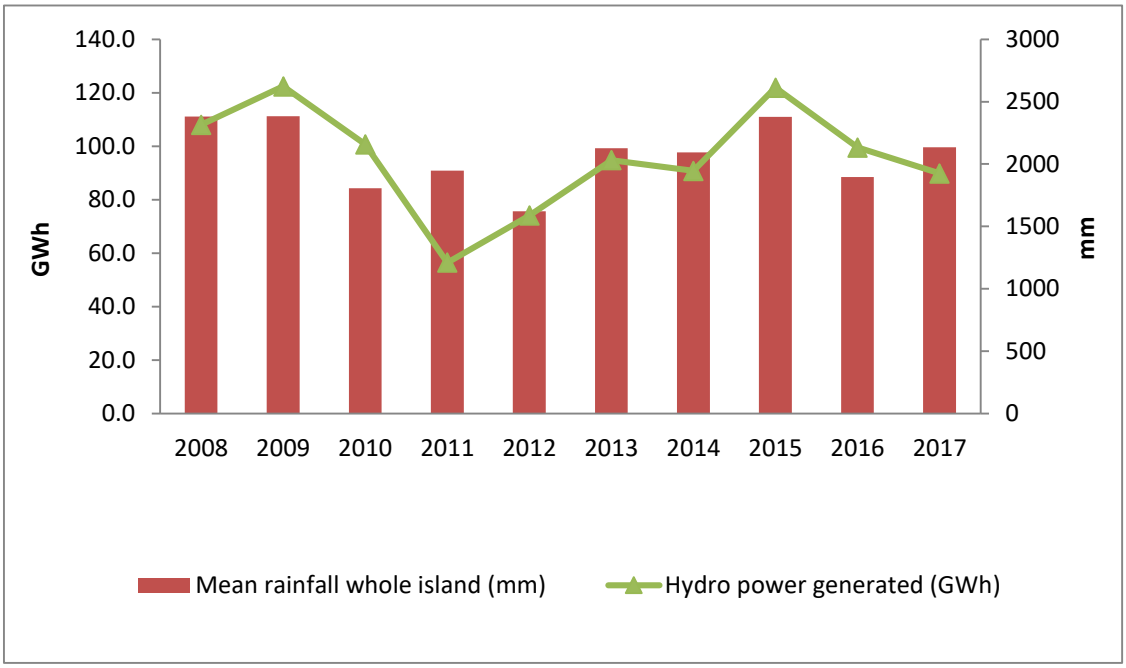
Bagasse is the main source of primary energy from local resources. The Small Scale Distributed Generation (SSDG) scheme implemented by the CEB, which allows Small Independent Power Producers (SIPP) to feed electricity generated through photovoltaic systems installed on their premises to the CEB grid. 2.8 ktoe of electricity was generated in 2017 from photovoltaic systems. Figure 1.5 shows the trend of primary energy obtained from local resources from 2008 to 2017:

Data Source: Statistics Mauritius

Figure 1.5 - Trend of primary energy from local resources, 2008 – 2017

1.4.1 Hydroelectricity

Hydroelectricity is a form of energy generated by the conversion of the energy from free-falling water to electricity.



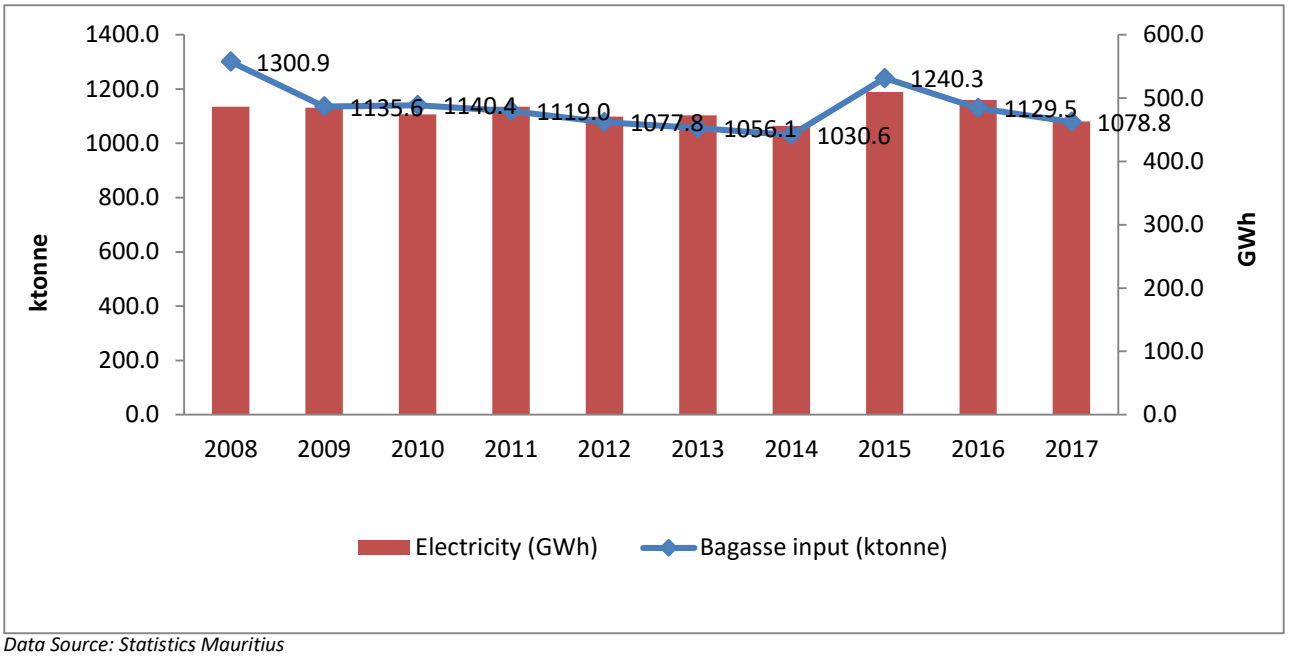
Data Source: Statistics Mauritius

Figure 1.6 - Trend of Hydro-electric Generation, 2008 to 2017

Hydroelectric power generation accounted for 2.9% of total electricity produced in 2017. Fluctuations in hydroelectric power generation tend to follow annual rainfall levels as shown in Figure 1.6. In 2011, the discrepancy between hydroelectric power generation and rainfall level can be attributed to the water shortage that affected the island of Mauritius where water, that otherwise would have been used for hydroelectric power generation, had to be diverted for use in other sectors.

1.4.2 Bagasse

Bagasse is the fibrous residue of sugar cane used on sugar estates for steam production to meet their own requirements and also for the production of electricity. Figure 1.7 gives the bagasse input for electricity generation and the amount generated over the period 2008 to 2017. In 2017, 1078.8 ktonnes of bagasse was used for electricity generation as compared to 1129.5 ktonnes in 2016. This was due to a decrease of 5.7% in the production of bagasse from 1288 ktonne in 2016 to 1215 ktonne in 2017.



Data Source: Statistics Mauritius

Figure 1.7 - Trend of electricity generation from bagasse, 2008 to 2017

Table 1.4 shows the ratio of electricity produced per tonne of bagasse over the period 2008 to 2017. The ratio varies in the range of 0.374 MWh/tonne to 0.448 MWh/tonne. In 2017, the ratio of electricity produced per tonne of bagasse was 0.429. Also 16.3 % of total electricity production in Mauritius was from bagasse, representing a decrease of 2.5 % compared to 2016.

Table 1.4 - Ratio of electricity produced per tonne of bagasse, 2008 - 2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ratio electricity produced to bagasse input (MWh/tonne)	0.374	0.427	0.416	0.435	0.437	0.448	0.443	0.411	0.440	0.429

1.4.3 Photovoltaics (PV)

Photovoltaics is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors.

PV installations are generally used as source of electricity in remote areas where access to the electricity network is not possible or the cost of extension of the existing network is too high. Another use of PV is for solar powered street lighting. PV installations are also used as a source of electricity to reduce dependency on electricity generated by fossil fuel-fired power plants.

The electricity generation from PV installations in Mauritius was 33.0 GWh in 2017 compared to 30.3 GWh in 2016.

Table 1.5 provides information about PV installations under the Small Scale Distributed Generation (SSDG) scheme up to the year 2017 for the Island of Mauritius.

Table 1.5 – SSDG summary, Island of Mauritius

Scheme	No. of approved applications (up to year 2017)	Total capacity of approved applications (kW) (up to year 2017)	Total capacity of PV systems connected to the CEB grid (kW) (up to year 2017)	Total kWh produced during year 2017	Total kWh exported to the CEB grid during year 2017
SSDG FIT Scheme	317	2,815	2,199	2,891,100	1,760,058
SSDG PECR Scheme	144	1,734	1,117	1,403,560	838,944
SSDG Net metering Scheme-Phase 1	1,477	4,576	2,353	2,252,056	1,444,705
SSDG Net metering Scheme-Phase 2	50	186	10	1279	1000
Total	**1,988**	**9,311**	**5,679**	**6,547,995**	**4,044,707**

Data source: CEB

Table 1.6 provides information about PV installations under the Small Scale Distributed Generation (SSDG) scheme up to the year 2017 for the Island of Rodrigues.

Table 1.6 - SSDG summary, Island of Rodrigues

Scheme	No. of approved applications (cumulated)	Total Capacity of approved applications (kW) (cumulated)	Total Capacity of PV systems connected to the CEB grid (kW) (cumulated)	Total kWh Produced during the year 2017	Total kWh Exported to the CEB grid during the year 2017
SSDG FIT scheme	25	157	172	231,525	190,879
SSDG PECR scheme	6	33	43	53,726	23,368
SSDG Net metering Scheme	30	97	24	10,365	7,998
Total	**61**	**287**	**239**	**295,616**	**222,245**

Data source: CEB

1.4.4 Electricity from Wind energy

Wind energy comes from the movement of air across the atmosphere of the Earth. Wind power is the conversion of wind energy into a useful form of energy, such as using wind turbines to generate electricity, windmills for mechanical power, wind pumps for water pumping or sails to propel ships.

In 2017, 2.7 GWh of electricity was produced from wind energy in Rodrigues Island.

In Mauritius, a wind farm with a total installed capacity of 9.35 MW, has been set up by Eole Plaines des Roches Ltd and has generated 11.88 GWh of electricity in 2017.

A Power Purchase Agreement for a 29.4 MW wind farm to be set up by Consortium Suzlon-Padgreen Co Ltd at Curepipe Point (Plaine Sophie) was signed in August 2012. The wind farm project is currently being implemented and is expected to come into operation in 2019.

1.4.5 Electricity from Landfill gas

Landfill gas is a gas, constituted mostly of methane, produced by the fermentation of organic waste in landfills in the absence of oxygen. 16.9 GWh of electricity was produced from landfill gas in Mauritius in 2017.

1.4.6 Electricity from biogas

Data on biogas from sludge digester used to partially meet the electricity requirements of the St Martin wastewater treatment plant is provided in Table 1.7. The electricity generated in 2017 was only 27,461 kWh given that the biogas plant was under breakdown for most of the time in 2017.

Table 1.7 - Electricity produced from biogas at St Martin Treatment plant

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Electricity generated (kWh)	1,093,335	1,140,138	1,185,523	1,145,557	965,616	950,773	644,031	783,883	27,461

Data source: Wastewater Management Authority

1.4.7 Solar Thermal – Solar Water Heaters (SWH) in Mauritius

Grants have been provided to subsidize the purchase of 73,480 solar water heaters up to 2016, under the four phases of the Solar Water Heater Grant Scheme (SWHGS)[1]. No updated figures are available currently for the year 2017.

Assuming that these solar water heaters have displaced electric water heaters and gas water heaters in the ratio of 1 : 5, the avoided electric energy is estimated at 6.34 GWh and the avoided LPG mass is estimated at 2, 987 tonnes. The avoided CO_2 emissions, using the grid emission factor of 954.8 gCO_2/kWh for year 2017, and assuming 1.51 kg of CO_2 per litre of LPG, would be 14 669 tCO_2.

It is to be noted that large scale solar water heaters are used in other sectors of the economy such as the tourism sector and manufacturing sector to preheat water for swimming pools and boilers respectively.

1.5 Petroleum products

The State Trading Corporation (STC) is responsible for the importation of all the country's requirements of petroleum products. These include the demands for the running of public transport, industrial and commercial activities, private motor vehicles, the needs of the Central Electricity Board in fuel oils for its

[1] Source: Performance Audit Report 2017 of the National Audit Office

power plants, the needs for aircraft refuelling at the SSR International Airport and the needs of bunker fuels for international shipping.

Upon arrival at the Port Louis Harbour, the petroleum products are pumped out of the tankers and delivered through pipelines into fuel tanks, owned by local oil companies, in the port Area. The capacity of the fuel tanks are as follows:

(i) Gasolene– 12,900 tonnes;
(ii) Diesel – 18,900 tonnes; and
(iii) LPG – 5,400 tonnes.

Joint Utility Hydrant Installation (JUHI), a consortium of four local oil companies, owns and operates a Jet Fuel tank of capacity 22,500 tonnes near SSR Airport.

The oil companies market, distribute and retail the products through their respective networks of fuel pump stations across the country. Some also operate barges to carry out their bunker supply operations at sea.

Table 1.8 shows the imports of petroleum products over the period 2008 to 2017. It may be noted that annual demand in petroleum products to meet domestic demand and bunkering increased by 12.2% from 1,452 thousand tonnes in 2016 to 1,629 thousand tonnes in 2017.

Table 1.8 - Import of petroleum products, 2008 – 2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Gasolene	108.5	104.4	120.6	116.7	128.2	138.2	137.9	154.7	168.8	172.2
Diesel oil	328.5	288.0	310.4	309.9	313.8	336.1	303.6	318.7	339.1	346.7
Aviation fuel	262.2	204.7	234.9	226.4	213.0	241.1	232.0	268.8	285.0	309.7
kerosene	5.9	4.1	6.7	4.3	7.0	2.8	2.2	2.5	2.1	2.0
Fuel oil	291.0	343.7	341.5	434.8	401.2	429.1	406.4	445.1	489.7	648.7
Liquefied Petroleum Gas (LPG)	63.1	62.6	62.7	66.3	67.9	68.2	75.6	72.5	167.0	149.4
TOTAL (thousand tonnes)	**1059.2**	**1007.6**	**1076.7**	**1158.4**	**1131.1**	**1215.5**	**1157.7**	**1262.3**	**1451.7**	**1628.7**

Data Source: Statistics Mauritius

Kerosene is used at the Nicolay power station for electricity generation. It was also used in the household sector for cooking purposes. Following a price increase in 2006, consumption of kerosene in the household sector has seen a sharp decrease over the years. In 2005, 18.1 ktonnes of kerosene was imported while in 2017, this stood at 2.0 ktonnes only.

1.6 Primary energy re-export

Primary energy re-export in 2017 is shown in Table 1.9.

Table 1.9 - Primary energy re-export

Energy Source	ktonne	ktoe
Diesel oil	128.7	130.0
Aviation fuel (foreign aircraft)	153.8	159.9
Fuel oil	340.7	327.1

Data Source: Statistics Mauritius

1.7 Stock variation

The variations in stock in 2017 are provided in the Table 1.10.

Table 1.10 - Variation in stock year

	2017							
	Import		Export		Primary energy requirement		Stock variations (import - export - primary energy requirement)	
	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe
Coal	1430.6	886.9			760.2	471.3	670.4	415.6
Gasolene	172.2	186			173.8	187.7	-1.6	-1.7
Diesel oil	346.7	350.1	128.7	129.5	212.3	214.4	5.7	6.3
Aviation Fuel	309.7	322.1	153.8	159.9	154.1	160.2	1.8	1.9
Kerosene	2.0	2.1			1.0	1.0	1.0	1.1
Fuel oil	648.7	622.7	340.7	327.1	280.5	269.3	27.5	26.3
LPG	149.4	161.4			75.3	81.3	74.1	80.1

Data Source: Statistics Mauritius

1.8 Dependency on Imported Energy Carriers

In 2017, the dependency rate on imported energy carriers was **86.6%**. The trend of the dependency rate from 2008 to 2017 is shown in Table 1.11.

