MINISTRY OF ENERGY AND PUBLIC UTILITIES

ENERGY OBSERVATORY REPORT 2020

MARCH 2022

EDITORIAL TEAM

Editorial Team:

The Editorial team has worked out this report, under the Chairmanship of Assoc. Prof. Dr. Abdel Anwar Hossen Khoodaruth, University of Mauritius. The other members of the Editorial Team are as follows:

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FOREWORD

I feel honoured and privileged to put down a few words on this Energy Observatory Report 2020. Indeed, it was high time for this valuable document to be upgraded to better reflect the needs of stakeholders operating in the Energy Sector in Mauritius. Of utmost importance, this revamped Energy Observatory Report should now enable all stakeholders to take cognizance of the existing challenges in the Energy Sector and to identify opportunities to meet their obligations under the Climate Change Act and other legislations.

Despite the year 2020 being peculiar due to the COVID-19 impact, the decrease in CO2 emissions is surely no nonsense. It is but the result of the consistent and concerted efforts of all stakeholders operating in the Energy Sector. We are also much obliged to the Government of Mauritius for the measures introduced in the Budget Speeches 2019-2020 and 2020-2021 for the Energy Sector which include, amongst others, the promotion of the efficient use of energy, the optimisation on renewable energy sources, and the decrease in excise duties for electric and Plug-in Hybrid Cars.

At the level of the Energy Efficiency Committee, we trust that professionals in the energy sector (energy auditors, compliance assessors, engineers, architects, and others), academics and researchers, businesses (hotel industry, textile industry, SMEs, importers and distributors of energy equipment, and others), and policy-makers will now be able to better navigate, identify and extract information from this report.

Besides, we believe that one particular way of meeting our commitments for a reduction in energy consumption by 10% by 2030 and to achieve 60% Renewable Energy in the energy mix in 2030 is the adoption of the consistent pattern in the new economic process which is the complex networks of interaction, whereby emphasis is on collaboration between the stakeholders. This can be the key for new innovation models during the uncertain times given rise by the COVID-19.

Last but not the least, allow me to commend the dedication and professionalism of the editorial team who worked tirelessly to put up this report for the benefit of the stakeholders in the Energy Sector. I am sure that time will prove them right in their endeavour.

Liladhur G. Sewtohul

Chairperson Energy Efficiency Committee

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EXECUTIVE SUMMARY

The year 2020 can be considered as an atypical year with the travel restrictions and lockdowns due to the COVID-19 pandemic. These have had major impacts on the imports of fossil fuels and the Primary Energy Requirements in Mauritius.

The salient points for the year 2020 are as follows:

(i) 1,983 ktoe of fossil fuel comprising petroleum products and coal, were imported. Coal constituted around 37% of fossil fuel imports, fuel oil 34%, diesel oil 13%, dual purpose kerosene 4%, gasolene 8% and LPG 4%. This represents an overall decrease of 23% as compared to 2019;

(ii) Imports of petroleum products decreased by 32%, from 1,852.7 ktoe in 2019 to 1,245.3 ktoe in 2020, while those of coal increased by 1%, from 727 to 737 ktoe;

(iii) The import bill of energy sources decreased by 33% from MUR 35,848 M in 2019 to MUR 24,090 M in 2020 and accounted for around 14% of the total imports bill for the Republic of Mauritius;

(iv) Significant decrease in the average import price of petroleum products as compared to 2019 – Gasolene (-12%) and diesel oil (-15%). On the other hand, there were increases in import price of aviation fuel (+4%), fuel oil (+8%) and LPG (+16%);

(v) Slight decrease in import energy dependency rate from 87.2% in 2019 to 86.7% in 2020;

(vi) Compared to 2019, there was an increase in production of primary energy from local renewable sources, for example energy produced from hydro increased from 98.7 GWh to 115.8 GWh, landfill gas from 19.9 GWh to 24.8 GWh, photovoltaic from 128.5 GWh to 145.7 GWh and wind from 15.2 GWh to 18.1 GWh in 2020. However a decrease was noted in the production of energy from bagasse from 439.6 GWh to 383.6 GWh ;

(vii) Compared to 2019, the peak power demand for the Island of Mauritius decreased by 2.6% from 507 MW to 494 MW in 2020 which can be attributed to the lockdown periods of 11 weeks, i.e from 19 March to 30 May 2020 due to COVID-19. While that of the Island of Rodrigues increased by 6.6% from 7.6 MW to 8.1 MW;

(viii) Total electricity production decreased by 11% from 3,237 GWh in 2019 to 2,882 GWh in 2020. 76% of electricity production was derived from fossil fuel sources while 24% of electricity production was from renewable energy sources. This is due to an increase in electricity production from photovoltaic from 128.5 GWh in 2019 to 145.7 GWh in 2020 and electricity generated from wind energy has also increased from 15.3 GWh in 2019 to 18.1 GWh in 2020;

(ix) Decrease of 20% in the final energy consumption from 1,016 ktoe in 2019 to 814 ktoe in 2020. Transport Sector and Manufacturing Sector accounting for nearly 49% and 22% respectively;

(x) Decrease of 28% in the final energy consumption in the transport sector from 552 ktoe in 2019 to 396 ktoe in 2020 with land transport (-15%), sea transport (-18%) and aviation (-62%);

(xi) In 2020, the powered vehicles fleet comprised 600,053 vehicles out of which 330 were electric vehicles and 17,069 were hybrid (petrol/electric) vehicles. The number of hybrid (petrol/electric) powered vehicles and electric vehicles increased by 3,307 and 135 respectively as compared to 2019;

(xii) Average daily electricity consumption of 2.08 kWh per inhabitant which represents an increase of 1% as compared to 2019;

(xiii) Decrease in CO_2 emissions from 3,903.30 ktonnes in 2019 to 3,290.95 ktonnes in 2020;

(xiv) Significant decrease noted in the energy intensity per inhabitant (primary energy requirement/population), namely from 1.26 toe/inhabitant in 2019 to 1.05 toe/inhabitant in 2020.

1 PRIMARY ENERGY REQUIREMENT

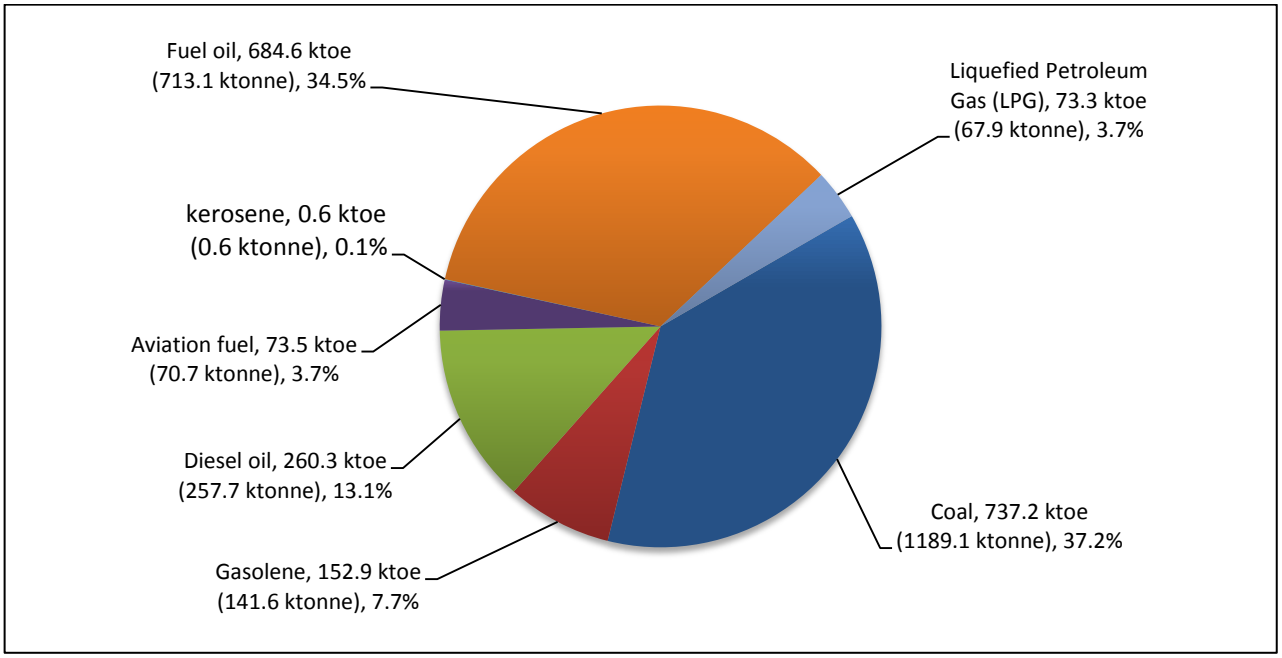
1.1 Introduction

The energy supply of Mauritius is divided into:

- imports of primary energy *(Fuel Oil, Liquefied Petroleum Gas, Gasolene, Diesel, Kerosene, Aviation fuel and Coal*);
- production of local primary energy (*Bagasse, hydro, wind, landfill gas, fuelwood, charcoal and photovoltaic*);
- primary energy re-exports and bunkering; and
- variation of stocks.

1.2 Imports

The distribution of fossil fuel imports in 2020 is shown in **Figure 1.1**.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 1.1 - Fossil fuel imports

Petroleum products are intended mostly for the sectors of transport, electricity generation, manufacturing as well as in the household, commercial and agricultural 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.

1.2.1 Petroleum products

Table 1.1 shows the imports of petroleum products over the period 2011 to 2020. It may be noted that annual demand in petroleum products to meet domestic demand and bunkering decreased by 32% from 1,842.6 ktonnes in 2019 to 1,251.6 ktonnes in 2020. This decrease is attributed to the COVID-19 pandemic and the prolonged lockdown periods.

Table 1.1 - Import of petroleum products, 2011 - 2020

Fuel (ktonnes)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasolene	116.7	128.2	138.2	137.9	154.7	168.8	172.2	172.2	183.5	141.6
Diesel oil	309.9	313.8	336.1	303.6	318.7	339.1	346.7	330.1	333.9	257.7
Aviation fuel	226.4	213.0	241.1	232.0	268.8	285.0	309.7	303.8	287.1	70.7
Kerosene	4.3	7.0	2.8	2.2	2.5	2.1	2.0	3.1	13.5	0.6
Fuel oil	434.8	401.2	429.1	406.4	445.1	489.7	648.7	663.4	849.5	713.1
Liquefied Petroleum Gas (LPG)	66.3	67.9	68.2	75.6	72.5	167.0	149.4	168.6	175.1	67.9
TOTAL (ktonnes)	**1,158.4**	**1,131.1**	**1,215.5**	**1,157.7**	**1,262.3**	**1,451.7**	**1,628.7**	**1,641.2**	**1,842.6**	**1,251.6**

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

1.2.2 Primary energy re-export and bunkering

Primary energy re-export and bunkering in 2020 is shown in **Table 1.2**.

Table 1.2 - Primary energy re-export and bunkering

Energy Source	ktonne	ktoe
Diesel oil	121.4	122.6
Aviation fuel (foreign aircraft)	55.8	58.0
Fuel oil	519.4	498.6

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

1.3 Stock variation

The variations in stock in 2020 are provided in the **Table 1.3**.

Table 1.3 - Variation in stock year

	2020							
	Import		Export		Primary energy requirement		Stock variations (import - export - primary energy requirement)	
	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe
Coal	1189.1	737.2	-	-	660.5	409.5	528.6	327.7
Gasolene	141.6	152.9	-	-	170.5	184.1	-28.9	-31.2
Diesel oil	257.7	260.3	121.4	122.6	184.0	185.8	-47.6	-48.1
Aviation Fuel	70.7	73.5	55.8	58.0	56.1	58.4	-41.2	-42.9
Kerosene	0.6	0.6	-	-	0.3	0.2	0.3	0.4
Fuel oil	713.1	684.6	519.4	498.6	246.2	236.4	-52.5	-50.4
LPG	67.9	73.3	0.0	0.0	76.0	82.1	-8.1	-8.8

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

1.4 Dependency on Imported Energy Carriers

In 2020, the dependency rate on imported energy carriers was 86.7%. Over the ten-year period, the dependency rate underwent slight changes ranging from about 84% in 2011 to 87% in 2020, as shown in **Table 1.4**.

Table 1.4 - Import energy dependency rate, 2011 – 2020

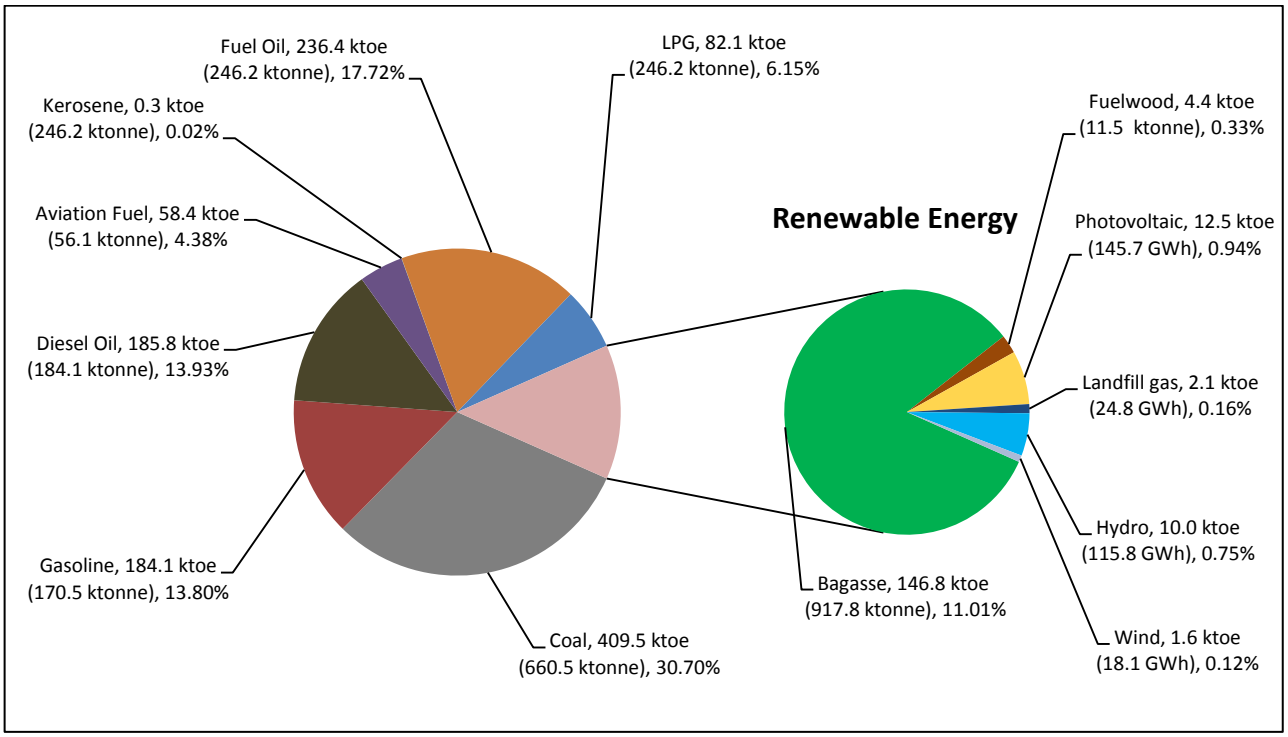
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
83.8%	84.4%	84.9%	85.8%	83.6%	85.4%	86.6%	87.1%	87.2%	86.7%

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

The reduction in dependency rate on imported fossil is due to a fall in fuel demand which can be attributed to the COVID-19 pandemic and prolonged lockdown periods.

