



Case Study-Kenya Fuel Economy Baseline

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Introduction

Global Fuel Economy Initiative (GFEI) methodology gives guidelines on how to reduce pollution from transport. The methodology specifies:

- What parameters to measure?
- How to monitor the parameters?
- How to manage the parameters?

The GFEI Objectives includes:

- To improve fuel economy of motor vehicles.
- To reduce amount of generated pollutants.
- To promote better maintenance of motor vehicles
- To promote better policies for management of mobility

Background circumstances

- Most countries do not manufacture vehicles domestically.
- Entire fleet could be imported.
- Record of car import or registration are the sources of data.
- Institutions that collect and maintain the records do so for their own needs.
- The needs may not be compatible with those for establishing fuel economy.

Steps in Developing Vehicle Fuel Economy Database

Step 1: Obtain vehicle registration records

- Such data include all categories of vehicles – motorcycles and mopeds, three wheelers, Light Duty Vehicles (LDV's), Heavy Duty Vehicles (HDV's) > 3500kg (buses and trucks)

Step 2: Clean Data

- To remove non - LDV's from database.
- Rectify errors e.g. spelling mistakes and wrong entries.
- Classify vehicles as new or used.

Step 3: Key attributes

- Fuel consumption tests conducted in laboratories are representative of actual average on road performance.
- **Urban cycle:** These are carried out at ambient temperature of 20 – 30 degrees centigrade from a cold start. The cycle consist of a series of accelerations, steady speeds, decelerations and idling. Max speed is 50km/hr, average speed is 19km/hr and distance covered is 4km.
- **Extra Urban Cycle:** This is conducted immediately after urban cycle. Max speed 120km/hr, average speed 63km/hr and distance covered 7km.
- **Combined Fuel Consumption Figure:** Is the average of the two tests weighed by the distance covered in each part.

Step 4: Basic fields used in determining fuel economy:

- Vehicle make
- Vehicle model
- Vehicle identification number/Chassis number
- Body type
- Engine capacity (cc)
- Fuel type
- Year of manufacture
- Year of registration
- Tare weight

Information From Manufacturers Websites/Car Guides

- Check fuel economy and CO2 emissions.
- Example is the Australian Government Initiative accessible at <https://www.greenvehicleguide.gov.au/>

Total	Condition	Body	Make	Model/Description	Year of Prod.	Year of Reg	Fuel Type	Engine Capacity (CC)	CO ₂ (g/km)	Fuel Economy(L/100km)	Vehicle Use	No. of Passengers	Tare Weight (kg)
2	Used	S. Wagon	Toyota	Avensis DBA-AZT250	2005	2011	Petrol	1990	220	9.2	Private	5	1280

Step 5: Convert fuel economy and CO₂ to NEDC

- Europe, Japan, and the United States have each developed their own test procedures to determine fuel economy and GHG emissions. Below is a comparison of the majority of test procedures used globally.
- CAFE – United States Corporate Average Fuel Economy
- NEDC – New European Driving Cycle
- JC08 – Japanese Test Cycle (2008)

Simulation Results for Gasoline Vehicle Fuel Economy Ratings Under Various Test Cycles

TYPE	MAKE	MODEL	TEST CYCLE FE (MPG)			TEST CYCLE MULTIPLIER		
			NEDC	CAFE	JC08	NEDC-JC08	CAFE-JC08	CAFE-NEDC
Small Car	Ford	Focus	26.0	29.8	22.9	1.14	1.30	1.15
	Toyota	Corolla	32.4	34.8	27.6	1.17	1.26	1.08
	Toyota	Yaris	40.6	42.2	36.1	1.12	1.17	1.04
	Honda	Fit	36.0	40.1	31.8	1.13	1.26	1.11
	Hyundai	Accent	35.1	39.0	32.1	1.09	1.21	1.11
	Kia	Rio	35.4	39.1	32.2	1.10	1.21	1.10
	Daewoo	Aveo	31.2	35.5	26.1	1.19	1.36	1.14
Large Car	Toyota	Camry	24.7	26.6	21.5	1.15	1.24	1.08
Minivan	Dodge	Grand Caravan	20.5	23.9	17.2	1.19	1.39	1.17
SUV	Ford	Explorer	17.6	20.2	14.6	1.20	1.38	1.15
Pickup	Chevrolet	Silverado	15.9	18.8	13.5	1.18	1.39	1.18
Crossover	Saturn	Vue	23.0	26.3	19.8	1.16	1.33	1.14
Simple Average						1.15	1.29	1.12

