The Global Fuel Economy Initiative (GFEI):
Promoting Cleaner and Efficient Vehicles

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GFEI GLOBAL FUEL ECONOMY INITIATIVE

FIA FOUNDATION

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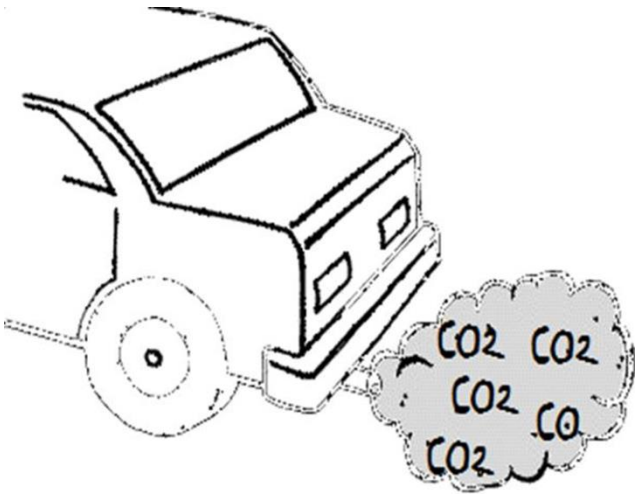
What is fuel economy?

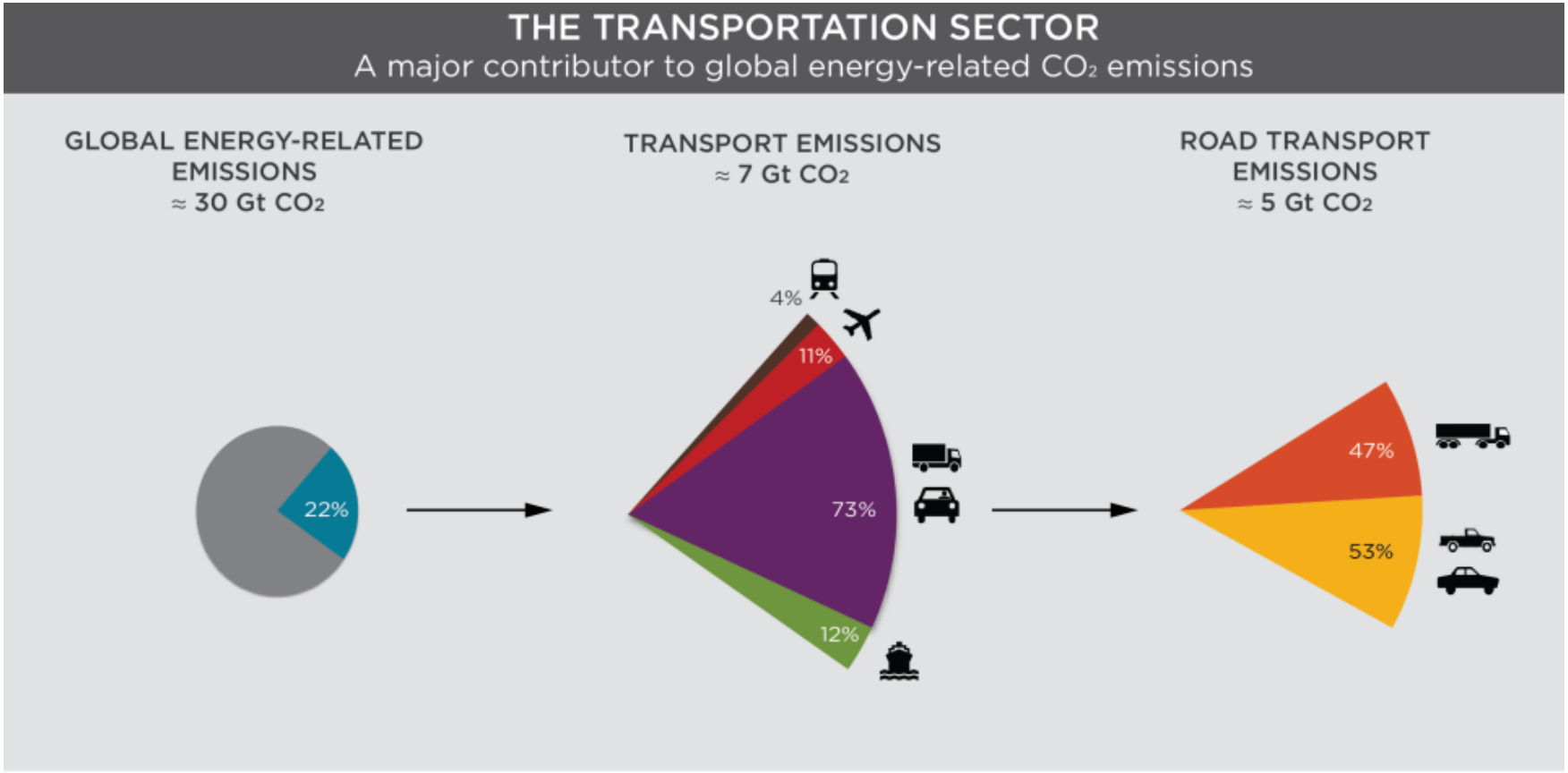
- Vehicles use energy, and fuel economy measures energy per unit of vehicle travel. **It is the RATE of energy use**.
  - Litres per 100km (Europe)
  - Km per litre (Japan)
  - Miles per gallon (United States)