1.5 Primary energy requirement

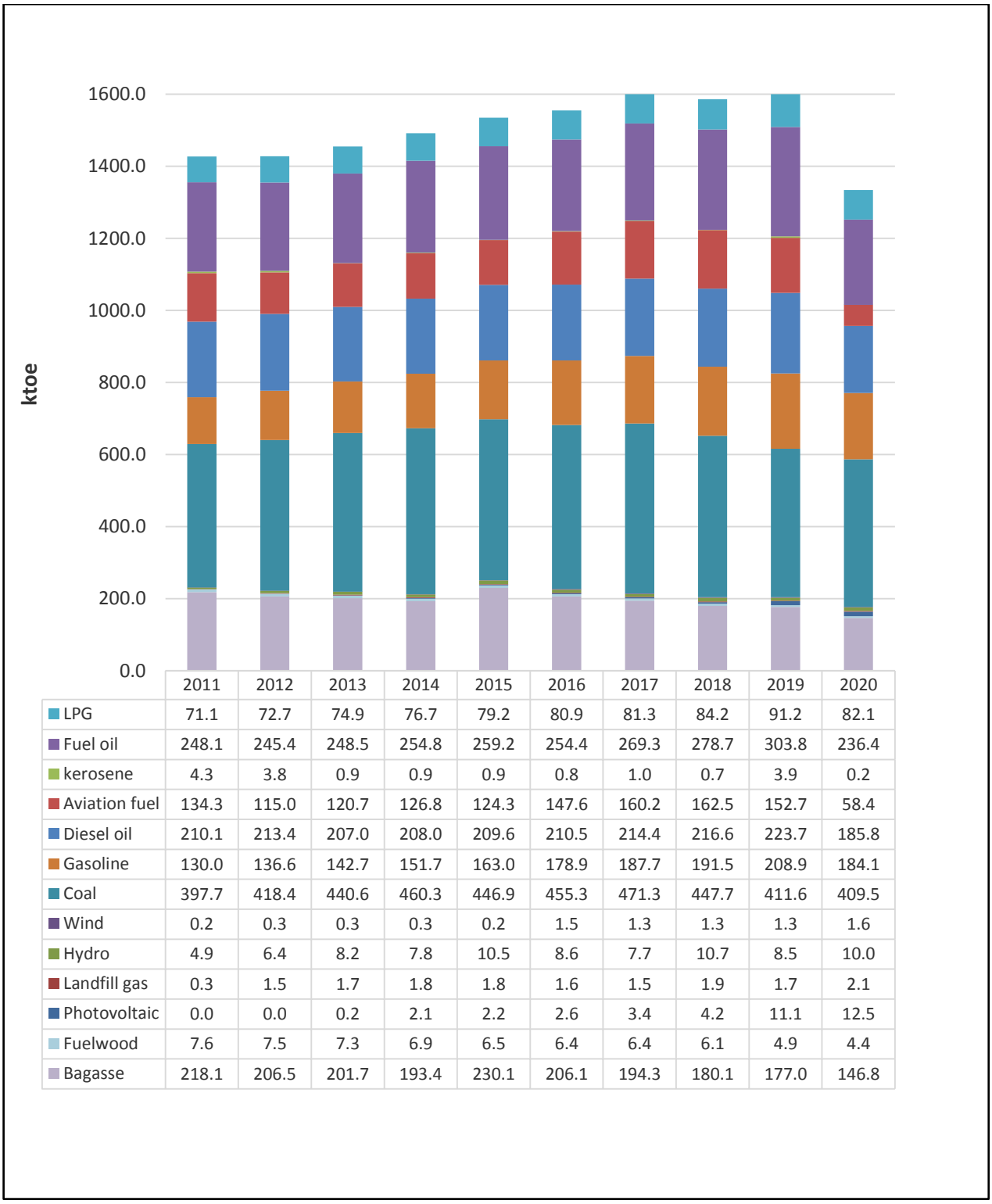
The primary energy requirements are met from imported sources and from local renewable sources. **Figure 1.2** shows the share of fuel source for Republic of Mauritius in the primary energy requirement for year 2020. It is noted that the major share for the primary energy requirements is from coal.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 1.2 - Primary Energy Requirement for Republic of Mauritius

The evolution of primary energy requirement for Republic of Mauritius over the period 2011 to 2020 is shown in **Figure 1.3**. It should be noted that the Total Primary Energy Requirement decreased by 16% from 1600.3 ktoe in 2019 to 1333.9 ktoe in 2020.



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
LPG	71.1	72.7	74.9	76.7	79.2	80.9	81.3	84.2	91.2	82.1
Fuel oil	248.1	245.4	248.5	254.8	259.2	254.4	269.3	278.7	303.8	236.4
kerosene	4.3	3.8	0.9	0.9	0.9	0.8	1.0	0.7	3.9	0.2
Aviation fuel	134.3	115.0	120.7	126.8	124.3	147.6	160.2	162.5	152.7	58.4
Diesel oil	210.1	213.4	207.0	208.0	209.6	210.5	214.4	216.6	223.7	185.8
Gasoline	130.0	136.6	142.7	151.7	163.0	178.9	187.7	191.5	208.9	184.1
Coal	397.7	418.4	440.6	460.3	446.9	455.3	471.3	447.7	411.6	409.5
Wind	0.2	0.3	0.3	0.3	0.2	1.5	1.3	1.3	1.3	1.6
Hydro	4.9	6.4	8.2	7.8	10.5	8.6	7.7	10.7	8.5	10.0
Landfill gas	0.3	1.5	1.7	1.8	1.8	1.6	1.5	1.9	1.7	2.1
Photovoltaic	0.0	0.0	0.2	2.1	2.2	2.6	3.4	4.2	11.1	12.5
Fuelwood	7.6	7.5	7.3	6.9	6.5	6.4	6.4	6.1	4.9	4.4
Bagasse	218.1	206.5	201.7	193.4	230.1	206.1	194.3	180.1	177.0	146.8

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 1.3 - Primary Energy Requirement for Republic of Mauritius, 2011 – 2020

In Mauritius, the main sources of renewable energy exploited are biomass, in the form of sugar cane bagasse[1], hydro, photovoltaic (PV), wind, landfill gas and fuel wood. A total of 177.4 ktoe of local resources was tapped in 2020. This represents a 13.2% decrease from the Total Primary Energy produced from local renewable sources in 2019.

However from the **Figure 1.3**, it can be observed that there was a decrease in the primary energy requirement for LPG, fuel oil, kerosene, aviation fuel, diesel oil, gasoline and coal. This overall decrease can be attributed to the COVID-19 pandemic and prolonged lockdown periods.

[1] In this document, unless specified otherwise, bagasse includes cane trash.

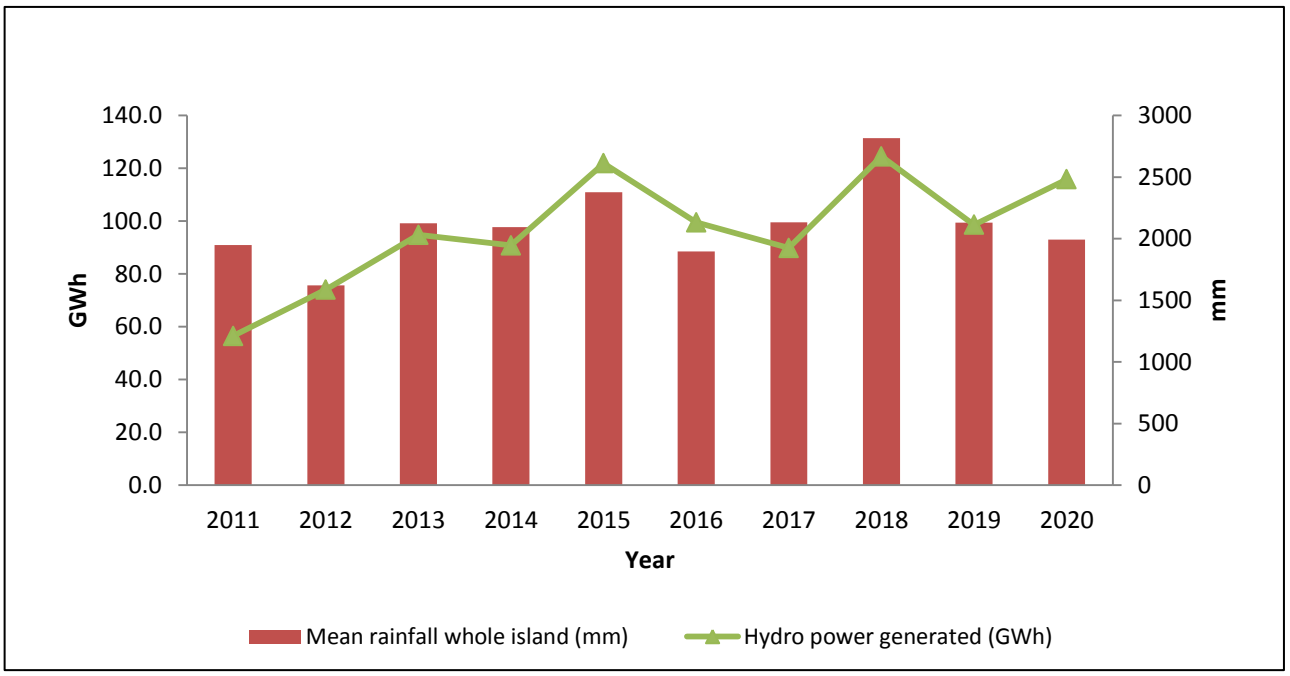
1.6 Hydroelectricity

There are 10 hydroelectric power stations, ranging in size from 0.35 MW to 28 MW, in operation in Mauritius.

Hydroelectric power generation accounted for 4.0% of total electricity produced in 2020. Fluctuations in hydroelectric power generation tend to follow annual rainfall levels as shown in **Figure 1.4**. The electricity generated from all the hydropower plants was 115.8 GWh in 2020. In a rainy season, the annual production can be as high as 125 GWh, while in a dry season, it can drop to 57 GWh. On an average therefore, some 96.6 GWh is produced annually in a normal rainfall year.

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.

1.6.1 Trend of Hydro-electric generation for Republic of Mauritius



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

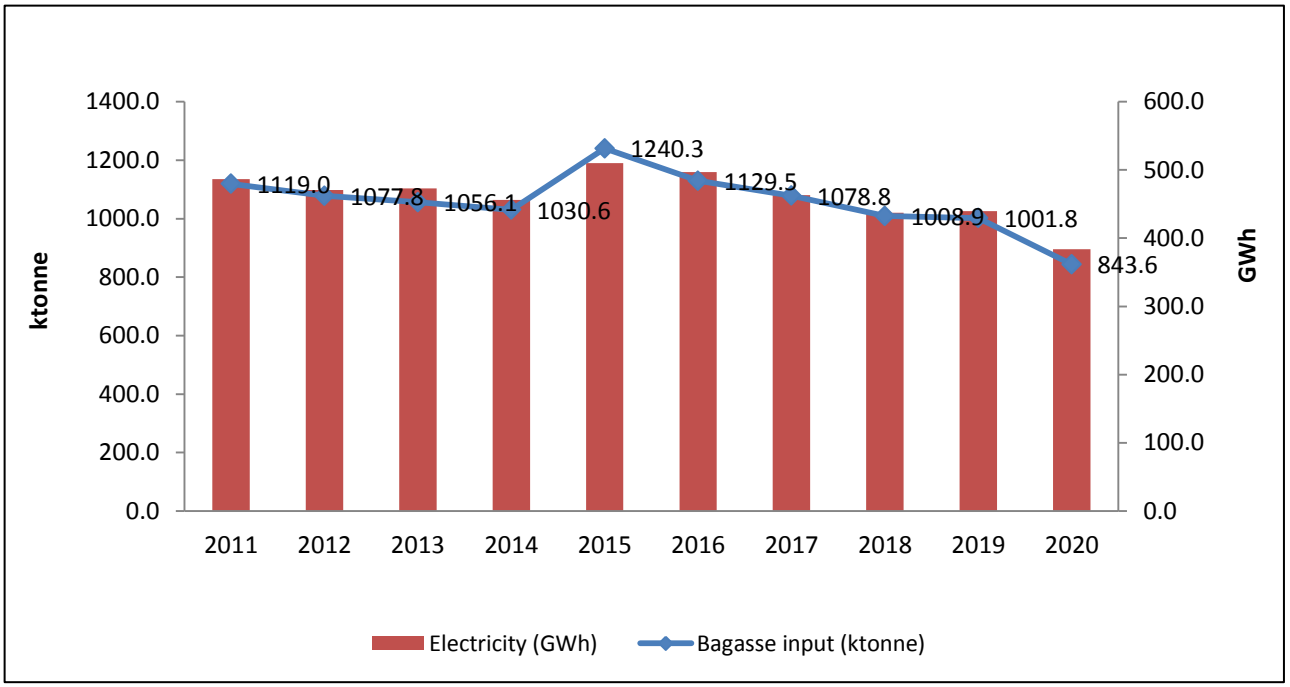
Figure 1.4 - Trend of hydro-electric generation for Republic of Mauritius, 2011 to 2020

The increase in hydroelectric power generation in 2020 is 17% as compared to that in 2019, which may be due to heavy rainfall for two or three consecutive days.

1.7 Bagasse

There are three main bagasse/coal power plants at the sugar factories of Alteo Energy Ltd, Terragen Ltd and Omnicane Thermal Energy Operations (La Baraque) Ltd. During the off-crop season, the three main power plants use coal to generate electricity, which account for about 70% of the electricity production of each plant. Overall, in the year 2020, the cane industry Independent Power Producers (IPPs) exported about 281.7 GWh from bagasse.

1.7.1 Trend of Electricity Generation from bagasse for Republic of Mauritius



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 1.5 - Trend of electricity generation from bagasse for Republic of Mauritius, 2011 to 2020

Figure 1.5 gives the bagasse input for electricity generation and the amount generated over the period 2011 to 2020. In 2020, 843.6 ktonnes of bagasse was used for electricity generation as compared to 1,001.8 ktonnes in 2019. This was due to a decrease of 17% in the production of bagasse from 1,106.1 ktonnes in 2019 to 917.8 ktonnes in 2020 resulting from a decrease of 45,805 hectares in the area under sugar cane cultivation in 2020 to 48,819 hectares as compared to 2019.

Table 1.5 shows the area under sugar cane cultivation and the ratio of electricity produced per tonne of bagasse over the period 2011 to 2020. The ratio varies in the range of 0.411 MWh/tonne to 0.455 MWh/tonne. In 2020, the ratio of electricity produced per tonne of bagasse was 0.455. Also 13.3% of total electricity production in Mauritius was from bagasse, representing a decrease of 12.8% compared to 2019.

Table 1.5 - Ratio of electricity produced per tonne of bagasse, 2011 - 2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Area under Sugar Cane Cultivation (Hectares)	59,724	57,160	56,391	57,081	56,872	55,560	54,182	51,454	48,819	45,805
Ratio electricity produced to bagasse input (MWh/tonne)	0.435	0.437	0.448	0.443	0.411	0.440	0.429	0.433	0.439	0.455

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Table 1.5 also shows an increasing trend of the ratio of electricity produced per tonne of bagasse while the area under sugar cane cultivation has been on a decreasing trend during the last 4 years. This increase in the ratio of electricity produced per tonne of bagasse can be attributed to the installation of high pressure boilers at Terragen and at Omnicane, resulting in an improvement in efficiency of bagasse combustion. Moreover, with the closure of Medine sugar factory at end crop 2018, and cane diversion plan, more bagasse is combusted at higher efficiency at the Terragen and Omnicane power plants. The increase in the ratio of electricity produced per tonne of bagasse can be also attributed to an improvement in quality of the bagasse.

1.8 Photovoltaics (PV)

The electricity generation from PV installations in Republic of Mauritius was 145.7 GWh in 2020 compared to 128.5 GWh in 2019. This represents an increase of 13.4%.

Table 1.6 provides information about PV installations under the Small Scale Distributed Generation (SSDG) and Medium Scale Distributed Generation (MSDG) scheme up to the year 2020 for the Island of Mauritius.

Table 1.6 - SSDG and MSDG summary, Island of Mauritius

Scheme	Total Capacity of PV systems connected to the CEB grid (kW) (cumulated)	Total kWh Produced during the year 2020	Total kWh Exported to the CEB grid during the year 2020
SSDG FIT Scheme	2064	2,516,388	1,639,268
SSDG PECR Scheme	1,456	1,383,917	677,822
SSDG Net metering Scheme-Phase 1	3,050	4,003,047	2,495,283
SSDG Net metering Scheme-Phase 2	1,351	1,797,342	1,260,026
SSDG Net metering Scheme-Phase 3	1,262	1,173,706	846,216
MSDG Net metering Scheme	6124	6,012,122	519,231
Cooperative Net Metering Scheme MRU	29	36,937	23,533
Home Solar Project	887	920,382	920,382
Green Energy Scheme for SMEs	1724	1,833,664	1,833,664
MOBEC/MSME	24	14,615	14,615
No Tariff Category-**SSDG**	144	48,858	9,273
No Tariff Category-**MSDG**	464	703,597	26,776
Total	**18,579**	**20,444,575**	**10,266,089**

Data Source: CEB

Table 1.7 provides information about PV installations under the Small Scale Distributed Generation (SSDG) and Medium Scale Distributed Generation (MSDG) scheme up to the year 2020 for the Island of Rodrigues.

Table 1.7 - SSDG summary, Island of Rodrigues

Scheme	Total Capacity of PV systems connected to the CEB grid (kW) (cumulated)	Total kWh Produced during the year 2020	Total kWh Exported to the CEB grid during the year 2020
SSDG FIT scheme	172	206,268	153,879
SSDG Net metering Scheme	28	41,894	25,642
SSDG PECR scheme	58	61,597	22,583
Cooperative Net metering Scheme	3	5,724	4,875
Home Solar Project (HSP)	91	68,376	68,376
Green Energy Scheme for SMEs	92	94,163	94,163
Total	**444**	**478,022**	**369,518**

Data Source: CEB

1.9 Electricity from Wind energy

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 15.1 GWh of electricity in 2020. The power is injected into the national grid at CEB's Amaury sub-station. As for Rodrigues Island, 2.9 GWh of electricity was produced from wind energy in 2020.

1.10 Electricity from Landfill gas

The amount of waste generated in Mauritius is currently around 460,000 tonnes per annum and this amount is expected to increase in the coming years. The wastes are disposed in the sole landfill of the island at Mare Chicose. Since 2011, electricity is generated from landfill gas which is constituted mostly of methane, produced by the fermentation of organic waste in landfills in the absence of oxygen. The effective capacity is 3 MW and in 2020, an amount of 24.8 GWh of electricity was generated.