Table 1.11 - Energy Dependency Rate, 2008 – 2017

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
81.2%	82.5%	83.1%	83.8%	84.4%	84.9%	85.8%	83.6%	85.4%	86.6%

Data Source: Statistics Mauritius

2 ELECTRICITY PRODUCTION CAPACITY

The capacity of power plants connected to the grid in 2017 is shown in Table 2.1.

Table 2.1 - Capacity of power plants in 2017

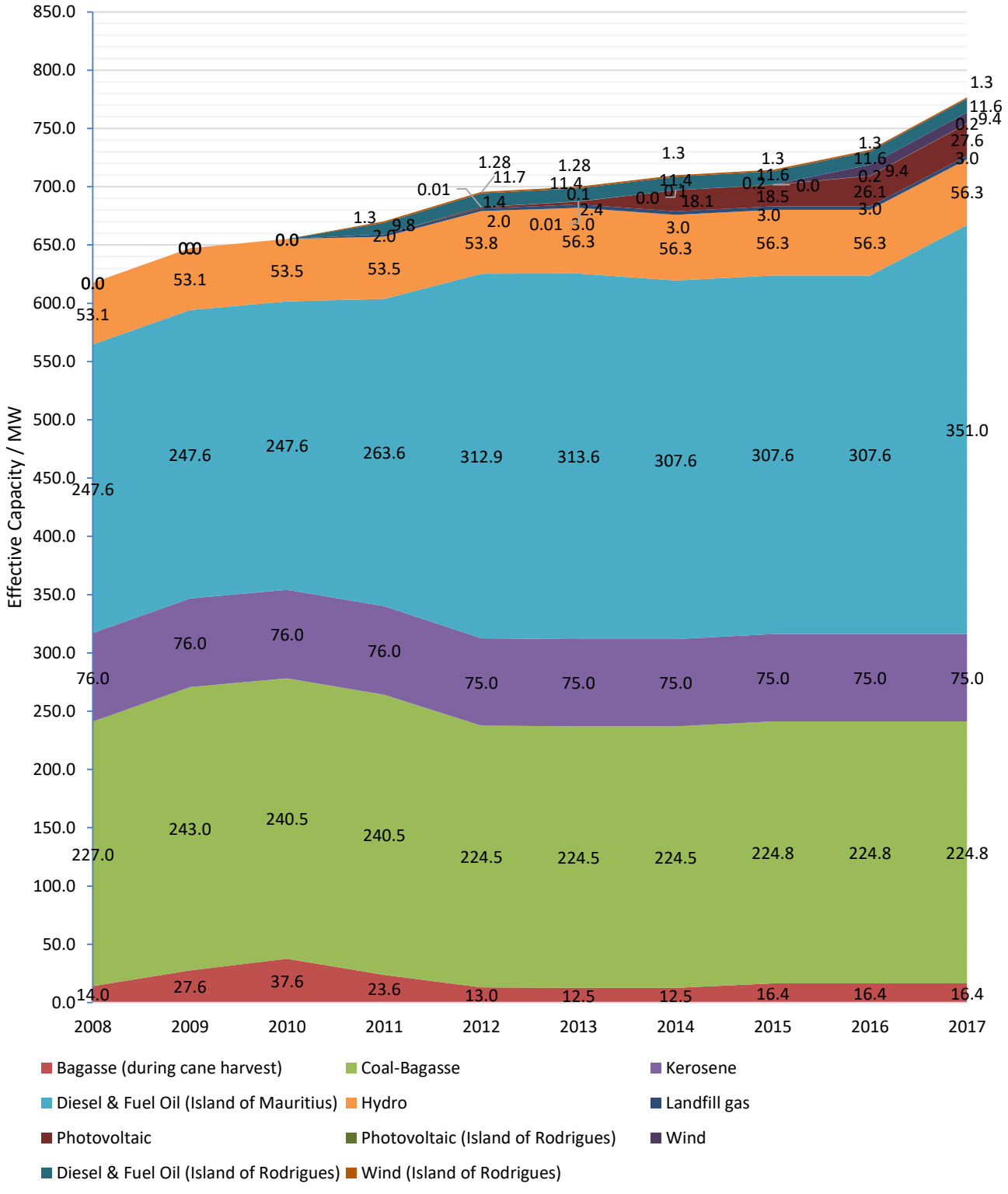
Type of power plant		Installed plant capacity (MW)	Total Installed plant capacity (MW)	Effective plant capacity (MW)	Total effective plant capacity (MW)
BAGASSE (cane harvest season)	Medine	22.50	22.50	16.40	16.40
COAL-BAGASSE	Alteo Energy Ltd (formerly Consolidated Energy Ltd)	36.70	258.80	33.00	224.80
	Terragen Ltd (formerly Compagnie Thermique de Belle Vue)	71.20		62.00	
	Consolidated energy limited	28.40		25.80	
	Omnicane Thermal Energy Operations (St Aubin) Ltd (formerly Compagnie Thermique du Sud)	32.50		30.00	
	Omnicane Thermal Energy Operations (La Baraque) Ltd (formerly Compagnie Thermique de Savannah)	90.00		74.00	
HYDRO	Champagne	30.00	60.44	28.00	56.30
	Ferney	10.00		10.00	
	Tamarind Falls	11.40		9.50	
	Le Val	4.00		4.00	
	Reduit	1.20		1.00	
	Cascade Cecile	1.00		1.00	
	Magenta	0.94		0.90	
	Midlands Dam	0.35		0.35	
	La Nicoliere	0.35		0.35	
	La Ferme	1.20		1.20	
LANDFILL GAS	Sotravic Ltd (Mare Chicose)	3.45	3.45	3.00	3.00
KEROSENE	Nicolay	78.40	78.40	75.00	75.00
DIESEL & FUEL OIL	St Louis	110.00	359.60	110.00	351.00
	Fort Victoria	109.60		107.00	
	Fort George	140.00		134.00	
PHOTOVOLTAIC	Island of Mauritius[2]	28.60	28.61	27.62	27.63
	Fort George	0.005		0.005	
	Fort Victoria	0.005		0.005	
PHOTOVOLTAIC	Island of Rodrigues[3]	0.24	0.24	0.24	0.24
WIND	Island of Mauritius (IPP)	9.35	9.35	9.35	9.35
WIND	Island of Rodrigues	1.28	1.28	1.28	1.28
DIESEL & FUEL OIL	Island of Rodrigues	12.40	12.40	11.60	11.60
Total capacity (Island of Mauritius) (MW)		***820.95***	***820.95***	***763.48***	***763.48***
Total capacity (Island of Rodrigues) (MW)		***13.92***	***13.92***	***13.12***	***13.12***
	Total (MW)	**834.87**	**834.87**	**776.60**	**776.60**

Data Source: Statistics Mauritius

[2] Includes SSDG, MSDG and Sarako

[3] Includes SSDG and MSDG

The trend of effective power plant capacity from 2008 to 2017 (Island of Mauritius) is shown in Figure 2.1.

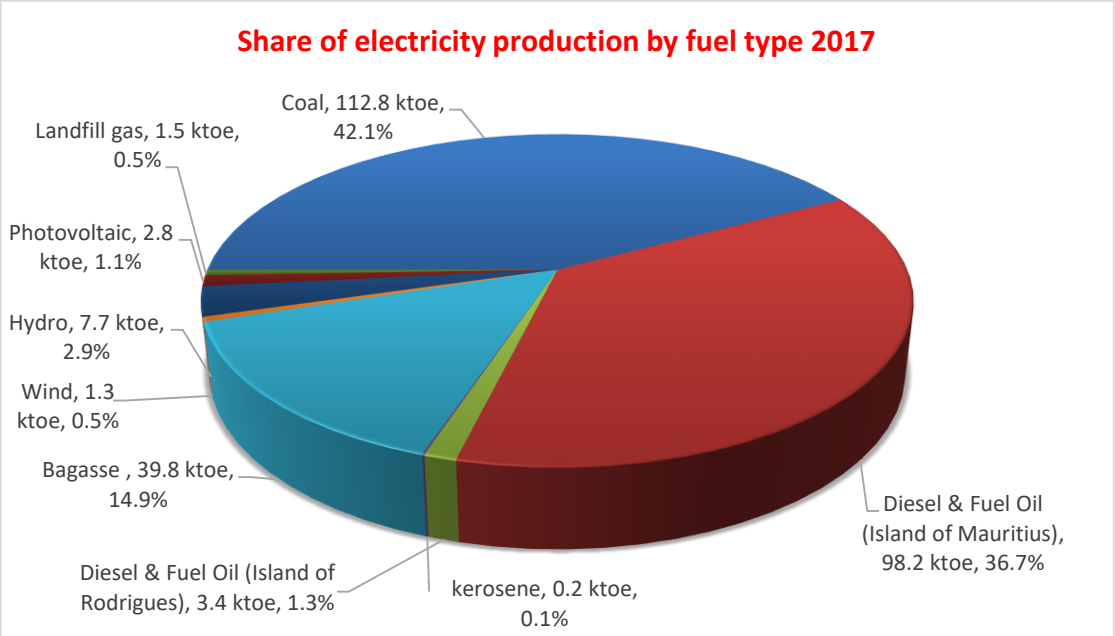


Data Source: Statistics Mauritius

Figure 2.1 - Trend of effective power plant capacity, 2008 – 2017

3 ELECTRICITY PRODUCTION

Figure 3.1 shows the share of electricity production by fuel type in 2017.



Data Source: Statistics Mauritius

Figure 3.1 - Share of electricity production by fuel type, 2017

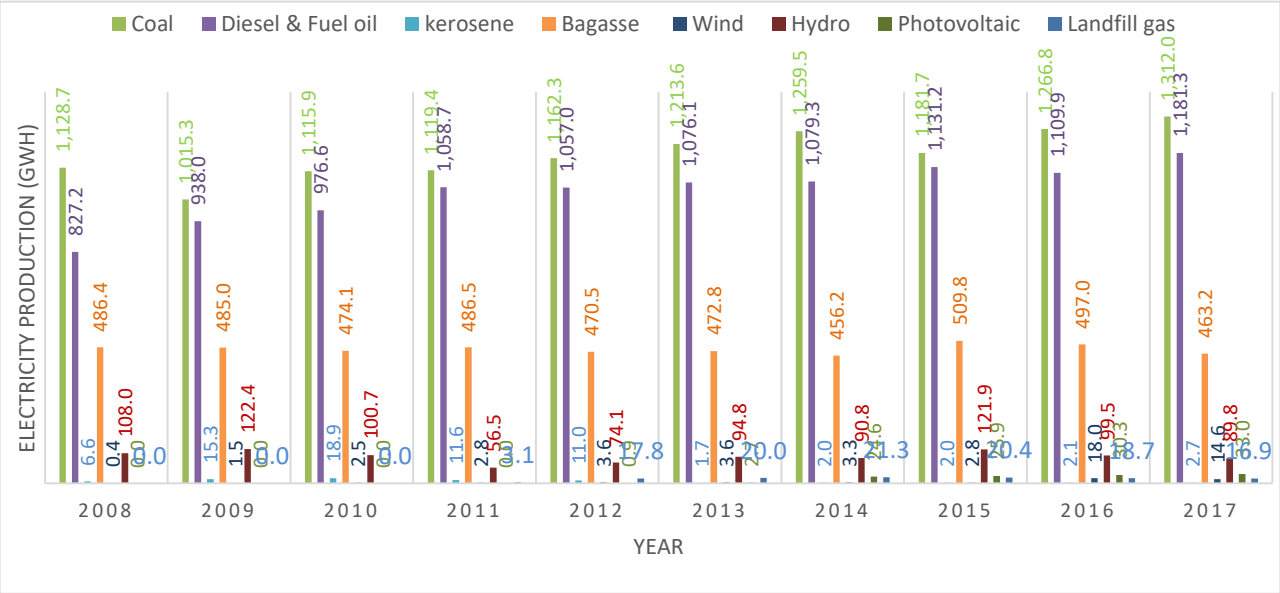
Overall conversion efficiencies of the power plants in 2017 are given in Table 3.1

Table 3.1 - Conversion efficiency of power plants

2017	Fuel input	Electricity production		Overall conversion efficiency
	ktoe	GWh	ktoe	%
Coal	450.5	1312.0	112.8	25.0
Diesel & Fuel Oil (Island of Mauritius)	222.5	1142.3	98.2	44.1
Diesel & Fuel Oil (Island of Rodrigues	8.6	39.0	3.4	39.2
Kerosene	1.0	2.7	0.2	23.7
Bagasse	172.6	463.2	39.8	23.1
TOTAL	**855.2**	**2959.2**	**254.5**	**29.8**

Data Source: Statistics Mauritius

Figure 3.2 shows the trend of electricity production per source of energy over the period 2008 to 2017.

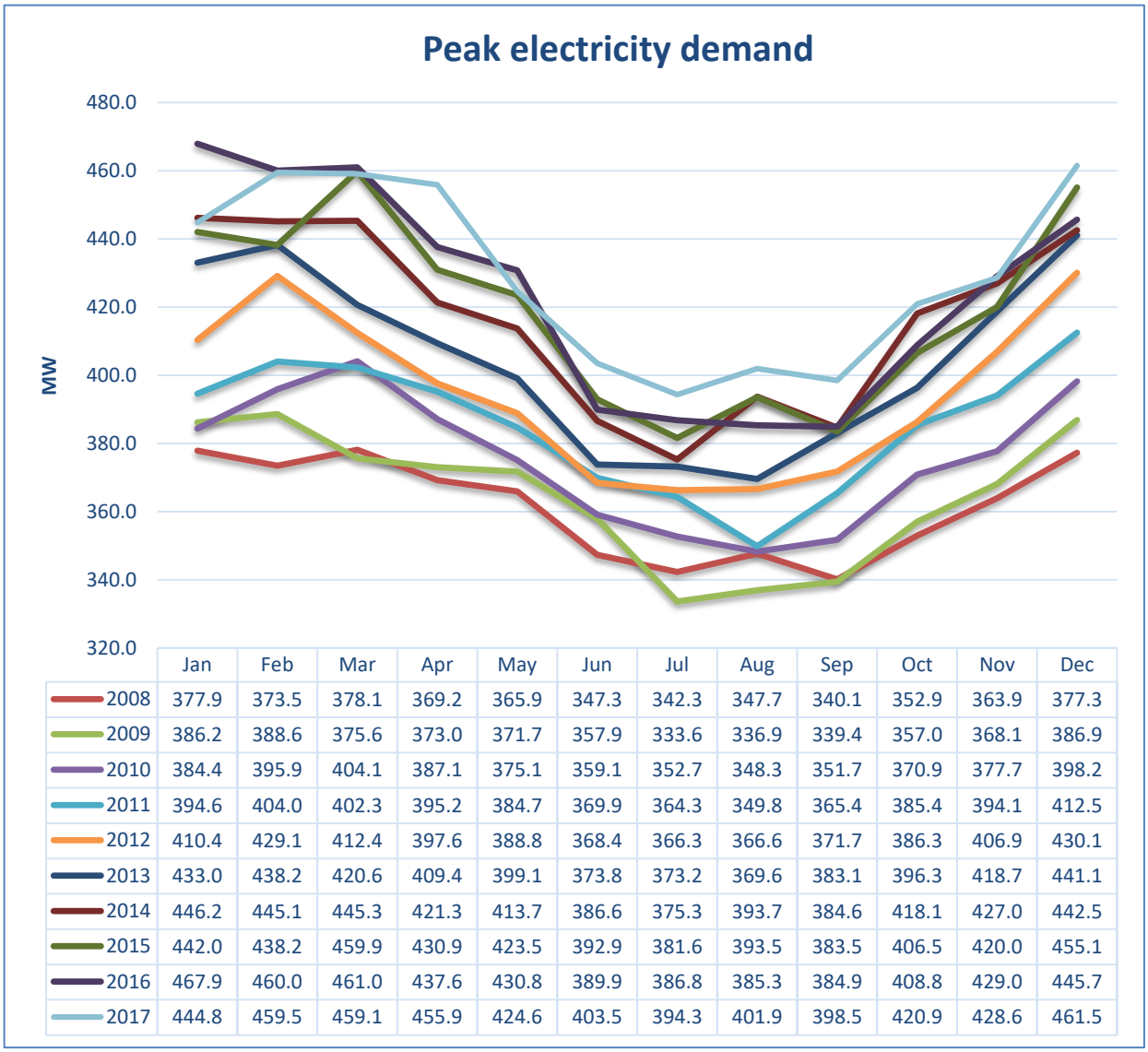


Data Source: Statistics Mauritius

Figure 3.2 - Trend of electricity production, 2008 - 2017

Total electricity production increased by 2.3 % in 2017 as compared to 2016. In 2017, 80.2% of electricity production was derived from fossil fuel sources while 19.8% of electricity production was from renewable energy sources. In 2016, the share of electricity generated from renewable energy sources was 21.8%. The decrease is due to a decrease in electricity production from bagasse, from 497.0 GWh in 2016 to 463.2 GWh in 2017, and from hydro power stations, from 99.5 GWh in 2016 to 89.8 GWh in 2017. Moreover, electricity generated from wind energy has also decreased from 18.0 GWh in 2016 to 14.6 GWh in 2017.