- Fuel economy, fuel efficiency, fuel intensity are all fairly interchangeable terms. But fuel economy always refers to fuel use relative to distance travelled.

- Also measured in CO_2 emissions=CO_2 g/km

CO2 Emissions from Transport



Sources:
ICCT (2014). Global Transportation Roadmap Model. Version 2.0. More information available at http://www.theicct.org/global-transportation-roadmap-model.
IEA (2012). CO2 Emissions from Fuel Combustion: Highlights. 2012 edition. Retrieved from https://www.iea.org/co2highlights/co2highlights.pdf.

THE GLOBAL GOALS: FUEL ECONOMY

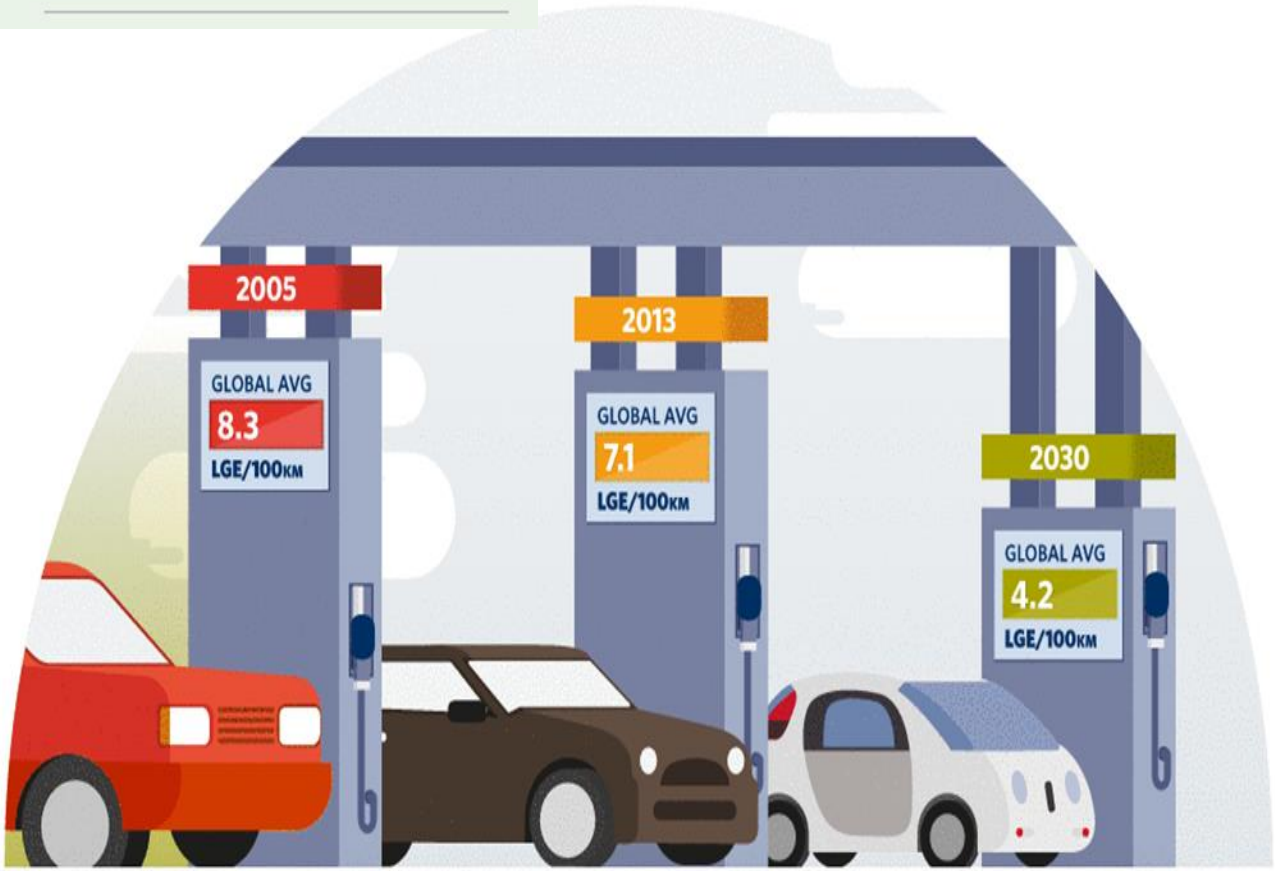
DOUBLE AVERAGE FUEL ECONOMY

OF NEW CARS BY 2030 AND ALL CARS BY 2050

THE GFEI FUEL ECONOMY TARGETS

From 2005 baseline:

