Global Fuel Economy Initiative in Mauritius

National Task Force Report on GFEI Project

MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

Coordination and Project Implementation Division

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Acknowledgement

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Acronyms

cc	engine displacement or engine capacity (cm^3)
EU	European Union
Gas oil	Diesel
GFEI	Global Fuel Economy Initiative
Gg	Giga grammes which is 10^9grammes or 10^6 kilogrammes
GEF	Global Environment Facility
LDVs	Light Duty Vehicles
LPG	Liquefied Petroleum Gas
MITD	Mauritius Institute for Training and Development
MOESD	Ministry of Environment and Sustainable Development
MOFED	Ministry of Finance and Economic Development
MICCP	Ministry of Industry, Commerce and Consumer Protection
Mogas	Gasoline or petrol
MRA	Mauritius Revenue Authority
MVL	Motor Vehicle Licence
NTA	National Transport Authority
NTFC	National Task Force Committee
STC	State Trading Corporation
SM	Statistics Mauritius

Executive Summary

The United Nations Environment Programme (UNEP) together with other partners launched the Global Fuel Economy Initiative (GFEI) and Mauritius is one of the pilot countries from the Africa region to undertake this project. The implementation of this project in Mauritius started in March 2013 and it aims at supporting the Government of Mauritius in the development of a cleaner, more efficient vehicle strategy, policy package and a timeline for implementation. The GFEI project was funded by the European Union (EU) and Global Environment Facility (GEF) to the tune of USD 70,000.

The Ministry of Environment and Sustainable Development (MOESD) has set up a National Task Force Committee (NTFC) comprising stakeholders from public and private sectors to pilot the GFEI project. Three Sub-committees respectively "Vehicle Inventory", "Fuel and Vehicle Legislation" and "Cost-Benefit Analysis of Policy Options" were set up. The Sub-committee on Vehicle Inventory was responsible for calculating a national auto fuel economy baseline for 2005 using GFEI methodology and to make a vehicle inventory for 2005, 2008, 2010 and 2012 to establish trends. The Sub-committee on Fuel and Vehicle Legislation was responsible for reviewing existing national fuel and vehicle legislations, incentives, standards and come up with recommendations. The Sub-committee on Cost-Benefit Analysis of Policy Options was responsible for analysing the Vehicle Inventory and Fuel and Vehicle Legislation reports with the main objective to identify, measure and value the economic, financial and social benefits and costs of identified policy interventions in reducing CO_2 emissions and average fuel consumption.

Vehicle Inventory

For the purpose of the Vehicle Inventory, only the Light Duty Vehicles (i.e. less than 3,500 kgs) were targeted. The services of the State Informatics Limited were hired for the development of a programme to extract data in the GFEI format from the National Transport Authority database. Data for 2005, 2008, 2010, 2012 and 2013 were available; however values for fuel consumption and carbon dioxide (CO_2) emissions were only available for years 2005 and 2013.

The trend in registration of LDVs was as follows:

(i) The annual registrations of LDVs had increased from 141,586 in year 2005 to 241,030 in year 2013.

(ii) It was projected that a total of 446,354 LDVs would be registered in 2030 and 691,929 LDVs in 2050. It was also observed that the number of hybrid cars from 2010 to 2013 had been doubling each year.

(iii) The predominant engine displacement (engine capacity: cc or cm^3) of petrol-driven vehicles registered was in the range of 1001-1300 and 1301-1500 cc for both 2005 and 2013. The predominant engine displacement of diesel-driven vehicles registered was in the range of 2001-2500 and 2501-3500 cc for both 2005 and 2013.

The fuel economy and CO_2 emission trends for LDVs were compiled, calculated and compared for years 2005 and 2013. The following observations were made:

(i) The average fuel consumption level for year 2005 was 7.0 L/100km and 6.6 L/100 km in 2013. For the same years, the average CO_2 emissions were 186 g/km and 169 g/km respectively, thus indicating an improvement in fuel efficiency for cars imported in year 2013 as compared to those of year 2005.

(ii) This improvement is due to the introduction of unleaded petrol since September 2002 and to the gradual reduction of sulphur content in diesel from 2500 ppm to 50 ppm (introduced in March 2012). A 6-fold decrease in the maximum level of SO_2 in ambient air quality has been observed with the introduction of 50 ppm sulphur diesel. These measures have enabled car dealers to import more efficient vehicles.

Cost-Benefit Analysis (CBA) of Policy Options

Vehicle owners have to pay a yearly road tax based on the types of vehicles and the engine displacement (cc or cm^3). No distinction is made for persons driving less, compared to those covering high mileages annually. Autocycles owners are presently exempted from road tax. The National Transport Authority (NTA) is incurring loss of revenue in many instances, for example while outsourcing core services of road tax payment to the Mauritius Post Ltd whereby over 60% of Motor Vehicle Licences (MVL) transactions are carried out and for which a commission of Rs 34.50 is paid per MVL disc which is a loss of revenue for Government; fake entries, fitness certificate, insurance certificate; dishonoured cheques; fraud by vehicle owners regarding modification of their engine capacity with a view to pay less road tax amongst other problems.

A new approach is being proposed to collect road tax at source through inclusion in the retail prices of Mogas (gasoline) and Gas Oil (diesel), which would reflect a kind of “Pay as You Drive”. This measure would place the burden on drivers with regards to their fuel consumption; the more they drive, the more they pay and need to compensate for polluting the environment. At the same time, all losses incurred by the NTA would no more be a problem. It is estimated that the price per litre of petrol will increase by Rs 4.50 and Rs 2.00 per litre for diesel.

In Mauritius, a motor car buyer pays an amount as levy per gramme of CO_2 per kilometer (g/km) above a set threshold. On the other hand, the buyer receives a rebate if the CO_2 emission of his vehicle is less than the threshold. It is important to note that prior to November 2013, the rate of rebate was the same whether the CO_2 emission certificate issued is in conformity or not in conformity with UN/ECE Regulation No. 101 and the CO_2 set threshold was 158 g/km. As from November 2013, the Excise Act has been amended to apply a lower rate of rebate for cars with CO_2 emission certificate not in conformity with the UN/ECE Regulation No. 101 and at the same time, the CO_2 threshold was lowered to 150 g/km.

Three different scenarios were compared whereby the threshold of CO_2 in terms of g/km was taken to be 158 g/km, 150 g/km and 130 g/km respectively due to the fact that as from 2015, all cars manufacturers in Europe, according to Regulation (European Commission) No. 443/2009 of the European Parliament and of the Council of 23 April 2009, will have to meet the CO_2 emissions level of 130 g/km. Moreover, by 2021, the emission level has been fixed to 95 g/km. It is to be noted that manufacturers outside EU wishing to sell their cars in Europe will also be concerned by this measure.

First scenario: CO_2 threshold is 158 g/km

In 2013, the total rebate granted by Government was Rs 549 million and sum collected through levy was Rs 93 million, hence a net total of Rs 456 million was granted as rebate. The heavy rebate granted by the Government is due to the fact that all analysis made to calculate the CO_2 threshold are based on the average CO_2 emissions of new cars imported in the previous year, whilst the average CO_2 emissions of second hand cars are very well below this threshold, thus resulting in a huge deficit in the revenue.

Second scenario: CO_2 threshold lowered to 150 g/km

Calculations revealed a loss of Rs 10 million.

Third scenario: Bring the CO_2 threshold to 130 g/km to align it with the European trends and to abolish the Rebate Scheme.

Based on official figures, 82% of cars imported in 2013 had a CO_2 emission of ≤ 150 g/km and 62 % had a CO_2 emission of ≤ 130 g/km. It is proposed to reduce the CO_2 threshold to 130 g/km in a first instance and the same time abolish the Rebate Scheme. The Government would collect revenue on 38% of cars imported emitting above 130 g/km.

Summary of findings of this analysis:

	Past (Jan-Dec 2013)	Actual	Proposed
REBATE	**158g/km**	**150g/km**	**130g/km**
New cars (Million Rupees)	117	26	0
Second hand cars (Million Rupees)	432	115	0
TOTAL REBATE	**549**	**141**	**0**

LEVY	**158g/km**	**150g/km**	**130g/km**
New cars (Million Rupees)	81	115	166
Second hand cars (Million Rupees)	12	16	34
TOTAL LEVY	**93**	**131**	**200**
NET TOTAL	**(456)**	**(10)**	**200**

The Rs 200 million levy collected could be used to finance other schemes such as providing a grant of Rs 30,000 to owners of cars 30 years old or above, to encourage them to stop using their old cars and purchase another vehicle of less than 5 years old. It estimated that 5,000 vehicles would be removed annually once the scheme is put in place. This measure would help to save 1.2 million litres of fuel annually. This would mitigate about 3 Gg of CO_2 emissions.

Eco driving is a smarter and more fuel efficient driving culture. It offers numerous benefits and the most important personal and immediate benefits are the saving of fuel costs and safety of driver and passengers. It is proposed to introduce eco driving modules/courses at the level of driving schools for safe driving as well as for fuel economy. With this measure, a net saving of at least 10% on fuel consumption could be achieved. Given that 1 litre of gasoline gives rise to 2.372 kg of CO_2 and 1 litre of diesel oil gives rise to 2.640 kg of CO_2, it was estimated that around 43 million litres of fossil fuel would be saved per year, resulting in a reduction in emissions of 108.6 Gg CO_2.

To address the transportation and congestion issue, the Government is envisioning the implementation of the Light Rail Transit system (LRT) between Curepipe and Port Louis. The project is at evaluation and tendering stage. The project will include a Park and Ride Service and it was estimated that around 25,000 vehicles would not pass through the Port Louis

daily. It was estimated that an amount of 19.2 million litres of fuel would be saved yearly and 46 Gg of CO_2 would not be emitted.

Mauritius imported 181 million litres of gasoline in 2013 for use as fuel in vehicles. With the introduction of fuel mixture of 10% anhydrous ethanol and 90% gasoline (E10), it would lead to the use of 19 million litres of ethanol and 168 million litres of gasoline. Therefore, 13 million litres of gasoline would not be imported representing a reduction in emissions of 31 Gg CO_2. However, the implementation of E10 would cause a shortcoming of Rs 140 million for the Government of Mauritius in terms of excise duties. It was assumed that ethanol would be exempted from excise duties as an incentive measure to keep the price of E10 at par or less than the current price of gasoline sold to consumers. This would also bring additional revenues to our cane sector and help to make the cane industry sustainable and viable.

1. Introduction

The Global Fuel Economy Initiative (GFEI) was launched on 4 March 2009 in Geneva by the United Nations Environment Programme (UNEP) and its partners, namely the International Energy Agency (IEA), the International Transport Forum (ITF), the "Fédération Internationale des Automobiles" (FIA Foundation), the International Council on Clean Transportation (ICCT) and the Institute of Transportation Studies (ITS). This initiative is being implemented in 25 countries across Asia, Europe, Latin America and Africa including Mauritius.

The global car fleet is expected to triple by 2050. The GFEI target termed "50by50" implies having a 50 per cent CO_2 emission level and average fuel consumption reduction by the year 2050. GFEI aims to stabilise CO_2 levels through improving the global fuel economy average from its current 8 L/100 km to an average of 4 L/100 km. The result would be a drop in CO_2 emissions from an average of around 180 g/km to 90 g/km. Cutting global average automotive fuel consumption by 50% would reduce emissions of CO_2 by over 2 gigatonnes (Gt) by 2050.