Figure 3.3 shows the monthly peak electricity demand for the years 2008 - 2017 (Island of Mauritius).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	377.9	373.5	378.1	369.2	365.9	347.3	342.3	347.7	340.1	352.9	363.9	377.3
2009	386.2	388.6	375.6	373.0	371.7	357.9	333.6	336.9	339.4	357.0	368.1	386.9
2010	384.4	395.9	404.1	387.1	375.1	359.1	352.7	348.3	351.7	370.9	377.7	398.2
2011	394.6	404.0	402.3	395.2	384.7	369.9	364.3	349.8	365.4	385.4	394.1	412.5
2012	410.4	429.1	412.4	397.6	388.8	368.4	366.3	366.6	371.7	386.3	406.9	430.1
2013	433.0	438.2	420.6	409.4	399.1	373.8	373.2	369.6	383.1	396.3	418.7	441.1
2014	446.2	445.1	445.3	421.3	413.7	386.6	375.3	393.7	384.6	418.1	427.0	442.5
2015	442.0	438.2	459.9	430.9	423.5	392.9	381.6	393.5	383.5	406.5	420.0	455.1
2016	467.9	460.0	461.0	437.6	430.8	389.9	386.8	385.3	384.9	408.8	429.0	445.7
2017	444.8	459.5	459.1	455.9	424.6	403.5	394.3	401.9	398.5	420.9	428.6	461.5

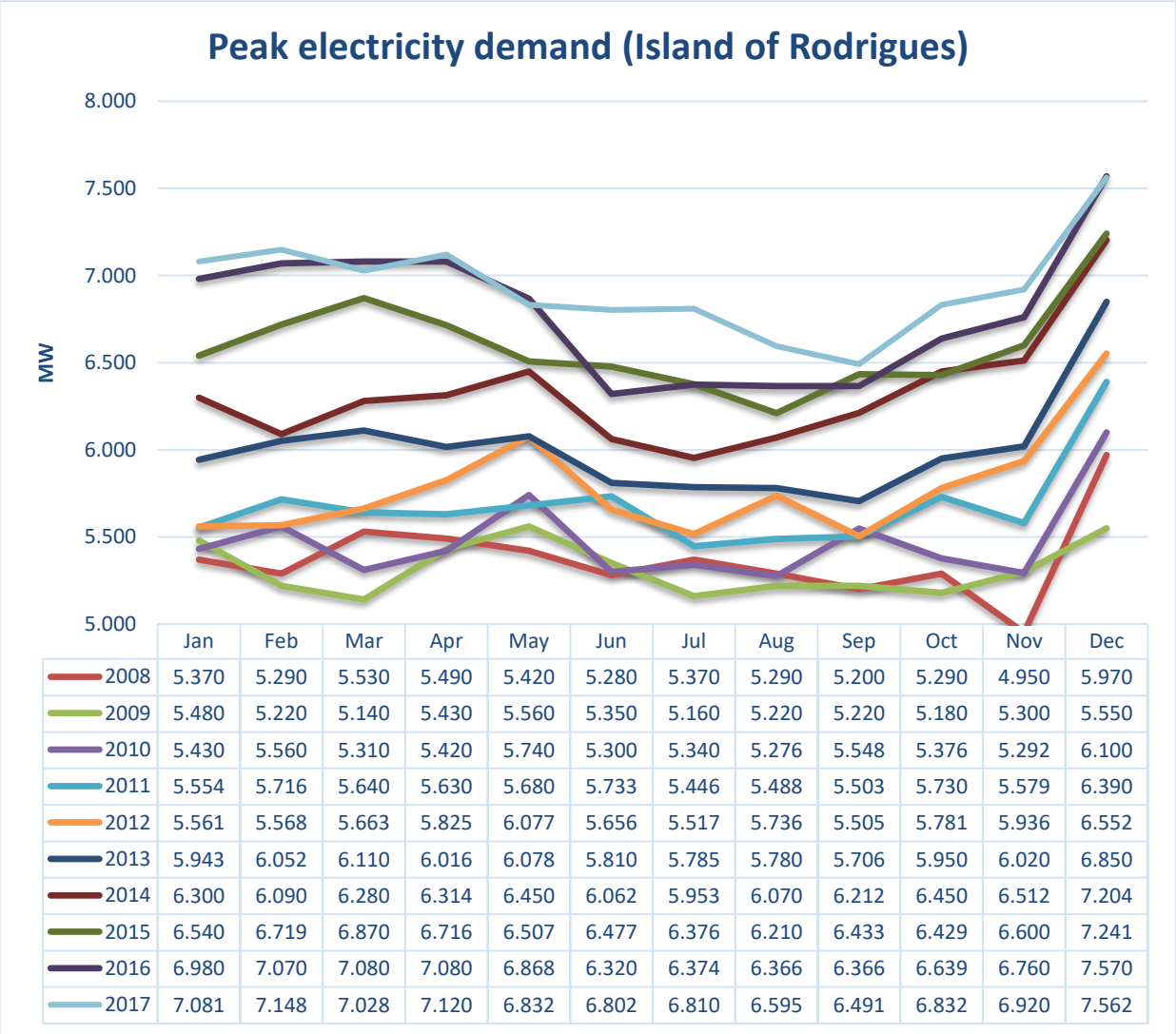
Data Source: Statistics Mauritius

Figure 3.3 - Peak electricity demand (Island of Mauritius), 2008 – 2017

In 2017, peak power demand varied between 394.3 MW and 461.5 MW. The peak for the year 2017, i.e 461.5 MW, occurred in December.

The peak power demand is observed to follow prevailing meteorological conditions, mainly temperature with peaks noted in the summer season, which implies additional power demand for air conditioning, use of fans and refrigeration across the island.

Figure 3.4 shows the monthly peak electricity demand for the years 2008 to 2017 (Island of Rodrigues).



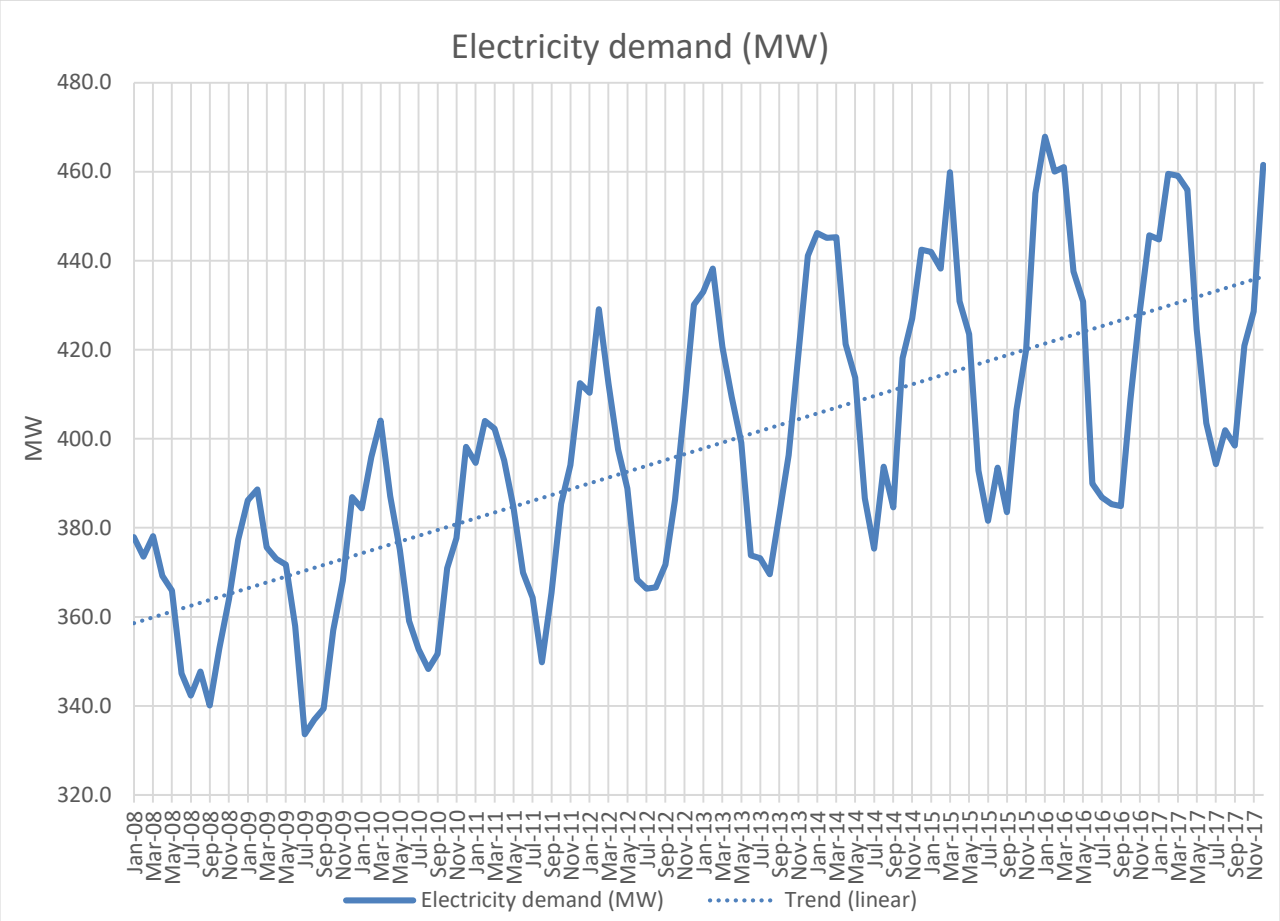
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	5.370	5.290	5.530	5.490	5.420	5.280	5.370	5.290	5.200	5.290	4.950	5.970
2009	5.480	5.220	5.140	5.430	5.560	5.350	5.160	5.220	5.220	5.180	5.300	5.550
2010	5.430	5.560	5.310	5.420	5.740	5.300	5.340	5.276	5.548	5.376	5.292	6.100
2011	5.554	5.716	5.640	5.630	5.680	5.733	5.446	5.488	5.503	5.730	5.579	6.390
2012	5.561	5.568	5.663	5.825	6.077	5.656	5.517	5.736	5.505	5.781	5.936	6.552
2013	5.943	6.052	6.110	6.016	6.078	5.810	5.785	5.780	5.706	5.950	6.020	6.850
2014	6.300	6.090	6.280	6.314	6.450	6.062	5.953	6.070	6.212	6.450	6.512	7.204
2015	6.540	6.719	6.870	6.716	6.507	6.477	6.376	6.210	6.433	6.429	6.600	7.241
2016	6.980	7.070	7.080	7.080	6.868	6.320	6.374	6.366	6.366	6.639	6.760	7.570
2017	7.081	7.148	7.028	7.120	6.832	6.802	6.810	6.595	6.491	6.832	6.920	7.562

Data Source: Statistics Mauritius

Figure 3.4 - Peak electricity demand (Island of Rodrigues), 2008 - 2017

In 2017, peak power demand in Island of Rodrigues varied between 6.491 MW and 7.562 MW. Peak demand of 7.562 MW occurred in December.

Peak demand has consistently increased as shown by the demand trend over the period 2008 - 2017 (Island of Mauritius) in Figure 3.5. However it is observed that the peak demand of 461.5 MW recorded in 2017 is less than the peak demand of 467.9 MW recorded in 2016.

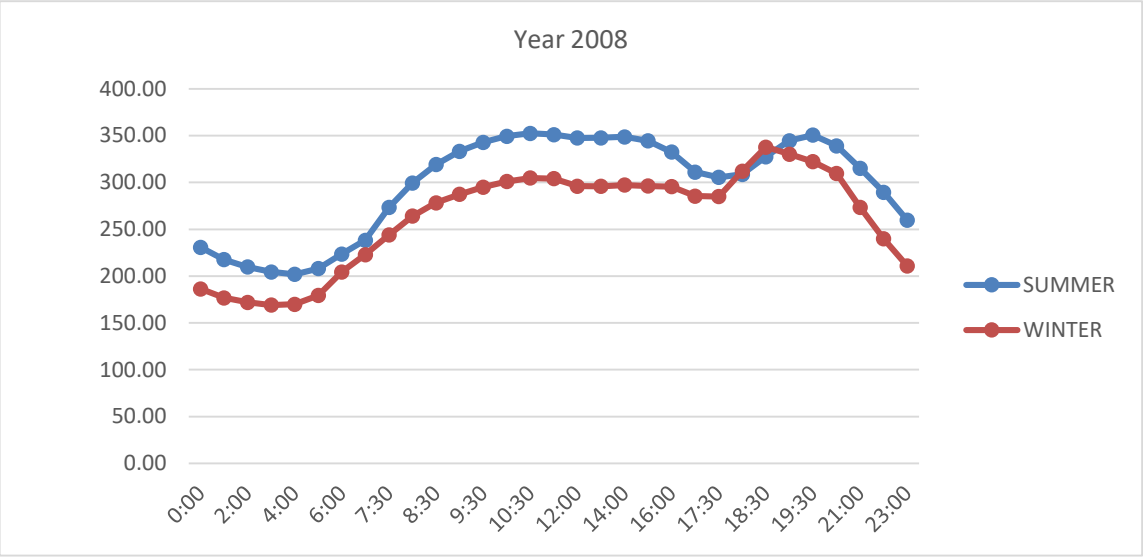


Data Source: Statistics Mauritius

Figure 3.5 - Electricity demand (MW) trend, 2008 to 2017 (Island of Mauritius)

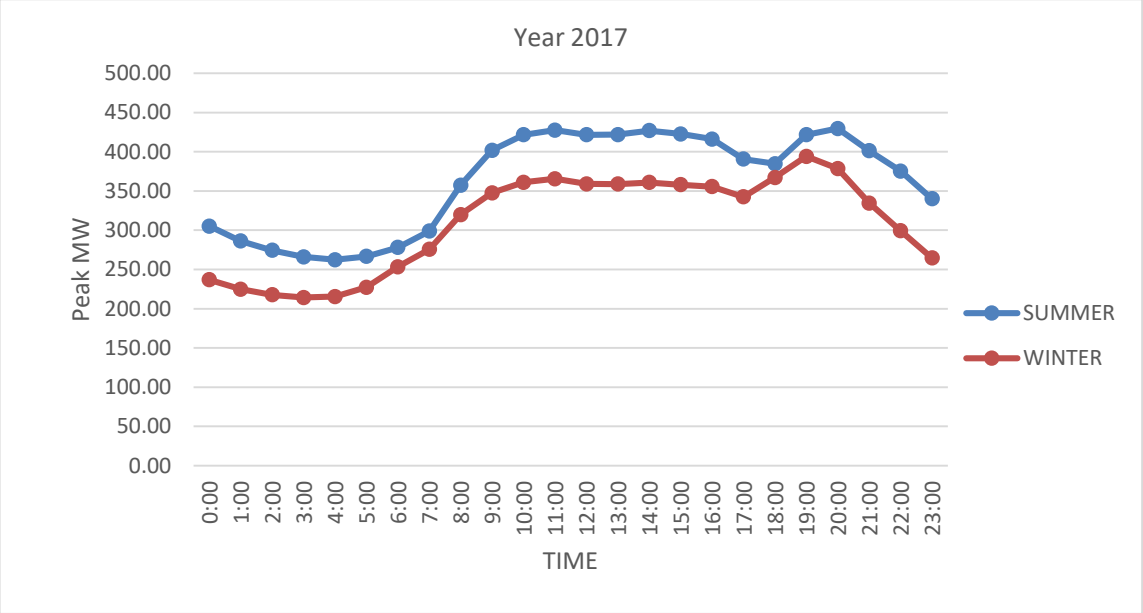
Based on the seasonality in Mauritius, two typical demand profiles namely winter demand profile and summer demand profile are identified. In summer, demand is higher than in winter. This is mainly due to air conditioning loads. However, during the day, the increase in demand is due to the Commercial and Industrial Sectors while the residential sector contributes mainly in the evening.