- **30%** reduction in L/100km by 2020 in all new cars in OECD countries
- **50%** by 2030 in all new cars globally
- **50%** by 2050 in all cars globally



GFEI Benefits

- Reduced urban air pollution
- Fuel savings: estimated at over USD 300 billion in 2025 and 600 billion in 2050
- CO_2 reduction: estimated at over 1 gigatonne a year by 2025 and over 2 gigatonnes by 2050

Partners:

FIA Foundation for the Automobile and Society

UNEP

UCDAVIS INSTITUTE OF TRANSPORTATION STUDIES

iea International Energy Agency

icct THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

International Transport Forum

Donors:

FIA Foundation for the Automobile and Society

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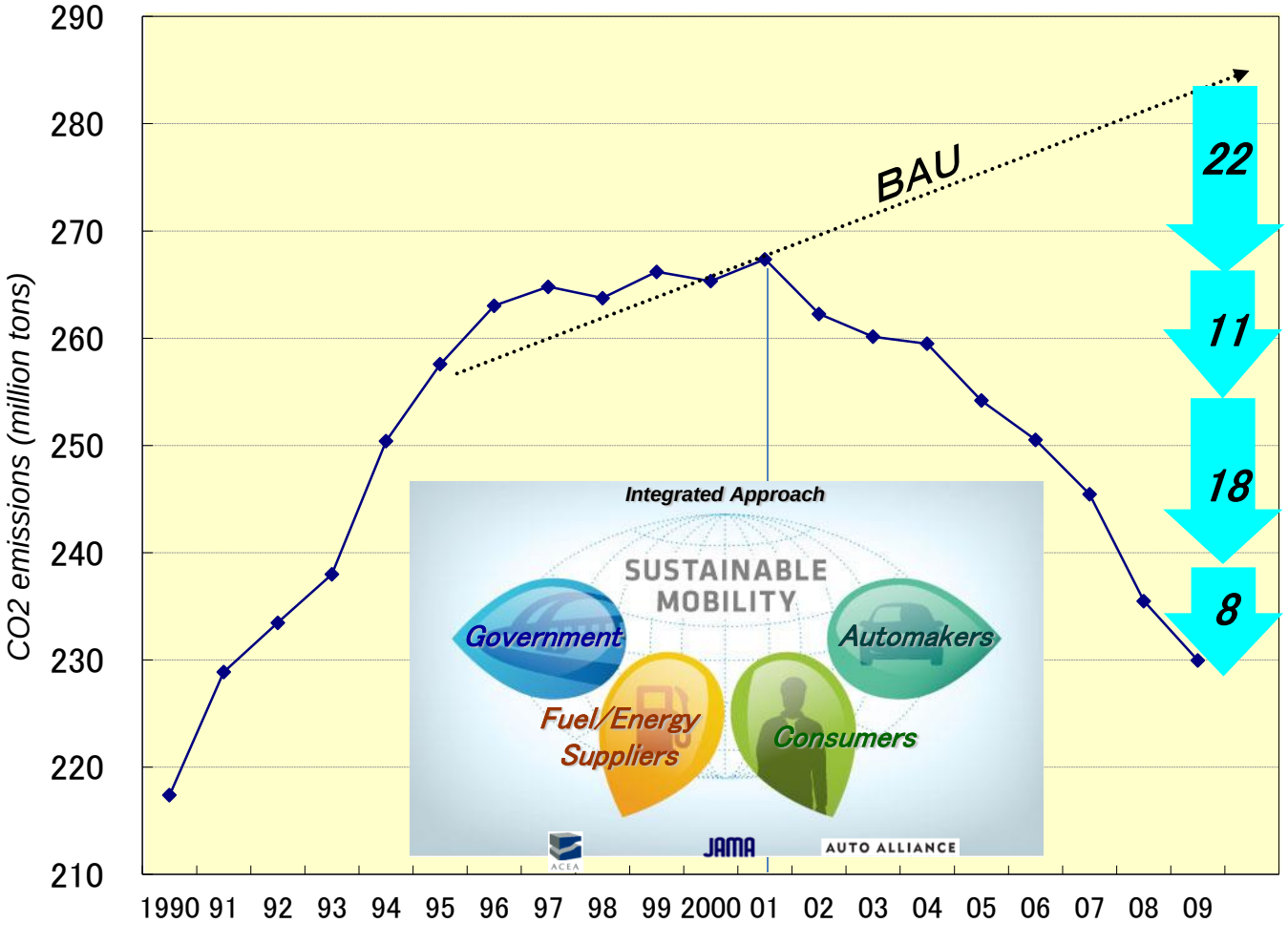
Importance of GFEI for Africa