1.11 Electricity from biogas

Data on biogas production through mesophilic anaerobic digestion and electricity production used to partially meet the electricity requirements of the St Martin Wastewater Treatment Plant over the period 2011 to 2020 are provided in **Table 1.8** and **Table 1.9**. No electricity was generated in year 2018 ,2019 and 2020 given that the Gas Generator Set was not operational since February 2017.

Table 1.8 - Volume of biogas produced over the last 10 years

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Volume (Nm3)	922,288	1,075,604	1,141,327	1,704,956	1,289,681	797,536	826,867	919,914	903,520	901,109

Data source: Wastewater Management Authority

Table 1.9 - Electricity produced from biogas over the last 10 years

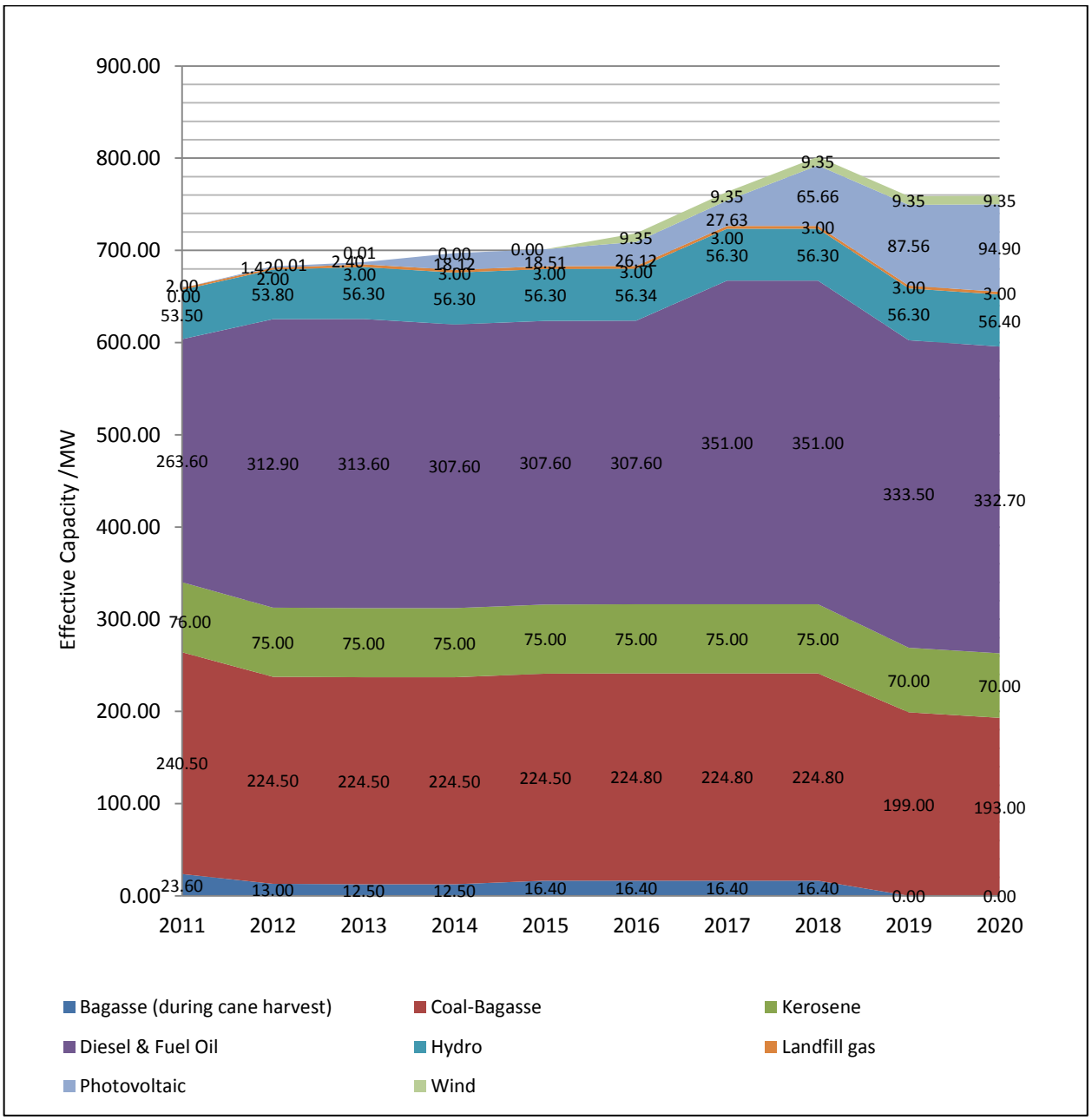
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Electricity generated (kWh)	1,185,523	1,145,557	965,616	950,773	644,031	783,883	27,461	0	0	0

Data source: Wastewater Management Authority

2 TRANSFORMATION OF ENERGY

2.1 Trend Effective power plant capacity for Island of Mauritius

The trend of effective power plant capacity from 2011 to 2020 for Island of Mauritius is shown in **Figure 2.1**.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 2.1 - Trend of effective power plant capacity for Island of Mauritius, 2011 – 2020

From **Figure 2.1**, it can be seen that diesel and fuel oil power plants and coal bagasse power plants represent 43.8% and 25.4% of the total effective power plant capacity for the Island of Mauritius.

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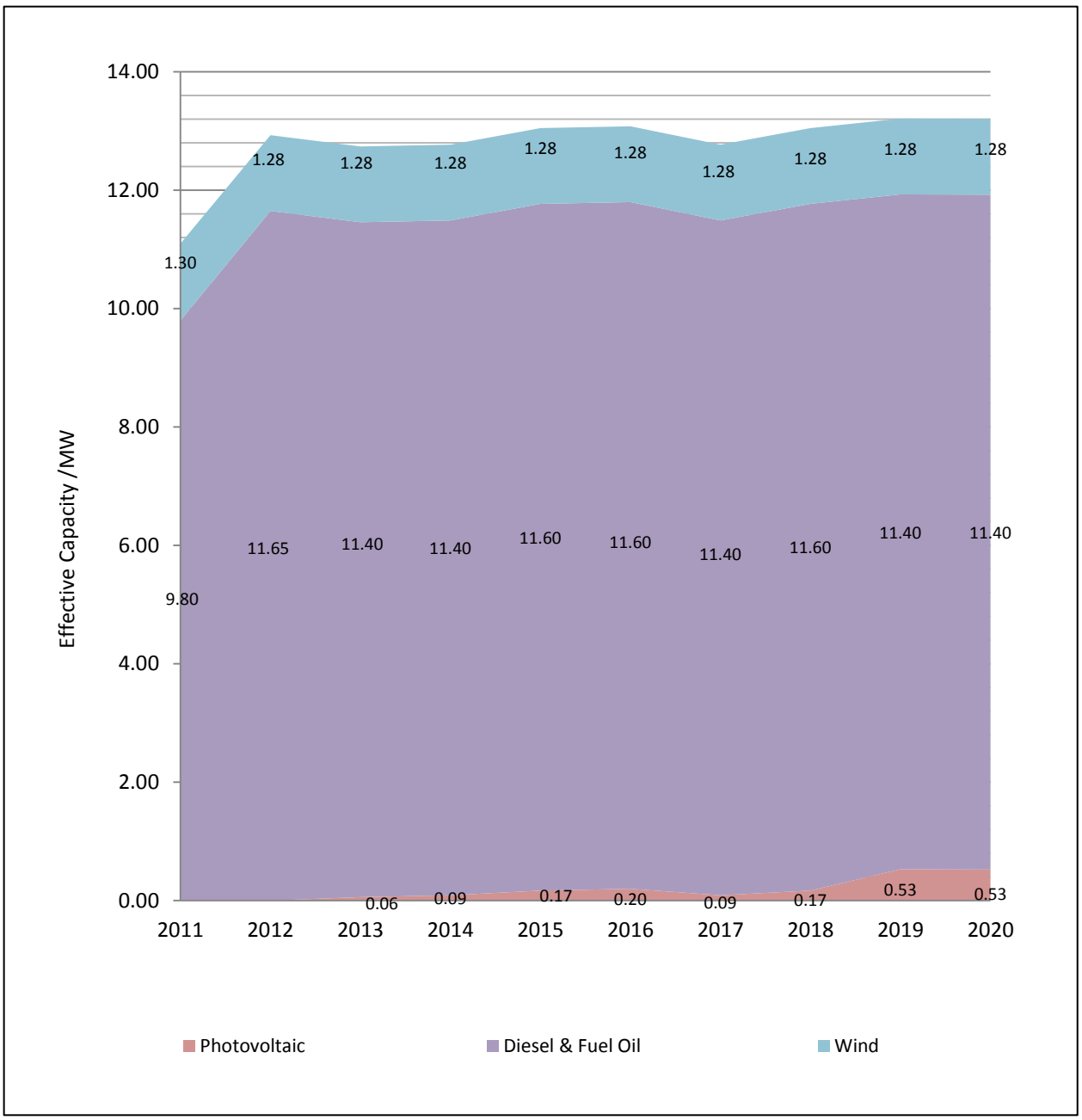
2.2 Trend of Effective power plant capacity for Island of Rodrigues

The trend of effective power plant capacity from 2011 to 2020 for Island of Rodrigues is shown in **Figure 2.2**.



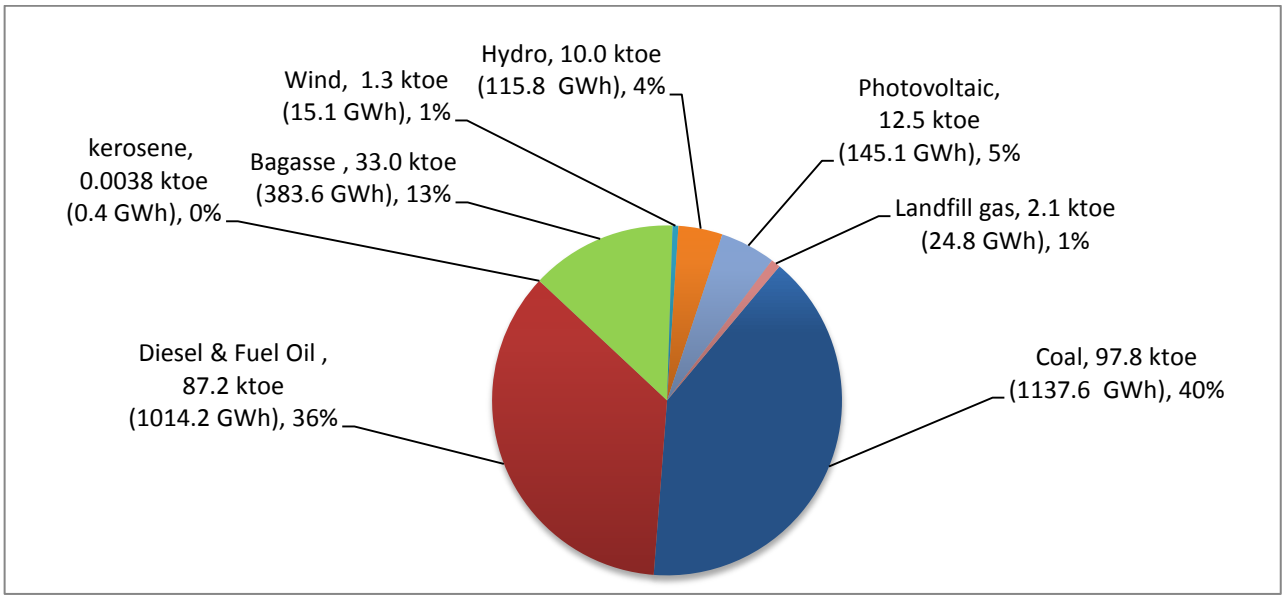
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 2.2 - Trend of effective power plant capacity for Island of Rodrigues, 2011 – 2020

From **Figure 2.2**, it can be seen that diesel and fuel oil power plants represent 86.3% of the total effective power plant capacity for the Island of Rodrigues.

2.3 Share of Electricity Production by fuel type for Island of Mauritius

Figure 2.3 shows the share of electricity production by fuel type for Island of Mauritius in 2020.



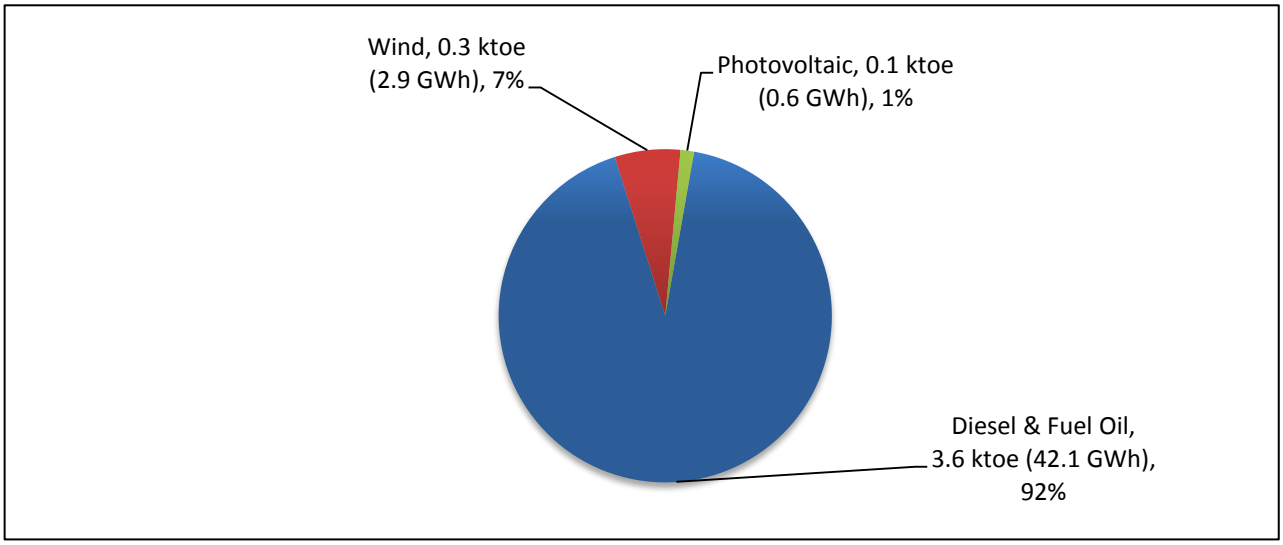
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 2.3 - Share of electricity production by fuel type for Island of Mauritius, 2020

From the **Figure 2.3**, it can be observed that the major share of electricity production is from coal for the Island of Mauritius.

2.4 Share of Electricity Production by fuel type for Island of Rodrigues

Figure 2.4 shows the share of electricity production by fuel type for Island of Rodrigues in 2020.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 2.4 - Share of electricity production by fuel type for Island of Rodrigues, 2020

From the **Figure 2.4**, it can be observed that the major share of electricity production is from diesel and fuel oil for the Island of Rodrigues.

2.5 Share of Renewable Energy in Electricity Mix

The actual renewable energy in the electricity mix in 2020 for Island of Mauritius and Island of Rodrigues are given in **Table 2.1** and **Table 2.2** respectively.

Table 2.1 - Share of renewable energy in electricity mix for Island of Mauritius

Renewable energy source	2020		
	Installed Capacity (MW)	Total RE (GWh)	% Share in Electricity Mix
On-shore wind	9.35	15.1	0.6
Solar Energy - SSDG	11.99	13.73	0.5
Solar Energy - MSDG	6.59	6.72	0.3
Solar Energy - Utility	105.78	145.0	5.5
Biomass - Bagasse	197.90	277.6	10.6
Biomass - Cane trash		4.1	0.2
Landfill Gas	3.45	24.8	0.9
Hydro	60.50	115.8	4.4
Total	**395.56**	**602.85**	**23.0**

Data Source: CEB

Note:

The electricity production from bagasse and cane trash excludes the IPPs' own use consumption.