Improvements in fuel economy will no doubt result in a number of benefits for all countries. This move towards a global fuel economy at a scale which is technically achievable may help to save around 6 billion barrels of fuel per year by 2050. Road transport is responsible for an estimated 70-90% of air pollution in urban areas, causing health problems and reduction in GDP. Improving fuel efficiency will improve urban air quality through reductions in vehicles emissions, including nitrogen oxides, hydrocarbons and particulate matter. Also, it would reduce the dependency of the country on oil imports resulting in savings.

Finally, the objective of this initiative is to assist countries to develop policies that encourage fuel economy improvement and efficiency for vehicles and to review existing policies on fuel economy.

1.1 Background

With the rise in the standard of living in Mauritius, the fleet of vehicles on our road has been continuously increasing from 255,149 in 2001 to 443,495 in 2013. 128,928 tonnes of gasoline, 164,802 tonnes of diesel and 4,068 tonnes of Liquefied Petroleum Gas (LPG) have been used in 2013 in the land transport sector. Urban pollution in Mauritius is thus largely caused by exhaust emissions from the transport sector, especially black smoke emissions from diesel-driven vehicles.

The land transport sector accounts for about 25.3 % of the total greenhouse gas (GHG) emission and is the second largest contributor to CO_2 emissions in Mauritius after industries.

With a view to stabilise CO_2 emission from this sector, Government has initiated several measures to tackle this problem, such as the introduction of cleaner fuels, promotion of energy efficient vehicles through fiscal incentives on the importation of motor cars (carbon dioxide levy/rebate mechanism) including preferential rate for registration fees and road tax. With these incentives, it is expected that in the long run, more buyers will opt for low CO_2 emission cars.

The introduction of unleaded petrol in Mauritius was a first step towards the use of cleaner fuels in petrol-driven vehicles and observations have shown that the levels of lead in ambient air have significantly decreased.

Regarding diesel-driven vehicles, Government has in March 2012 introduced better quality diesel of sulphur content 50 parts per million (ppm), thus making Mauritius the first country (except South Africa) in the Sub-Saharan African region to take such an initiative. This new diesel grade has paved the way for the import of a new generation of diesel-driven vehicles which are more energy efficient and less polluting. The previous diesel grades of sulphur content 2500 ppm and subsequently reduced to one with sulphur content of 500 ppm were considered to be less environment friendly. Hence, the policy of Government was to further reduce it to 50 ppm. A further reduction to 15 ppm is being envisaged.

The National Transport Authority (NTA) and the Police de L'Environnement are the responsible authorities for the monitoring of smoke emissions from vehicles as per the Road Traffic (Control of Vehicular Emissions) Regulations 2002. These regulations make provisions for a maximum allowable opacity limit of not more than 50% for exhaust emissions from diesel-driven vehicles. To further strengthen enforcement actions against smoky vehicles, Government has acquired 11 portable smoke meters. These equipment are being used by the Police de L'Environnement for road side checks and by the National Transport Authority at the two Vehicle Examination Centres for further control. Over and above enforcement, Government is pursuing sensitization campaigns to trigger the attention of drivers to have proper maintenance of their vehicles.

1.2 Implementation of the GFEI in Mauritius

A Small Scale Funding Agreement (SSFA) for GFEI implementation in Mauritius was signed between UNEP and the Ministry of Environment and Sustainable Development (MOESD) in March 2013 and the project is scheduled for completion in December 2014. Its objective is to support the first phase of the development of an efficient vehicle strategy in Mauritius. The project was spearheaded by the United Nations Environment Programme (UNEP) and funded by EU and GEF to the tune of USD 70,000.

1.3 Project components

The implementation of the GFEI required the following:

(i) Establishment of a project national working group to support GFEI implementation;
(ii) Development of a national auto fuel economy baseline to monitor trends;
(iii) A cost and benefit analysis of policy options to support fuel economy; and
(iv) Holding of two national workshops, one at the beginning of the project to kick-start the project and the second one at the end of the project to present the key findings and the policy recommendations.

1.4 Committees under the project

The Ministry of Environment and Sustainable Development (MOESD) set up a National Task Force Committee (NTFC) to pilot the project, which was chaired by Mr. P. Kallee, Deputy Director of Environment. The project management was carried out by the Coordination and Project Implementation Division (CPID) of MOESD. Staff of the CPID comprises of:

SN	Name	Grade	Work assigned/ Responsibility
1.	Mr. D. Prithipaul	Divisional Environment Officer	Overall responsibility for the project. Author of main report.
2.	Mr. S. Buskalawa	Environment Officer	Vehicle Inventory
3.	Mrs. A. Ghoorah	Environment Officer	Fuel and Vehicle Legislation
4.	Mr. A. Juggurnath	Environment Officer	Cost-Benefit Analysis of Policy Options

The NTFC comprised stakeholders from the public and private sectors. The list of members is at Annex 1. For the implementation of the GFEI project, the NTFC set up three Sub-committees namely:

SN	Sub-committee	Chairperson and Author	Main Task
1.	Vehicle Inventory	Mr. D. Romooah Transport Planner, National Transport Authority	To compile and calculate a national auto fuel economy baseline for 2005 using GFEI methodology and vehicle inventory for 2005, 2008, 2010 and 2012 to establish trends.
2.	Fuel and Vehicle Legislation	Mrs. C. Green-Jokhoo, Principal State Counsel, Attorney General's Office.	To review existing national fuel and vehicle regulations, incentives and standards and make recommendations.

3.	Cost-Benefit Analysis of Policy Options	Mr. A. Khoodaruth, Senior Lecturer, University of Mauritius.	To identify, measure and value the economic, financial and social benefits and costs of identified policy interventions in reducing CO_2 emissions and the average fuel consumption.

The key findings and recommendations are provided in the next chapter. The Terms of Reference (TOR) and members of the three Sub-committees are at Annex 2.

2. Findings and recommendations of the Sub-committees

2.1 Report on the national auto fuel baseline calculated for 2005 using the GFEI methodology and vehicle inventory for 2005, 2008, 2010 and 2012

2.1.1. Purpose and Target

The purpose of the Sub-committee on Vehicle Inventory was to develop the vehicle fuel economy database and to calculate the auto fuel baseline for 2005. The aim was to compile data on the LDVs fleet registered in Mauritius since 2005 using the GFEI Baseline Methodology and to determine the trend in fuel economy for this fleet and the corresponding carbon dioxide emissions expressed in grammes per kilometre (gCO_2/km).

The present study dealt with the 2005 and 2013 database. Data for 2008, 2010 and 2012 have been collected, but values for fuel consumption and CO_2 emissions were not available. The data on CO_2 emissions for the year 2005 were collected from the website of the car manufacturers and data for the year 2013 were available at Mauritius Revenue Authority (MRA), Customs for taxation purposes. Detailed analysis was carried out for the year 2005 and 2013 only.

2.1.2. Vehicle Registration Data

Records of vehicles imports and registrations are the main sources of data for establishing an automobile fuel economy baseline. The following information is available on each vehicle in the Registry of Motor Vehicles at the NTA:

(i) Registration number of the vehicle;
(ii) New or second hand imported;
(iii) Type (saloon, station wagon, pick-up, two-wheeler etc.);
(iv) Make;
(v) Class – classified as goods vehicle or private;
(vi) Model;
(vii) Year of first registration in Mauritius (New);
(viii) Year of first registration outside Mauritius (Second hand);
(ix) Fuel type (diesel, petrol, hybrid);
(x) Engine size (cubic centimeters); and
(xi) Number of passengers.

2.1.3. Data Cleaning

For the cleaning process, the services of the State Informatics Limited were hired for the development of a programme to extract the data in the GFEI format from the NTA database. The cleaning process included sorting of raw data obtained from the Registry of Motor Vehicles to fit the objectives of the exercise and it involved:

(i) removal from the data set of vehicles not classified as light duty;

(ii) separation of new and second hand vehicles; and

(iii) addition of other relevant fields, e.g. CO_2 emission level and fuel efficiency.

2.1.4. Data frame of key attributes

Database of registration of new and second-hand vehicles for years 2005, 2008, 2010, 2012 and 2013 were worked out. The database for 2005 consisted of a total of 10,533 vehicles (5221 new and 5312 second hand) and for 2013; there were 15,854 vehicles (8342 new and 7512 second hand).

The cumulative total of LDV registration as from base year 2005 up to 2013 is provided in Table 1 below:

Table 1: Cumulative total LDV registration

Year	Petrol	Diesel	LPG	LPG + PETROL	Hybrid	Total
2005	98,740	42,618	209	15	4	141,586
2006	106,377	45,309	209	18	5	151,918
2007	114,531	48,108	210	20	5	162,874
2008	124,804	51,095	212	20	9	176,140
2009	133,795	53,486	213	25	55	187,574
2010	142,891	56,014	216	28	180	199,329
2011	151,822	58,463	218	28	337	210,868
2012	163,102	61,096	219	28	731	225,176
2013	175,915	63,446	223	28	1,418	241,030

Note: Percentage of unclassified vehicles - For years 2005 and 2013, there were respectively 4817 and 12,667 LDVs not classified and therefore have not been accounted in Figure 1 below.

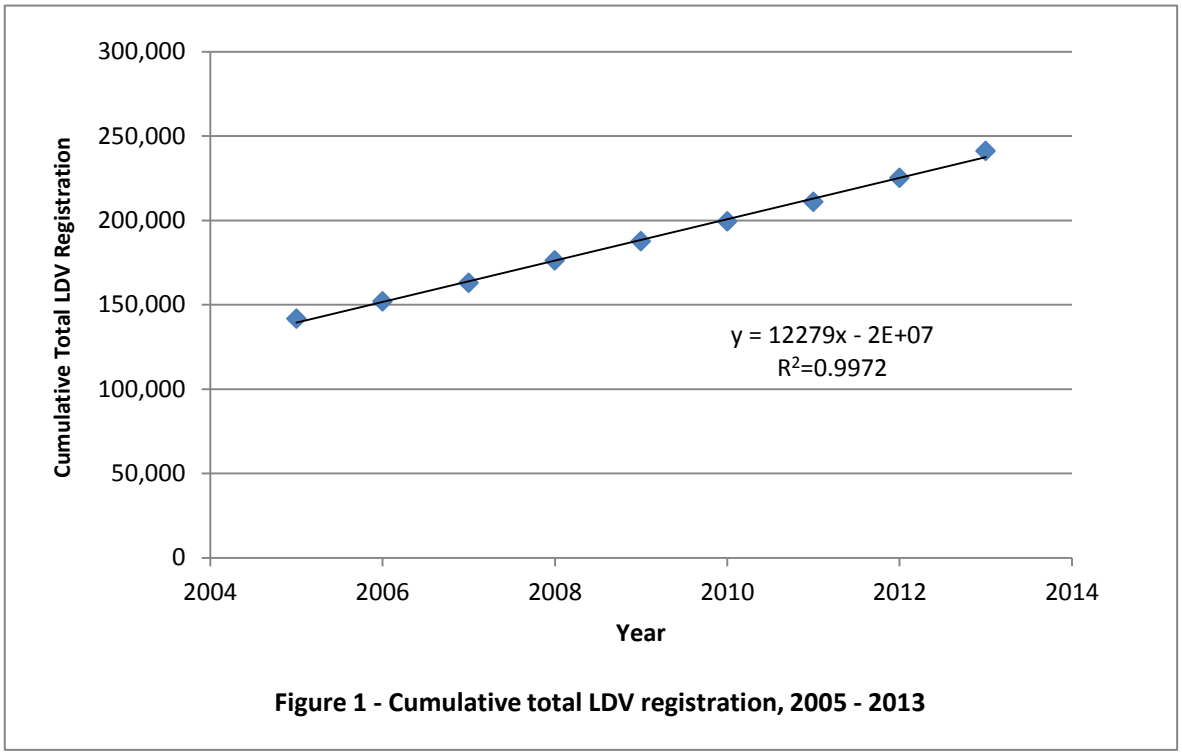


Figure 1 - Cumulative total LDV registration, 2005 - 2013

Table 2: Cumulative total vehicle registrations: observed and predicted values

Year	Cumulative vehicle registrations
2005	141,586
2013	241,030
2030	446,354
2050	691,929

Figure 1 shows the trend in registration of LDVs from 2005 to 2013. On the basis of the best line of fit and continuation of trend, it was projected that a total of 446,354 LDVs would be registered in 2030 (double compared to 2013) and 691,929 in 2050 (triple compared to 2013).