Figure 3.6 and Figure 3.7 show the hourly seasonal peak demand profile (Island of Mauritius) for the years 2008 and 2017 respectively.



Data Source: CEB

Figure 3.6 – Seasonal peak demand profile, 2008



Data Source: CEB

Figure 3.7 – Seasonal peak demand profile, 2017

Table 3.2 provides a summary of the electricity production over the period 2008 to 2017 (Island of Mauritius).

Table 3.2 - Summary of electricity production, 2008 – 2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fossil (GWh)	1,962.4	1,968.5	2,111.4	2,189.6	2,230.3	2,291.3	2,340.7	2,314.9	2,378.8	2,496.0
Renewables (GWh)	594.8	608.9	577.3	548.9	566.8	594.0	596.2	680.6	663.5	617.5
Increase (GWh)	92.5	20.2	111.3	49.9	58.6	88.1	51.6	58.7	46.5	71.2
Percentage increase overall	3.8 %	0.8 %	4.3 %	1.9 %	2.1 %	3.2 %	1.8 %	2.0 %	1.6 %	2.3%
Percentage of renewables	23.3%	23.6%	21.5%	20.0%	20.3%	20.6%	20.3%	22.7%	21.8%	19.8%
Peak demand (MW) (Island of Mauritius)	378.1	388.6	404.1	412.5	430.1	441.1	446.2	459.9	467.9	461.5
Peak demand evolution	2.9 %	2.8 %	4.0 %	2.1 %	4.3 %	2.5 %	1.2 %	3.1 %	1.7 %	-1.4%

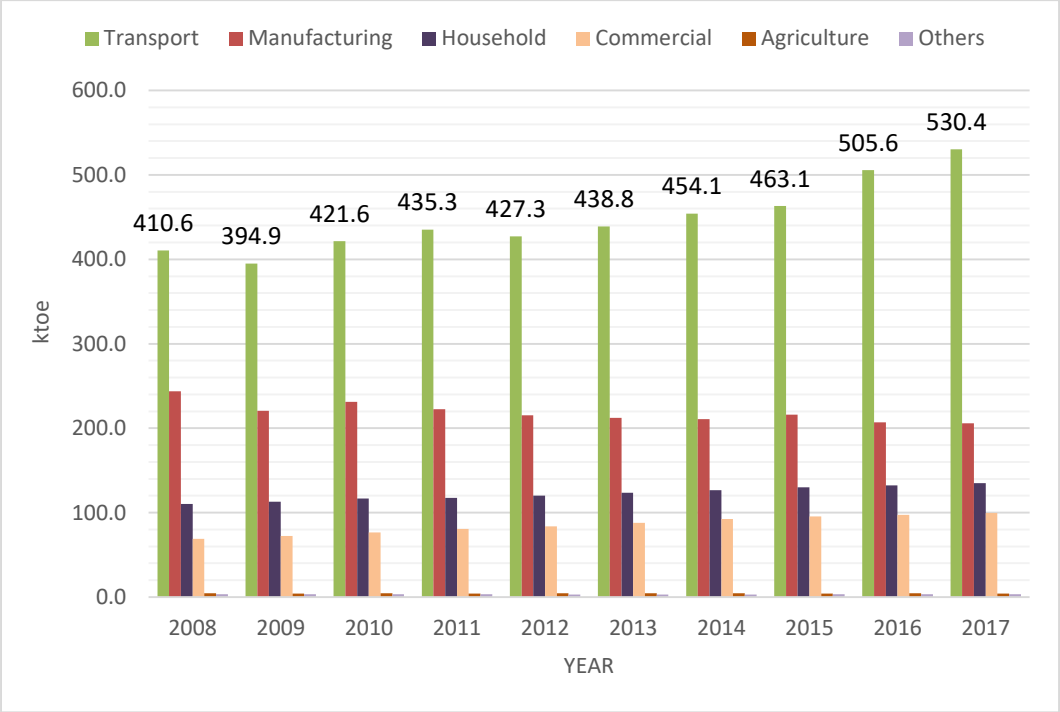
Data Source: Statistics Mauritius

4 FINAL ENERGY CONSUMPTION

4.1 General

Final energy consumption describes consumption of end users, excluding energy used for electricity generation and losses in the energy transfer matrix. Figure 4.1 shows the final energy consumption on a sector basis, for the period 2008 to 2017. The total final energy consumption in 2017 amounted to 978.7 ktoe, representing an increase of 3.0 % compared to 2016. As can be seen in Figure 4.1, an increase in final energy consumption has been observed in the transport, household and commercial sectors, with the highest increase (+ 24.8 ktoe) being for the transport sector. However, a decrease in final energy consumption is observed for the manufacturing, agriculture and 'others[4]' sectors.

[4] 'Others' sector includes mining and quarrying (stone extraction and crushing),



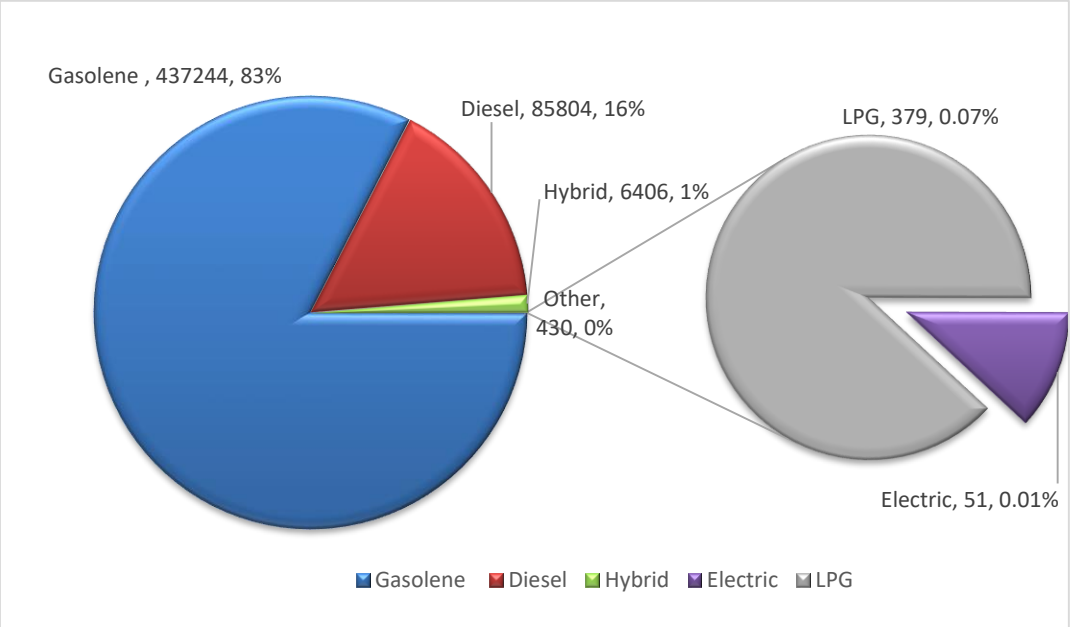
Data Source: Statistics Mauritius

Figure 4.1 : Final energy consumption by sector, 2008– 2017

4.2 Final Energy consumption - Transport sector

4.2.1 Vehicle fleet

The fleet of powered vehicles for Mauritius comprised 531,797 vehicles in 2017, with the share of fuel type as given in Figure 4.2.



Data Source: National Transport Authority

Figure 4.2 - Vehicle fleet by type of fuel in 2017

In 2017 the number of hybrid powered vehicles increased by 70% as compared to 2016, i.e. from 3765 to 6406, and the number of electric vehicles increase by 76% as compared to 2016, i.e. from 29 to 51.

It may be noted from Table 4.1 that there has been an increase in new and second hand imported vehicles registrations in 2017 of +7 % compared to 2016, whereas the increase from 2015 to 2016 was +70%.

Table 4.1 - New and second hand imported car, 2008-2017

Engine capacity	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	% growth in 2017 over 2016
Up to 1,000 c.c	726	804	948	856	1634	1982	1519	3205	8988	9769	9%
1,001 - 1,250 c.c	1580	1211	1060	1158	1582	2056	3166	4128	3199	2600	-19%
1,251 - 1,400 c.c	1801	1691	2205	2015	2691	3321	3212	1986	3888	3472	-11%
1,401 - 1,500 c.c	2042	1835	2384	1771	1824	2528	2425	2543	3138	4147	32%
1,501 - 2,000 c.c	2858	2927	2105	2867	3557	3240	3039	2743	3556	4270	20%
2,001 - 2,250 c.c	338	32	9	20	30	51	56	61	160	177	11%
2,251 - 2,500 c.c	169	155	196	166	58	432	512	335	1224	1579	29%
2,501 - 3,000 c.c	162	139	154	185	142	102	94	122	676	733	8%
Above 3,000 c.c	115	72	87	71	77	48	44	34	937	946	1%
Total	**9791**	**8866**	**9148**	**9109**	**11595**	**13760**	**14067**	**15157**	**25766**	**27693**	**7%**

Data Source: National Transport Authority

4.2.2 Fuel Consumption

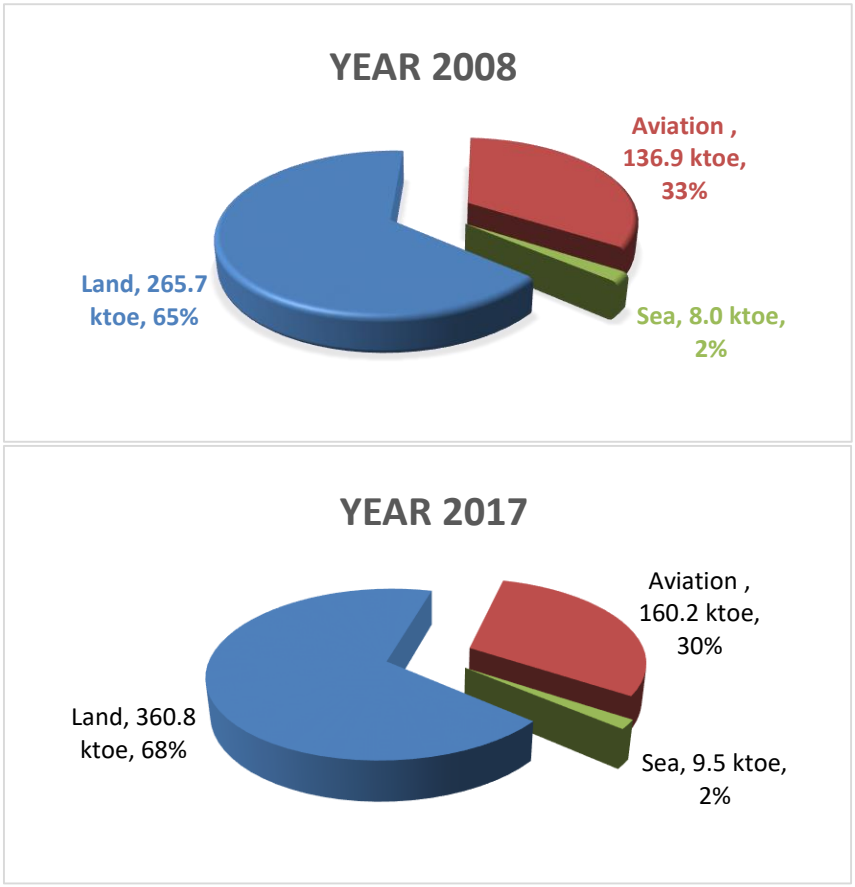
Table 4.2 gives the fuel consumption in the sub-sectors of the transport sector in 2017, while Figure 4.3 shows the share of fuel use in each sub-sector in 2008 and 2017 and Figure 4.4 depicts the trend in consumption over the period 2008 – 2017.

Table 4.2 - Fuel consumption in the Transport sector, 2017

Transport sector	Gasolene (ktoe)	Diesel (ktoe)	Aviation fuel (local aircraft) (ktoe)	LPG (ktoe)	Fuel Oil (ktoe)	Total (ktoe)
Land	183.3	173.7		3.7		360.8
Aviation			160.2			160.2
Sea[5]	4.3	1.3			3.9	9.5
Total	**187.6**	**175.0**	**160.2**	**3.7**	**3.9**	**530.5**

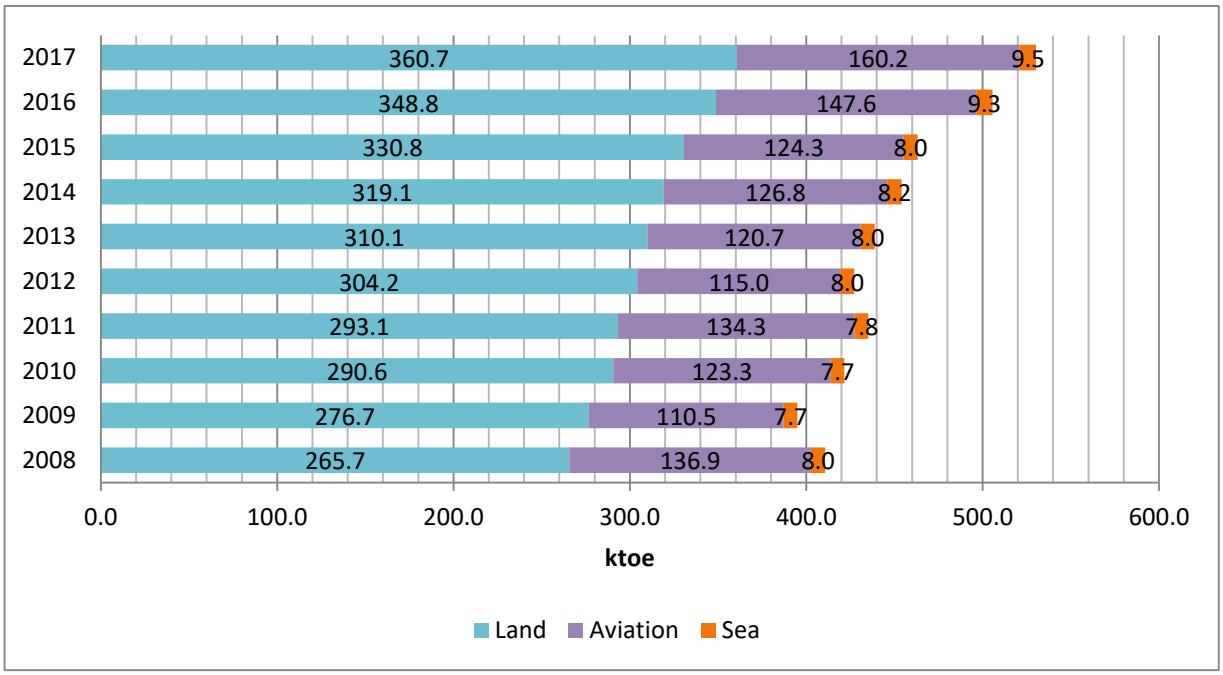
Data Source: Statistics Mauritius

[5] Sea Transport comprises interisland traffic for both cargo and passengers, pleasure crafts in the tourism sector and Mauritian fishing vessels.