- The project provides a good understanding of vehicles imported into the country e.g. models, sizes, technologies
- This will allow policymakers to choose the right combination of policy instruments to meet
  - national emission targets
  - energy security, and
  - efficiency goals

◆ CO_2 Emission Reduction in Japanese Transportation Sector



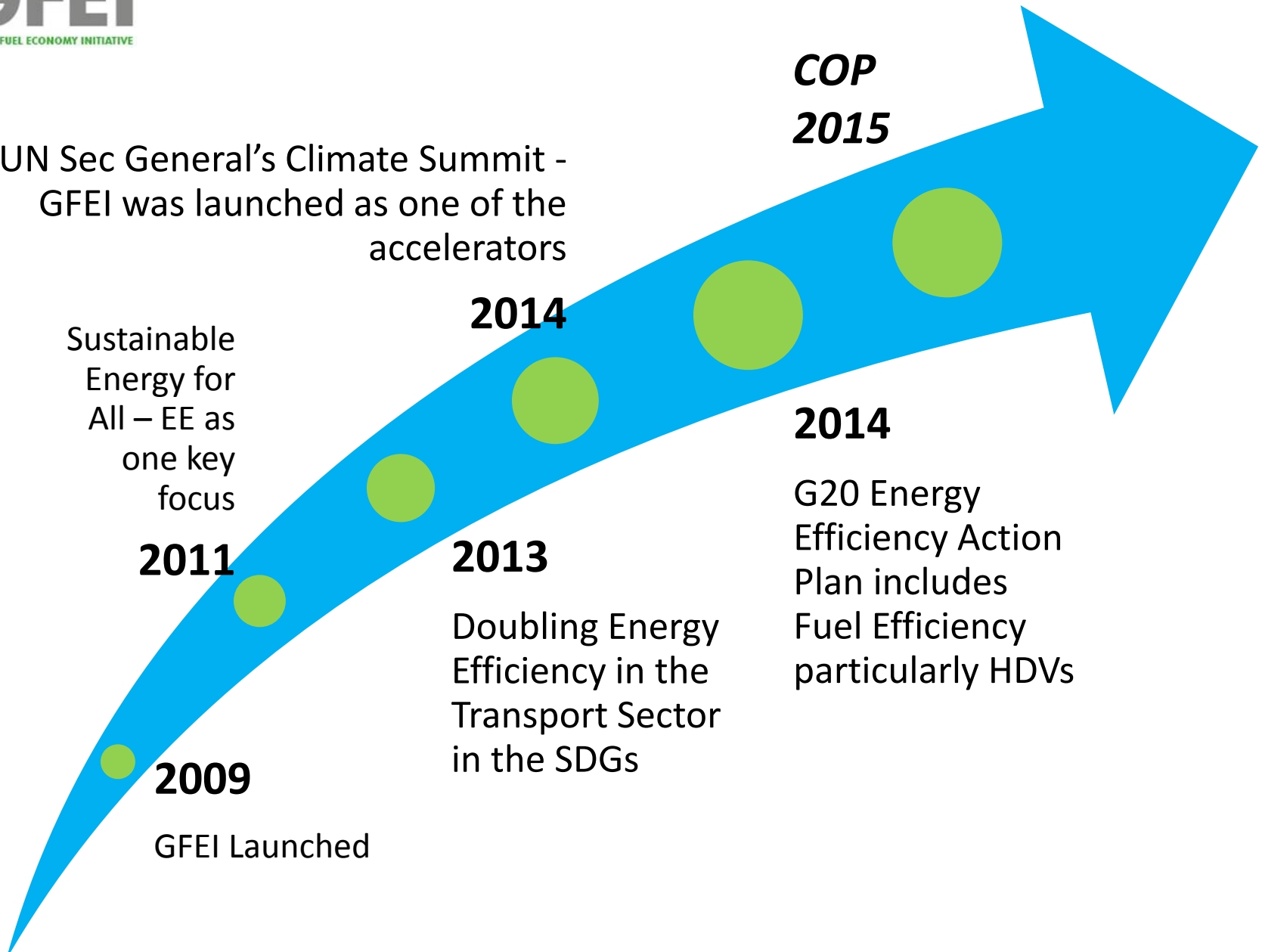
- Fuel Economy
- Traffic Flow
- Eco-Driving
- Alternative Fuels
- Travel Distance (modal shifts, etc)
- Others