From Table 1, it was observed that the number of hybrid cars from 2010 to 2013 has been doubling each year. This is mainly due to incentives provided by the Government of Mauritius for the purchase of hybrid cars.

2.1.5. Populating missing fields of data

The primary data required for developing vehicle fuel economy databases is the fuel consumption in L/100 km and the CO_2 emission in g/km. In most developing economies, vehicles are not tested for fuel economy in domestic laboratories. Governments often rely on published data from manufacturers when calculating vehicle fuel economy and CO_2 emission level. In the present study, the data source was based primarily on US, European and Japanese test cycles.

2.1.6. Fuel economy and CO_2 emissions

Data for 2005 and 2013 have been compiled and worked out for LDVs in respect of fuel consumption and CO_2 emissions. The results are set out in Table 3 below:

Table 3: Average fuel consumption and average CO_2 emission for LDV registered in 2005 and 2013

Year	Average Fuel Consumption (L/100km)	Average CO_2 Emission (g/km)
2005	7	186
2013	6.6	169

In 2005, the average fuel consumption for LDV vehicles in Mauritius was 7.0 L/100km with a corresponding CO_2 emission of 186 g/km. The average fuel consumption in 2013 was 6.6 L/100km with a corresponding CO_2 emission of 169 g/km.

Average fuel consumption and CO_2 emissions for new and second-hand LDVs

The average fuel consumption and CO_2 emission for new and second hand LDVs is provided in Table 4:

Table 4: Average fuel consumption and CO_2 emission for new and second hand LDVs

Year	Average Fuel Consumption (L/100km)		Average CO_2 Emission (g/km)	
	New	Second Hand	New	Second Hand
2005	7.2	7.4	193	197
2013	5	6.8	118	178

Fuel consumption and CO_2 emission according to engine displacement (engine capacity)

The average fuel consumption and CO_2 emission level according to engine displacement is provided in Table 5:

Table 5: Average fuel consumption and CO_2 emission according to engine displacement

Engine Capacity	Average Fuel Consumption (L/100km)		Average CO_2 Emission (g/km)	
	2005	2013	2005	2013
<1000	7.2	6.1	185	143
1001-1300	7.1	6.6	185	145
1301-1500	6.9	6.8	184	167
1501-2000	7.2	6.6	192	166
2001-2500	9.1	7.2	220	198
2501-3500	8.2	7.6	241	229

Fuel consumption and CO_2 emission level according to engine displacement for diesel and petrol powered LDVs

The average fuel consumption and CO_2 emission according to engine displacement for diesel and petrol powered LDVs is provided in Table 6:

Table 6: Average fuel consumption and CO_2 emission by engine displacement for diesel & petrol LDVs

Engine Capacity (cc or cm^3)	2005				2013			
	Diesel		Petrol		Diesel		Petrol	
	Average Fuel Consumption (L/100km)	Average CO_2 Emission (g/km)	Average Fuel Consumption (L/100km)	Average CO_2 Emission (g/km)	Average Fuel Consumption (L/100km)	Average CO_2 Emission (g/km)	Average Fuel Consumption (L/100km)	Average CO_2 Emission (g/km)
<1000	6.7	174	6.8	178	5.9	135	6.1	145
1001-1300	6.6	175	6.7	180	6.3	126	6.4	147
1301-1500	7	182	6.8	181	6.5	149	6.3	147
1501-2000	7.3	194	7	185	6.5	172	6.5	166
2001-2500	7.4	199	7.3	198	7.4	190	6.5	181
2501-3500	7.3	195	7.4	195	6.6	220	6.9	182

Figures 2 and 3 below show that the preferred engine displacement for petrol-driven LDVs were in the range of 1001-1300 cc and 1301-1500 cc and for diesel-driven LDVs were in the range of 2001-2500 cc and 2501-3500 cc.

Figure 2 - Registration of LDVs by engine displacement and fuel type, 2005

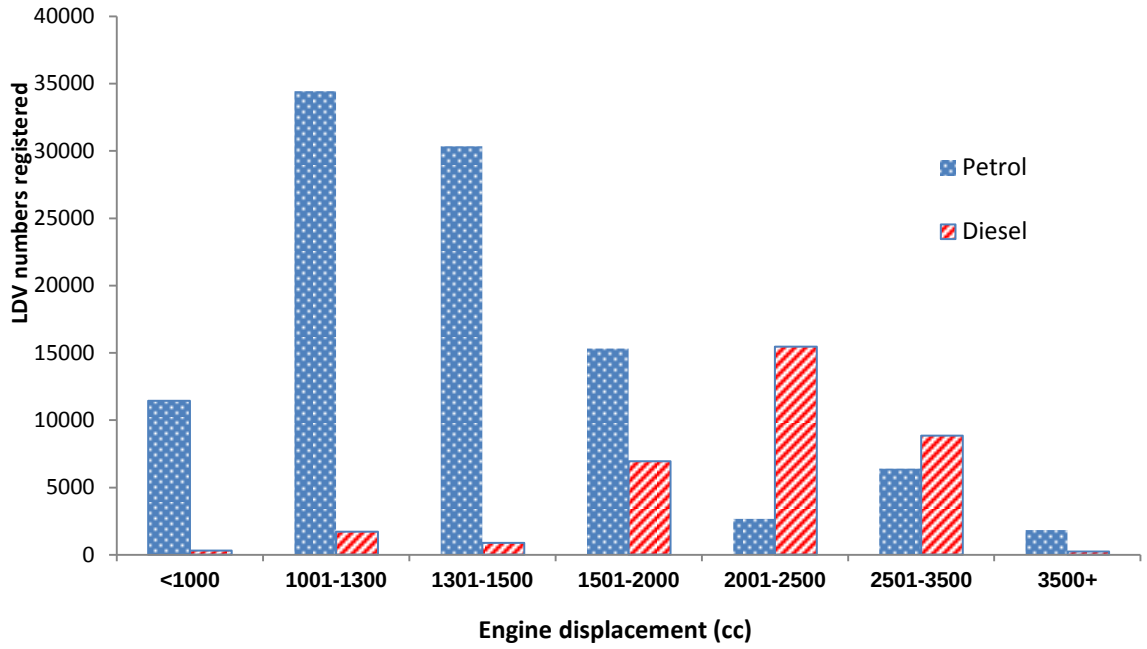
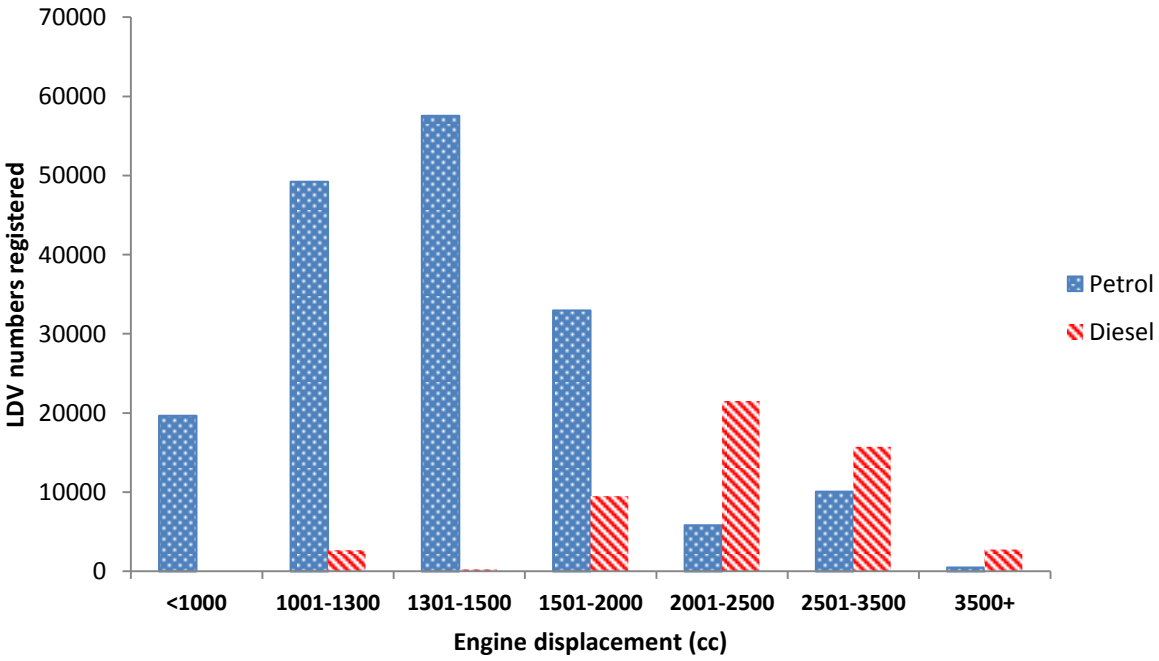
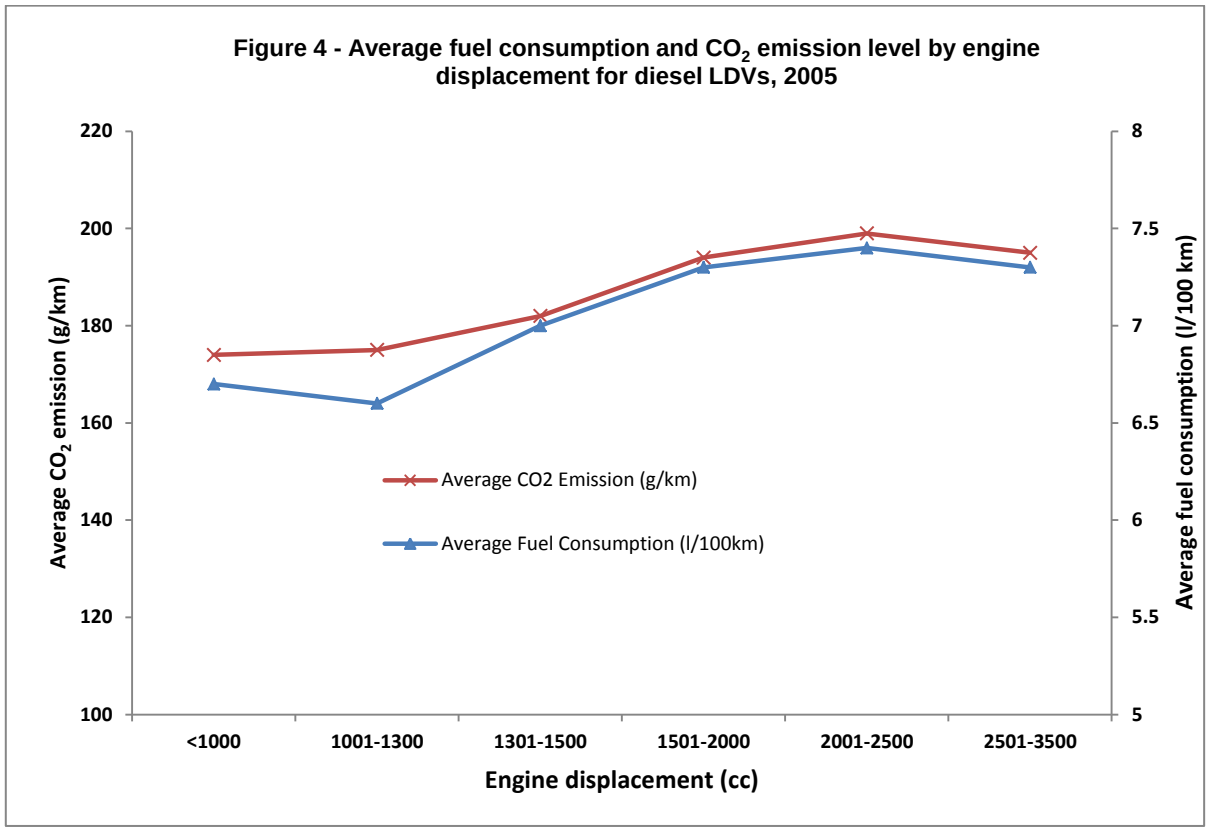


Figure 3 - Registration of LDVs by engine displacement and fuel type, 2013



Figures 4 to 7 below show the average fuel consumption and CO_2 emission levels for diesel and petrol driven LDVs by engine displacement for the years 2005 and 2013.