Data Source: Statistics Mauritius

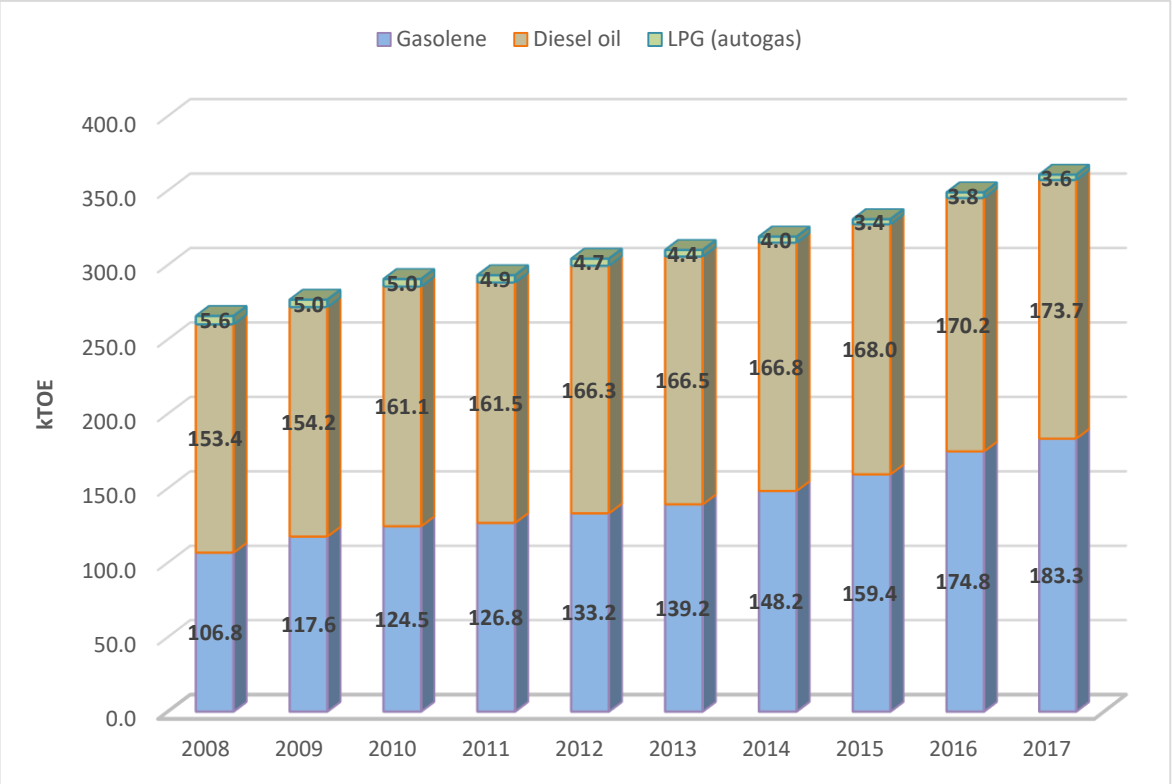
Figure 4.3 - Fuel consumption share in sub-sectors of the Transport sector in 2008 and in 2017



Data Source: Statistics Mauritius

Figure 4.4 - Trend of Fuel Consumption in sub-sectors of Transport sector 2008 – 2017

The trend of fuel consumption in the land transport sector over the period 2008 to 2017 is shown in Figure 4.5. It may be noted that fuel consumption in land transport reached 360.8 ktoe in 2017; representing an increase of 3.4 % over 2016.



Data Source: Statistics Mauritius

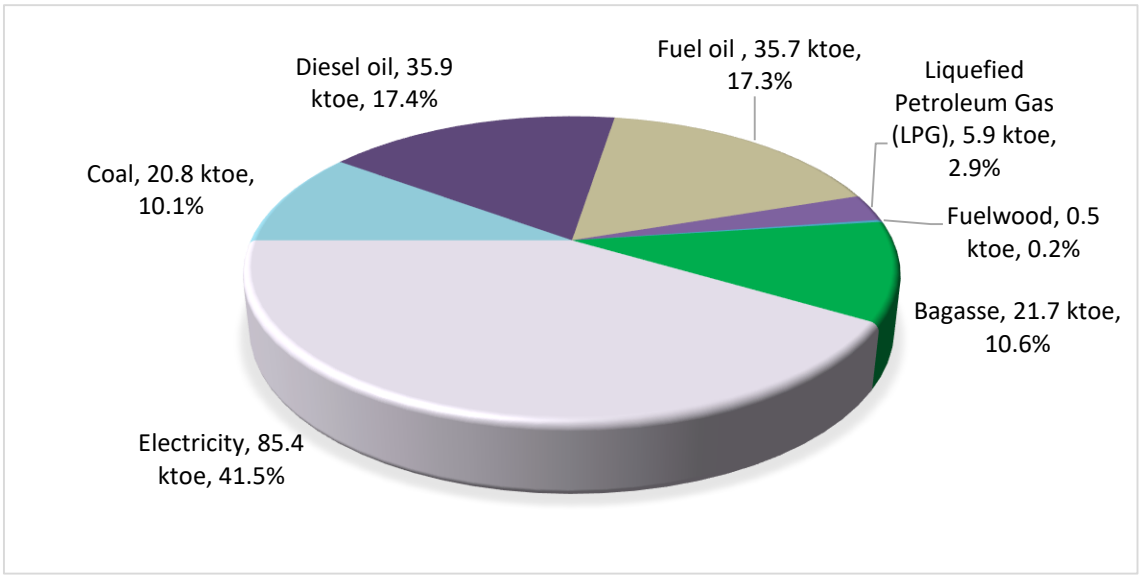
Figure 4.5 - Trend of Fuel Consumption in land Transport, 2008 - 2017

Compared to 2016, it may be observed that in 2017:

- diesel consumption increased by 2.1%.
- gasolene consumption increased by 4.9 %.
- LPG (autogas) consumption has decreased by 1.5 %

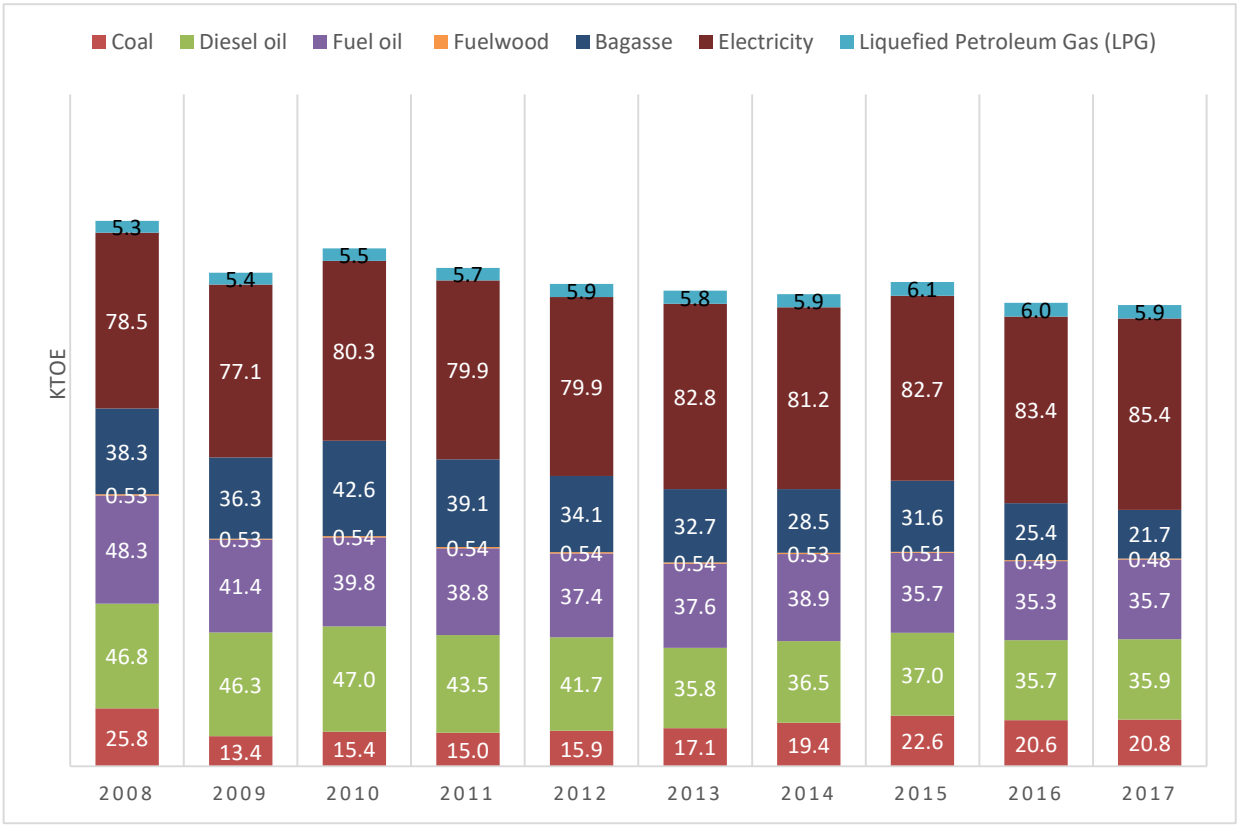
4.3 Final energy consumption - Manufacturing sector

Total energy consumption in the manufacturing sector amounted to 205.9 ktoe in 2017, which was 0.5 % less than in 2016. Figure 4.6 shows the share of different energy sources used in the manufacturing sector in 2017, while Figure 4.7 provides the trend for the period 2008 to 2017.



Data Source: Statistics Mauritius

Figure 4.6 - Share of energy sources in the Manufacturing Sector, 2017

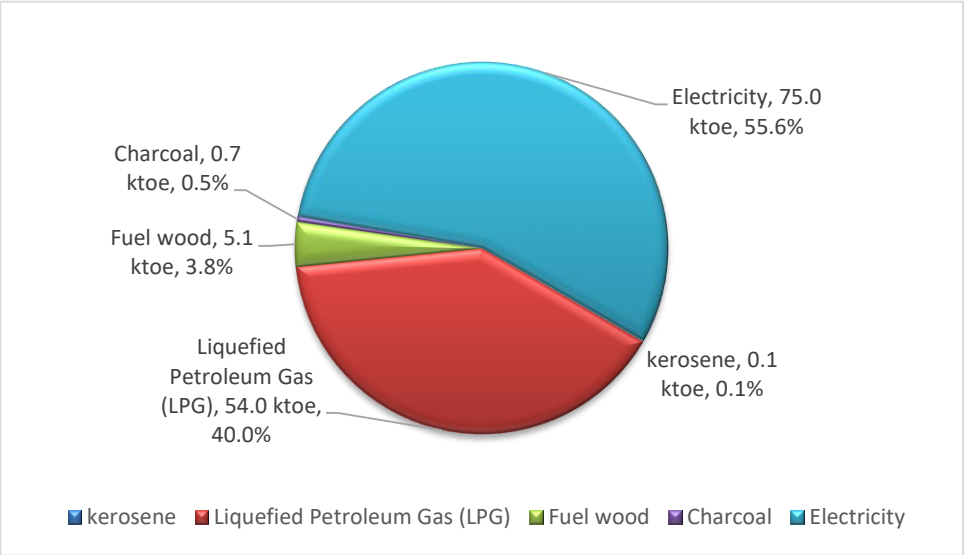


Data Source: Statistics Mauritius

Figure 4.7 - Trend of energy consumption in the Manufacturing Sector, 2008 – 2017

4.4 Final energy consumption - Household sector

Total energy consumption in the household sector amounted to 134.3 ktoe in 2017 representing a 1.6% growth over 2016. The share of energy sources in the Household sector in 2017 is given in Figure 4.8.

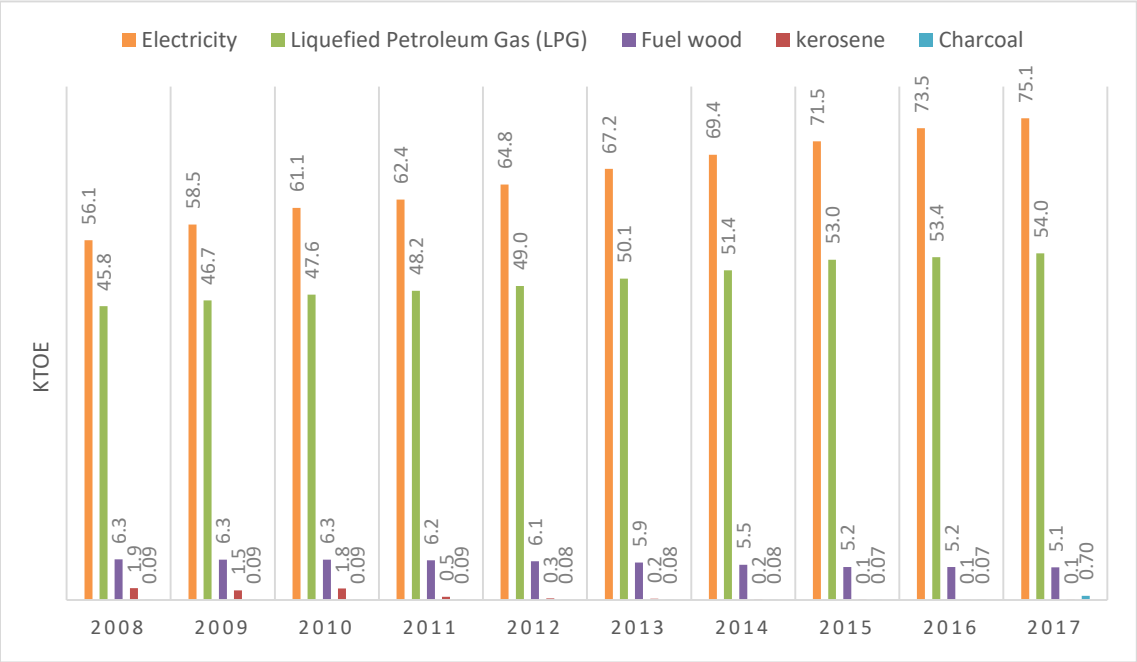


Data Source: Statistics Mauritius

Figure 4.8 - Share of energy sources, Household sector, 2017

As can be seen from Figure 4.8, the main sources of energy for the household sector are LPG and electricity. LPG is used mostly for cooking and water heating. Fuel wood is still in use as cooking fuel albeit insignificant. Use of kerosene as fuel has nearly ceased since an increase in its retail price in 2006. In 2017 the consumption of electricity and LPG have both increased compared to 2016 by 2.1 % and 1.1 % respectively.

The trend of the use of each fuel over the period 2008 to 2017 is shown in Figure 4.9.