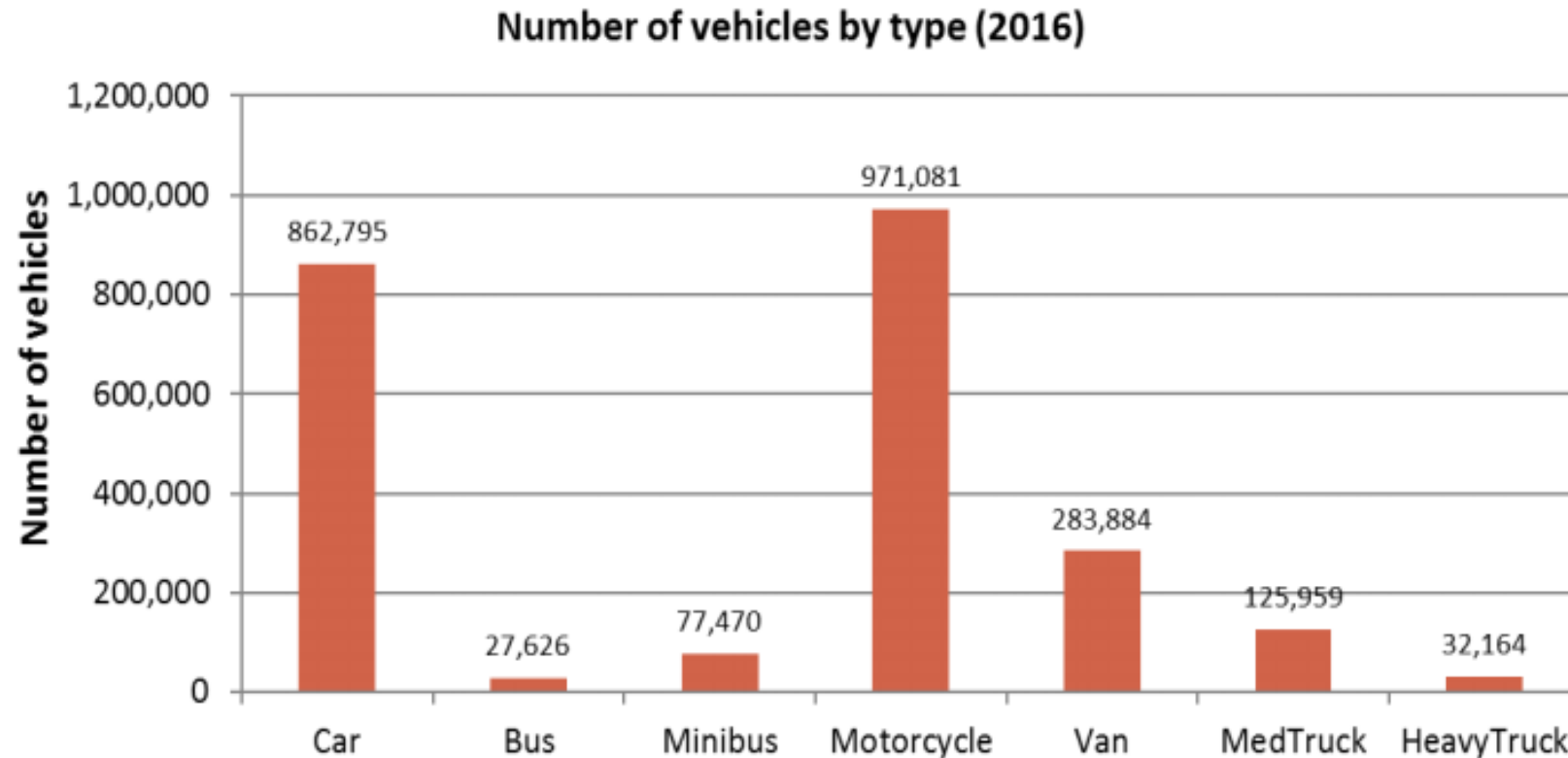
Step 6: Calculate weighed averages of:

- baseline fuel economy in L/ 100 km
- CO₂ emissions gCO₂/ km

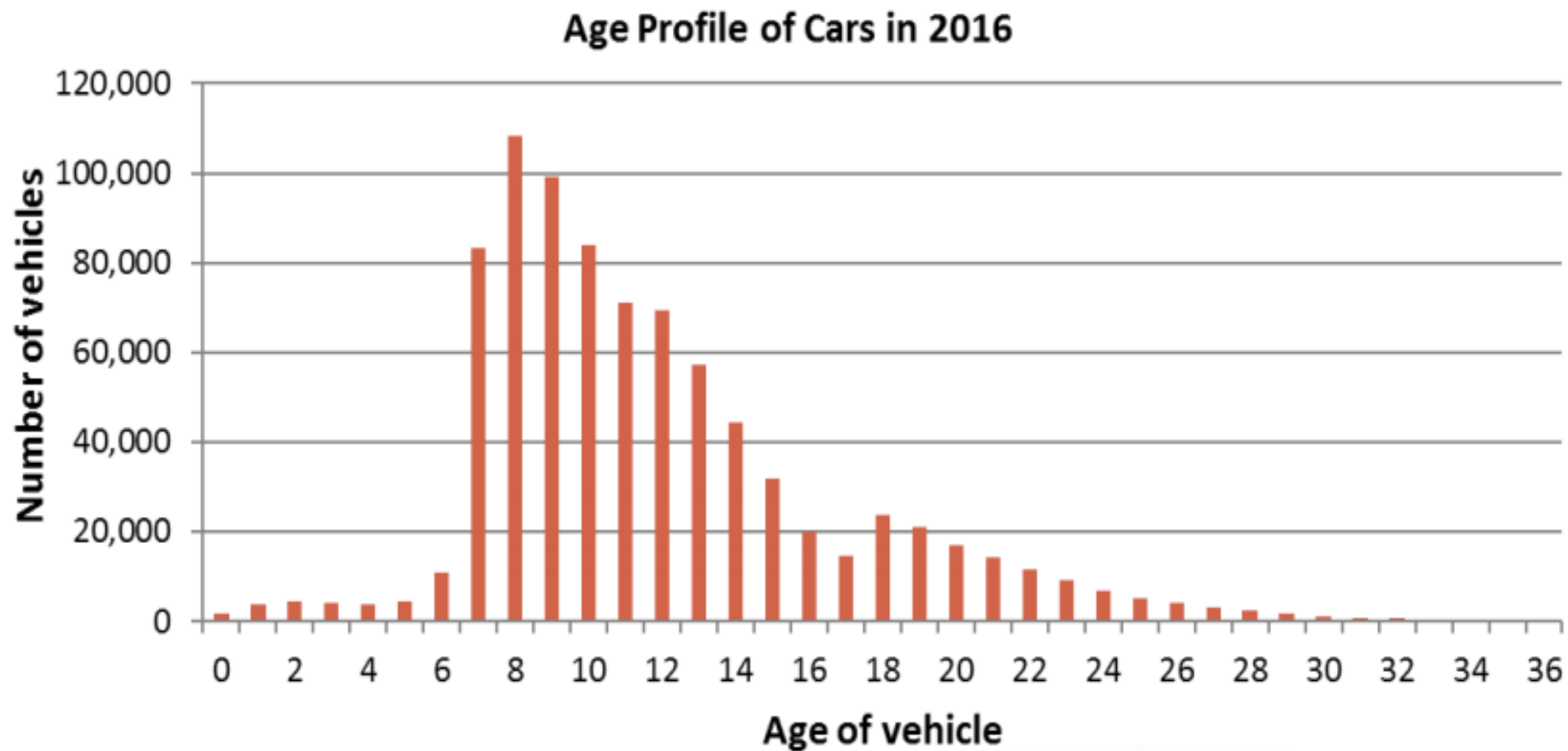
Step 7: Report findings on fuel economy, CO₂ emissions and Trends for period of study