Table 2.2 - Share of renewable energy in electricity mix for Island of Rodrigues

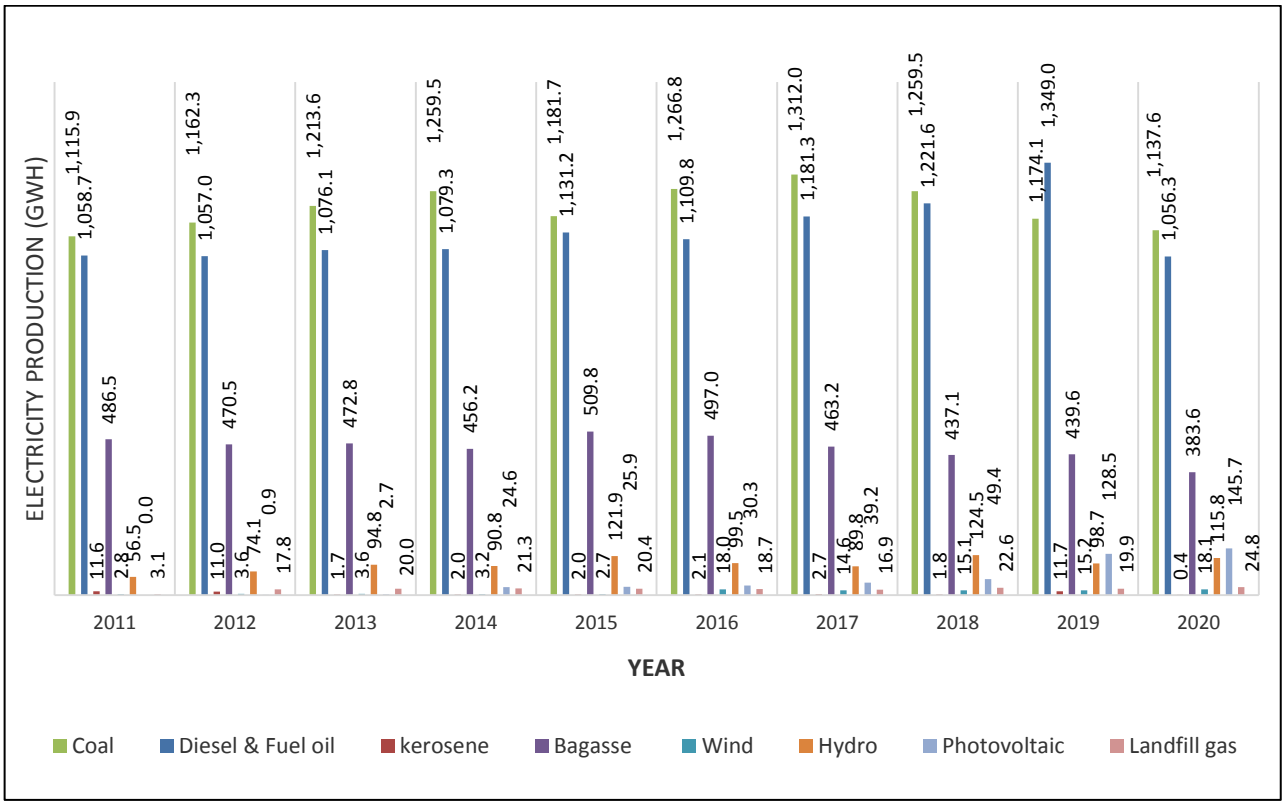
Renewable energy source	2020		
	Installed Capacity (MW)	Total RE (GWh)	% Share in Electricity Mix
On-shore wind	1.28	2.9	6.5
Solar Energy	0.529	0.578	1.4
Total	**1.809**	**3.478**	**7.9**

Data Source: CEB

From the **Table 2.2**, it can be observed that on-shore wind has the highest percentage share of renewable energy in the electricity mix for the Island of Rodrigues.

2.6 Trend of Electricity Production for the Republic of Mauritius

Figure 2.5 shows the trend of electricity production per source of energy over the period 2011 to 2020.



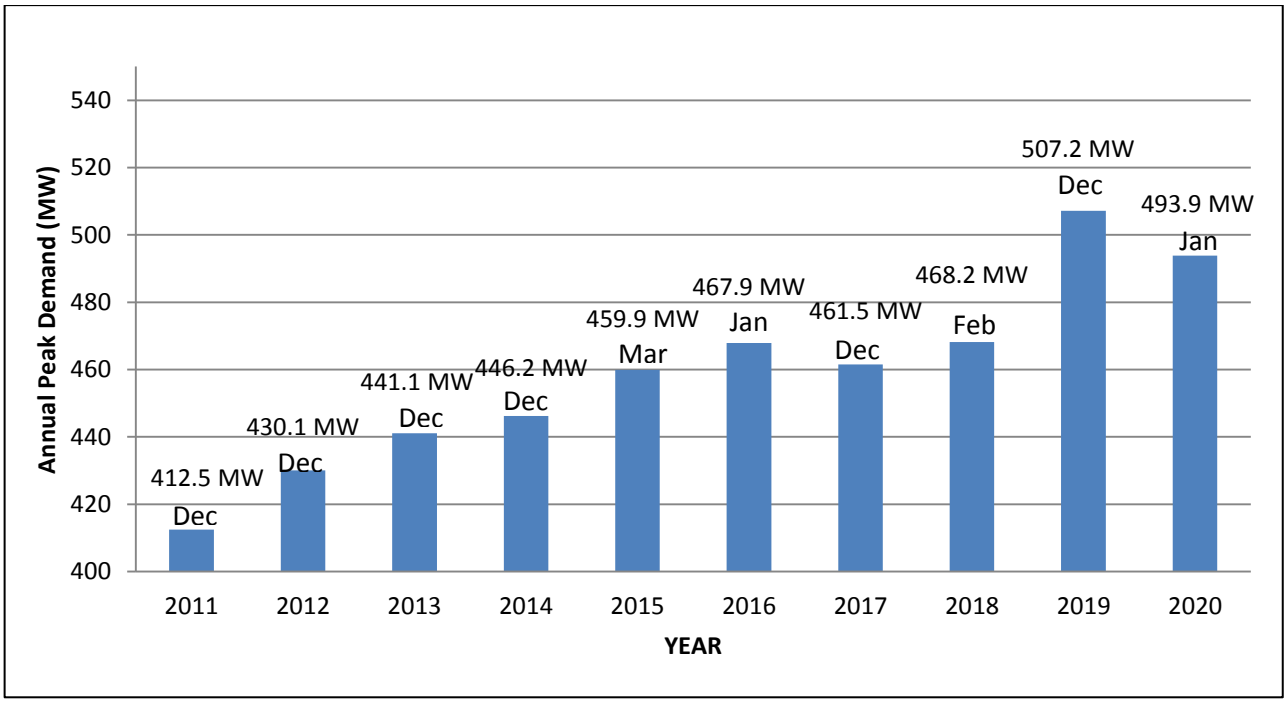
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 2.5 - Trend of electricity production, 2011 – 2020

Total electricity production decreased by 11% in 2020 as compared to 2019. In 2020, 76.1% of electricity production was derived from fossil fuel sources while 23.9% of electricity production was from renewable energy sources. This is due to an increase in electricity production from photovoltaic from 128.5 GWh in 2019 to 145.7 GWh in 2020 and electricity generated from wind energy has also increased from 15.3 GWh in 2019 to 18.1 GWh in 2020.

2.7 Peak Electricity Demand for Island of Mauritius

Figure 2.6 shows the yearly peak electricity demand and their month of occurrence for Island of Mauritius during the period 2011 – 2020.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

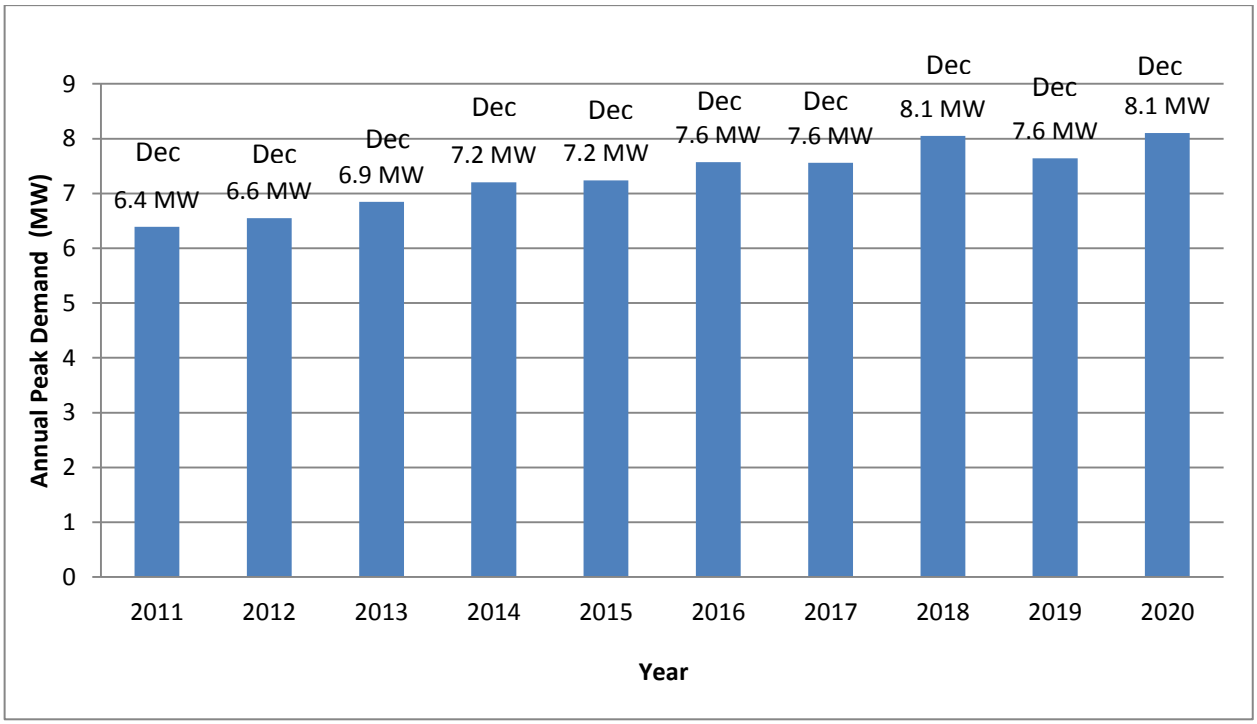
Figure 2.6 - Peak of electricity demand for Island of Mauritius, 2011 – 2020

In 2020, the monthly electricity demand varied between 336.5 MW and 493.9 MW. The peak electricity demand for the year 2020, i.e. 493.9 MW, occurred in January 2020, which can be considered as a pre COVID-19 peak electricity demand.

From **Figure 2.6**, it can be observed that there has been a constant increase in the peak electricity demand over the period 2011 – 2020 for the Island of Mauritius.

2.8 Peak Electricity Demand for Island of Rodrigues

Figure 2.7 shows the yearly peak electricity demand and their month of occurrence for Island of Rodrigues during the period 2011 to 2020.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

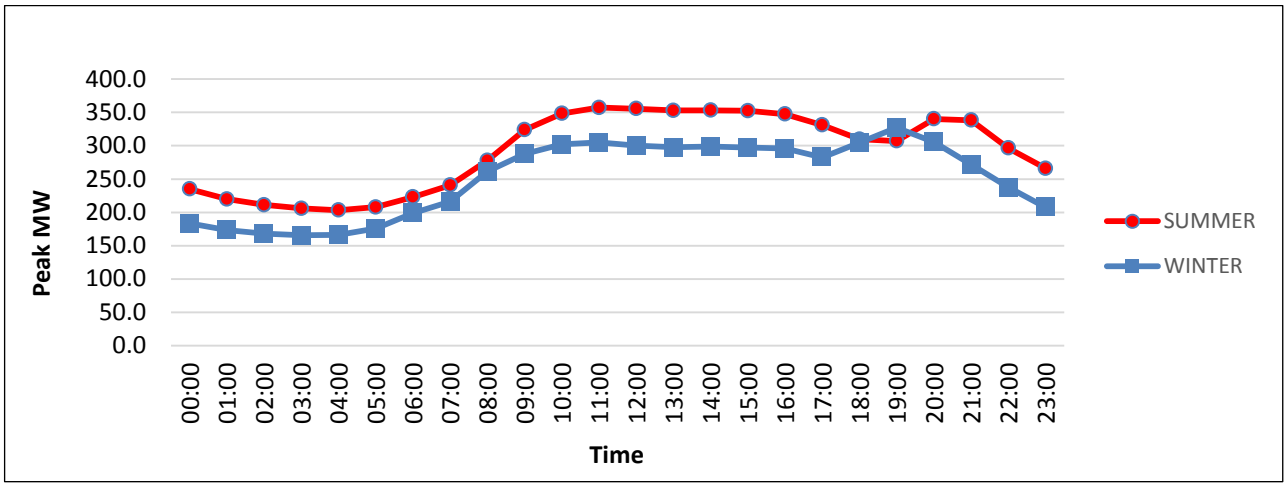
Figure 2.7 - Peak of electricity demand for Island of Rodrigues, 2011 – 2020

In 2020, the monthly peak electricity demand in Island of Rodrigues varied between 6.9 MW and 8.1 MW. The peak electricity demand of 8.1 MW occurred in December 2020.

2.9 Seasonal Demand Profile

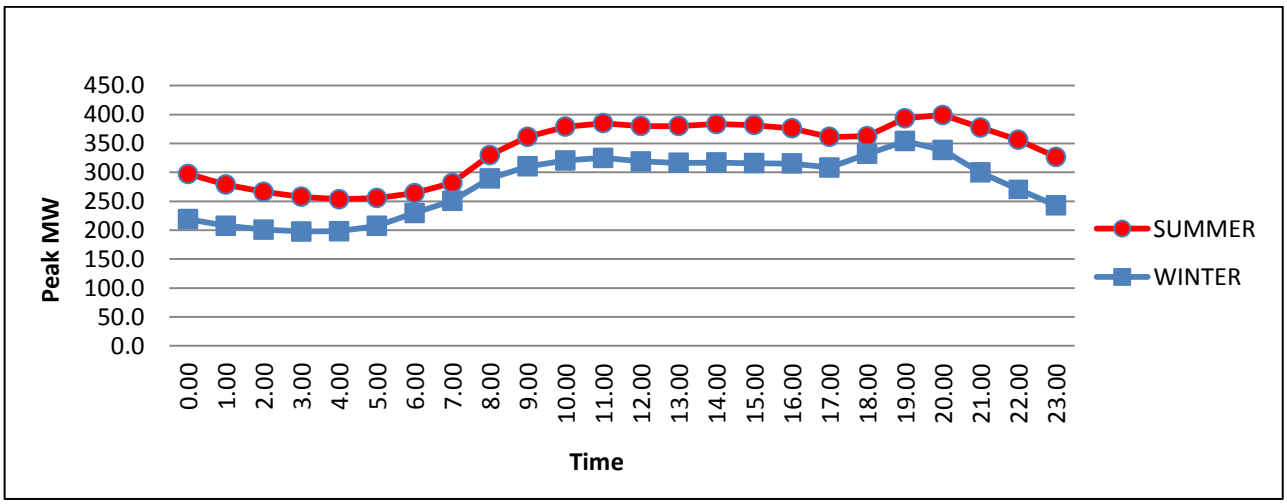
Based on the seasonality in Mauritius, two typical demand profiles namely winter demand profile and summer demand profile are identified. In summer, the electricity demand is higher than in winter. This is mainly due to air conditioning loads. During the day, the increase in demand is mainly due to the commercial and industrial sectors while the residential sector contributes mainly in the evening.

Figure 2.8 and **Figure 2.9** show the hourly seasonal peak demand profile (Island of Mauritius) for the years 2011 and 2020 respectively.



Data Source: CEB

Figure 2.8 - Seasonal peak demand profile, 2011



Data Source: CEB

Figure 2.9 - Seasonal peak demand profile, 2020

From the typical day summer profile, the peak demand occurs around 20.00 hrs whereas for the typical day winter profile, the peak demand occurs earlier at around 19.00 hrs.

2.10 Summary of Electricity Production

Table 2.3 provides a summary of the electricity production over the period 2011 to 2020 for the Republic of Mauritius.

