



Air Quality Improvement achieved from the Vehicle Fleet of Hybrid Motor Car in Sri Lanka – Sample Survey Results and Assessment of Technology and Characteristics of Owner ship

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Air Quality Management and Climatic Change

Introduction

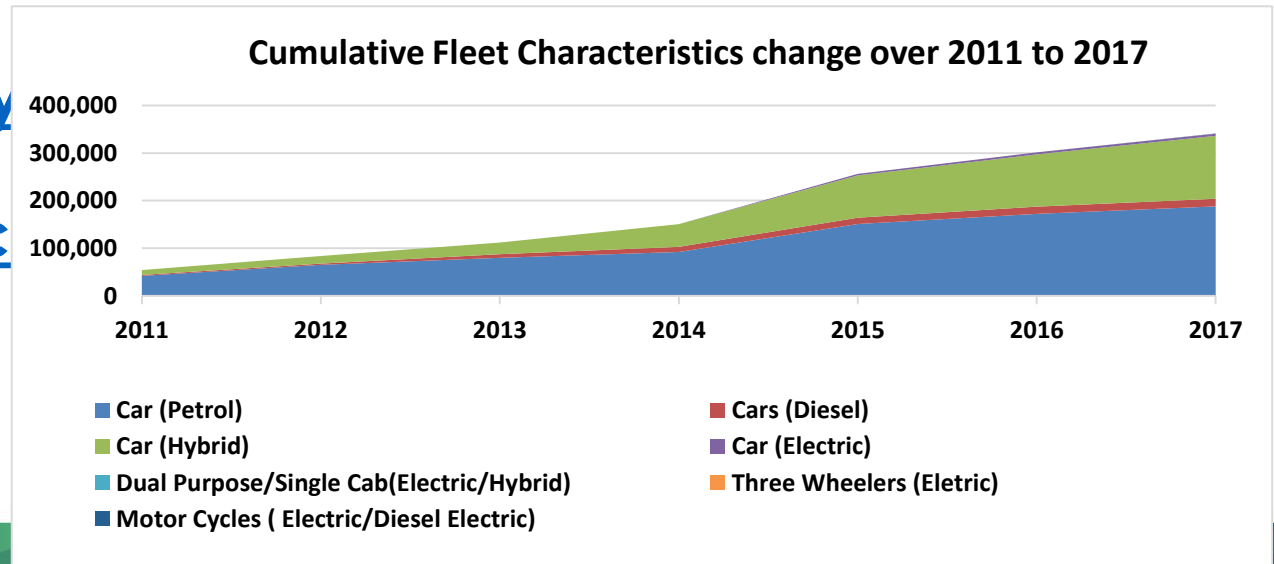
It has been estimated that the approximately 60% of the fossil fuel consumption is accounted for transport sector in 2011 which was around 68% before 2011. The Government of Sri Lanka (GOSL) introduced a well design tax policy to encourage vehicle owners to choose the hybrid technology as one of the demand management tool to reduce the fossil fuel consumption in Sri Lanka. There was rapid economic growth since 2009 up to 2014 keeping average GDP growth around 6% taking Per Capita GDP from US \$ 1200/= in 2010 to US \$ 3,842 in 2014. This made to increased of vehicle ownership and the petrol and Diesel consumption. The Clean Air Sri Lanka which is the local network of Clean Air Asia under took the study with sample survey of hybrid vehicle performance on fuel consumption and productivity to provide analytical inputs for policymakers to consider for further refining the current fiscal policy to reduce vehicle emission which contributes to air pollution.

Overview of the Research

The cumulative motor car fleet of Hybrid has reached 132,197 and Electric Motor Car reached 4,417 in 2017,. The Radom Sample survey executed to assessed the effective benefits from hybrid fleet through questioner.

Hybrid [Car Survey](#)

[Vehicle Fleet.doc](#)



Fuel Performance of Hybrid

This against 8.1 km of petrol and diesel motor car

Mean Km/litre = 16.8; Min =10.3; Max = 35.1

Fuel Efficiency	Toyota	Other make
Per Litre	Engine (1490)	Engine (1490)
km 8-10	16	22
km 11-15	57	59
km 16-20	138	7
km 21-25	25	16
km 26-30	5	5
km 31-35	24	26
Total	265	135

Source: Hybrid Motor Car Survey, 2017, Clean Air SL

Performance of driving by gender

Fuel Efficiency	Male	Female	Not Specified
Km's per Litre			
10-15	85	60	23
16-20	154	53	17
21-25	39	9	3
26-30	8	4	0
30-40	4	1	6
Mean	17.29	16.12	15
Min	10	10	10
Max	40	32	25