Selected results from GFEI Study in Kenya

Current Situation – Fleet Size



Average private car age is 11 years



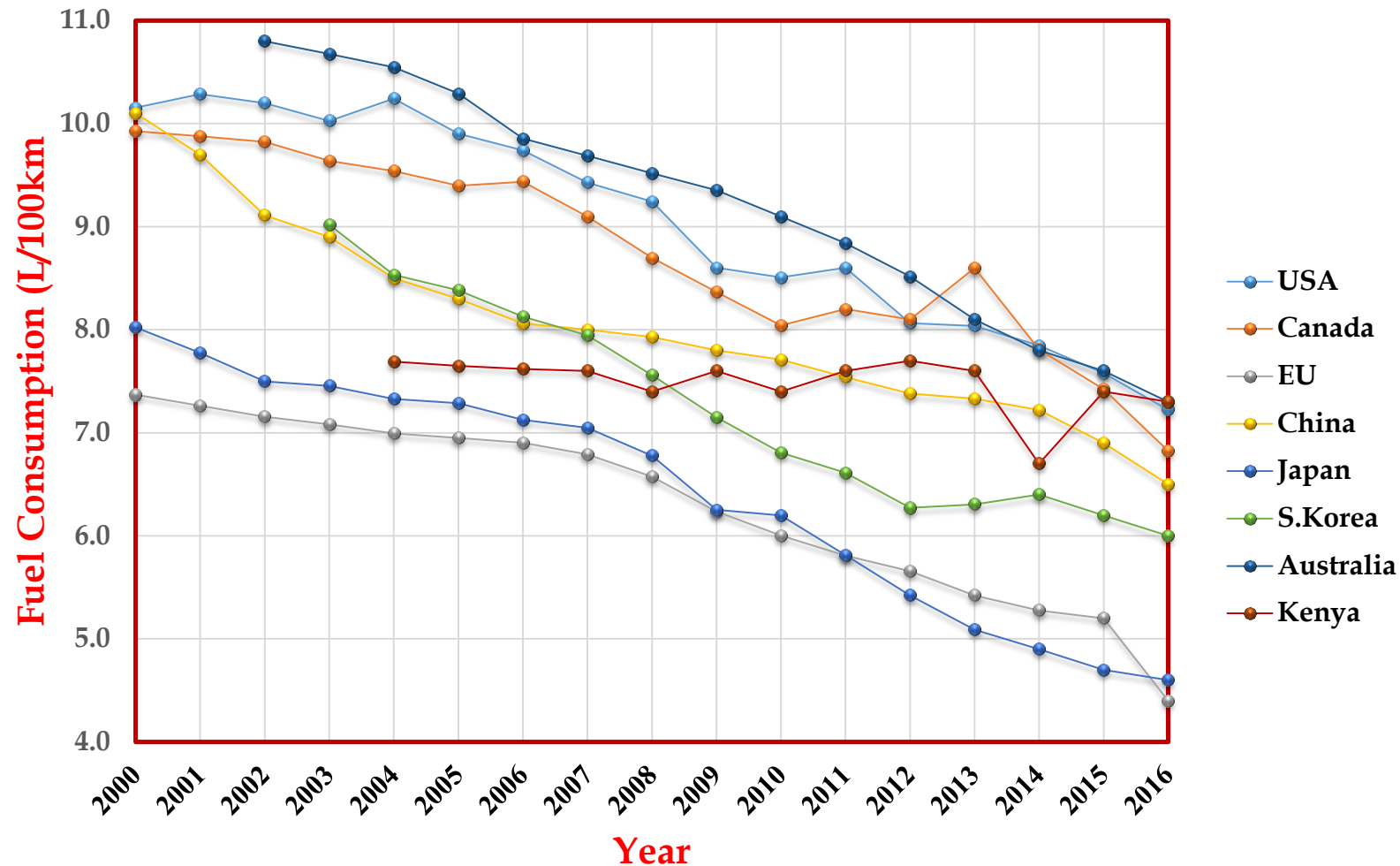
Vehicle Registration Data and Projections