Table 2.3 - Summary of electricity production, 2011 – 2020

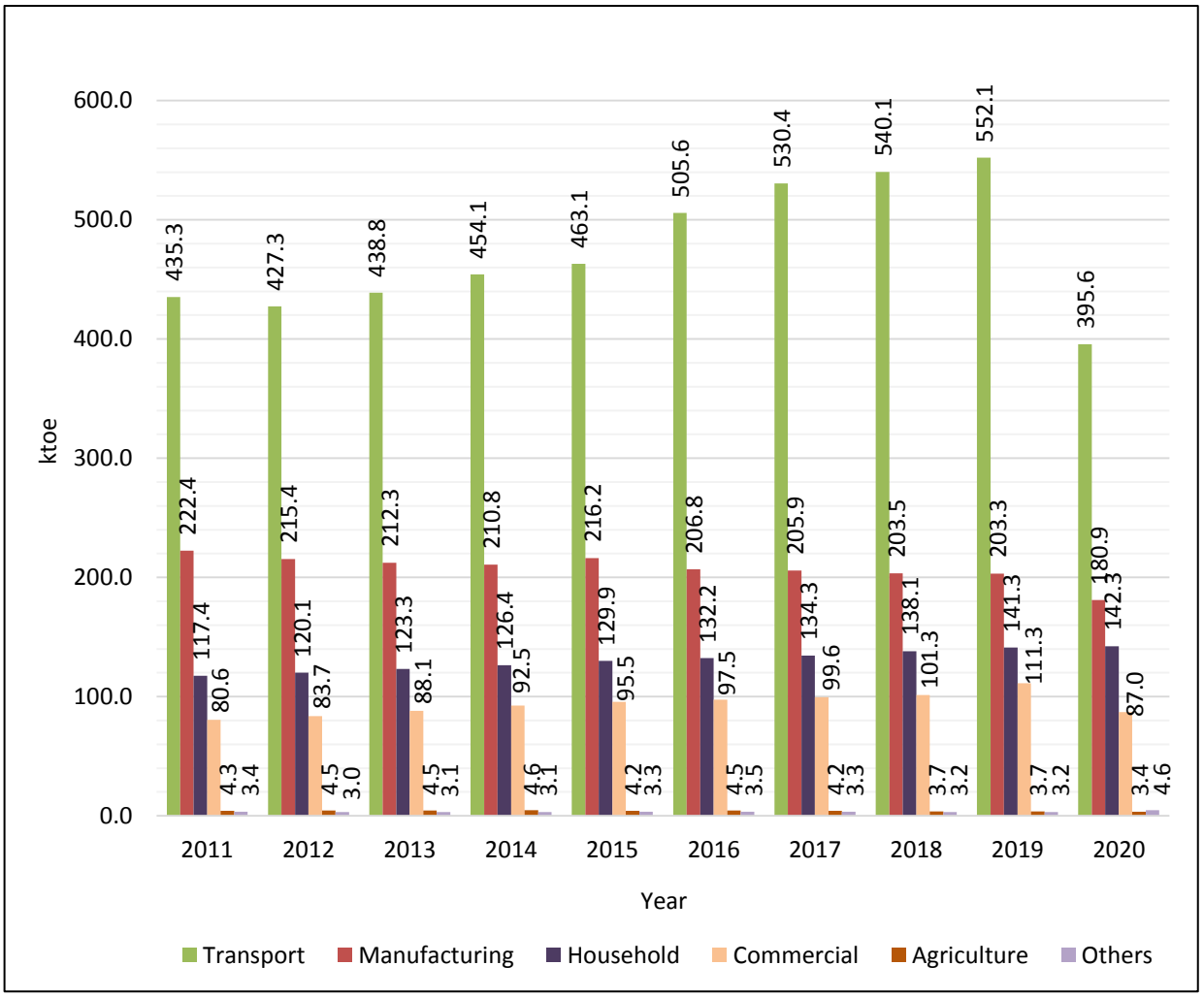
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fossil (GWh)	2,189.6	2,230.3	2,291.3	2,340.8	2,314.9	2,378.7	2,496.0	2,482.9	2,534.8	2,194.4
Renewables (GWh)	549.0	566.8	594.0	596.2	680.6	663.5	623.7	648.7	701.8	688.0
Increase in Electricity Production (GWh)	49.9	58.5	88.2	51.6	58.7	46.6	77.5	11.9	105.0	-354.3
Percentage overall increase/decrease	1.8%	2.1%	3.1%	1.8%	2.0%	1.5%	2.5%	0.4%	3.2%	-10.9%
Percentage of renewables	20.0%	20.3%	20.6%	20.3%	22.7%	21.8%	20.0%	20.7%	21.7%	23.9%
Peak demand (MW) (Island of Mauritius)	412.5	430.1	441.1	446.2	459.9	467.9	461.5	468.2	507.2	493.9
Peak demand evolution	2.1%	4.3%	2.6%	1.2%	3.1%	1.7%	-1.4%	1.5%	8.3%	-2.6%

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

3 FINAL ENERGY CONSUMPTION

3.1 General

Final energy consumption describes consumption of end users, excluding energy used for electricity generation and losses in the energy transfer matrix. **Figure 3.1** shows the final energy consumption on a sectoral basis, for the period 2011 to 2020. The total final energy consumption in 2020 amounted to 813.81 ktoe, representing a decrease of 19.9% compared to 2019. As can be seen in **Figure 3.1**, a decrease in final energy consumption has been observed in the transport, manufacturing and commercial sectors. However, a slight increase in final energy consumption is observed for the household sector. This overall decrease in the final energy consumption can be attributed to the COVID-19 pandemic and prolonged lockdown periods.



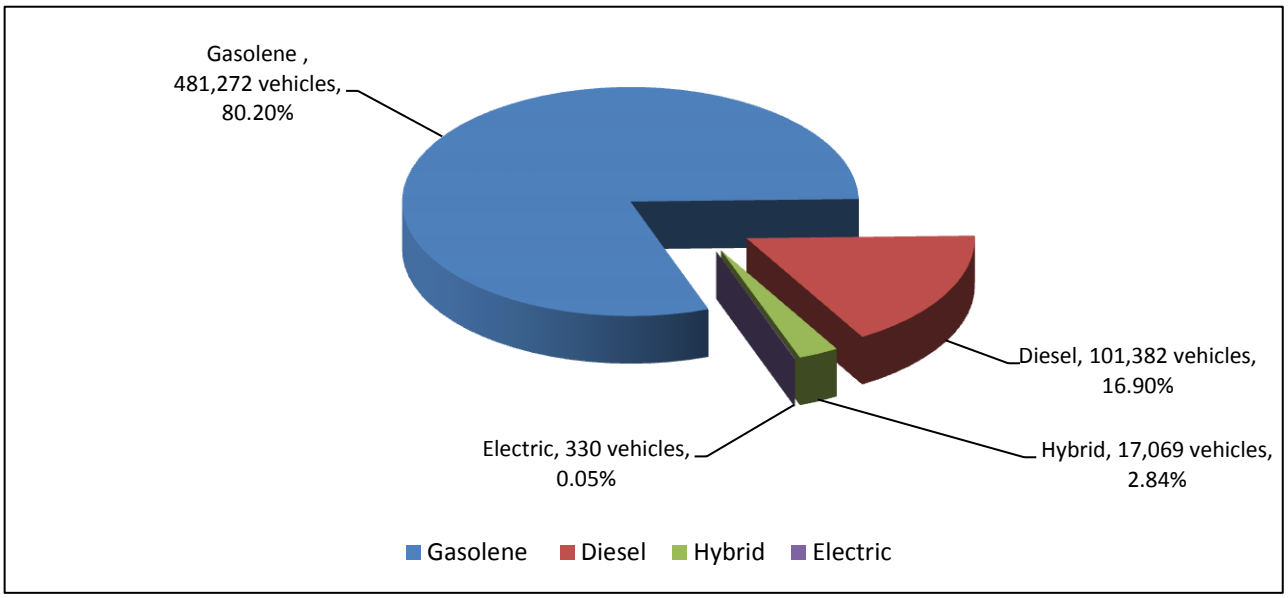
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.1 - Final energy consumption by sector, 2011 – 2020

3.2 Transport sector

3.2.1 Vehicle fleet

The fleet of powered vehicles for Mauritius comprised 600,053 vehicles in 2020, with the share of fuel type as given in **Figure 3.2**.



Data Source: National Land Transport Authority

Figure 3.2 - Vehicle fleet by type of fuel in 2020

In 2020 the number of hybrid (petrol/electric) powered vehicles increased by 19.3% as compared to 2019 i.e. from 13,762 to 17,069 and the number of electric vehicles increased by almost 41% as compared to 2019, i.e. from 195 to 330.

During the financial year 2019-2020, new tax measures to incentivise hybrid and electric vehicles were introduced. The excise duty was reduced by 5 - 15% depending on the type/rating of the electric vehicle. The impact of these measures can be seen on the increase of the import of electric cars.

Table 3.1 - New and second-hand imported vehicles, 2011 – 2020

Engine capacity	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	% Growth in 2020 over 2019
Up to 1,000 c.c	856	1634	1982	1519	3205	8988	9769	9805	9875	7709	-21.9
1,001 - 1,250 c.c	1158	1582	2056	3166	4128	3199	2600	2617	3119	1229	-60.6
1,251 - 1,400 c.c	2015	2691	3321	3212	1986	3888	3472	2955	2396	695	-71.0
1,401 - 1,500 c.c	1771	1824	2528	2425	2543	3138	4147	5012	5871	1559	-73.4
1,501 - 2,000 c.c	2867	3557	3240	3039	2743	3556	4270	4270	3985	2165	-45.7
2,001 - 2,250 c.c	20	30	51	56	61	160	177	249	420	259	-38.3
2,251 - 2,500 c.c	166	58	432	512	335	1224	1579	1530	1276	956	-25.1
2,501 - 3,000 c.c	185	142	102	94	122	676	733	798	870	376	-56.8
Above 3,000 c.c	71	77	48	44	34	937	946	963	1155	719	-37.7
Electric	2	3	1	2	11	10	21	31	108	134	24.1
Total	**9109**	**11595**	**13760**	**14067**	**15157**	**25766**	**27693**	**28199**	**29075**	**15801**	-45.7

Data Source: National Land Transport Authority

It may be noted from **Table 3.1** that there has been a decrease of 45.7% in new and second-hand imported vehicles registrations in 2020 as compared to 2019.

3.2.2 Fuel Consumption

Table 3.2 shows the fuel consumption by fuel type for each of the sub-sectors of the transport sector in 2020.

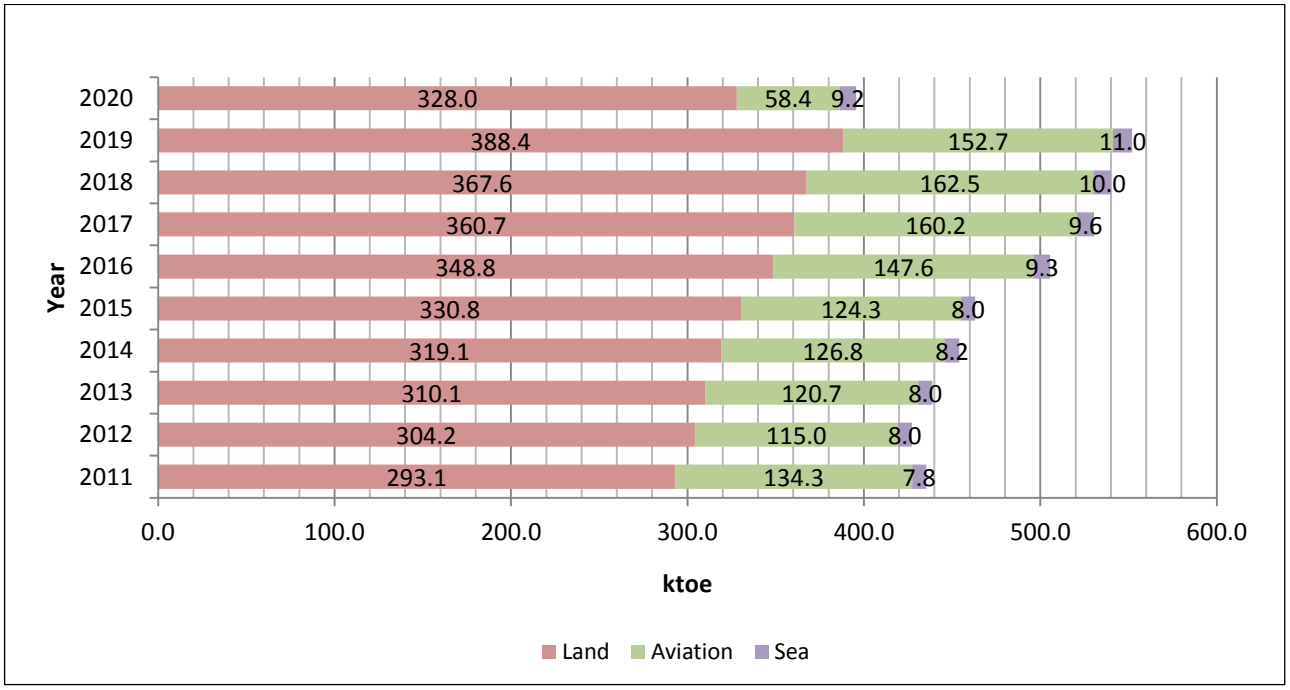
Table 3.2 - Fuel consumption in the transport sector, 2020

Transport sector	Gasolene		Diesel		Aviation fuel (local aircraft)		LPG		Fuel Oil		Total	
	ktoe	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe	ktonne	ktoe	ktonne
Land	179.7	166.4	145.6	144.2	-		2.7	2.5	-		328	313.1
Aviation	-		-		58.4	56.1	-		-		58.4	56.1
Sea[2]	4.4	4.1	1.5	1.5	-		-		3.3	3.5	9.2	9.1
Total	**184.1**	**170.5**	**147.1**	**172**	**58.4**	**56.1**	**2.7**	**2.5**	**3.3**		**395.6**	**378.5**

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

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

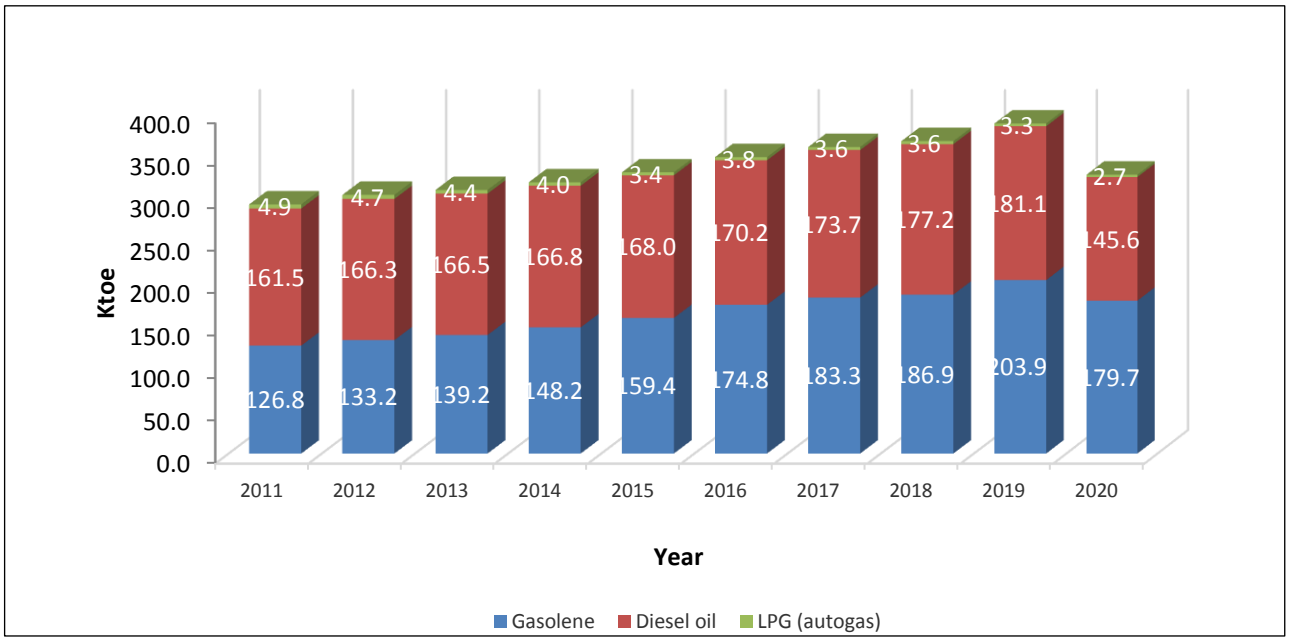
3.2.3 Trend of Fuel Consumption in Transport Sector



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.3 - Trend of fuel consumption in sub-sectors of transport sector 2011 – 2020

The trend of fuel consumption in the transport sector over the period 2011 to 2020 is shown in **Figure 3.3**. It may be noted that fuel consumption for land transport was 328 ktoe in 2020; representing a decrease of 15.6% as compared to 2019 while the decrease in fuel consumption for Aviation is 61.8% as compared to 2019. This decrease can be attributed to the closure of the national borders due to the COVID-19.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

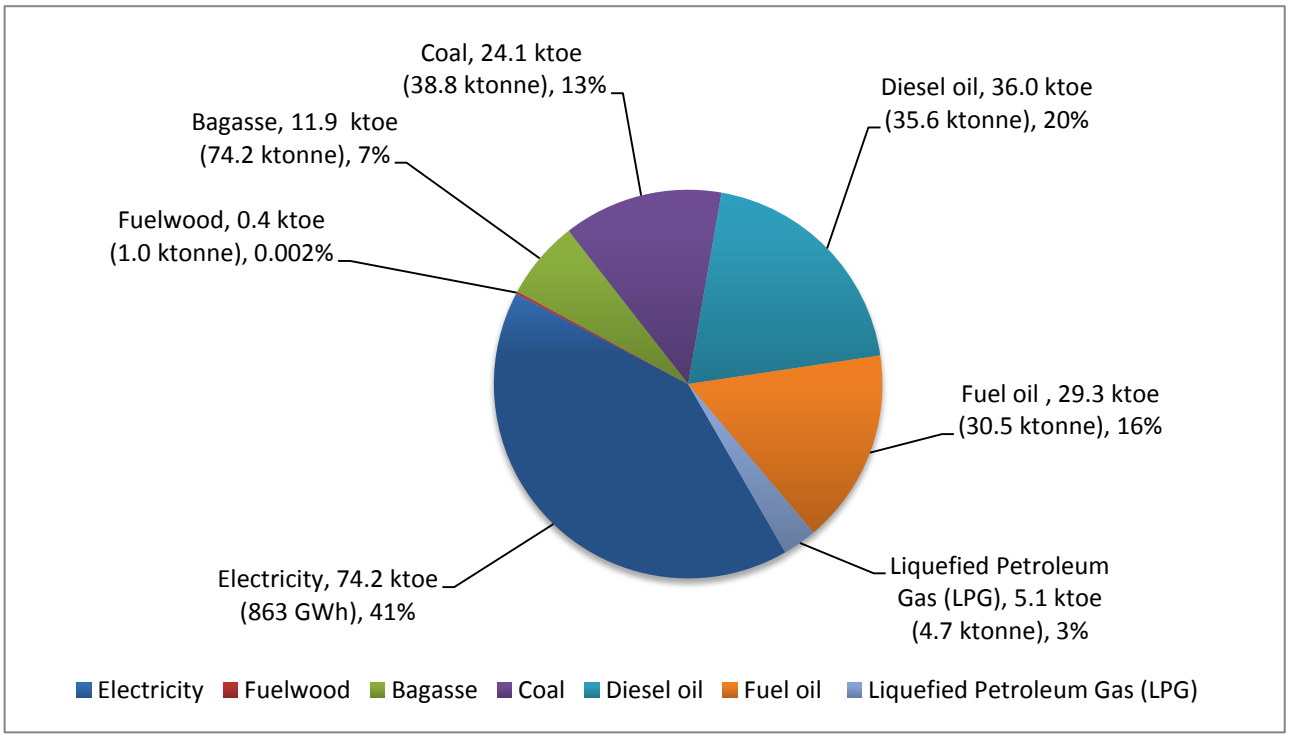
Figure 3.4 - Trend of fuel consumption by type in land transport, 2011 – 2020

Compared to 2019, it may be observed that the fuel consumption by fuel type for the year 2020 decreased by:

- Diesel: 19.6%.
- Gasoline: 11.9%.
- LPG (auto gas): 18.2%.