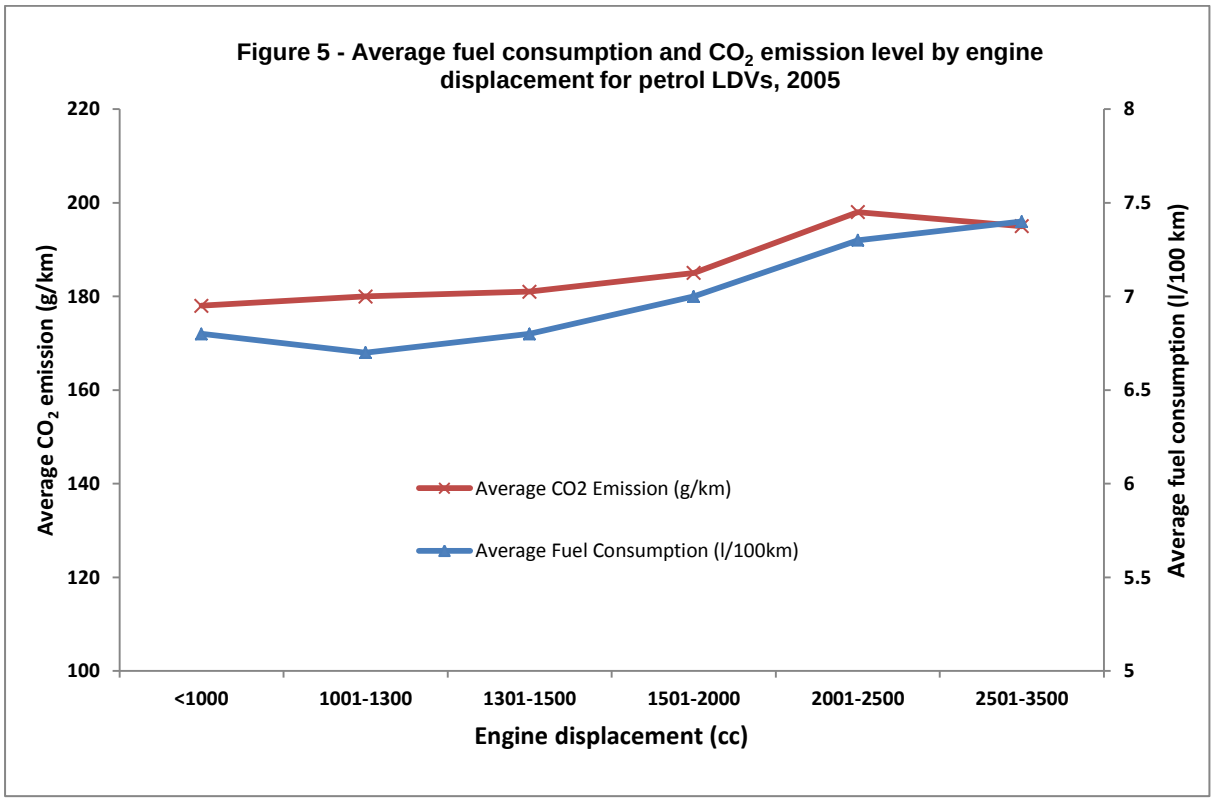


Figure 6 - Average fuel consumption and CO_2 emission level by engine displacement for diesel LDV, 2013

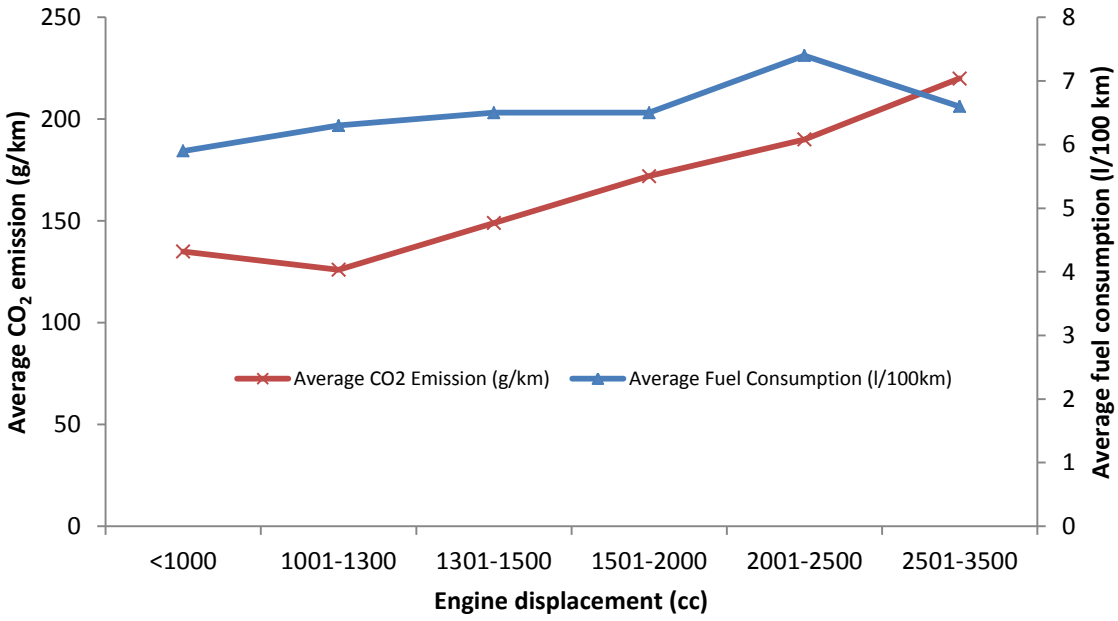
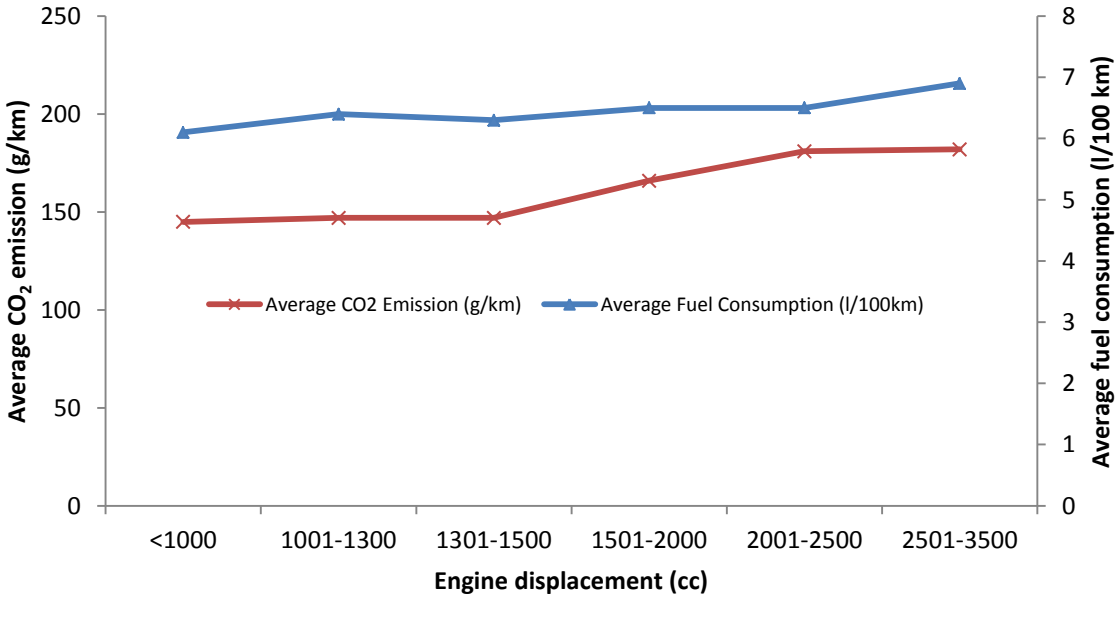


Figure 7 - Average fuel consumption and CO_2 emission level by engine displacement for petrol LDV, 2013



Average fuel consumption and CO_2 emission of LDVs by make

127 makes of LDVs were registered in 2013. The different makes and their average fuel consumption levels and average CO_2 emission are provided in the Sub-committee report.

Percentage of LDVs registration by make

The percentage of LDVs registered by make in 2005 and 2013 are given in Figures 8 and 9 below. Only the main makes have been considered.

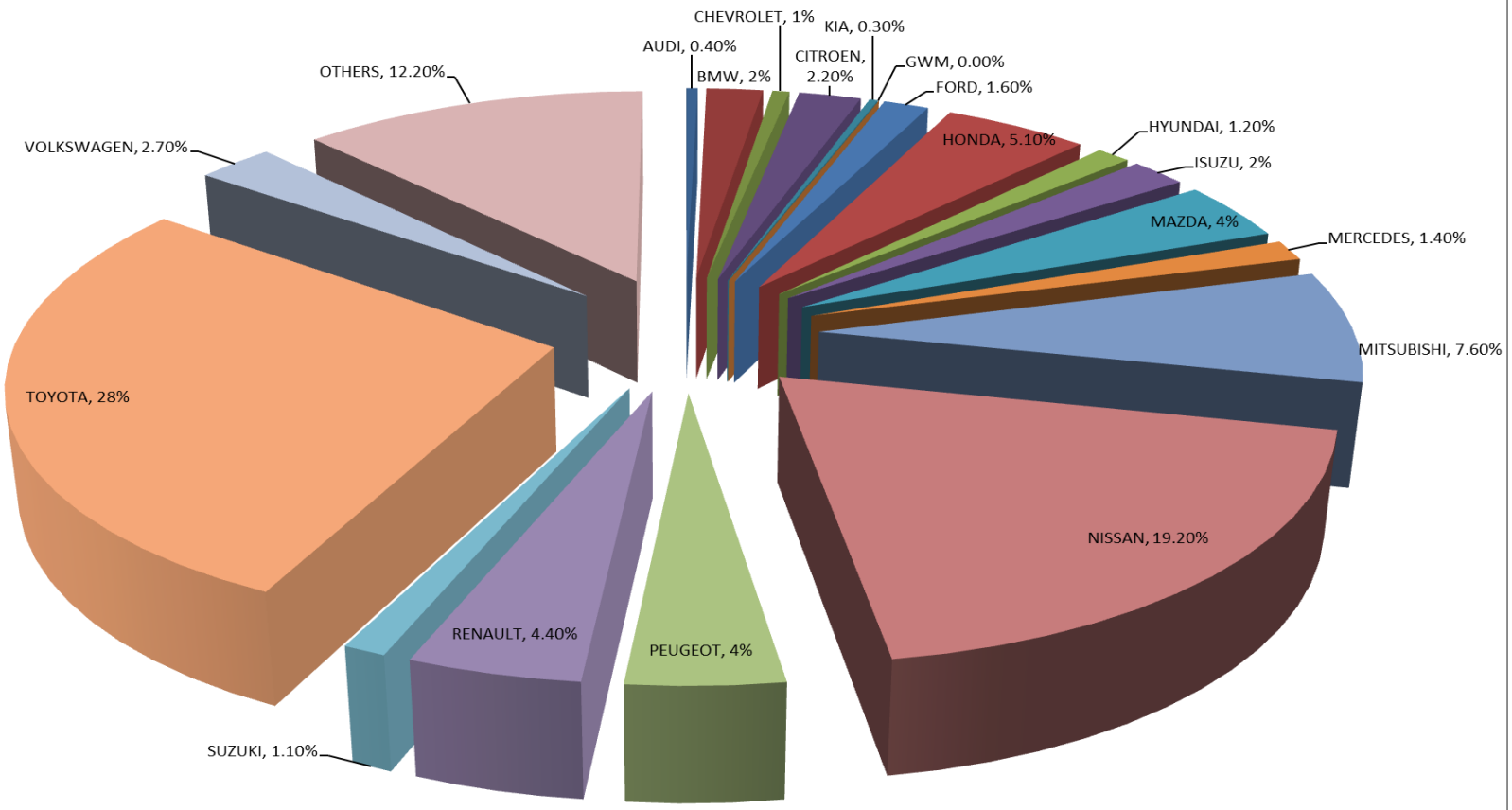


Figure 8: Percentage of vehicles on Mauritian roads by make registered during the year 2005.