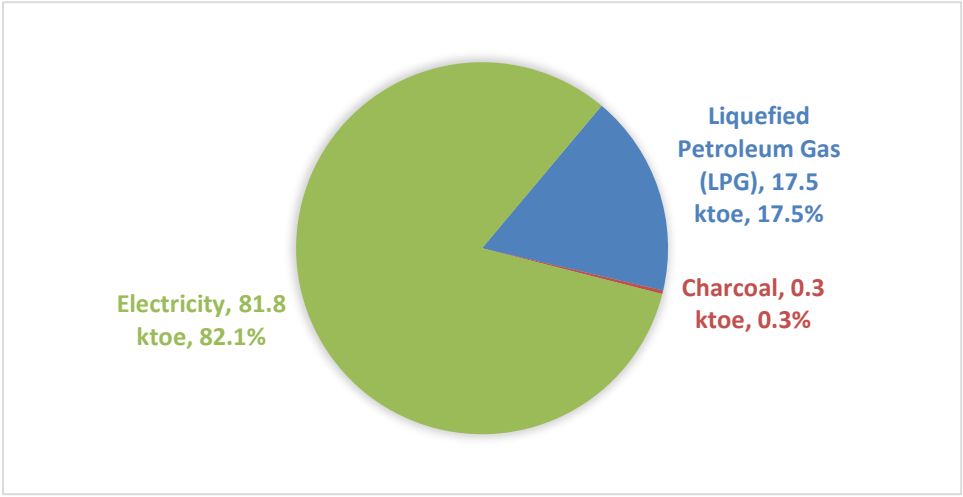


Data Source: Statistics Mauritius

Figure 4.9 - Trend of fuel consumption in the Household sector, 2008 - 2017

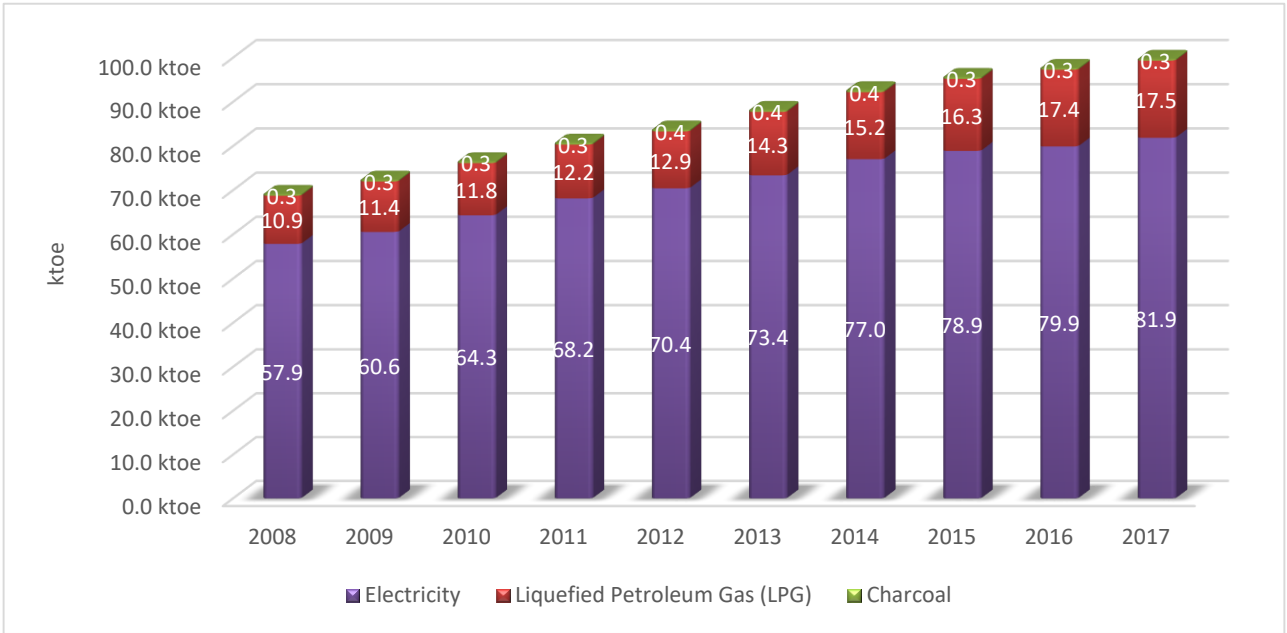
4.5 Final energy consumption - Commercial sector

Total energy consumption in the Commercial sector amounted to 99.6 ktoe in 2017 and the share of energy sources in 2017 is shown in Figure 4.10, while Figure 4.11 gives the trend of fuel consumption over the period 2008 to 2017.



Data Source: Statistics Mauritius

Figure 4.10 - Share of energy sources in the Commercial sector, 2017



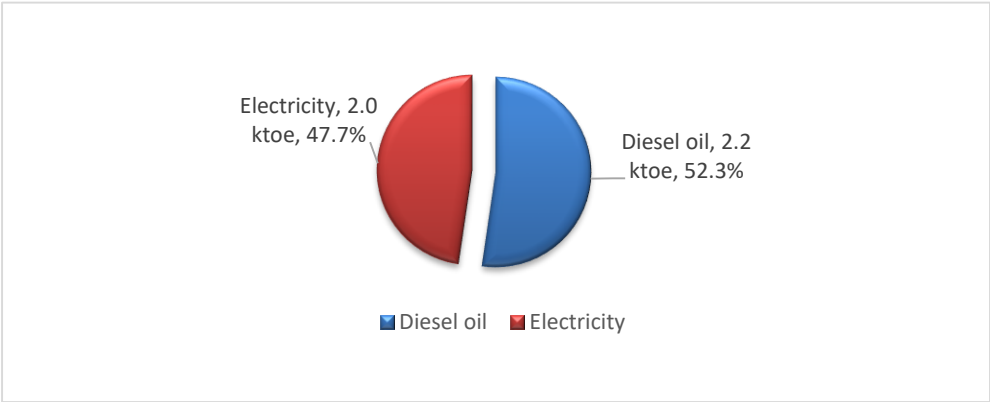
Data Source: Statistics Mauritius

Figure 4.11 - Trend of fuel consumption in the Commercial sector, 2008 - 2017

In 2017, electricity consumption in the commercial sector increased by 2.5% compared to 2016, indicating continued expansion in the sector. The main areas of electricity use in this sector are refrigeration, air conditioning and decorative and security lighting.

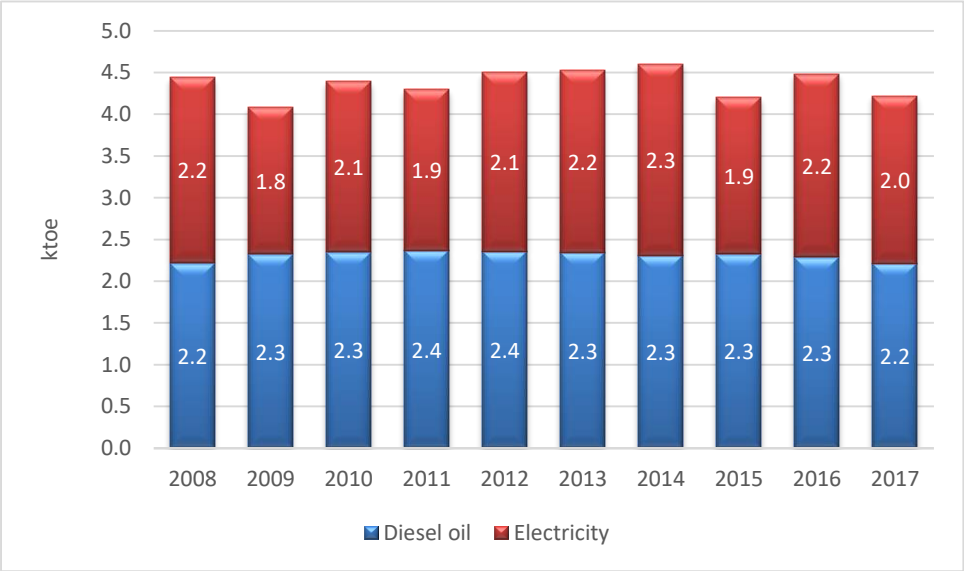
4.6 Final energy consumption - Agricultural sector

Total energy consumption in the agricultural sector amounted to 4.2 ktoe in 2017 and the share of energy sources in 2017 is shown in Figure 4.12, while Figure 4.13 gives the trend of fuel consumption over the period 2008 to 2017.



Data Source: Statistics Mauritius

Figure 4.12 - Share of energy sources in Agricultural sector, 2017



Data Source: Statistics Mauritius

Figure 4.13 - Share of fuel consumption in the Agricultural sector, 2008 – 2017

It may be noted from Figure 4.13 that the fuel consumption in the Agricultural sector is rather stable, in the range of 4.1 to 4.6 ktoe over the period 2008 to 2017.

4.7 Electricity consumption

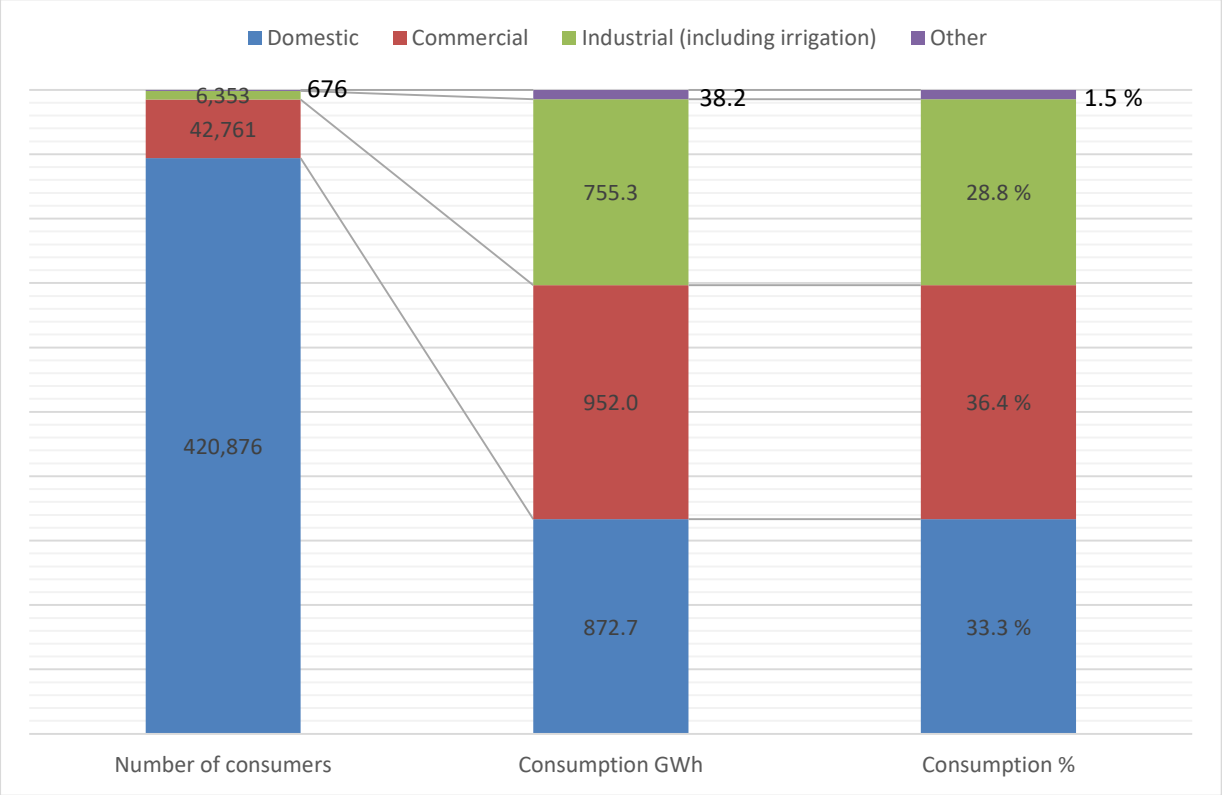
As shown in Table 4.3 electricity consumption for 2017 amounted to 2618.1 GWh compared to 2,558.6 GWh in 2016, that is an increase of 2.3% compared to 2016. Figure 4.14 gives details on the number of different category consumers, the electricity consumption in each category and the share of consumption of each of these for the year 2017.

Table 4.3 - Electricity consumption per category of consumers, 2017

Type of tariff	Number of consumers		Consumption GWh		Consumption %	
	2016	2017	2016	2017	2016	2017
Domestic	413068	420876	854.5	872.7	33.4	33.3
Commercial	41879	42761	927.8	952.0	36.3	36.4
Industrial (including irrigation)	6352	6353	735.8	755.3	28.8	28.8
Other[6]	654	676	40.5	38.2	1.6	1.5
Total	**461953**	**470666**	**2558.6**	**2618.1**	**100.0**	**100.0**

Data Source: Statistics Mauritius

Figure 4.14 - Electricity consumption per category of consumers, 2017



Data Source: Statistics Mauritius

[6] 'Other' means sugar factories, street lighting & traffic lights, pumping for irrigation and temporary supply

An analysis of domestic electricity consumption is given in Table 4.4, which shows an increase from 1.86 MWh/consumer/year in 2008 to 2.07 MWh/consumer/year in 2017.

Table 4.4 - Analysis of domestic electricity consumption, 2008 – 2017

Domestic consumers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Consumption (GWh)	652.2	680.1	710.7	725.3	753.0	780.8	806.3	831.0	854.5	872.7
Number of consumers	350627	358359	364474	372315	381096	388910	396335	404463	413068	420876
Annual electricity consumption per consumer (MWh/consumer/year)	1.86	1.90	1.95	1.95	1.98	2.01	2.03	2.06	2.07	2.07
Consumption growth rate %	-0.7%	2.0%	2.7%	-0.1%	1.4%	1.6%	1.3%	1.0%	0.7%	0.2%
Average inhabitant/ consumer	3.55	3.48	3.43	3.36	3.30	3.24	3.18	3.12	3.06	3.01
Average daily consumption per inhabitant (kWh/inhabitant/day)	1.44	1.49	1.56	1.59	1.64	1.70	1.75	1.80	1.85	1.89

Data Source: Statistics Mauritius

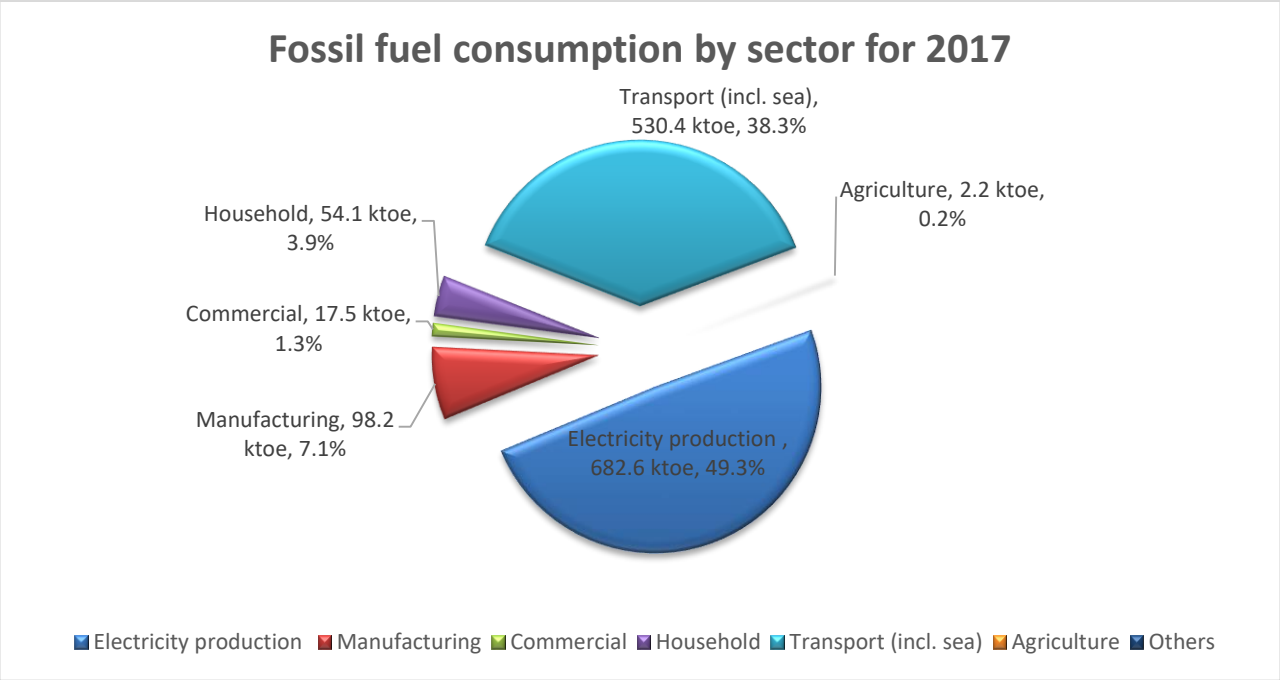
4.8 Fossil Fuel consumption

Table 4.5 provides a breakdown of fossil fuel consumption by sector in 2017 while Figure 4.15 shows the share of fossil fuel consumption by sector for the same year.

Table 4.5 - Fossil fuel consumption (toe) by sector, 2017

Sector	Coal	Gasolene	Diesel	Aviation fuel	Kerosene	HFO	LPG	Total (ktoe)
Electricity production	450.5	-	1.3	-	1.0	229.8		682.6
Manufacturing	20.8	-	35.9	-	-	35.7	5.9	98.2
Commercial	-	-	-	-	-	-	17.5	17.5
Household	-	-	-	-	0.1	-	54.0	54.1
Transport (incl. sea)	-	187.7	175.0	160.2	-	3.9	3.6	530.4
Agriculture	-	-	2.2	-	-	-		2.2
Others	-	-	-	-	-	-	0.3	0.3
Total	**471.3**	**187.7**	**214.4**	**160.2**	**1.0**	**269.3.2**	**81.3**	**1385.3**

Data Source: Statistics Mauritius



Data Source: Statistics Mauritius

Figure 4.15 - Share of fossil fuel consumption by sector, 2017

5 CO2 EMISSIONS DUE TO FOSSIL FUELS

5.1 Introduction

The greenhouse gas effect is a natural phenomenon that captures part of the energy emitted by the Sun to the Earth. Greenhouse Gases (GHG) have a role comparable to that of glass in a greenhouse shed. The heat from the atmosphere depends on solar radiation (constant) and the amount of radiation trapped by greenhouse gases.