source : JAMA

GFEI Country Engagement 2016

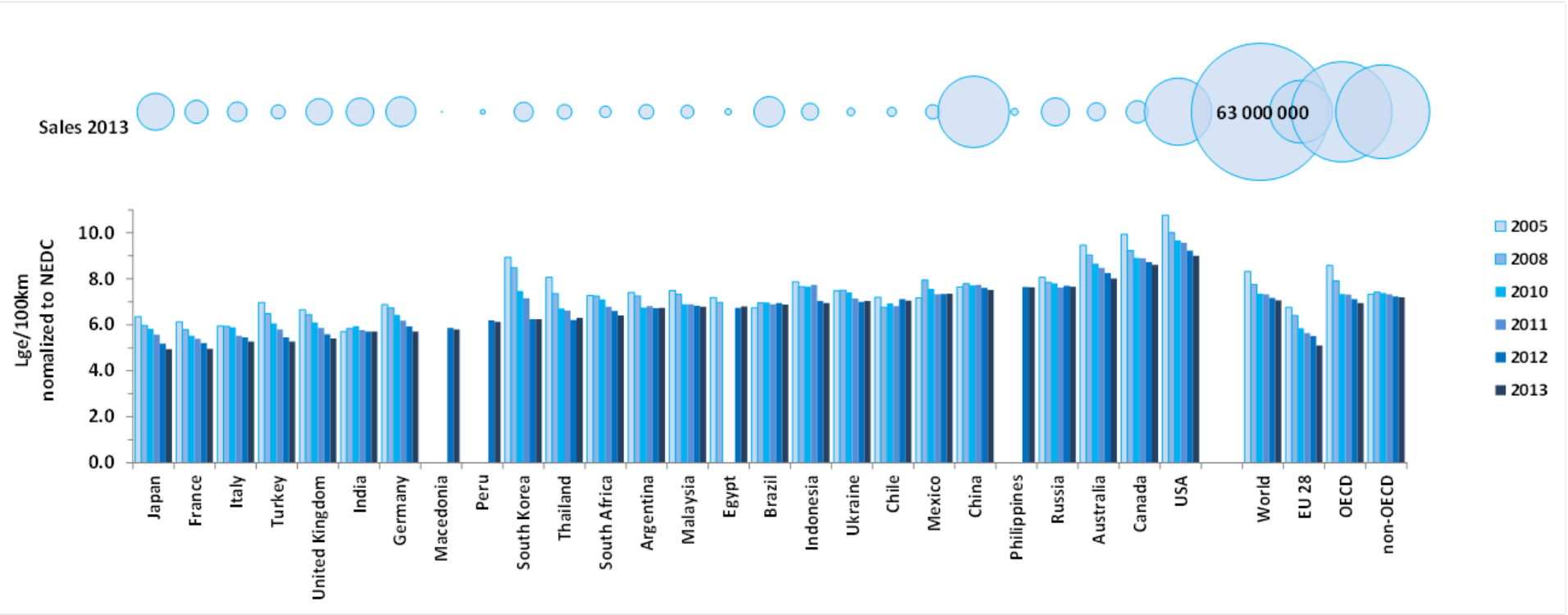
countries with ongoing projects	new countries 2016	Countries expressed interest
1Chile	28Malaysia	63Panama
2Ethiopia	29Bangladesh	64Iran
3Indonesia	30Kazakhstan	65Angola
4Kenya	31Mali	66Bhutan
5Georgia	32Nigeria	67Burkina Faso
6Ivory Coast	33Togo	68Burundi
7Mauritius	34Tanzania	69Cambodia
8Jamaica	35Rwanda	70Cameroon
9Montenegro	36Bolivia	71Cape Verde
10Macedonia	37Argentina	72D.R. Congo
11Costa Rica	38Ecuador	73Eritrea
12Vietnam	39Ukraine	74Fiji
13Morocco	40Jordan	75Guinea
14Bahrain	41Colombia	76Iran
15Tunisia	42Djibouti	77Kyrgyzstan
16Thailand	43Dominican Republic	78Laos
17Peru	44Guatemala	79Lesotho
18Russia	45Moldova	80Marshall Islands
19Benin	46Pakistan	81Mongolia
20Algeria	47Barbados	82Namibia
21Uruguay	50St. Lucia	83Niger
22Nepal	51Lebanon	84Papua New Guinea
23Paraguay	52Zambia	85Senegal
24Sri Lanka	53Ghana	86Sierra Leone
25Philippines	54Malawi	87Solomon Islands
26Uganda	55Zimbabwe	88South Africa
27Egypt	56Honduras	89Tajikistan
	57Nicaragua	90Turkmenistan
	58El Salvador	91Turkey
	59Botswana	92Armenia
	60Mozambique	93Azerbaijan
	61Myanmar	94Serbia
	62Liberia	95Samoa
		96Gambia
		97Uzbekistan
		98Bosnia-Herzegovina
		99Albania