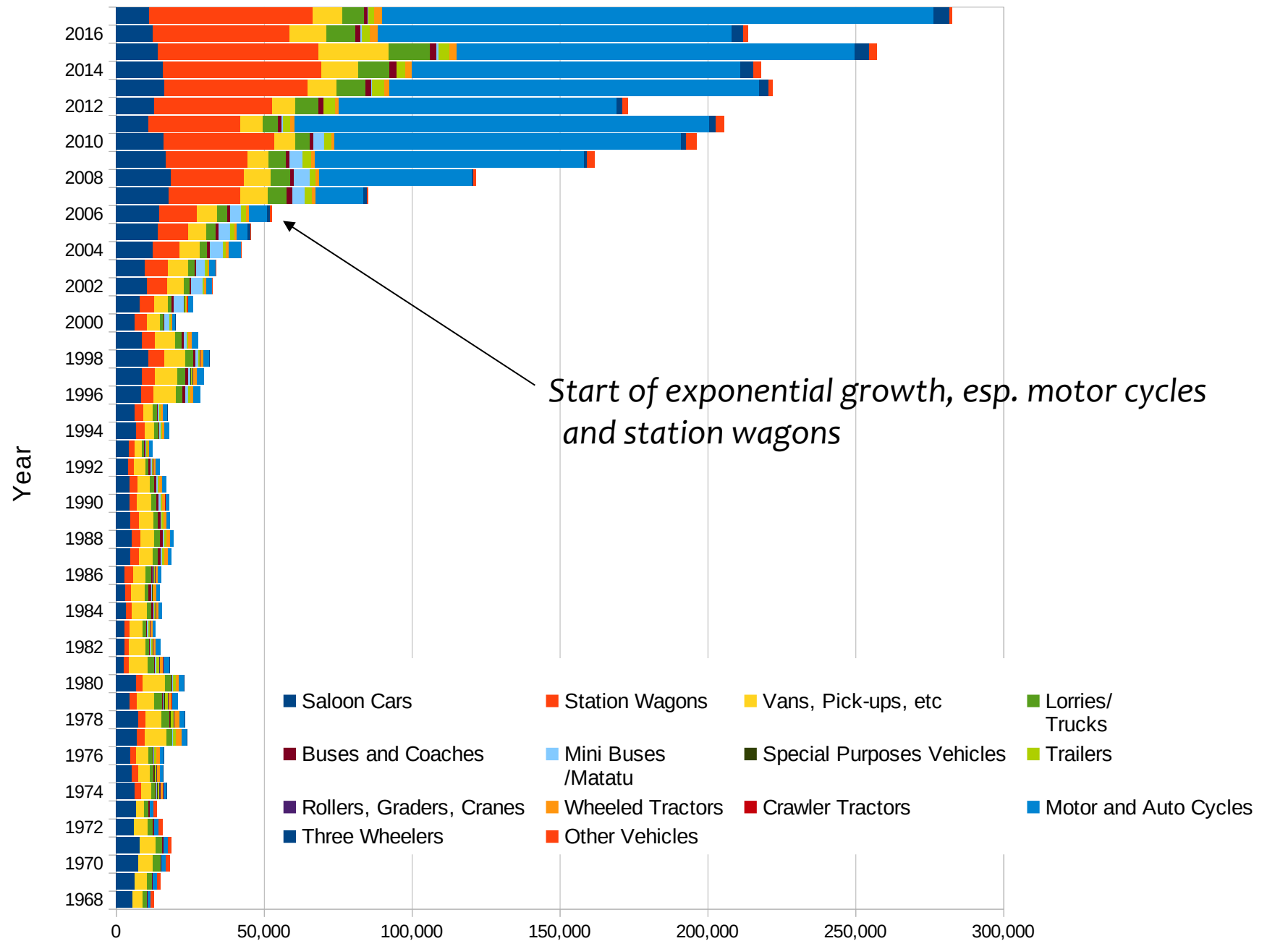
Year	2010 (Actual)	2011 (Actual)	2012 (Actual)	2030 (Projected)	2050 (Projected)
LDV Yearly registration	93,136	96,484	110,474	307,445	518,025
Cumulative registration (Millions)	1.6	1.9	2.0	5.0	8.0

Fuel Economy and CO₂ emission standards

Year	Average fuel Consumption Metric combined(L/100Km)	Average CO ₂ emission (g/Km)
2010	7.4	178.2
2011	7.6	182.0
2012	7.7	185.4
Grand Average	7.5	181.7

Comparison of Average Fuel Economy (L/100km) with selected countries





New Registrations

Source: KNBS Annual Surveys 1970,...,2018

Thank You