5.2 Greenhouse Gas Emissions

A greenhouse gas is a gas in the atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in the earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone.

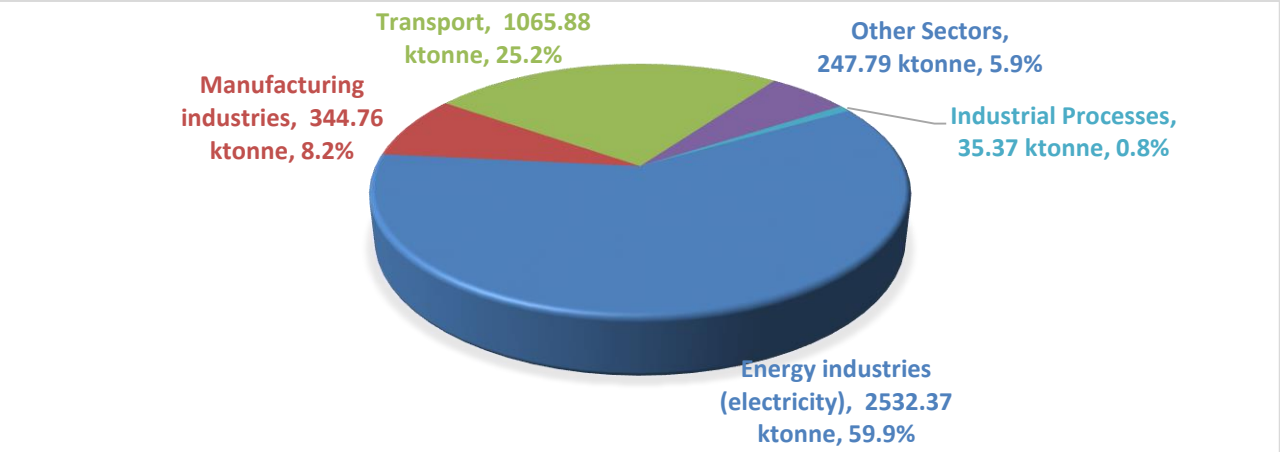
Emissions from human activities mainly concern the following six gases, covered by the Kyoto Protocol: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

Human activity since the industrial era has, due to the consumption of fossil energy, led to the increase in carbon dioxide in the atmosphere, despite the uptake of a large portion of the emissions through various natural "sinks" involved in the carbon cycle. Carbon dioxide (CO_2) emissions produced by human activities come mainly from combustion of fossil fuels, principally coal, heavy fuel oil and its derivatives (gasolene, diesel, Liquefied Petroleum Gas (LPG) etc.), and natural gas.

5.3 Inventory of CO_2 from energy sources for the Republic of Mauritius in 2017

This report focuses only on CO_2 emissions (excluding other greenhouse gases) during combustion of fossil fuels. The scope of emissions discussed concerns all CO_2emissions due to fossil energy conversion in all sectors (electricity generation, transport, residential and manufacturing).

Figure 5.1 gives the share of carbon dioxide emission from fossil fuel combustion in each sector in 2017. It may be noted that, in 2017, total CO_2 emissions from fuel combustion activities amounted to **4,190.80 thousand tonnes** and CO_2 removals[7] amounted to **364.72 thousand tonnes**. Net CO_2 emissions for 2017 stood at **3,861.45 thousand tonnes**.



Data Source: Statistics Mauritius (Provisional data)

Figure 5.1 - Sectoral carbon dioxide emissions from fossil fuel combustion, 2017

5.4 Trend of CO_2 emissions

Table 5.1 and Figure 5.2 show the trend in tonnes of CO_2 emissions per capita and per Rs 100,000 GDP (at 2006 prices). It may be observed that the amount of CO_2 emitted with respect to GDP has generally been decreasing from 2008 to 2017.

Table 5.1 - CO2 emissions, 2008 -2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net CO2 emissions (ktonnes)	3209.0	3177.9	3414.9	3376.7	3490.0	3573.6	3696.3	3685.4	3723.7	3861.5
tCO2 emissions per capita	2.9	2.8	3.0	3.0	3.1	3.1	3.2	3.2	3.2	3.3
tCO2 per Rs 100,000 GDP (at 2006 prices)	1.29	1.24	1.28	1.21	1.21	1.20	1.20	1.15	1.12	1.12

Data Source: Statistics Mauritius

[7] CO2 removal excludes the amount of CO2 sequestrated by trees and vegetations found along rivers and canal reserves and trees along road

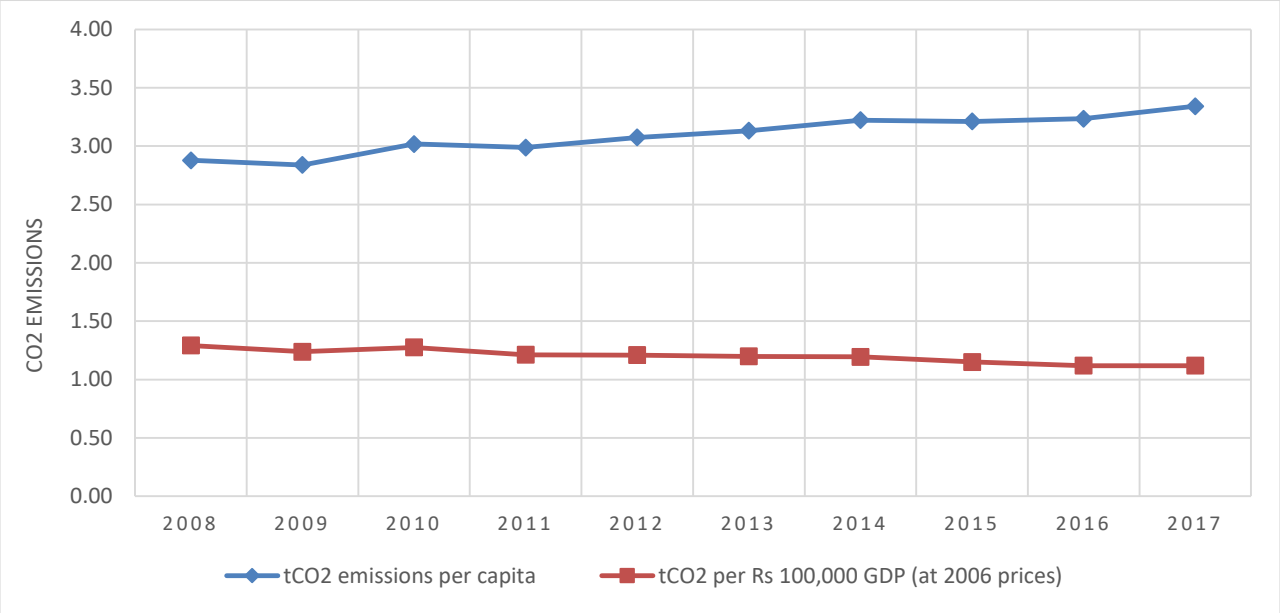


Figure 5.2 - Trend of CO_2 emissions, 2008 – 2017

5.5 CO_2 emissions for electricity generation

In 2017, the total CO_2 emissions from electricity generation amounted to **2532.37 thousand tonnes** representing an increase of 4.6% compared to 2016.

The Grid Emission Factor for year 2017 was 954.8 gCO_2/kWh.[8]

5.6 CO_2 emission in the transport sector (inclusive of aviation)

In 2017 emissions reached **1,065.88 thousand tonnes** of CO_2 representing an increase of 2.1% compared to 2016.

[8] Data source: Central Electricity Board

6 KEY FIGURES

Indicator	Unit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total primary energy requirement	ktoe	1404.4	1346.9	1430.7	1426.9	1427.6	1454.8	1491.7	1534.4	1555.3	1599.3
Imported	*ktoe*	*1140.9*	*1110.6*	*1189.0*	*1195.7*	*1205.3*	*1235.4*	*1279.4*	*1283.2*	*1328.5*	*1385.3*
Local	*ktoe*	*263.5*	*236.3*	*241.6*	*231.1*	*222.3*	*219.4*	*212.3*	*251.3*	*226.8*	*214.0*
Annual increase (Primary Energy)	%	1.6	-4.1	6.2	-0.3	0.1	1.9	2.5	2.9	1.4	2.8
Import Dependency	%	81.2	82.5	83.1	83.8	84.4	84.9	85.8	83.6	85.4	86.6
GDP in 2006 rupees	Rs M	248328	256560	267790	278709	288453	298146	309311	320301	332594	345248
Population		1244121	1247429	1250400	1252404	1255882	1258653	1260934	1262605	1263473	1264887
Energy intensity	toe per Rs 100000 GDP at 2006 prices	0.57	0.52	0.53	0.51	0.49	0.49	0.48	0.48	0.47	0.46
Per capita primary energy requirement	toe	1.13	1.08	1.14	1.14	1.14	1.16	1.18	1.22	1.23	1.26

Data Source: Statistics Mauritius

7 SUMMARY TABLE 2016

-' Consumption in ktoe +' Production and supply	Coal	Petroleum products							Biomass				Hydro	Solar		Wind	Electricity + Prod - Cons	Heat + Prod - Cons	TOTAL
		Gasolene	Diesel	Aviation fuel	Kerosene	HFO	LPG	Used oils	Bagasse	Landfill Gas	Fuelwood	Charcoal		PV	Thermal				
Primary Energy and Supply																			
Local Production (LP)									206.076	1.608	6.416		8.557	2.606		1.544			226.8
Imported Resources	573.8	182.3	342.5	296.4	2.2	470.1	180.4												2047.8
Re-exports and bunkering			-121.1	-147.3		-208.3	-89.3												-566.0
Stocks (+ destocking; - stocking)	-118.5	-3.4	-10.9	-1.6	-1.4	-7.4	-10.1												-153.3
TOTAL Primary Energy (PE)	**455.339**	**178.931**	**210.460**	**147.592**	**0.832**	**254.448**	**80.903**	**0.000**	**206.076**	**1.608**	**6.416**	**0.000**	**8.557**	**2.606**	**0.000**	**1.544**	**0.000**	**0.000**	**1555.3**
% Energy independence (LP/PE)																			14.6
Secondary Energy																			
Coal input for electricity production	-434.8																108.9		-325.8
HFO and diesel input for electricity production			-1.0			-215.2											95.4		-120.8
Bagasse input for electricity production									-180.7								42.7		-138.0
Kerosene input for electricity production					-0.8												0.2		-0.6
Biogas input for electricity production										-1.6							1.6		0.0
Hydro input for electricity production													-8.6				8.6		0.0
PV input for electricity production PV														-2.6			2.6		0.0
Wind input for electricity production																-1.5	1.5		0.0
Electricity production own use																	-3.8		-3.8
Solar Thermal heat production																			0.0
Fuelwood to charcoal											-0.8	0.4							-0.4
TOTAL Secondary supply (SS)	**-434.8**	**0.0**	**-1.0**	**0.0**	**-0.8**	**-215.2**	**0.0**	**0.0**	**-180.7**	**-1.6**	**-0.8**	**0.4**	**-8.6**	**-2.6**	**0.0**	**-1.5**	**257.8**	**0.0**	**-589.4**
Energy Distribution																			
Final distribution (D=PE+SS)	20.6	178.9	209.4	147.6	0.1	39.2	80.9	0.0	25.3	0.0	5.6	0.4	0.0	0.0	0.0	0.0	257.8	0.0	965.9
Losses (L=(D+F))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-14.8	0.0	-14.8
TOTAL final distribution (D+L)	20.6	178.9	209.4	147.6	0.1	39.2	80.9	0.0	25.3	0.0	5.6	0.4	0.0	0.0	0.0	0.0	243.0	0.0	951.1
																			951.1
Final Energy Consumption																			
Manufacturing	-20.6		-35.7			-35.3	-6.0		-25.3		-0.5						-83.4		-206.8
Commercial							-17.4					-0.3					-79.9		-97.6
Household					-0.1		-53.4				-5.2	-0.1					-73.5		-132.2
Transport		-178.9	-171.5	-147.6		-3.9	-3.8										0.0		-505.6
Agriculture			-2.3														-2.2		-4.5
Others							-0.3										-4.0		-4.3
TOTAL (F)	**-20.6**	**-178.9**	**-209.4**	**-147.6**	**-0.1**	**-39.2**	**-80.9**	**0.0**	**-25.3**	**0.0**	**-5.6**	**-0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**-243.0**	**0.0**	**-951.1**