GFEI at the global stage



Regional fuel economy trends

- Countries with FE policies in place show encouraging improvement rates
- Size shift vs. technology evolution moderates non-OECD improvement



Source: IEA 2014

GFEI Implementation Steps

- Data Collection
- Analysis of Vehicle fleet, Vehicle regulations, Fiscal incentives, Fuel standards
- Baseline Setting - 2005
- Analysis of Trend (2008, 2010, 2012, 2014, 2015)
- Policy options to support fuel efficient vehicles
- National and Regional Consultations
- Data to be collected is for all vehicles entering a country for the first time:
  - new vehicles imported
  - second hand vehicles imported into the country
  - car that is already in-country, but re-registered because re-sold should not be counted

Minimum information required

- Vehicle make and model
- Model production year
- Year of first registration
- Fuel type (petrol or diesel)
- Engine size
- Domestically produced or imported
- New or second hand import
- Rated Fuel Economy per model and test cycle basis
- Number of sales by model

Vehicle Type
Model
Manufacturer
Body type
Simplified Body Type
Segment
Axle configuration
Driven wheels
Engine cylinders
Engine ccm
CC Category
Engine kW
KW class
Engine horse power
Engine valves
Fuel type
Model year
Number of gears
Transmission type
Turbo
Gross vehicle weight
Height
Length
Number of seats

Final Data

Make	Model	Condition	Body Type	Engine CC	Fuel Type	Model Year	Registration Date	L/100km	CO2
BMW	316I	Used	S.WAGON	1596	Petrol	1989	2005	7.5	176
CHEVROLET	OPTRA	Used	SALOON	1799	Petrol	2005	2005	6.2	145
CHEVROLET	NULL	Used	S.WAGON	1799	Petrol	2005	2005	6.2	145
NISSAN	SUNNY	Not Specified	SALOON	1970	Diesel	1998	2005	6.6	177
MITSUBISHI	LANCER	Used	SALOON	1600	Diesel	1998	2005	6.9	185
SKODA	OCTAVIA	Used	SALOON	1800	Diesel	2004	2005	7.0	188
SKODA	OCTAVIA	Used	SALOON	1800	Diesel	2005	2005	7.0	188
TOYOTA	COROLLA	New	S.WAGON	1970	Diesel	1998	2005	7.0	188
TOYOTA	COROLLA	New	SALOON	2000	Diesel	1998	2005	7.0	188
FORD	RANGER	New	VAN	2500	Petrol	2005	2005	8.1	170
HONDA	CR-V	NULL	S.WAGON	1970	Petrol	1998	2005	9.3	217

Average fuel economy

At the simplest level, taking a weighted average (by sales) of all new (including newly imported second hand) vehicles in the database will provide the average fuel economy of new vehicles sold in the country in the given year:

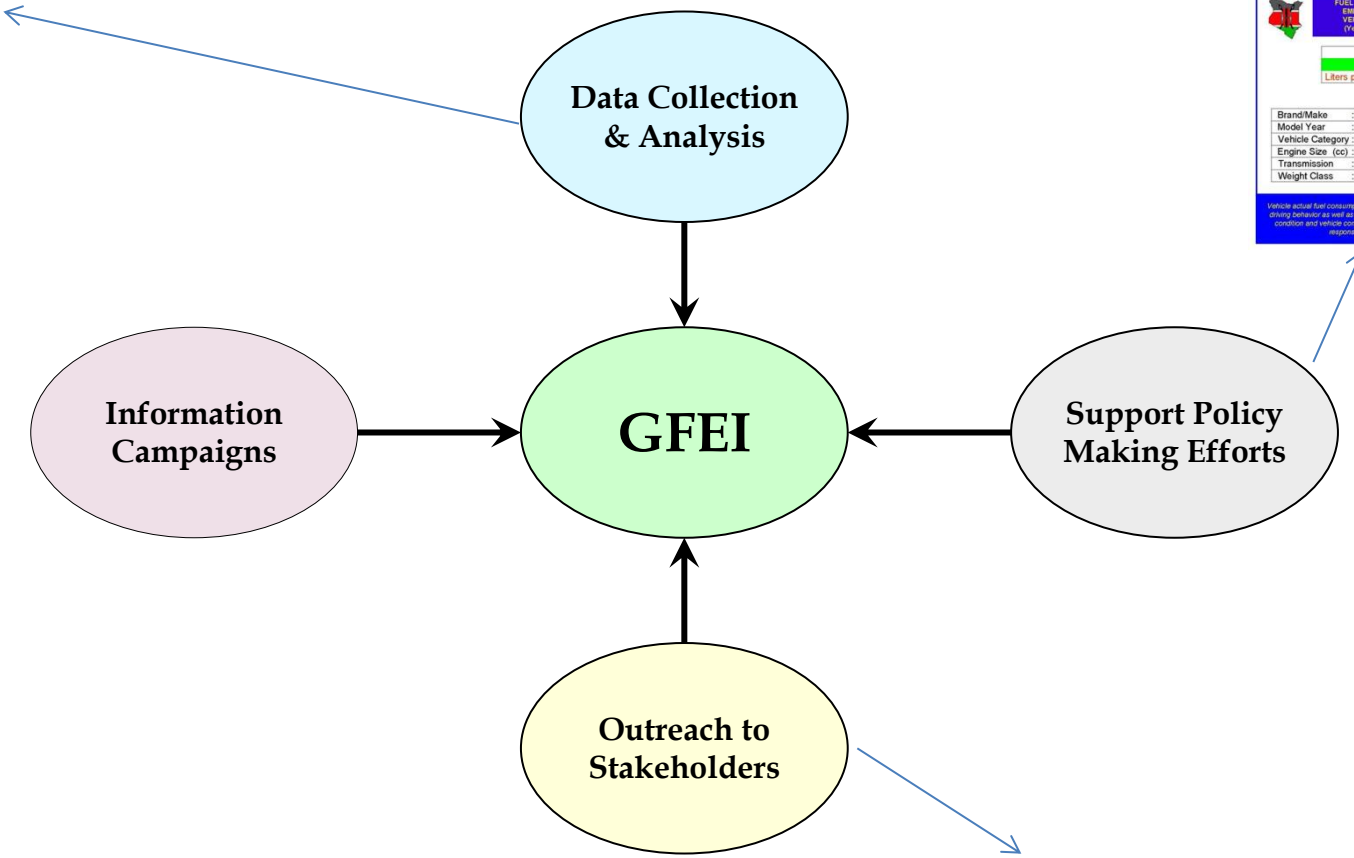
$$Harmonic\ average\ annual\ fuel\ economy = \frac{Total\ sales\ in\ the\ year}{\sum_1^n \frac{sales\ model\ i}{fuel\ economy\ model\ i}}$$

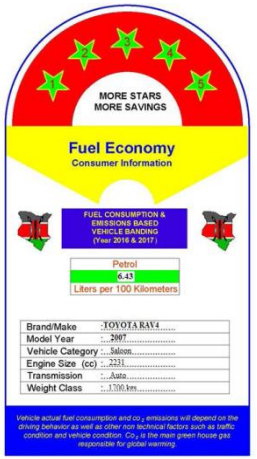
In a similar way, average CO_2 intensity can be obtained through weighted average with the sales of each model:

$$Average\ annual\ emission = \frac{\sum_1^n sales\ model\ i * emission\ model\ i}{Total\ sales\ in\ the\ year}$$

GFEI Activities

Vehicle Type
Model
Manufacturer
Body type
Simplified Body Type
Segment
Axle configuration
Driven wheels
Engine cylinders
Engine ccm
CC Category
Engine kW
KW class
Engine horse power
Engine valves
Fuel type
Model year
Number of gears
Transmission type
Turbo
Gross vehicle weight
Height
Length
Number of seats





Fuel Economy Levels

Global	2005	2008	2011	2013
Average (l/100km)	8.07	7.67	7.2	7.1
OECD Average	8.1	7.6	7.0	6.9
Non-OECD Average	7.5	7.6	7.5	7.2