3.3 Manufacturing sector

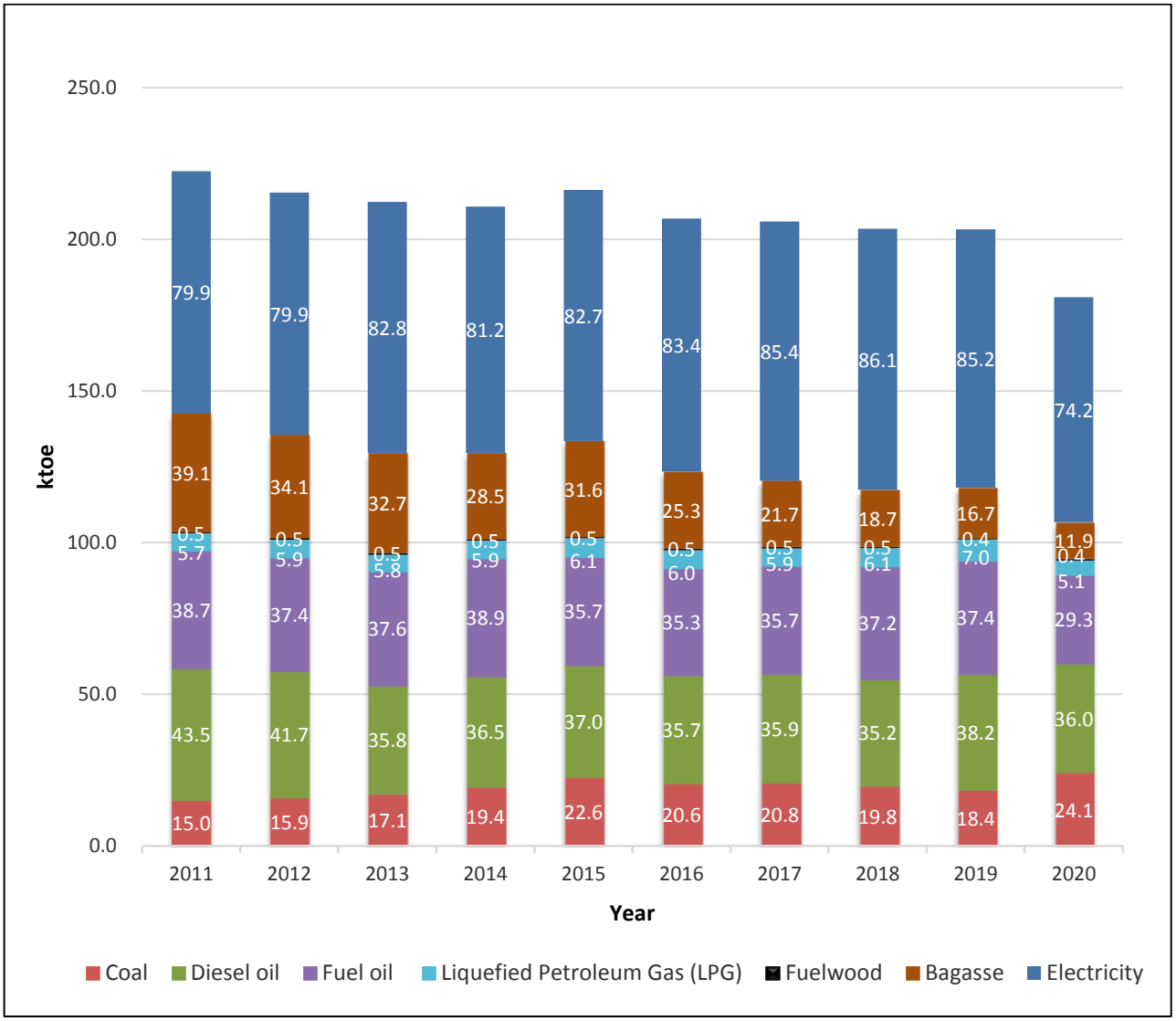
Total energy consumption in the manufacturing sector amounted to 180.9 ktoe in 2020, which was 11% less than in 2019. **Figure 3.5** shows the share of different energy sources used in the manufacturing sector in 2020, while **Figure 3.6** provides the trend for the period 2011 to 2020. This decrease can be attributed to the lockdown periods of 11 weeks, i.e from 19 March to 30 May 2020 due to COVID-19.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.5 - Share of energy sources in the manufacturing sector, 2020

3.3.1 Trend of Energy Consumption in Manufacturing Sector



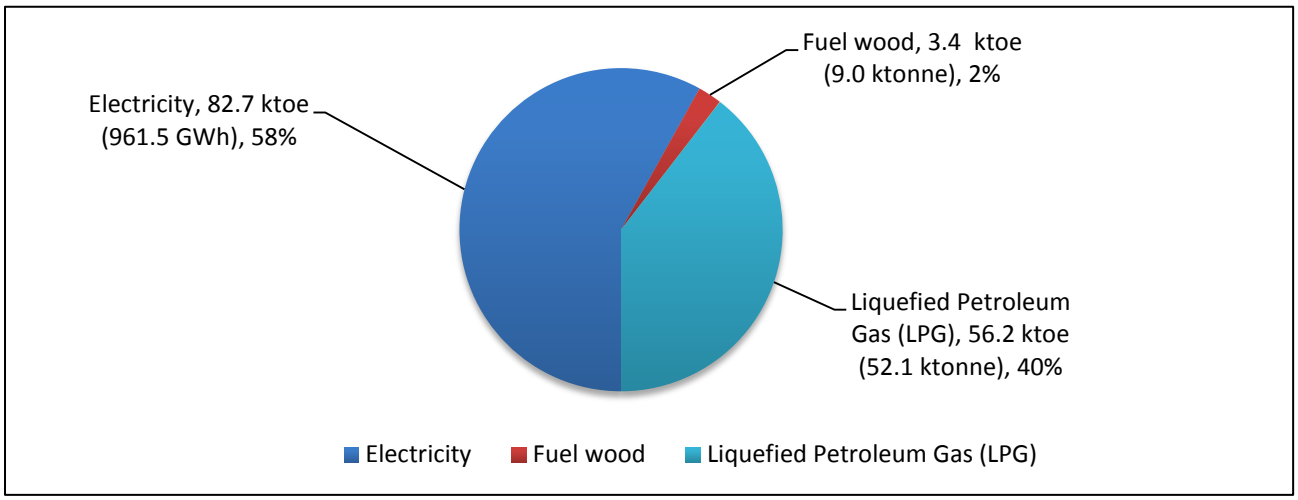
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.6 - Trend of energy consumption in the manufacturing sector, 2011 – 2020

There had been a decrease of 11.0% in the total energy consumption in the manufacturing sector, that is from 203.3 ktoe in 2019 to 180.9 ktoe in 2020. This decrease in the energy consumption in the manufacturing sector can be attributed to the lockdown of 11 weeks, i.e from 19 March to 30 May 2020 due to COVID-19.

3.4 Household sector

Total energy consumption in the household sector amounted to 142.3 ktoe in 2020 representing a 0.8% growth compared to the year 2019. The share of energy sources in the household sector in 2020 is given in **Figure 3.7**.



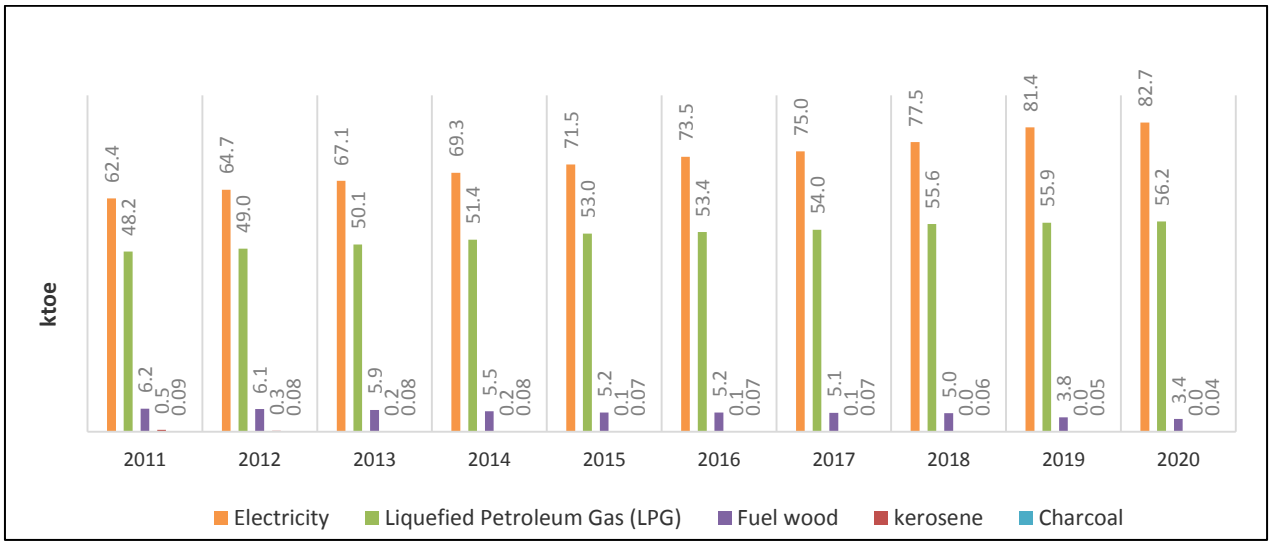
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.7 - Share of energy sources, household sector, 2020

The main sources of energy for the household sector are LPG and electricity. LPG is used mainly for cooking and water heating. Fuel wood is still in use as cooking fuel albeit insignificant. In 2020 the consumption of electricity and LPG have both increased compared to 2019 by 1.6% and 0.5% respectively. This increase can be attributed to the lockdown periods of 11 weeks, i.e from 19 March to 30 May 2020 due to COVID-19.

3.4.1 Trend of Fuel Consumption for Household Sector

The trend of each fuel consumption over the period 2011 to 2020 is shown in **Figure 3.8**. The increase in fuel consumption in household can be attributed to the lockdown periods of 11 weeks, i.e from 19 March to 30 May 2020 due to COVID-19.

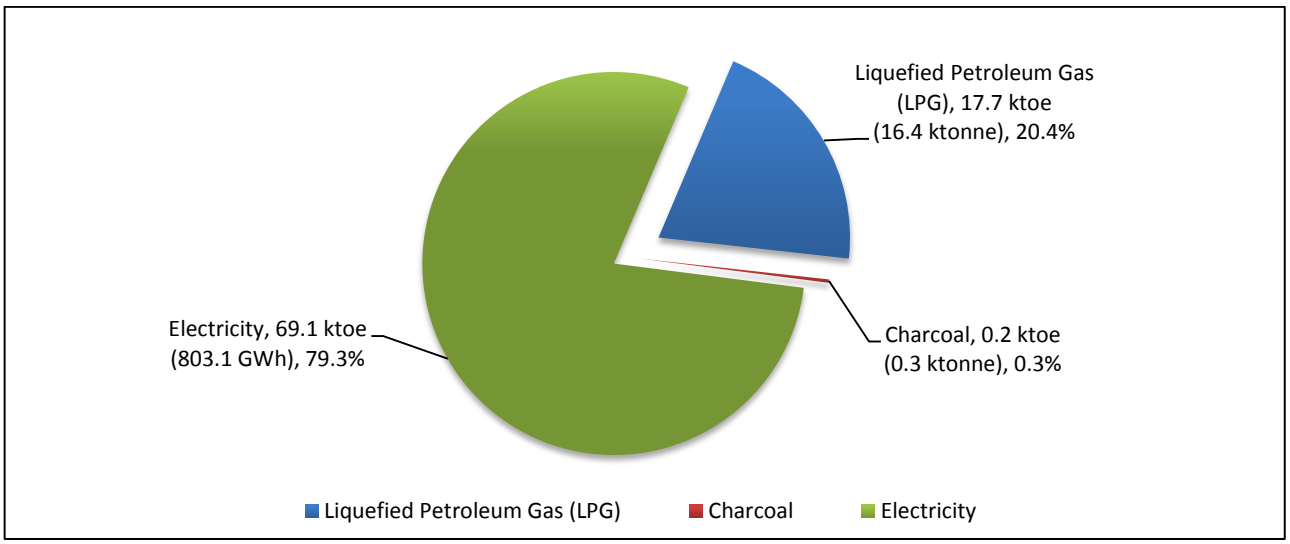


Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.8 - Trend of fuel consumption in the household sector, 2011 – 2020

3.5 Commercial sector

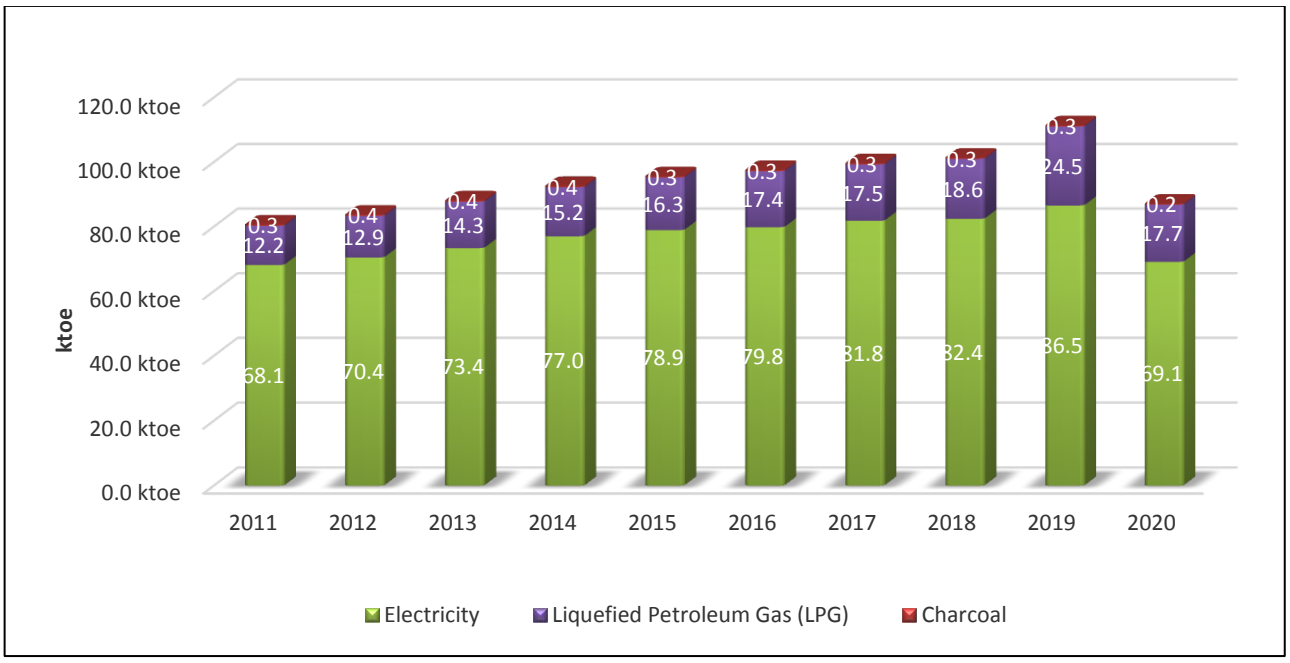
Total energy consumption in the Commercial sector amounted to 87 ktoe in 2020 and the share of energy sources in 2020 is shown in **Figure 3.9**, while **Figure 3.10** gives the trend of fuel consumption over the period 2011 to 2020.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.9 - Share of energy sources in the commercial sector, 2020

3.5.1 Trend of Fuel Consumption for Commercial Sector



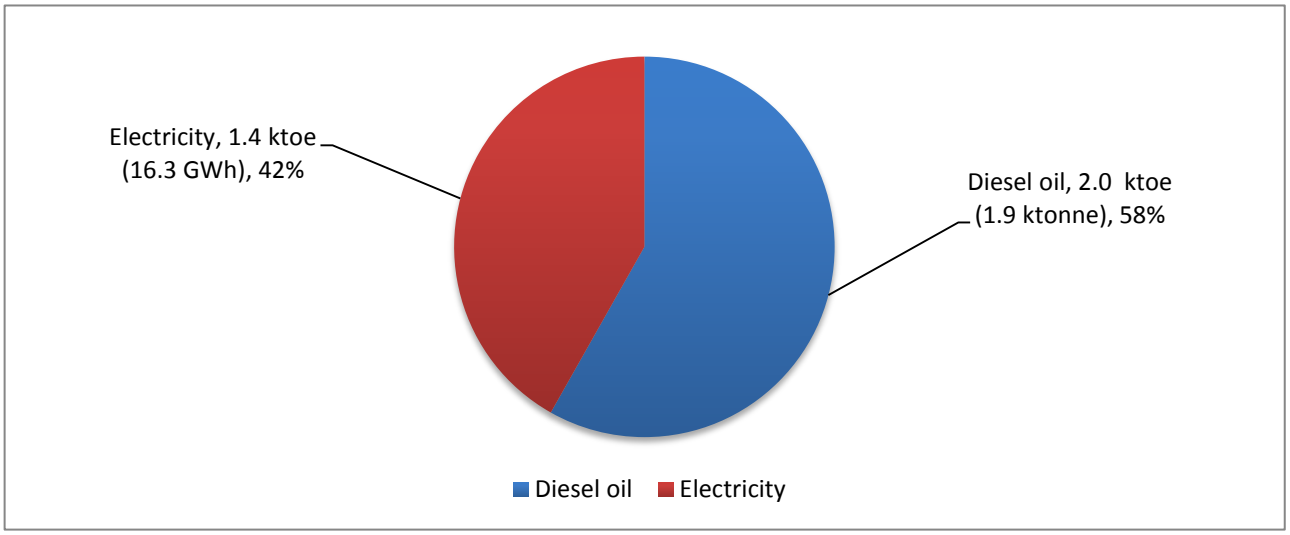
Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.10 - Trend of fuel consumption in the commercial sector, 2011 – 2020

In 2020, electricity consumption in the commercial sector decreased by 20.1% compared to 2019, due to the prolonged lockdown periods due to COVID-19 pandemic whereby many shops were closed. The main areas of electricity use in this sector are refrigeration, air conditioning and decorative and security lighting.