Mean value of hybrid is around 17km per litre

Minimum is always 10 km per litre and max goes 32 to 40 km per litre

Operational Characteristics of Hybrid Motor Cars

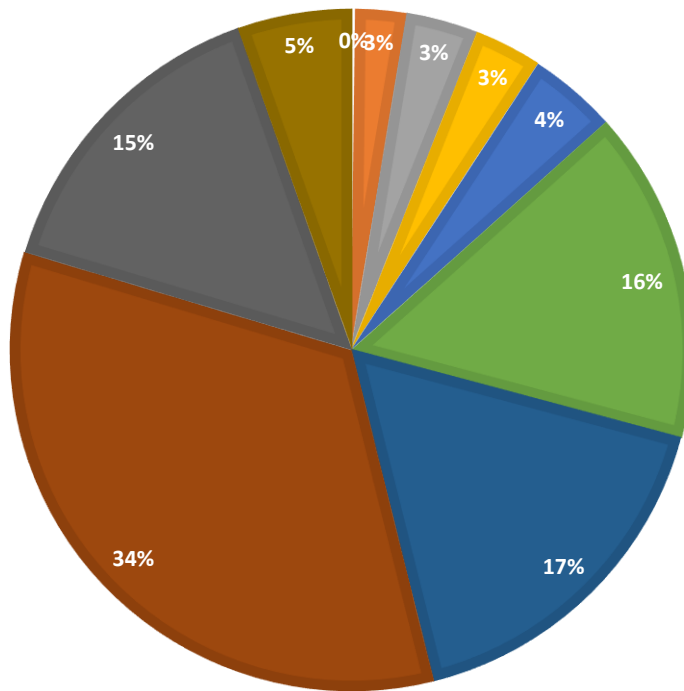
	Weekly operated Km's	Average Occupancy
Mean	237.2763419	2.299595142
Minimum	75	1
Maximum	400	6
Annual Operated KM Per one car	12,372.27	
Passenger km operated per one car	28,451.20	
Total Fleet Operated	132,197	
Total Km operated by Hybrid	1,635,576,501.49	
Total PKM operated by Hybrid	3,761,163,776.71	

Source: Hybrid Motor Car Performance Survey, 2018, Clean Air SL

Hybrid Fleet Characteristics (year of Manufacture)

HYBRID MOTOR CAR BY YEAR OF MANUFACTURE

2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

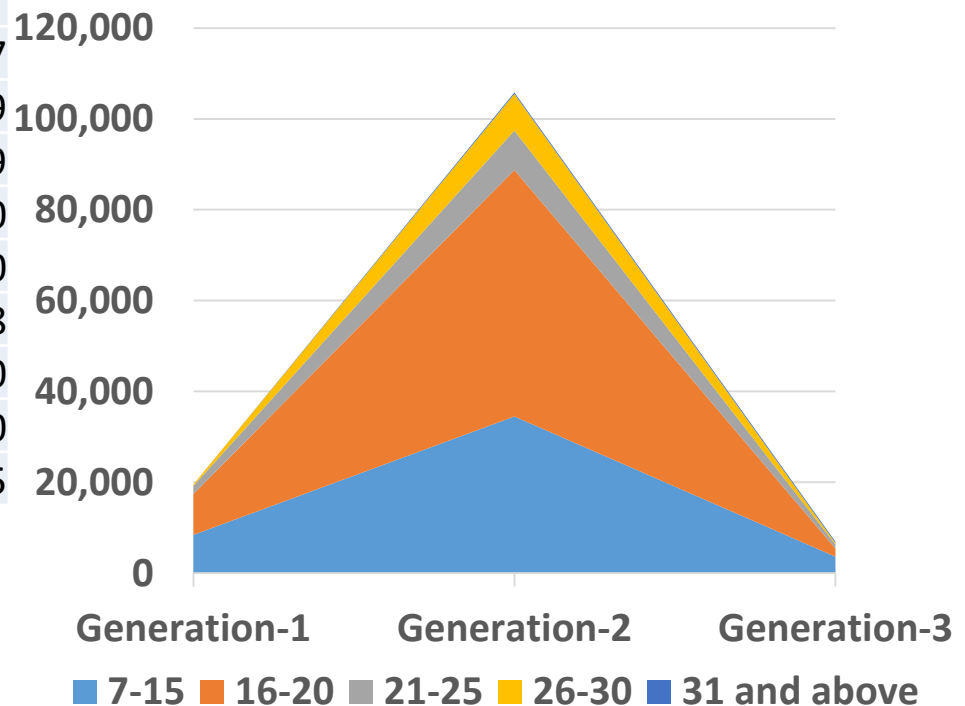


Year	No of MC	%
2007	279	0.21%
2008	3,347	2.53%
2009	4,741	3.59%
2010	4,462	3.38%
2011	5,857	4.43%
2012	22,033	16.67%
2013	23,706	17.93%
2014	46,855	35.44%
2015	20,917	15.82%
2016	7,530	5.70%
	132,197	