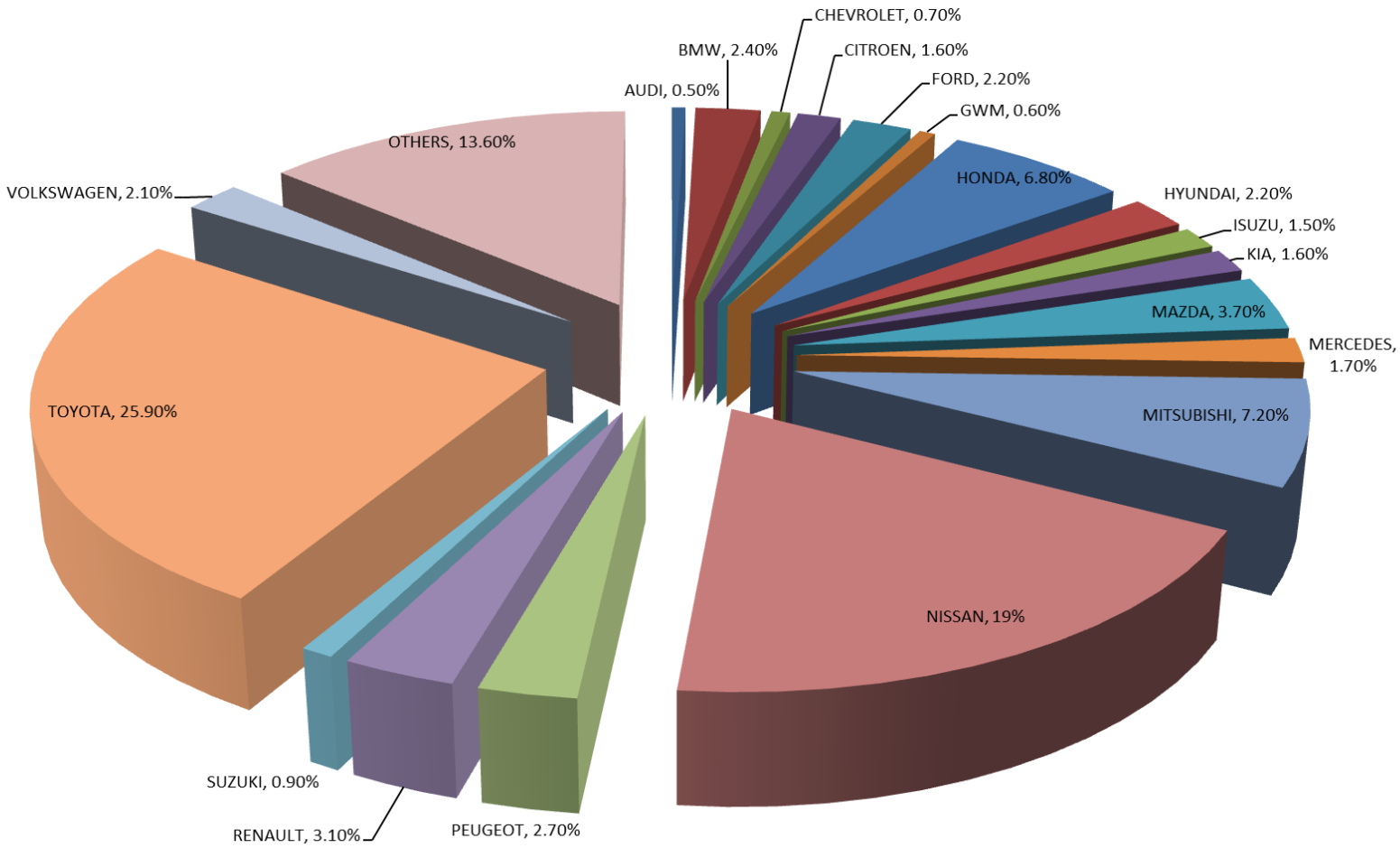


Figure 9: Percentage of vehicles on Mauritian roads by make registered during the year 2013.

Vehicle makes and their CO_2 emissions and Fuel Consumption

Figures 10 and 11 give a summary of different makes of vehicles with their CO_2 emissions and fuel consumption levels respectively.