3.6 Agricultural sector

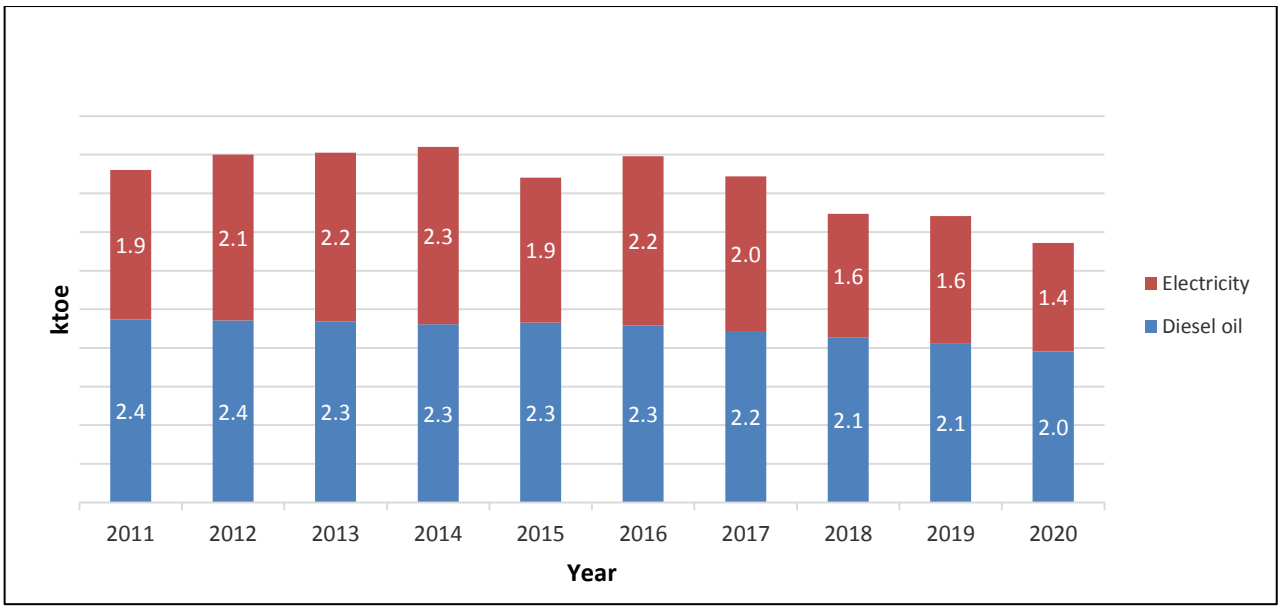
Total energy consumption in the agricultural sector amounted to 3.4 ktoe in 2020. The share of energy sources in 2020 is shown in **Figure 3.11**, while **Figure 3.12** gives the trend of fuel consumption over the period 2011 to 2020.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.11 - Share of energy sources in agricultural sector, 2020

3.6.1 Share of Fuel Consumption in Agricultural Sector



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.12 - Share of fuel consumption in the agricultural sector, 2011 – 2020

It may be noted from **Figure 3.12** that in 2020, the fuel consumption in the Agricultural sector was 3.4 ktoe.

3.7 Fossil Fuel consumption by sector

Table 3.3 provides a breakdown of fossil fuel consumption by sector in 2020.

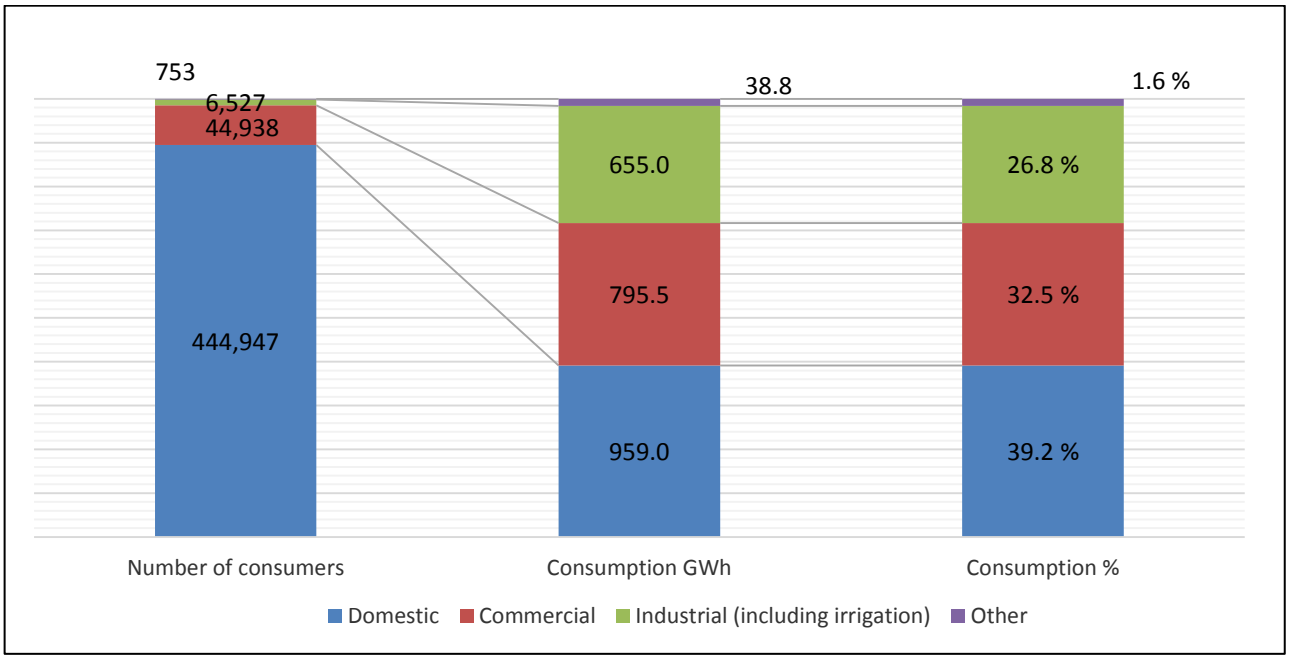
Table 3.3 - Fossil fuel consumption (ktoe) by sector, 2020

Sector	Coal	Gasolene	Diesel	Aviation fuel	Kerosene	Fuel oil	LPG	Total
Electricity production	385.5	-	0.8	-	0.3	203.7		590.3
Manufacturing	24.1	-	36.0	-	-	29.3	5.1	94.5
Commercial	-	-	-	-	-	-	17.7	17.7
Household	-	-	-	-	0.0	-	56.2	56.2
Transport (incl. sea)	-	184.1	147.1	58.4	-	3.3	2.7	395.6
Agriculture	-	-	2.0	-	-	-	-	2.0
Others	-	-	-	-	-	-	0.3	0.3
Total	**409.5**	**184.1**	**185.8**	**58.4**	**0.3**	**236.3**	**82.0**	**1156.5**

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

3.8 Sales of Electricity

Figure 3.13 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 2020. The sales of electricity has increased because the number of customers, the cost of living and number of household equipment have increased.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 3.13 - Sales of Electricity per category of consumers, 2020

An analysis of domestic electricity consumption is given in **Table 3.4**, which shows an increase in the Annual electricity consumption per consumer from 1.95 MWh/consumer/year in 2011 to 2.16 MWh/consumer/year in 2020.

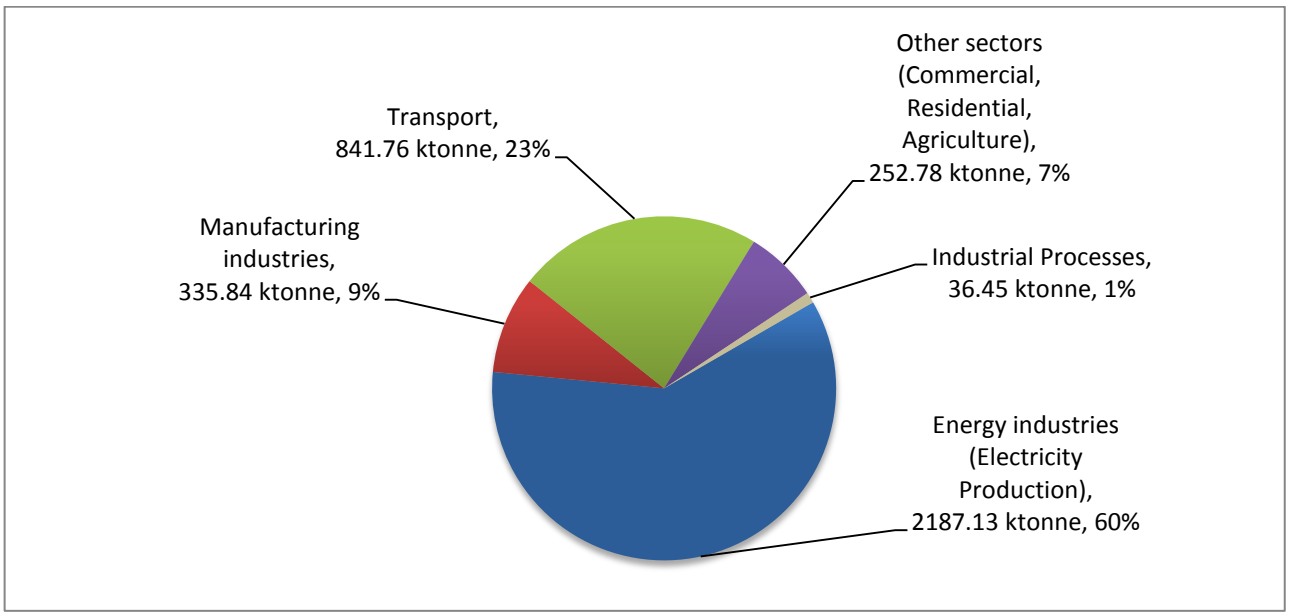
Table 3.4 - Analysis of domestic electricity consumption, 2011 – 2020

Domestic consumers	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Consumption (GWh)	725.3	753.0	780.8	806.3	831.0	854.5	872.7	899.3	945.0	959.0
Number of consumers	372,315	381,096	388,910	396,335	404,463	413,068	420,876	428,569	436,831	444,947
Annual electricity consumption per consumer (MWh/consumer/year)	1.95	1.98	2.01	2.03	2.05	2.07	2.07	2.10	2.16	2.16
Annual Electricity Consumption per Consumer Growth Rate %	-0.1%	1.4%	1.6%	1.3%	1.0%	0.7%	0.2%	1.2%	3.1%	-0.4%
Average daily consumption per inhabitant (kWh/inhabitant/day)	1.59	1.64	1.70	1.75	1.80	1.85	1.89	1.95	2.05	2.08

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

4 CO_2 EMISSIONS DUE TO FOSSIL FUELS

Figure 4.1 gives the share of carbon dioxide emission from fossil fuel combustion in each sector in 2020. It may be noted that, in 2020, total CO_2 emissions from fuel combustion activities amounted to 3,654 ktonnes and CO_2 removals amounted to 363.01 ktonnes. Net CO_2 emissions for 2020 stood at 3,291 ktonnes.



Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

Figure 4.1 - Sectoral carbon dioxide emissions from fossil fuel combustion, 2020

4.1 Trend of CO_2 emissions

Table 4.1 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 CO2 emitted with respect to GDP has generally been decreasing from 2011 to 2020.

Table 4.1 - CO_2 emissions, 2011 – 2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Net CO_2 emissions (ktonnes)	3,376.45	3,490.08	3,573.70	3,696.08	3,683.44	3,723.82	3,861.45	3,825.46	3,903.30	3,290.95
tCO_2 emissions per capita	2.99	3.07	3.13	3.22	3.21	3.23	3.34	3.31	3.37	2.89
tCO_2 per Rs 100,000 GDP (at 2006 prices)	1.21	1.21	1.20	1.20	1.15	1.12	1.12	1.07	1.06	1.05

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

From the **Table 4.1**, the decrease in CO2 emission can be attributed to the lockdown periods of 11 weeks, i.e. from 19 March to 30 May 2020 due to COVID-19.

4.2 Trend of Sectorial CO_2 emissions

Table 4.2 - Sectorial CO_2 emissions

Item	Indicators	Unit	2016	2017	2018	2019	2020
CO_2 Emissions	Total CO_2 emissions	$ktCO_2$	4,087.1	4,226.2	4,190.5	4,264.2	3,653.96
	Net CO_2 emissions	$ktCO_2$	3,723.7	3,861.5	3,825.5	3,903.3	3,290.95
	Energy sector	%	59.25	59.92	58.83	56.69	59.86
	Manufacturing sector	%	8.38	8.16	8.22	8.26	9.19
	Transport sector	%	25.55	25.22	25.95	26.00	23.04
	Others	%	6.00	5.86	6.12	8.18	6.92
	CO_2 emissions per kWh of electricity generated (Grid emission factor)[3]	gCO_2/ kWh	945.9	954.8	917.8[4]	917.8[4]	954.3

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

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

In 2020, CO_2 emissions reached 841.8 ktonnes representing a decrease of 24% compared to 2019. This decrease can be attributed to the prolonged lockdown periods due to the COVID-19 pandemic.

4.5 CO_2 emissions for electricity generation

In 2020, the total CO_2 emissions from electricity generation amounted to 2187.13 ktonnes representing a decrease of 9.6% compared to 2019.

The Grid Emission Factors for the national grid of Mauritius is as follows:

Table 4.3 - Grid Emission Factors for National Grid of Mauritius

Type of Project	Operation Margin (tCO_2/MWh)	Built Margin (tCO_2/MWh)	Combined Margin (tCO_2/MWh)
PV and wind	1.0273	0.8814	0.9908
All other projects	1.0273	0.8814	0.9543

Data Source: CEB

The above table for the Grid Emission Factor is valid up to 08 December 2022.

[3]Data Source: CEB

[4]Data Source: ABS ASB0046-2019 Standardized Baseline Mauritius Grid Emission Factor, United Nations Framework Convention on Climate Change

4.5 CO_2 emissions avoided for Island of Mauritius

Table 4.4 shows the CO_2 emission avoided due to the production of electricity from renewable energy sources for the Island of Mauritius in 2020.

Table 4.4 - Avoided CO_2 emission for the Island of Mauritius, 2020

Renewable energy source	2020	
	Total RE (GWh)	Avoided CO_2 Emissions (tCO_{2e})
On-shore wind	15.1	14,410
Solar Energy - SSDG	13.73	13,103
Solar Energy - MSDG	6.72	6,413
Solar Energy - Utility	145.0	138,374
Biomass - Bagasse	277.6	264,914
Biomass –Cane trash	4.1	3,913
Landfill Gas	24.8	18,792
Hydro	115.8	110,508
Total	**602.85**	**575,300**

Data Source: CEB

4.6 CO2 emissions avoided for Island of Rodrigues

Table 4.5 shows the CO_2 emission avoided due to the production of the electricity from renewable energy sources for the Island of Rodrigues in 2020.

Table 4.5 - Avoided CO_2 emission for the Island of Rodrigues, 2020

Renewable energy source	2020	
	Total RE (GWh)	Avoided CO_2 Emissions (tCO_{2e})
On-shore wind	2.9	2,767
Solar Energy	0.578	551
Total	**3.478**	**3,318**

Data Source: CEB

Note:

(1) Grid Emission Factor for the island of Mauritius: 0.9543 tons/MWh = 954.3 tons/GWh (UNFCCC, Mauritius Grid Emission Factor Valid until 22 December 2022)

(2) Biomass is assumed to be carbon neutral.