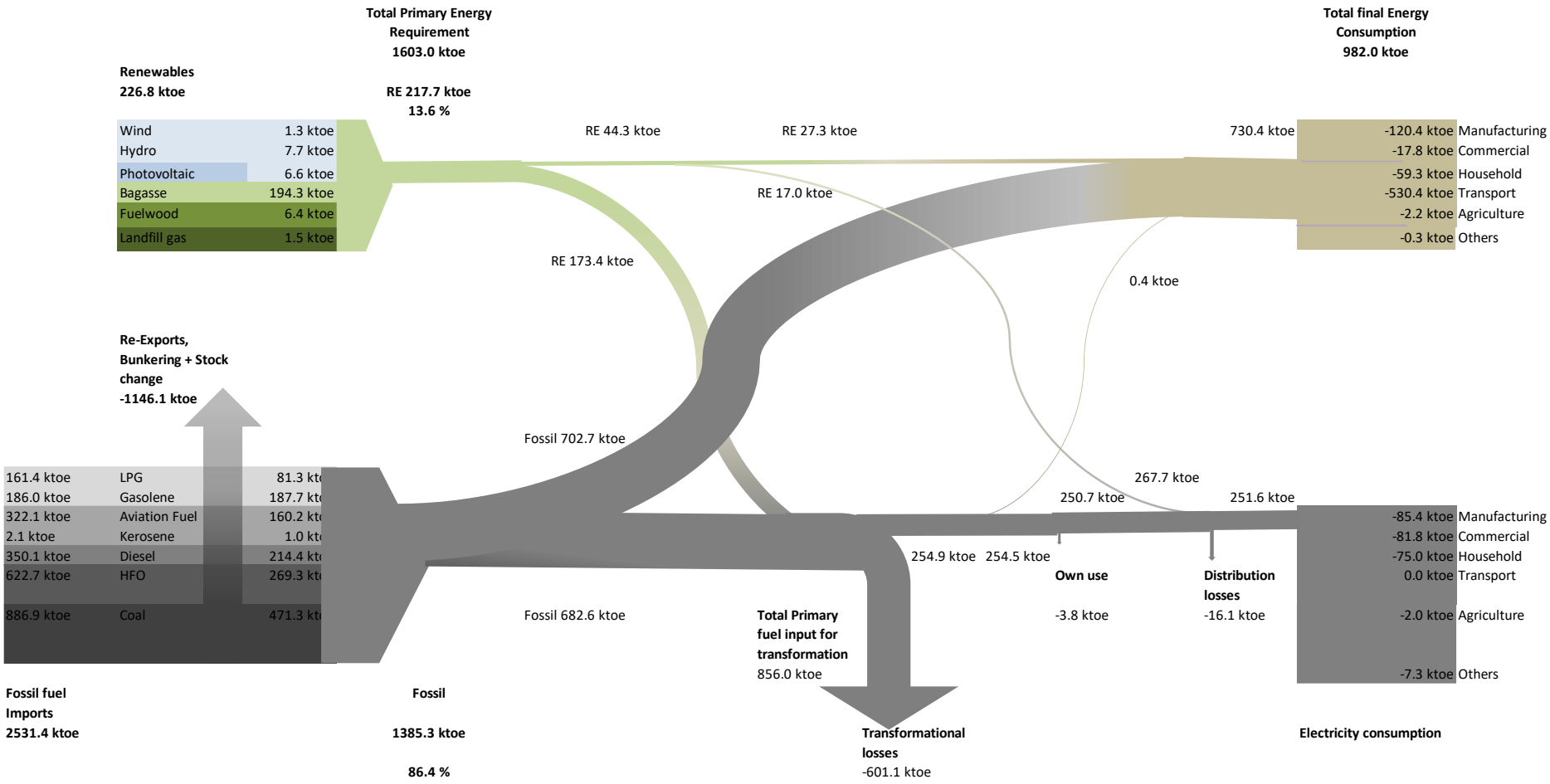
8 SUMMARY TABLE 2017

-' Consumption in ktoe +' Production and supply	Fossil Fuels								Renewable Energy											
	Coal	Petroleum products							Biomass				Hydro	Solar		Wind	Electricity	Heat	TOTAL
		Gasolene	Diesel	Aviation fuel	Kerosene	HFO	LPG	Used oils	Bagasse	Landfill Gas	Fuelwood	Charcoal		PV	Thermal		+ Prod - Cons	+ Prod - Cons	
Primary Energy and Supply																			
Local Production (LP)									194.3	1.5	6.4		7.7	6.6		1.3			217.7
Imported Resources	886.9	186.0	350.1	322.1	2.1	622.7	161.4												2531.4
Re-exports and bunkering			-129.5	-159.9		-327.1													-616.5
Stocks (+ destocking; - stocking)	-415.6	1.7	-6.3	-2.0	-1.1	-26.3	-80.1												-529.6
TOTAL Primary Energy (PE)	**471.3**	**187.7**	**214.4**	**160.2**	**1.0**	**269.3**	**81.3**	**0.0**	**194.3**	**1.5**	**6.4**	**0.0**	**7.7**	**6.6**	**0.0**	**1.3**	**0.0**	**0.0**	**1603.0**
% Energy independence (LP/PE)																			13.6
Secondary Energy																			
Coal input for electricity production	-450.5																112.8		-337.7
HFO and diesel input for electricity production			-1.3			-229.8											101.6		-129.5
Bagasse input for electricity production									-172.6								39.8		-132.8
Kerosene input for electricity production					-1.0												0.2		-0.7
Biogas input for electricity production										-1.5							1.5		0.0
Hydro input for electricity production													-7.7				7.7		0.0
PV input for electricity production														-6.6			6.6		0.0
Wind input for electricity production																-1.3	1.3		0.0
Electricity production own use																	-3.8		-3.8
Solar Thermal heat production																			0.0
Fuelwood to charcoal											-0.8	0.4							-0.4
TOTAL Secondary supply (SS)	**-450.5**	**0.0**	**-1.3**	**0.0**	**-1.0**	**-229.8**	**0.0**	**0.0**	**-172.6**	**-1.5**	**-0.8**	**0.4**	**-7.7**	**-6.6**	**0.0**	**-1.3**	**267.7**	**0.0**	**-604.9**
Energy Distribution																			
Final distribution (D=PE+SS)	20.8	187.7	213.1	160.2	0.1	39.5	81.3	0.0	21.7	0.0	5.6	0.4	0.0	0.0	0.0	0.0	267.7	0.0	998.1
Losses (L=(D+F))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-16.1	0.0	-16.1
TOTAL final distribution (D+L)	20.8	187.7	213.1	160.2	0.1	39.5	81.3	0.0	21.7	0.0	5.6	0.4	0.0	0.0	0.0	0.0	251.6	0.0	982.0
																			982.0
Final Energy Consumption																			
Manufacturing	-20.8		-35.9			-35.7	-5.9		-21.7		-0.5						-85.4		-205.8
Commercial							-17.5					-0.3					-81.8		-99.6
Household					-0.1		-54.0				-5.1	-0.1					-75.0		-134.3
Transport		-187.7	-175.0	-160.2		-3.9	-3.6										0.0		-530.4
Agriculture			-2.2														-2.0		-4.2
Others							-0.3										-7.3		-7.6
TOTAL (F)	**-20.8**	**-187.7**	**-213.1**	**-160.2**	**-0.1**	**-39.5**	**-81.3**	**0.0**	**-21.7**	**0.0**	**-5.6**	**-0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**-251.6**	**0.0**	**-982.0**

9 GROWTH PERCENTAGE (%) IN 2017 COMPARED TO 2016

	Fossil Fuels								Renewable Energy										
	Coal	Petroleum products							Biomass				Hydro	Solar		Wind	Electricity	Heat	TOTAL
-' Consumption in ktoe		Gasolene	Diesel	Aviation fuel	Kerosene	HFO	LPG	Used oils	Bagasse	Landfill Gas	Fuelwood	Charcoal		PV	Thermal		+ Prod	+ Prod	
+' Production and supply																	- Cons	- Cons	
Primary Energy and Supply																			
Local Production (LP)									-5.7 %	-9.5 %	-1.0 %		-9.7 %	151.8 %		-18.7 %			-4.0 %
Imported Resources	54.6 %	2.0 %	2.2 %	8.7 %	-4.6 %	32.5 %	-10.5 %												23.6 %
TOTAL Primary Energy (PE)	3.5 %	4.9 %	1.9 %	8.6 %	25.2 %	5.8 %	0.5 %		-5.7 %	-9.5 %	-1.0 %		-9.7 %	151.8 %		-18.7 %			3.1 %
Secondary Energy																			
Coal input for electricity production	3.6 %																		3.6 %
HFO and diesel input for electricity production			24.3 %			6.8 %													7.2 %
Bagasse input for electricity production									-4.5 %										-3.8 %
Kerosene input for electricity production					28.9 %														29.1 %
Biogas input for electricity production										-9.5 %									
Hydro input for electricity production													-9.7 %						
PV input for electricity production PV														151.8 %					
Wind input for electricity production																-18.7 %			
Electricity production own use																			-1.3 %
Solar Thermal heat production																			
Fuelwood to charcoal											-1.4 %	-1.3 %							-1.5 %
TOTAL Secondary supply (SS)	3.6 %		24.3 %		28.9 %	6.8 %			-4.5 %	-9.5 %	-1.4 %	-1.3 %	-9.7 %	151.8 %		-18.7 %	3.8 %		2.6 %
Final Energy Consumption																			
Manufacturing	1.0 %		0.6 %			1.0 %	-2.5 %		-14.3 %		-1.5 %						2.4 %		-0.5 %
Commercial							0.6 %					-1.6 %					2.5 %		2.1 %
Household					-10.8 %		1.1 %				-0.9 %	0.0 %					2.1 %		1.6 %
Transport		4.9 %	2.1 %	8.6 %		-0.2 %	-4.7 %												4.9 %
Agriculture			-3.6 %														-8.5 %		-6.0 %
Others							3.8 %										83.8 %		78.0 %
TOTAL (F)	1.0 %	4.9 %	1.8 %	8.6 %	-10.8 %	0.8 %	0.5 %		-14.3 %		-0.9 %	-1.3 %					3.6 %		3.3 %

10 ENERGY PATTERN 2017



11 TABLE OF INDICATORS

Item	Indicators	Unit	2013	2014	2015	2016	2017
Primary Energy Consumption	Primary Energy Consumption	ktoe	1454.8	1491.7	1534.4	1555.3	1599.3
	Share of local resources: local primary consumption/total primary consumption	%	15.1	14.2	16.4	14.6	13.4
Energy intensity	Energy intensity per inhabitant: Primary energy Consumption/population	toe/inhab	1.16	1.18	1.22	1.23	1.26
	Energy intensity per 100,000 (2006 Rs): Primary Energy Consumption/GDP	toe/Rs	0.49	0.48	0.48	0.47	0.46
Electricity Production	Total fossil fuel input for electricity production	ktoe	633.1	655.4	646.7	651.8	682.6
	Total renewable input for electricity production	ktoe	169.0	164.9	198.4	180.7	172.6
	Total electricity production	GWh	2885.3	2937.0	2995.8	3042.2	3113.5
	Penetration of renewable resources	%	20.6	20.3	22.7	21.8	19.8
Final electricity consumption per sector	Total electricity sold	GWh	2384.1	2452.2	2505.4	2558.6	2618.1
	Domestic sector	%	32.8	32.9	33.2	33.4	33.3
	Commercial sector	%	35.7	36.5	36.6	36.3	36.4
	Industrial sector	%	30.0	29.2	28.7	28.8	28.8
	Others	%	1.5	1.5	1.5	1.6	1.5
	Annual electricity consumption per consumer (Domestic)[9]	GWh/ Consumer /year	2.01	2.03	2.05	2.07	2.07
	Annual electricity consumption per consumer (Commercial)	GWh/ Consumer /year	21.74	22.30	22.27	22.15	22.26
	Annual electricity consumption per consumer (Industrial)	GWh/ consumer /year	106.70	108.48	112.85	115.84	118.88
Final energy consumption in transport sector	Total energy consumption (transport)	ktoe	438.8	454.1	463.1	505.6	530.4
CO2 Emissions	Total CO_2 emissions	$ktCO_2$	3941.2	4063.2	4054.1	4087.1	4226.2
	Net CO_2 emissions	$ktCO_2$	3573.6	3696.3	3685.4	3723.7	3861.5
	Energy sector	%	59.70	60.00	59.13	59.25	59.92
	Manufacturing sector	%	8.54	8.68	8.83	8.38	8.16
	Transport sector	%	25.06	24.64	25.23	25.55	25.22
	Others	%	5.75	5.75	6.01	6.00	5.86
	CO_2 emissions per kWh of electricity generated (Grid emission factor)[10]	gCO_2/ kWh	1084.6	915.2	909.7	945.9	954.8

Data Source: Statistics Mauritius

[9] Domestic sector in this document includes CEB residential consumers, charitable and religious institutions.

[10] Source: Central Electricity Board

12 GLOSSARY

Aviation fuel:
A kerosene type meeting the required properties for use in jet engines and aircraft-turbine engines.

Bagasse:
Cellulosic residue left after sugar is extracted from sugar cane.

Capacity:
The maximum power available from a power station at a point in time:
- *Installed capacity*: The nameplate capacity of the generator set.
- *Plant capacity*: The net capacity measured at the terminals of the stations, i.e., after deduction of the power absorbed by the auxiliary installations and the losses in the station transformers.
- *Effective capacity*: It is the plant capacity less any amount of derated capacity from the installed capacity.

Charcoal:
Comprises the solid residue obtained by the destructive distillation of wood in the absence of air.

CPP (Continuous Power Producers)
Entities which, in addition to their main activities, themselves produce (individually or in combination) electric energy intended, in whole or in part, to meet their own needs from bagasse only and the surplus for sale to the CEB only during the cane harvest period.

Coal:
Fossil fuel that has a high degree of coalification, with a gross calorific value over24MJ/kg (5700 Kcal/kg) on an ash-free but moist basis.

Diesel Oil:
Consists primarily of medium oil distilling between 180^0C and 380^0C.

Electric energy dependence:
The ratio of electricity generation from fossil fuels and electricity generation total.

Electric dependency ratio:
Ratio between electricity production from fossil fuels and the total electricity production.

Energy:
Capacity for doing work or for producing heat. Producing heat is a common manifestation of ‘doing work’ as are producing light and motive force.

Energy intensity
A measure of the energy efficiency of the economy of the country. Provides a measure of the efficiency with which energy is being used in production. A lower ratio usually reflects a more efficient use of energy.

Energy unit:
The International System of Units (SI unit) of energy is the Joule.

Final energy:
Energy that is supplied to consumers (electricity, petrol, diesel, natural gas, fuel oil, heating oil).

Final Energy Consumption:
Energy consumption by final user- i.e. energy which is not being used for transformation into other forms of energy. The consumption by sector is presented as follows:
Agriculture: Energy used for irrigation and by other agricultural equipments;
Commercial & distributive trade: Energy consumed by the business and commercial sector;
Residential: Consumption of energy by residential sector;
Manufacturing: Consumption in industry and construction; and
Transport: Includes consumption by land vehicles, ships and local aircrafts.

Fossils fuels:
Formed from the fossilized remains of dead plants and animals by exposure to heat and pressure in the Earth's crust over hundreds of millions of years.

Fuels:
Term used to describe energy sources that must be subjected to combustion in order to release the energy stored up inside them.

Fuel wood:
All forms of woody material.

Fuel Oils:
Heavy oils from the refining process of crude oil and used as fuel in power stations. It is also commonly used by ships and industrial large-scale heating boilers installations as a fuel in furnaces or boilers in the manufacturing sector.

Gasolene:
A mixture of relatively volatile hydrocarbons, which have been blended to form a fuel suitable for use in spark-ignition internal combustion engines.

Gross Domestic Product (GDP):
The aggregate money value of all goods and services produced within a country out of economic activity during a specified period, usually a year, before provision for the consumption of fixed capital.

Gigawatt hour (GWh):
Unit of electrical energy, equal to 3.6 terajoules (TJ).

Hybrid vehicle:
A vehicle that uses different types of energy for power. This vehicle has usually two types of engines: internal combustion engine and electric motor.

IPP (Independent Power Producers):
Entities which, in addition to their main activities, themselves produce(individually or in combination) electric energy intended, in whole or in part, to meet their own needs and for sale to the CEB throughout the year from bagasse during the cane harvest period and coal outside this period.

Kerosene (excl. Aviation fuel type):
A medium oil distilling between 150^0C and 300^0C and which is used in sectors other than aircraft transport.

Kilowatt (kW):
Unit of electrical power equal to 1 000 watts

Kilowatt hour (kWh):

Unit of electrical energy equal to one kilowatt (1 kW) of power expended for one hour (3 600 s) or 3 600 000 joules.

Liquefied petroleum Gas (LPG):

Consists mainly of propane or butane, derived from either petroleum refining process or extracted from petroleum streams. It is normally liquefied under pressure for transportation and storage. In Mauritius it is often used to power cooking stoves or gas water heaters and to fuel some types of vehicle.

Losses (transmission / distribution losses):

Comprise losses in transmission and distribution of electric energy and losses in transformers, which are *not* considered as integral parts of the power stations.

Own use (Station use and loss):

Included are consumption by station auxiliaries and losses in transformers, which are considered as integral parts of the power stations.

Peak demand:

Term used in energy demand management describing a period in which electrical power is expected to be provided for a sustained period at a significantly higher than the average supply level. Peak demand fluctuations may occur on daily, monthly seasonal and yearly cycles.

Petroleum products:

The primary source of petroleum products is crude oil. Petroleum or crude oil is a naturally occurring, flammable liquid found in rock formations in the Earth. Diesel oil, fuel oils, Gasolene, Kerosene and Liquefied petroleum gas (LPG) are among the major products derived from crude oil distillation.

Primary energy:

Primary energy designates energy from sources that involve only extraction or capture. Primary energy is not derived from any other forms of energy. By convention, sources of energy that occur naturally such as coal, heavy fuel oil, fuel wood are termed primary energy.

Primary energy consumption:

The final energy consumption in which is included the losses and consumption of producers and transformers of energy.

Production:

Comprises gross production, i.e., the amount of electric energy produced, including that consumed by station auxiliaries and any losses in transformers that are considered integral parts of the power station.

Renewable energy or Renewables;

Natural resources that, after exploitation, can return to their previous stock levels by natural processes of growth or replenishment.

Secondary energy:

Designates energy from all sources of energy that results from transformation of primary sources. e.g. electricity from coal.

Solar Thermal

Solar energy harnessed in the form of thermal energy

Thermal plants:

Comprises of conventional thermal plants of all types that require combustion of fuels to generate electricity. They include steam-operated generating plants and plants using internal combustion engines or gas turbines.

Thermal sources of electricity:

These include coal, oil and its derivatives and bagasse.

Tonne

The tonne (SI symbol: t) is a metric system unit of mass equal to 1,000 kilograms.

Tonne of oil equivalent (toe):

Amount of heat obtained by the perfect combustion one tonne of oil, defined as 41.868 gigajoules.

Watt (W):

The conventional unit to measure a rate of conversion of energy. One watt equals to 1Joule per second.

13 ENERGY CONVERSION FACTORS

	tonne	toe
Gasoline	1	1.08
Diesel Oil	1	1.01
Dual Purpose Kerosene (DPK)	1	1.04
Fuel Oil	1	0.96
Liquified Petroleum Gas (LPG)	1	1.08
Coal	1	0.62
Bagasse	1	0.16
Fuelwood	1	0.38
Charcoal	1	0.74

	GWh	ktoe
Hydro/Wind/Bagasse	1	0.086
Electricity	1	0.086

1 toe = 0.041868 terajoule (TJ) (net calorific value)