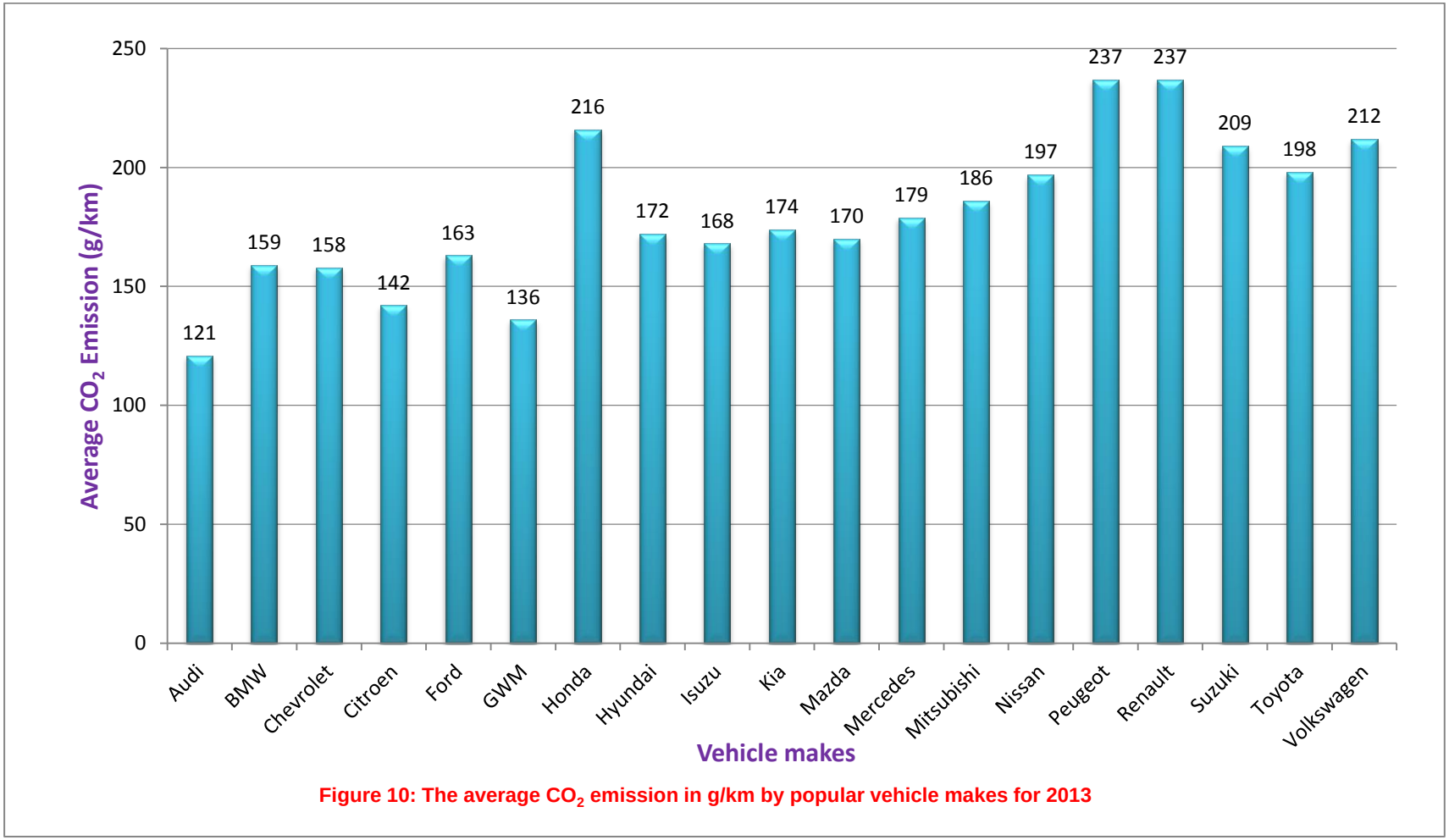


Figure 10: The average CO_2 emission in g/km by popular vehicle makes for 2013

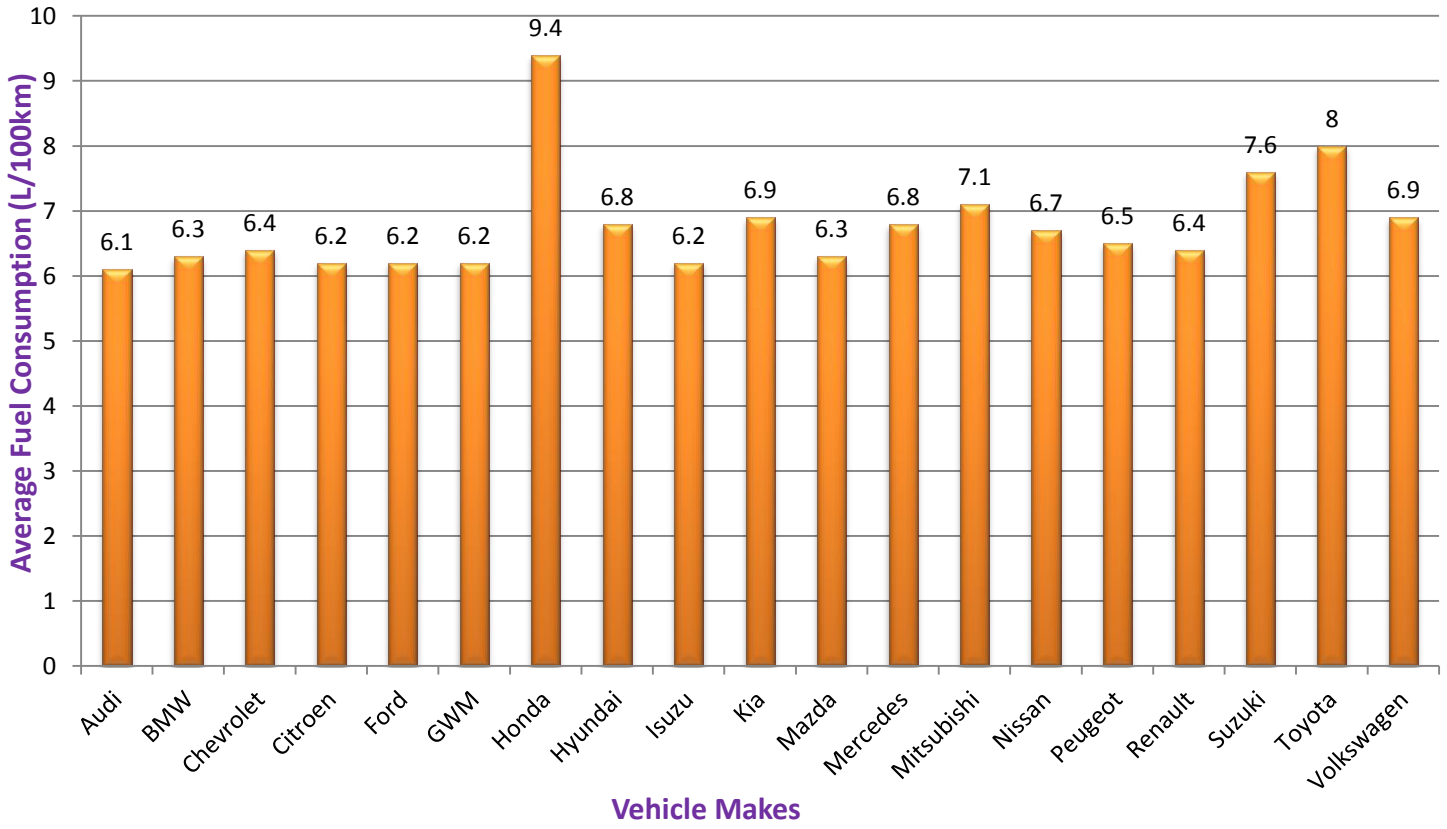


Figure 11: The average fuel consumption in L/100km by make of vehicle for 2013

2.2 Report on summary of existing national fuel and vehicle legislations, incentives and proposed recommendations and policies

2.2.1 Organisations involved in vehicles matters, their roles and legislations

The Sub-committee on Fuel and Vehicle Legislation was responsible to conduct a thorough review of existing national fuel and vehicle legislation and a detailed review of existing incentives to promote cleaner and more fuel efficient vehicles.

2.2.1.1 Regulatory

A. Ministry of Finance and Economic Development (MOFED)

MOFED is responsible for the formulation of budget strategies and fiscal policies. As quoted in 2011 Budget Speech: "*We need to change the system of motor vehicle taxation to fully reflect the polluter pay principle and to be based on a CO_2 emission standard which is becoming the new practice worldwide*."

The Excise (Amendment) Act 2011 made provision for the CO_2 Levy/Rebate Scheme and the CO_2 threshold was set at 158 g/km as from July 2011. The Excise Act was amended through Finance (Miscellaneous Provisions) Act 2013 and the CO_2 threshold was lowered to 150 g/km with effect from November 2013.

B. Mauritius Revenue Authority (MRA)

One of the main functions of Customs Department is the fiscal function which consists of collection of customs duty, excise duty and taxes at importation. As from 2011, the MRA is collecting data on CO_2 emission for both new and second hand cars.

As per the Excise Act,

(i) The CO_2 levy computed in addition to the Excise Duty on a motor car, is payable to the Director-General of the Mauritius Revenue Authority.

(ii) The CO_2 rebate computed is granted from excise duty payable on that motor car.

(iii) Importer of a motor car which is specified in Sub-Part A of Part III of the First Schedule is required to submit to the Director-General of the Mauritius Revenue Authority, at the time of importation, the CO_2 emission certificate of that motor car.

C. Ministry of Industry, Commerce and Consumer Protection (MICCP)

The Ministry of Industry, Commerce and Consumer Protection issues import permits for importation of second-hand cars (i.e. the Ministry is involved in the licensing of the importation of second hand cars), the age of which should be not less than 18 months and not more than 48 months at the time of the shipment.

As per the Consumer Protection (Control of Imports) Regulations 1999, the Ministry of Industry, Commerce and Consumer Protection issues a Pre-shipment Inspection Certificate/Inspection Certificate, after verification of the particulars of the car including CO_2 emission.

D. State Trading Corporation (STC)

The State Trading Corporation establishes the retail prices of Mogas (motor gasoline) and Gas Oil (diesel). Pursuant to Regulation 8 of the Consumer Protection (Control of Price of Petroleum Products) Regulations 2011, the Petroleum Pricing Committee is mandated to verify the correctness of the retail prices of Mogas and Gas Oil made by the STC.

2.2.1.2 Laws and Enforcement

E. The National Transport Authority (NTA)

It is the main enforcement authority for vehicle emission regulations i.e. for monitoring of smoke emissions from vehicles, as per The Road Traffic (Control of Vehicular Emissions) Regulations 2002 (GN No. 198 of 2002, amended by GN No. 35/2003 and GN No. 15/2010) in force since December 2002 and contain, in relation to diesel-driven vehicles, the following main provisions:

(i) New diesel-driven motor vehicles since March 2003 should not exceed 40% of opacity limit (blackness of the smoke) or 1.20 m^{-1} (light absorption coefficient);
(ii) Motor vehicles before March 2003, should not exceed 50% of opacity limit or 1.60 m^{-1};
(iii) Motor vehicles emitting more than the standards, but less than 70% of opacity limit or 2.80 m^{-1} are fined;
(iv) Motor vehicles emitting more than 70% of opacity limit or 2.80 m^{-1} are issued a Prohibition Notice, fined and then referred to the Vehicle Examination Centres for opacity test;
(v) Any person owning 20 or more diesel-driven vehicles is required to operate and maintain an approved facility;
(vi) Amendment has been made to The Road Traffic (Control of Vehicular Emissions) Regulations 2002 where the penalty fine has been raised from Rs 1,000 to Rs 10,000 for smoky vehicles.

F. The Road Traffic (Construction and Use of Vehicles) Regulations 2010 (GN No. 53/2010) require (Regulation 83(1)) that a motor vehicle be equipped with an exhaust system which is properly adjusted and operated so as to prevent the discharge of clearly visible smoke from the exhaust outlet for more than 10 consecutive seconds, visible vapour, grit, ashes etc. likely to cause damage to any property or injury or danger to any person who is on the road. Any person who commits an offence under these regulations shall, on conviction, be liable to a fine not exceeding Rs 10,000.

G. **The Ministry of Environment and Sustainable Development (MOESD)**, through the Police de L'Environnement, regularly conducts smoke tests on vehicles. The MOESD in collaboration with relevant stakeholders is implementing a Smoke Control Action Plan (SCAP) with the aim to curb down the number of diesel-driven vehicles emitting black smoke. This programme was launched on 8 August 2013 and comprises (i) sensitization including TV programmes; (ii) roadside checks, (iii) training on the use of opacity meters, including legislations, handling of the equipment, deponing in Court amongst others; (iv) meeting with bus owners having a fleet of 20 or more diesel-driven vehicles.

Achievements

Since the launching of the SCAP up to July 2014, 79 operations have been conducted at different places around the island and more than 168 contraventions have been established (i.e. for the period August 2013 to June 2014) against vehicles above 50% opacity; out of which 81 Prohibition Notices have been issued to vehicles above 70% for the same period. Additionally, 307 Police Form 17 (PF. 17) have been issued based on visual inspection, so that vehicles get inspected at the NTA fitness centres.

Bus owners having a fleet of 20 or more diesel-driven vehicles have prepared actions plans on ways to reduce and control black smoke emissions from buses. In general, most of the bus owners are monitoring their vehicles both at the garage level and on road. This is followed by regular maintenance.

2.2.2 Incentives provided by Government

Several measures have been taken by the Government of Mauritius to improve fuel efficiency:

(i) Our Excise Act provides for a taxation system for motor cars, to promote the use of more energy efficient vehicles, based on their CO_2 emissions. Under the Act, a CO_2 levy/rebate Scheme on motor cars was introduced in July 2011. A CO_2 rebate is granted and deducted from the Excise Duty, and a CO_2 levy is payable and added to

the Excise Duty. The calculation of the rebate or levy is based on a computed CO_2 emission threshold. This threshold is reviewed annually by a Technical Certification Committee (TCC) chaired by Statistics Mauritius in order to reflect the pattern of importation of new motor vehicles and to make recommendations to the Ministry of Finance and Economic Development.

(ii) Introduction of unleaded petrol in September 2002.

(iii) Introduction of diesel with sulphur content 50 ppm in March 2012. A 6-fold decrease in the maximum level of SO_2 in ambient air quality has been observed with the introduction of 50 ppm sulphur diesel. A further reduction to 15 ppm is being envisaged.

(iv) The rate of Excise duty on electric cars has been reduced to 25%.

(v) 50% reduction in levy on Road Tax and Registration Fee for hybrid and electric vehicles.

(vi) Seminar for fleet managers and advanced training course on Eco driving for Government officers and Driving School Association conducted on 27 and 28 March 2014.

(vii) Sensitization on GFEI during important environmental events such as World Environment Day.

(viii) The Mauritius National Long Term Energy Strategy (2009-2025) aims to reduce the country's dependence on fossils fuels, increase the share of renewable energy, democratize energy supply and promote energy efficiency and conservation. Our target is to increase the share of renewable sources of energy in electricity supply from around 17.5% presently to 35% in 2025.

2.2.3 Summary of recommendations of the Sub-committee on Fuel and Vehicle Legislation

Policy Options discussed

(i) A single standard should be used to make the assessment of petrol consumption and CO_2 emission for all cars as presently different countries use different test procedures;

(ii) Importation of better fuels quality: Cleaner fuels should be introduced such as biofuel, diesel with 15 ppm sulphur content, as this can bring a substantial drop in carbon dioxide emissions.

(iii) With the introduction of diesel with sulphur content of 50 ppm since 2012, Mauritius could have imported up to EURO IV engines. However, the cost of EURO engines is very high. All bus companies should envisage to import at least EURO I engine buses. This would considerably contribute to reduce emissions. The use of biodiesel in buses should be considered as this can bring a substantial drop in CO_2 emissions.

(iv) Measures to reduce petrol consumption and CO_2 emission: Reduce the number of cars entering and leaving Port Louis during the peak hours through the introduction of the Park and Ride Service. This project could eventually set the base for the use of the Light Rail Transit System for commuting to Port Louis.

(v) Amendment to be brought to the Pre-shipment Inspection Certificate/Inspection Certificate to include fuel consumption: Second hand cars are verified by the Ministry of Industry, Commerce and Consumer Protection based on a Pre-shipment Inspection Certificate/Inspection Certificate. Information on CO_2 emission is included in the certificate, but not fuel consumption. The Certificate should therefore be reviewed to include fuel consumption. The Consumer Protection (Control of Imports) Regulations 1999 should therefore be amended.

(vi) Eco driving and fuel consumption: A proposal to introduce eco driving at the level of driving tests is already under consideration. Companies and individual car owners need to be encouraged to install a Driver's Behaviour Monitoring System in their vehicles. A mass sensitization campaign on eco driving should be undertaken.

(vii) Fitness tests should be done after 3 or 5 years or based on the mileage per year, instead of after 7 years. The servicing of vehicles should be done at approved agencies where the checks are done as per the manufacturer's guidelines. Fitness tests should not be limited to only verification of particulars of cars. The fitness centres should be transformed into a repository of data on all vehicles that are examined. MITD or other specialized garages could be empowered to check the performance of vehicles (fuel consumption and CO_2 emission) and provide certification against payment.