(3) Emission Factor of Landfill gas 54.6 tons/TJ (IPCC 2006), $EF_{Landfill}$ = 196.56 tons/GWh

5 Budget Measures for the Energy Sector

In the Budget Speech 2019-2020 and 2020-2021, the government announced the following measures for the Energy Sector:

- To promote efficient use of energy, the importation of incandescent lamps of 50W and 75W will be banned as from 1st January 2020 and standards for LED lights will be enforced.
- New Renewable Energy Generation Schemes will be set up to encourage smart cities, small and medium scale power producers and public sector entities to generate electricity from solar photovoltaic (PV). The Schemes will operate on a gross metering principle and will eliminate the limit of 30% of consumption capacity and the connection fee.
- A new scheme will be introduced to encourage religious bodies to produce electricity from solar PV under a net billing scheme and additional 14MW battery energy storage systems will be installed to regulate frequency and promote the integration of intermittent renewable energy on the national grid.
- A Renewable Energy Roadmap
    - To optimise the use of the various renewable sources of energy to produce electricity. This will facilitate private investment in the renewable energy sector.
    - To give a fillip to the production of electricity from solar sources, the imposition that a producer can produce from solar energy sources only 30 percent of the electricity it consumes is being removed. Moreover, the monthly fee for supplying electricity from solar energy sources to the national grid is being removed.
    - Waste to Energy project will be implemented where some 1,000 tons of municipal solid wastes will be used to generate some 20 MW of electricity.
- To increase the share of local renewable energy in our energy mix to 40% by 2030. In this context, the following new projects will be pursued:
    - Setting up of a 2 MW floating solar PV plant at Tamarind Falls reservoir.
    - Increasing the capacity of the solar PV farm at Henrietta from 2 MW to 10 MW.
    - Installing 1,000 solar panels on houses of low income families.
    - Commissioning a battery energy storage system of 14 MW.

- The Central Electricity Board (CEB) will introduce the following schemes to encourage the use of renewable energy:
    - A Medium-Scale Distributed Generation (MSDG) Scheme, for a maximum of 10 MW, to enable beneficiaries to produce electricity for their own consumption and sell the excess to CEB; and
    - Installation of 25 MW of rooftop solar PV to cater for public and residential buildings
- Lowering the rate of excise duty on:
    - an electric car of more than 180 kilowatt from 25 percent to 15 percent.
    - a plug-in hybrid car.
- Excise Duty Electric and Plug-in Hybrid Cars

The rate of excise duty is being lowered as follows:

Table 5.1 – Rate of excise duty

Type of Motor Car	Current	New
Electric Car		
Up to 180 kW	0%	0% (no change)
Above 180 kW	25%	15%
Plug-in Hybrid Car		
Up to 550 c.c.	0%	0% (no change)
551 - 1,000 c.c.	25%	10%
1,001 - 1,600 c.c.	25%	15%
1,601 - 2,000 c.c.	45%	30%
2,001 – 3,000 c.c.	70%	55%
Above 3,000 c.c.	70%	65%

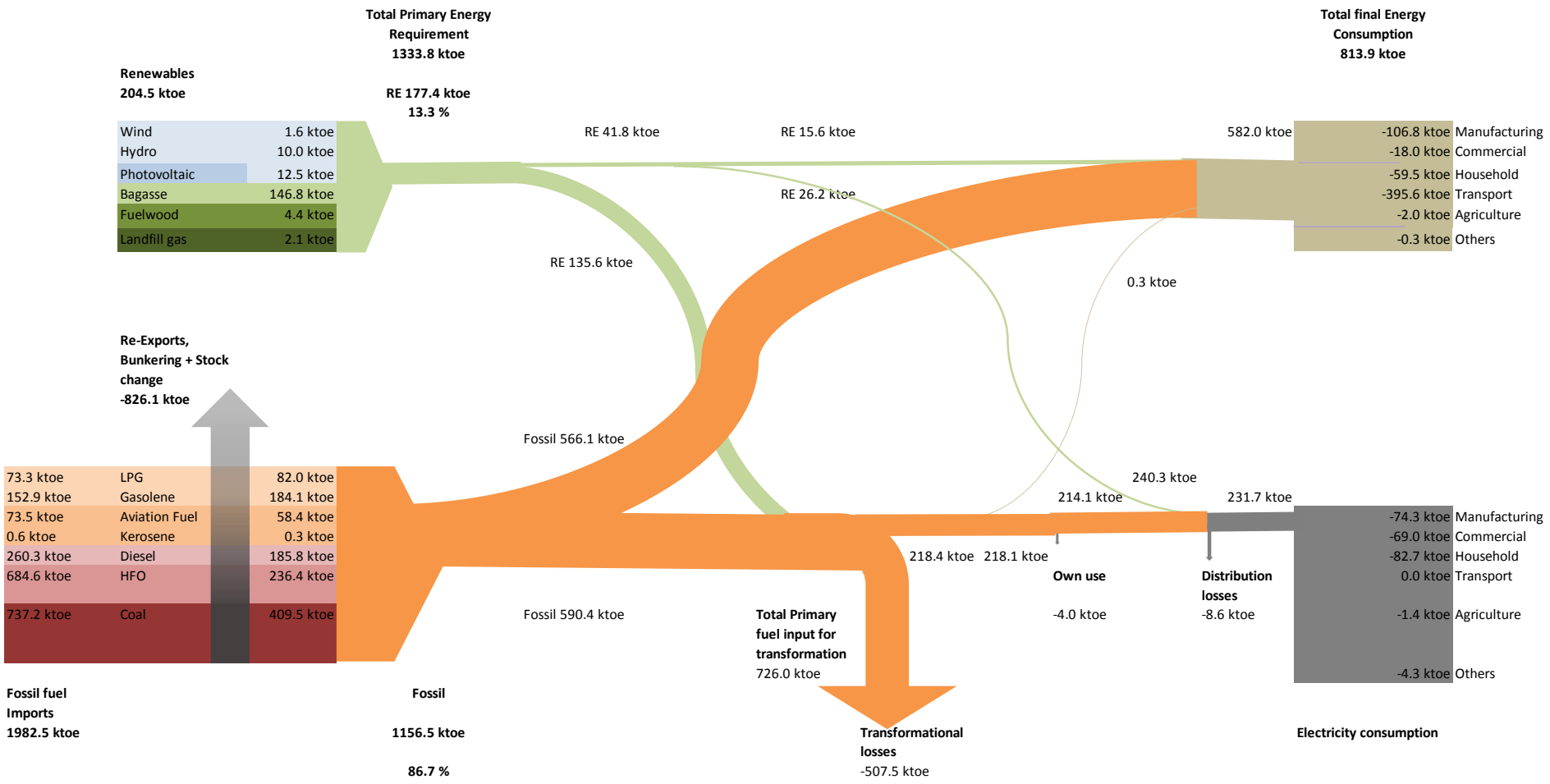
6 SUMMARY TABLE 2020

	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)									146.8	2.1	4.4		10.0	12.5		1.6			177.4
Imported Resources	737.2	152.9	260.3	73.5	0.6	684.6	73.3												1982.5
Re-exports and bunkering			-122.6	-58.0		-498.6	0.0												-679.2
Stocks (+ destocking; - stocking)	-327.7	31.2	48.1	42.9	-0.4	50.4	8.8												-146.8
TOTAL Primary Energy (PE)	**409.5**	**184.1**	**185.8**	**58.4**	**0.3**	**236.4**	**82.0**	**0.0**	**146.8**	**2.1**	**4.4**	**0.0**	**10.0**	**12.5**	**0.0**	**1.6**	**0.0**	**0.0**	1333.9
% Energy independence (LP/PE)																			13.3
Secondary Energy																			
Coal input for electricity production	-385.5																97.8		-287.7
HFO and diesel input for electricity production			-0.8			-203.7											87.2		-117.3
Bagasse input for electricity production									-135.0								33.0		-102.0
Kerosene input for electricity production					-0.3												0.0		-0.3
Biogas input for electricity production										-2.1							2.1		0.0
Hydro input for electricity production													-10.0				10.0		0.0
PV input for electricity production														-12.5			12.5		0.0
Wind input for electricity production																-1.6	1.6		0.0
Electricity production own use																	-4.0		-4.0
Solar Thermal heat production																			0.0
Fuelwood to charcoal											-0.6	0.3							-0.3
TOTAL Secondary supply (SS)	**-385.5**	**0.0**	**-0.8**	**0.0**	**-0.3**	**-203.7**	**0.0**	**0.0**	**-135.0**	**-2.1**	**-0.6**	**0.3**	**-10.0**	**-12.5**	**0.0**	**-1.6**	**240.3**	**0.0**	-511.5
Energy Distribution																			
Final distribution (D=PE+SS)	24.0	184.1	185.0	58.4	0.0	32.6	82.0	0.0	11.8	0.0	3.8	0.3	0.0	0.0	0.0	0.0	240.3	0.0	822.4
Losses (L=(D+F))	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-8.6	0.0	-8.3
TOTAL final distribution (D+L)	24.1	184.1	185.1	58.4	0.0	32.6	82.0	0.0	11.9	0.0	3.8	0.3	0.0	0.0	0.0	0.0	231.7	0.0	814.1
																			814.06
Final Energy Consumption																			
Manufacturing	-24.1		-36.0			-29.3	-5.1		-11.9		-0.4						-74.3		-181.1
Commercial							-17.7					-0.3					-69.0		-87.0
Household					0.0		-56.2				-3.4	0.0					-82.7		-142.3
Transport		-184.1	-147.1	-58.4		-3.3	-2.7										0.0		-395.6
Agriculture			-2.0														-1.4		-3.4
Others							-0.3										-4.3		-4.6
TOTAL (F)	**-24.1**	**-184.1**	**-185.1**	**-58.4**	**0.0**	**-32.6**	**-82.0**	**0.0**	**-11.9**	**0.0**	**-3.8**	**-0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**-231.7**	**0.0**	**-813.99**

7 GROWTH PERCENTAGE (%) IN 2020 COMPARED TO 2019

	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)									-17.1 %	23.5 %	-11.0 %		17.6 %	12.6 %		23.1 %			-13.3 %
Imported Resources	1.4 %	-22.8 %	-22.8 %	-75.4 %	-95.5 %	-16.1 %	-61.2 %												-23.2 %
TOTAL Primary Energy (PE)	-0.5 %	-11.9 %	-16.9 %	-61.7 %	-93.1 %	-22.2 %	-10.0 %		-17.1 %	23.5 %	-11.0 %		17.6 %	12.6 %		23.1 %			-16.6 %
Secondary Energy																			
Coal input for electricity production	-2.0 %																		-1.6 %
HFO and diesel input for electricity production			18.0 %			-22.3 %													-20.1 %
Bagasse input for electricity production									-15.8 %										-16.7 %
Kerosene input for electricity production					-92.3 %														-90.9 %
Biogas input for electricity production										23.5 %									
Hydro input for electricity production													17.6 %						
PV input for electricity production PV														12.6 %					
Wind input for electricity production																23.8 %			
Electricity production own use																			5.7 %
Solar Thermal heat production																			
Fuelwood to charcoal											0.0 %	0.0 %							0.0 %
TOTAL Secondary supply (SS)	-2.0 %		18.0 %		-92.3 %	-22.3 %			-15.8 %	23.5 %	0.0 %	0.0 %	17.6 %	12.6 %		23.8 %	-12.5 %		-10.0 %
Final Energy Consumption																			
Manufacturing	31.0 %		-5.8 %			-21.7 %	-27.1 %		-28.7 %		0.0 %						-12.8 %		-10.9 %
Commercial							-27.8 %					6.2 %					-20.2 %		-21.8 %
Household					-14.1 %		0.5 %				-10.5 %	-13.5 %					1.5 %		0.8 %
Transport		-11.9 %	-19.5 %	-61.8 %		-22.4 %	-18.3 %												-28.4 %
Agriculture			-4.8 %														-12.5 %		-8.1 %
Others							-29.5 %										6.9 %		3.6 %
TOTAL (F)	31.0 %	-11.9 %	-17.0 %	-61.8 %	-14.1 %	-21.7 %	-10.0 %		-28.7 %		-9.5 %	9.8 %					-10.5 %		-19.9 %

8 ENERGY PATTERN 2020



9 TABLE OF INDICATORS

Item	Indicators	Unit	2016	2017	2018	2019	2020
Primary Energy Requirement	Primary Energy Requirement	ktoe	1,555.3	1,599.8	1,586.3	1,600.3	1,333.9
	Share of local resources: local primary requirement/total primary requirement	%	14.6	13.4	12.9	12.8	13.3
Energy intensity	Energy intensity per inhabitant: Primary energy Requirement/population	toe/inhab	1.23	1.27	1.25	1.26	1.05
	Energy intensity per 100,000 (2006 Rs): Primary Energy Requirement/GDP	toe/Rs	0.47	0.46	0.44	0.43	0.42
Electricity Production	Total fossil fuel input for electricity production	ktoe	651.8	682.6	666.9	659.9	590.3
	Total renewable input for electricity production	ktoe	180.7	172.6	161.4	160.3	135.0
	Total electricity production	GWh	3,042.2	3,119.7	3,131.6	3,236.6	2882.4
	Penetration of renewable resources	%	21.8	20.0	20.7	21.7	23.9
Final electricity consumption per sector	Total electricity sold	GWh	2,558.6	2,618.1	2,650.2	2,754.0	2,448.2
	Domestic sector	%	33.4	33.3	33.9	34.3	39.2
	Commercial sector	%	36.3	36.4	36.0	36.3	32.5
	Industrial sector	%	28.8	28.8	28.7	28.0	26.8
	Others	%	1.6	1.5	1.4	1.4	1.6
	Annual electricity consumption per consumer (Domestic)[5]	MWh/ Consumer /year	2.07	2.07	2.10	2.16	2.16
	Annual electricity consumption per consumer (Commercial)	MWh/ Consumer /year	22.15	22.26	21.99	22.51	17.70
	Annual electricity consumption per consumer (Industrial)	MWh/ consumer /year	115.84	118.89	118.24	119.07	100.35
Final energy consumption in transport sector	Total energy consumption (transport)	ktoe	505.6	530.4	540.1	552.1	395.6
CO_2 Emissions	Total CO_2 emissions	$ktCO_2$	4,087.1	4,226.2	4,190.5	4,264.2	3,653.96
	Net CO_2 emissions	$ktCO_2$	3,723.7	3,861.5	3,825.5	3,903.3	3,290.95
	Energy sector	%	59.25	59.92	58.83	56.69	59.86
	Manufacturing sector	%	8.38	8.16	8.22	8.26	9.19
	Transport sector	%	25.55	25.22	25.95	26.00	23.04
	Others	%	6.00	5.86	6.12	8.18	6.92
	CO_2 emissions per kWh of electricity generated (Grid emission factor)[6]	gCO_2/ kWh	945.9	954.8	917.8[7]	917.8[7]	954.3

Data Source: Digest of Energy and Water Statistics 2020, Statistics Mauritius

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

[6]Data Source: CEB

[7]Data Source: ABS ASB0046-2019 Standardized Baseline Mauritius Grid Emission Factor, United Nations Framework Convention on Climate Change

10 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.

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 equipment;

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 fuel:
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.

Fuel:
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 motor vehicle:
A motor vehicle which for the purpose of its mechanical propulsion, has at least two different energy convertors and two different on-vehicle energy storage systems.

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.

Normal cubic metre (Nm^3):
Common unit used to refer to gas emissions or exchange. It is the value that a gas of a constant mass occupies under normal or standard condition.

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 (t):
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 1 Joule per second.

11 ENERGY CONVERSION FACTORS

	tonne	toe
Gasolene	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/Landfill gas/Photovoltaic	1	0.086
Electricity	1	0.086

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

12 Net Calorific Value (NCV)

The Net Calorific Value (NCV) used for the calculation of the grid emission factor.

Fuel Source	**Net Calorific Value NCV (GJ/t)**	**Emission Factor, EF (tCO_2/TJ)**	**(NCV*EF)/1000 (tonnes CO_2/tonnes of Fuel)**
Coal	25.5	87.3	2.226
HFO	40.19	75.5	3.034
Kerosene	43.4	69.7	3.025

Data source: CEB

13 LIST OF REFERENCES

1. Digest of Energy and Water Statistics 2020, Statistics Mauritius.
2. Renewable Energy Roadmap 2030 for the Electricity Sector, Ministry of Energy and Public Utilities.
3. ASB0046-2019 Standardized Baseline Mauritius Grid Emission Factor, United Nations Framework Convention on Climate Change.

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 error may be present on certain totals.

Disclaimer:

This report has been compiled using data from Statistics Mauritius, Ministry of Energy and Public Utilities (MEPU), National Land Transport Authority (NLTA), Central Electricity Board (CEB), Wastewater Management Authority (WMA) and Mauritius Meteorological Services (MMS). Neither the Energy Efficiency Management Office (EEMO), nor any of its employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information in this report.