Hybrid Motor Car Fuel Efficiency by Generations

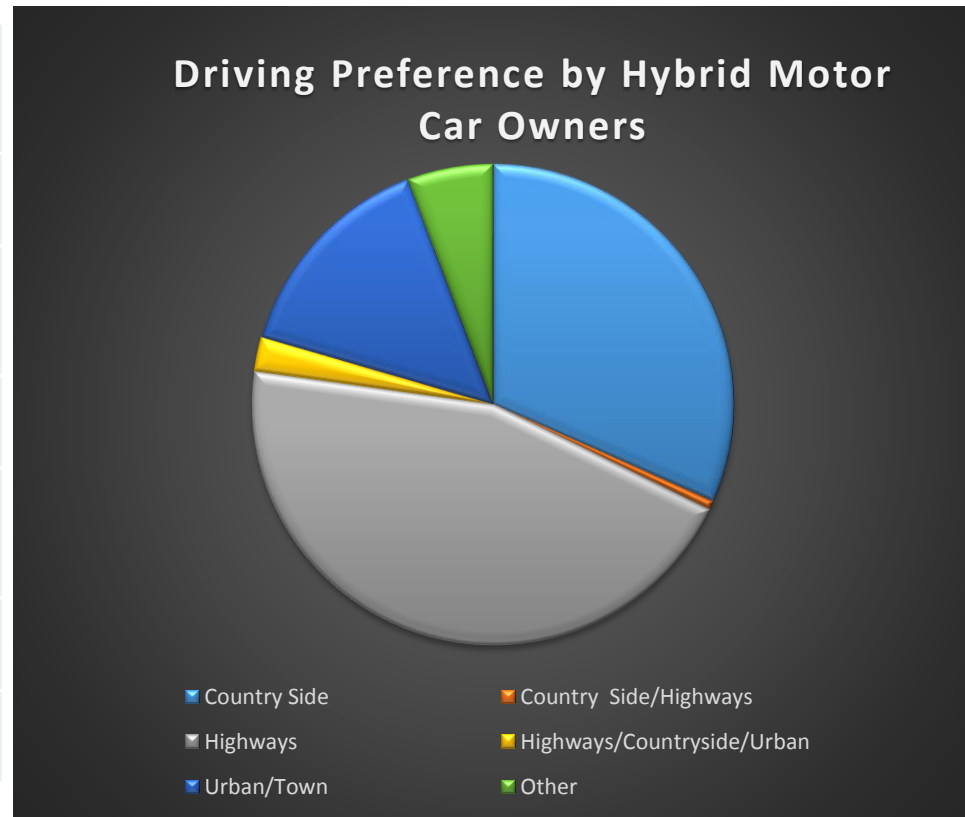
Km's per Litre	Generation-1	Generatio n-2	Generati on-3
7-15	8,393	34,473	3,597
16-20	8,993	54,258	1,799
21-25	1,799	8,693	899
26-30	300	8,094	300
31 and above	0	300	300
Mean	15.78	16.2	16.48
Minimum	9	9.7	10
Maximum	27	37	40
Total	19,485	105,818	6,895

Hybrid Fleet Performance by Generations



Driving Preference by Hybrid Motor Car Owners

Driving Preference	Number	%
Country Side	165	31.61%
Country Side/Highways	3	0.57%
Highways	235	45.02%
Highways/Countryside/Urban	12	2.30%
Urban/Town	77	14.75%
Other	30	5.75%



Fuel saving due to Hybrid motor car fleet in 2017

- I. The Hybrid Motor Car fleet has produced **1,635,576,501km's** with **3,761,163,776 Pkm's** using **95,091,657** litres of petrol
- II. If this number of vehicle km's produces by regular petrol motor car uses **201,923,025 litres of Petrol** which uses 106,831,368 additional litres of petrol in 2017 (2.1 times from regular motor car fuel use)
- III. The total foreign exchange savings amounting to **US \$ 75,850,271.1 (US \$ 75.8 million)** as per price of **US \$ 64.5 per barrel.**

Conclusion and Recommendation

- I. The Random sample survey on the operational impact of Hybrid fleet (42% of operational fleet) shows that made tangible financial savings, but has increased the use of motor cars with high operated km's
- II. The Urban Traffic Congestion has increased as a result of this reducing CMA travel speed from 16km's per hours to 9 Km's in 2017
- III. Therefore, demand management tools need to be designed to address all of these variables also to manage to meet final goal

Thank You from Sri Lanka !!