(viii) The life span of vehicles should be reviewed and regulated by legislation. Vehicles should be assessed, based on road worthiness rather than age. A scheme could be put in place to encourage owners of old vehicles to purchase better vehicles and to stop

using their old vehicles. However, a distinction has to be made between vintage and old vehicles.

(ix) Information provided to a prospective buyer of any vehicle does not lay enough emphasis on the fuel consumption and the CO_2 emission. Clients should be informed on the efficiency of the vehicle and not only on the brand or accessories of the vehicle so that they are able to make informed decision prior to purchase. It is recommended that a Regulation for labeling of motor cars be developed to provide information on the fuel consumption and carbon dioxide emission of cars and not only on the make of the vehicle.

(x) Insurance and road tax: the introduction of different insurance policies and tariffs for road tax for fuel efficient vehicles was discussed. Also whether vehicle taxes could be differentiated according to CO_2 emissions and fuel efficiency and whether insurance companies could offer incentives for owners of fuel efficient vehicles. This proposal was not retained.

2.3 Report on cost-benefit analysis and the finalized policy recommendations

The Sub-committee on Cost-Benefit Analysis (CBA) of Policy Options was responsible for analyzing the Vehicle Inventory and Fuel and Vehicle Legislation Reports with the main objective to identify, measure and value the economic, financial and social benefits and costs of identified policy interventions in reducing CO_2 emissions and average fuel consumption.

2.3.1. Policy Options and Recommendations

The Sub-committee on Fuel and Vehicle Legislation and Cost-Benefit Analysis discussed about various policy options and regulatory issues and came up with recommendations which are outlined below:

2.3.1.1 Road Tax

In Mauritius, vehicle owners have to pay an annual road tax based on the engine capacity and vehicle type. However, owners of autocycles; around 114,985[1], are exempted from yearly road taxation. Road tax is collected by the National Transport Authority (NTA).

The Sub-committee on CBA proposed that a new mechanism could be put in place to collect the road tax at source through inclusion in the retail prices of Mogas (gasoline) and Gas Oil (diesel). This mechanism would reflect a kind of "Pay as You Drive", that is the more you travel, the more fuel is consumed and the more pollution is caused to the environment for which drivers need to compensate.

Advantages:

The Sub-committee highlighted that replacement of existing road taxation system through the "Pay as You Drive" scheme presents several advantages, inter alia:

(i) This measure would be fairer to people driving less, compared to those covering high mileages annually;
(ii) This scheme would also apply to autocycles owners who were so far exempted from road tax;
(iii) This will prevent the NTA from incurring loss of revenue, for example core services of road tax payment (MVL) has been outsourced to the Mauritius Post Ltd whereby over

[1]Source: Statistics Mauritius – Road transport and road traffic statistics 2013.

60% of MVL transactions are carried out and for which a commission of Rs 34.50 is paid per MVL disc which is a loss of revenue for Government;

(iv) Fake entries, fitness certificate, insurance certificate, dishonoured cheques among others would no more be a problem;

(v) Prevent fraud by vehicle owners regarding modification of their engine capacity with a view to pay less road tax.

Moreover, there are other direct costs and unaccounted costs associated with the MVL system. It also came out that there were a number of risk factors associated with the current road taxation system. All details are provided in the Sub-committee Report on CBA.

Estimation of road tax for inclusion on fuel prices

The computed results indicated that for vehicles running on Mogas, the yearly road taxation represented approximately Rs 4.50/litre and for Gas Oil, same was around Rs 2.00/litre. This implies that the retail price of Mogas and Gas Oil would increase by Rs 4.50 and Rs 2.00 respectively as shown in the Table 7 below.

Table 7: Proposed retail prices of Mogas and Gas Oil in Mauritius

	Mogas	Gas Oil
Reference Price - US$ per metric ton	**953.7200**	
Reference Price - US$ per barrel		**117.3300**
CIF - US$/litre	0.7793	0.7977
Exchange rate – Rs/US$	31.0500	31.0500
	Rupees per litre	
CIF	**24.1973**	**24.7686**
Excise duty	10.8000	3.3000
Maurice Ile Durable levy	0.3000	0.3000
Contribution to Road Development Authority	1.8500	1.7500
Contribution to Rodrigues transportation and storage	0.0500	0.0500
Contribution to the Build Mauritius Fund	1.0000	1.0000
Contribution to subsidy on LPG, Flour and Rice	1.5000	1.5000
STC's operational expenses	0.3500	0.4000
Adjustment	0.0274	0.0182
TRANSFER PRICE TO OIL COMPANIES	**40.0747**	**33.0868**
Oil Companies' operational expenses and wholesale margin	1.8200	1.6700
VAT (15%)	6.5413	5.4652
WHOLESALE PRICE	**48.4360**	**40.2220**
*** Contribution as Road Tax**	**4.5000**	**2.0000**
Retail margin (Filling station's margin)	1.7140	1.6780
RETAIL PRICE (Price at Filling Station)	**54.6500**	**43.9000**

** Proposed contribution as Road Tax*

The revenue on the road tax collected through this mechanism for year 2013 is estimated to Rs 1312 million. Over and above, the NTA would save in terms of human resources at NTA and Post Offices for the collection of road tax, which would not be necessary. The savings amounts to around Rs 21 million. It is worth noting that in 2013, the road tax collected by the NTA amounted to Rs 1280 million for Mauritius and Rs 11 million[2] for Rodrigues.

Recommendations:

- Retail price would increase for which a National Awareness Campaign would need to be made for the public in general.
- If the above computation measure is applied to bus owners, the bus fare would increase accordingly. It is proposed that Government refunds the additional cost incurred for the purchase of fuel to maintain the bus fare.
- The computation be undertaken annually to reflect the number of vehicles on the road and the amount of fuel imported used for transportation purposes.

2.3.1.2 CO_2 Levy/Rebate Scheme

Under the provisions of Section 3C of the Excise Act 1994, a CO_2 Levy/Rebate Scheme was introduced in July 2011. Based on a set of CO_2 threshold, a CO_2 rebate is granted and deducted from the Excise Duty, and a CO_2 levy is payable and added to the Excise Duty.

The calculation of the CO_2 levy/rebate is based on a computed CO_2 emission threshold using the formula below according to the First Schedule of the Excise Act:

CO_2 levy or CO_2 rebate: A = R x (C – T)

Where:
A – is the amount of the CO_2 levy or CO_2 rebate;
R – is the appropriate rate of the CO_2 levy, or the appropriate CO_2 rebate, per gramme per kilometer (g/km);
C – is the CO_2gramme per km of the motor car, rounded to the nearest whole number; and
T – is the CO_2 set threshold in gramme per km.

The threshold is reviewed annually by the Technical Certification Committee (TCC) chaired by Statistics Mauritius in order to reflect the pattern of importation of new motor vehicles and to make recommendations to the Ministry of Finance and Economic Development. Data being used to compute the new threshold are from Customs Management System Database

[2] Source: National Transport Authority

(Mauritius Revenue Authority) for new imported cars and cover the period January to December. From July 2011 to November 2013, the set threshold was 158 g/km. The rate of rebate was the same whether based on UN/ECE Regulation No. 101 or other than UN/ECE Regulation No. 101 (Table 8).

Table 8: Appropriate Rate of CO_2 Rebate

Value of C	Value of R
CO_2 gramme per km	**Rate**
Up to 90	Rs 3,000 per gramme per km
91 to 158	Rs 1,000 per gramme per km

The rate of levy was as per Table 9 below:

Table 9: Appropriate Rate of CO_2 Levy

Value of C	Value of R
CO_2 gramme per km	**Rate**
159 to 190	Rs 2,000 per gramme per km
191 to 225	Rs 3,000 per gramme per km
226 to 290	Rs 4,000 per gramme per km
Over 290	Rs 5,000 per gramme per km

As per data from Mauritius Revenue Authority (MRA) on rebate and levy calculated, it was observed that the levels of CO_2 emissions from second hand cars were very much lower from the CO_2 threshold. Hence, the rebate that had been granted by the Government was very high.

Consequently to address this problem, the Excise Act was amended in November 2013 to apply a lower rate of rebate for cars with a CO_2 emission Certificate which is not in conformity with the UN/ECE Regulation No. 101 and at the same time, the CO_2 threshold was lowered to 150 g/km.

Table 10: Present Rate of CO_2 Rebate

Value of C	Value of R, where C is computed in conformity with UN/ECE Regulation No. 101	Value of R, where C is not supported by a CO_2 emission certificate issued in conformity with UN/ECE Regulation No. 101
CO_2 gramme per km	**Rate**	**Rate**
Up to 90	Rs 3,000 per gramme per km	Rs 1,000 per gramme per km
91 to 150	Rs 1,000 per gramme per km	Rs 350 per gramme per km

It is to be noted that the rate for levy is same for all cars (Table 11).

Table 11: Present Rate of CO_2 Levy

Value of C	Value of R
CO_2 gramme per km	**Rate**
151 to 190	Rs 2,000 per gramme per km
191 to 225	Rs 3,000 per gramme per km
226 to 290	Rs 4,000 per gramme per km
Over 290	Rs 5,000 per gramme per km

Recommendations

(i) Policy to review the CO_2 threshold and to abolish the Rebate Scheme

As from 2015, all cars manufacturers in Europe, according to Regulation (European Commission) No. 443/2009 of the European Parliament and of the Council of 23 April 2009, will have to meet the CO_2 emissions level of 130 g/km. Moreover, by 2021, the emission level has been fixed to 95 g/km.

The heavy rebate granted by the Government is due to the fact that all analysis made to calculate the CO_2 threshold are based on the average CO_2 emissions of new cars imported in the previous year, whilst the average CO_2 emissions of second hand cars is very well below this threshold thus resulting in a huge deficit in the revenue.

Based on official figures, 82% of cars imported in 2013 had a CO_2 emission of ≤ 150 g/km and 62% had a CO_2 emission of ≤ 130 g/km. In view of the fact that more efficient vehicles are being imported and for which Government has to grant huge sums in terms of rebate, the Sub-committee on CBA proposed that the CO_2 threshold be reduced accordingly to 130 g/km and that a policy decision could be taken whereby the Government would not have to grant any rebate for all cars emitting 130 g/km or less. With this measure, the Government would only generate revenue through levy for cars emitting above 130 gCO_2/km, representing around 38% of cars imported.

(ii) To amend the Levy Scheme

Proposed rate of CO_2 levy

The Sub-committee on CBA proposed that the Levy Scheme should be amended with the setting the CO_2 threshold at 130 g/km (Table 12).

Table 12: Proposed Rate of CO_2 Levy

Value of C	Value of R, where C is computed in conformity with UN/ECE Regulation No. 101
CO_2gramme per km	Rate (in rupees per gramme per km)
*131-150	1000
151-190	2000
191-225	3000
226-290	4000
Over 290	5000

** Proposed threshold.*

The Sub-committee on CBA compared three scenarios where the threshold of CO_2 in terms of g/km was taken as 158 g/km, 150 g/km and 130 g/km respectively. The findings of this analysis, revealed the following:

	Past (Jan-Dec 2013)	Actual	Proposed
REBATE	**158 g/km**	**150 g/km**	**130 g/km**
New cars (Million Rupees)	117	26	0
Second hand cars (Million Rupees)	432	115	0
TOTAL REBATE	**549**	**141**	**0**

	Past (Jan-Dec 2013)	Actual	Proposed
LEVY	**158 g/km**	**150 g/km**	**130 g/km**
New cars (Million Rupees)	81	115	166
Second hand cars (Million Rupees)	12	16	34
TOTAL LEVY	93	**131**	**200**
NET TOTAL	**(456)**	**(10)**	**200**

If the CO_2 threshold is lowered to 130 g/km:

- No rebate would be paid by Government as it is proposed to abolish the Rebate Scheme. In fact, Government would save Rs 456 M which was paid as rebate when the CO_2 threshold was 158 g/km;
- Government could collect Rs 200 million as CO_2 levy;
- The levy for second hand cars would double from Rs 16 to 34 million (112% increase); and

- The levy for new cars would increase from Rs 115 to 166 million (44% increase).

Based on the data from the MRA, of all the cars imported in 2013, it was observed that most of second hand cars are small cars such Toyota Vitz and Nissan March. This explains why the levy collected is relatively low compared to the levy collected for new cars.

Recommendations:

- The Technical Certification Committee at the Ministry of Finance and Economic Development chaired by the Director of Statistics Mauritius should review the CO_2 emissions level and align it with European Union norms that is 130 g/km in 2015 and subsequently reduce it progressively to 95 g/km in 2021. The proposed rate of CO_2 levy should be amended accordingly.
- The Rs 200 million levy collected could be used to finance other measures recommended by the Sub-committee such as scrapping of old vehicles and purchase of a newer vehicle as well as incentives for biofuel.
- Cleaner fuels should be introduced as more efficient vehicles are being imported. This will at the same time help in curbing down the problem of black smoke emission.

2.3.1.3 Test procedures

A single standard should be used to make the assessment of CO_2 emission for both new and second hand cars.

Car manufacturing countries are working on a standardized measurement of CO_2 called the World Harmonised Light Vehicles Test Procedures (WHLVTP) which might become mandatory as from 2017 and hence resolve the problem of having two test procedures.

2.3.1.4 Eco driving

Eco driving is a smarter and more fuel efficient driving culture. It offers numerous benefits and the most important personal and immediate benefits are the saving of fuel costs and safety of driver and passengers. By reducing fuel consumption, eco driving also reduces the emission of greenhouse gases as well as local air pollution.

It is recommended to introduce eco driving modules/courses at the level of driving schools for safe driving as well as for fuel economy. A net saving of at least 10% on fuel consumption

could be achieved. Given that 1 litre of gasoline gives rise to 2.372 kg of CO_2 and 1 litre of diesel oil gives rise to 2.640 kg of CO_2, it is estimated that around 43 million litres of fossil fuel would be saved per year, resulting in a reduction in emissions of 108.6 Gg CO_2.

Recommendations:

- Integration of eco driving into learner driver education through driving schools and further education of licensed drivers on eco driving.
- Recognized and registered trainers of driving schools should be trained on eco driving so that they in turn impart the concepts to their students.
- Eco driving should gradually be introduced at the level of driving tests.
- A Driving Education and Testing Centre with new types of infrastructure and driver education facilities should be set up.
- Training programmes on eco driving should be undertaken for licence holders (e.g. drivers in public and private sectors, general public). Each company should provide training to their drivers under the module of driving for economy /safety.
- To encourage companies and individual car owners to install a Driver's Behaviour Monitoring System in their vehicles which is a device to ensure that drivers are engaged in eco driving at all times.
- A mass sensitization campaign on eco driving should be undertaken. This could include communicating tips on eco driving at fitness centres, where hundreds of people transit everyday and the distribution of flyers at fuel dispensing stations to reach out to the maximum number of people.

2.3.1.5 Introduction of Park and Ride Service

It is estimated that about 100,000 vehicles enter and leave the City of Port Louis (main business centre and capital of the country) during peak hours and fuel consumption and carbon dioxide emission due to vehicular traffic and congestion is quite consequent. Hence, the need to reduce the number of vehicles entering Port Louis.

To address the transportation and congestion issue, the Government is envisioning the implementation of the Light Rail Transit system (LRT) between Curepipe and Port Louis. The project is at evaluation and tendering stage. With the coming into operation of the LRT, it is

estimated that around 25,000 vehicles would not pass through the Port Louis as a Park and Ride Service would be integrated in the project.

As 1 litre of diesel oil and gasoline give rise to 2.640 and 2.372 kg of CO_2 emissions respectively, it is estimated that an amount of 19.2 million litres of fuel would be saved yearly and 46 Gg of CO_2 would not be emitted.

Recommendations:

- Introduction of Park and Ride Service accompanied with safe parking facilities at strategic points; comfortable buses with appropriate fares and timely departures.

2.3.1.6 Old Vehicles

It was observed that most old vehicles were inefficient due to their early technologies and caused environmental pollution. It is proposed that owners of cars 30 years or above be encouraged to buy better cars by giving them an incentive of up to Rs 30,000 prior to putting the vehicle off the road and purchase another vehicle of less than 5 years old. This sum could be granted through a rebate or relief in paying the registration duty of the vehicle purchased. It estimated that 5,000 vehicles would be removed annually once the scheme is put in place. It is estimated that this measure would help to save 1.2 million litres of fuel annually. This would mitigate about 3 Gg of CO_2 emissions.

Recommendation:

- Cars 30 years old or above should not be allowed to run. The owners of these cars could be given a sum of up to Rs 30,000 to stop using their old cars and purchase another vehicle of less than 5 years old.

2.3.1.7 Incentive for biofuels

Mixed with gasoline, ethanol is used as fuel. Normally, the ethanol is blended with gasoline up to a certain proportion to be used as fuel in motor vehicles running on spark ignition engine. According to Bell et al. (2011)[3], one litre of E10, that is, 10% anhydrous ethanol and

[3] Source: Bell, D. R., Silalertruksa, T., Gheewala, S. H., Kamens, R. 2011. The net cost of biofuels in Thailand—An economic analysis. Energy Policy. 39, 834–843.

90% gasoline, is equivalent to 0.967 litre of gasoline. This is due to the lower caloric value of ethanol. Consequently, a vehicle running on E10 consumes about 3.4% more than those running on gasoline. Mauritius imported 181 million litres of gasoline in 2013 for use as fuel in vehicles. With the introduction of E10, it would lead to the use of 19 million litres of ethanol and 168 million litres of gasoline. Therefore, 13 million litres of gasoline would not be imported representing a reduction in emission of 31 Gg of CO_2.

However, the implementation of E10 would cause a shortcoming of Rs 140 million for the Government of Mauritius in terms of excise duties. It is assumed that ethanol would be exempted from excise duties as an incentive measure to keep the price of E10 at par or less than the current price of gasoline sold to consumers. This would also bring additional revenues to our cane sector and help to make the cane industry sustainable and viable.

Recommendations:

- Once a decision is taken by Government to embark on biofuel, incentives could be given to local industries to produce anhydrous ethanol (e.g. tax rebate).
- A mechanism should be put in place to verify the quality of the biofuels supplied at filling stations.

3. Public Outreach Activities

3.1 Posters on GFEI were exhibited during important environmental events such as World Environment Day 2014.

3.2 The first workshop on GFEI was organised by the MOESD in collaboration with UNEP on 22 and 23 July 2013 at Le Maritim Hotel, Balaclava with participants from the land transport and automobile sectors. The main objective of the workshop was to sensitize key stakeholders in Mauritius on the need to monitor their vehicle import trends. This will facilitate the formulation of vehicle strategies that promote the import of fuel efficient cars, as fuel quality improvements are realized. The workshop thus kick started the implementation of the GFEI project which entails baseline setting and monitoring of vehicle fuel efficiency trends, proposals for additional policies based on a cost-benefit analysis for Government intervention including an analysis of the "feebate system" based on rebates and taxes. During the workshop, participants learned from the experience of South Africa and Ethiopia on the GFEI project, particularly in data gathering, baseline setting and cost-benefit analysis.

3.3 The second national workshop has been scheduled for the 27 November 2014 to share with all stakeholders the key findings and policy recommendations of the National Task Force Committee.

4. Collaboration opportunities for national level activities

4.1 Sensitization campaigns

Sensitisation campaigns covering, amongst others, the health impacts of emission from vehicles, causes of black smoke emissions from vehicles, the role of each vehicle owner and regulations are carried out in collaboration with the Mauritius Broadcasting Corporation (MBC), the National Transport Authority, Ministry of Health and Quality of Life and Police de L'Environnement. The TV programmes are carried out in several languages to reach all sectors of society.

4.2 Eco driving

The Ministry of Environment and Sustainable Development in collaboration with the Prime Minister's Office organized a half-day seminar on 27 March 2014 for fleet managers of the private and public sector and an advance training course on 28 March 2014 for Government officials and representatives of the Driving School Association on Eco-driving. The seminar and training was conducted by two international experts, namely Mr. D. Herregods and Mr. J. Daveau. Powerpoint presentations are at Annexes 3 and 4.

5. Other activities

GEF - 6 multifocal project: Climate change mitigation, chemical and waste, low-emission, climate resilient urban development in the Port Louis–Plaines Wilhems Conurbation:

Project implementing partners: Prime Minister's Office (Maurice Ile Durable Commission), Ministry of Public Infrastructure, National Development Unit, Land Transport & Shipping, Ministry of Industry, Commerce & Consumer Protection, Ministry of Local Government & Outer Islands and Board of Investment.

Project summary: This multi-focal area project will seek to reduce greenhouse gas emissions from a range of sectors (buildings, transport, industry and waste) in the Port Louis–Plaines Wilhems Conurbation. The project will be highly strategic, supporting key Government priorities including bus modernisation, the Port Louis-Curepipe Light Rail Transit System and more efficient use of energy to promote national energy security.

6. Summary of Recommendations

Short Term (within 1 year)

- Provide better incentives for the purchase of hybrid vehicles;
- Use GFEI model for consistency in compiling the database of vehicles;
- Fitness tests should be done more frequently (after 3 or 5 years) rather than after 7 years;
- Policy to review the CO_2 threshold to 130 g/km in the first instance and progressively to 95 g/km to align it with European Union norms. The Levy Scheme to be amended accordingly to calculate the CO_2 Levy based on the new set threshold.
- Abolish the Rebate Scheme as Government is granting a huge sum in the form of rebate;
- The levy collected could be used to finance other measures such as scrapping of old vehicles and incentives for biofuel;
- The Consumer Protection (Control of Imports) Regulations 1999 should be amended to include fuel consumption in the Pre-shipment Inspection Certificate/Inspection Certificate;
- Need to enhance enforcement against polluting vehicles;
- Implement the eco driving concept, including integration of eco driving into learner driver education through driving schools and further education of licensed drivers on eco driving.

Short to medium term (1-3 years)

- Cleaner fuels should be introduced as more efficient vehicles are being imported;
- Encourage the use of biofuels such as biodiesel and bioethanol;

- A Regulation for labeling of motor cars should be developed to provide information on the fuel consumption and CO_2 emission of cars and not only on the make of the vehicle.

- The Road Traffic (Construction and Use of Vehicles) Regulations 2010 to be amended to require passenger cars and LCVs newly registered to be to Euro 4 standard, and heavy vehicles to Euro 3 standard, from a date to be established.

Medium to Long Term (more than 3 years)

- The Government to come up with a policy to remove from the vehicle fleet all vehicles above 30 years old. A scheme could be put in place to encourage owners of old vehicles to purchase better vehicles and to stop using their old vehicles;

- A new mechanism could be put in place to collect road tax at source through inclusion in the retail prices of Mogas (gasoline) and Gas Oil (diesel). This mechanism would reflect a kind of "Pay as You Drive". The Government needs to carry out an awareness campaign on the mechanism of "Pay as You Drive". Moreover, the Government need to refund the additional cost incurred for the purchase of fuel to maintain bus fare;

- Introduction of the Park and Ride Service accompanied with safe parking facilities at strategic points; comfortable buses with appropriate fares and timely departure;

- Setting up of a Driving Education and Testing Centre with new types of infrastructure and driver education facilities to promote eco driving.