Uganda	2005	2008	2011	2014
Average (l/100km)	10.94	11.14	11.34	12.15

Kenya	2010	2011	2012
Average (l/100km)	7.4	7.6	7.7

Mauritius	2005	2013	2014
Average (l/100km)	7.0	6.6	5.8

Ethiopia	2005	2010
Average (l/100km)	8.4	7.9

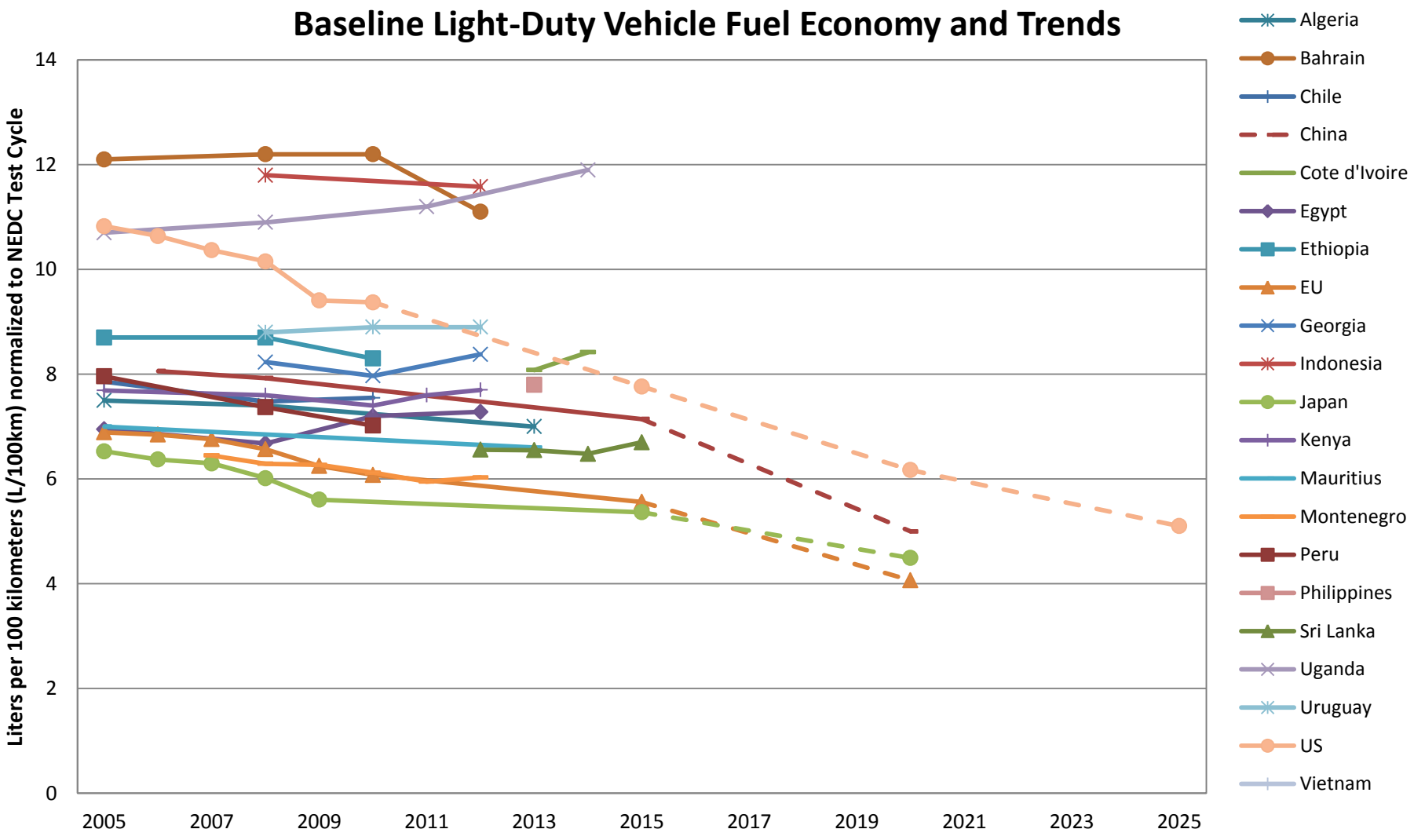
Algeria	2005	2008	2013
Average (l/100km)	7.5	7.4	7.0

Kenya Fuel Economy Levels

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

Year of vehicle registration	Fuel Type		
	Diesel	Petrol	Grand Average
2010	8.0	7.2	7.4
2011	7.9	7.5	7.6
2012	8.0	7.6	7.7
Grand Average	8.0	7.4	7.5

GFEI baseline setting – little progress in fuel economy improvement in countries without policies

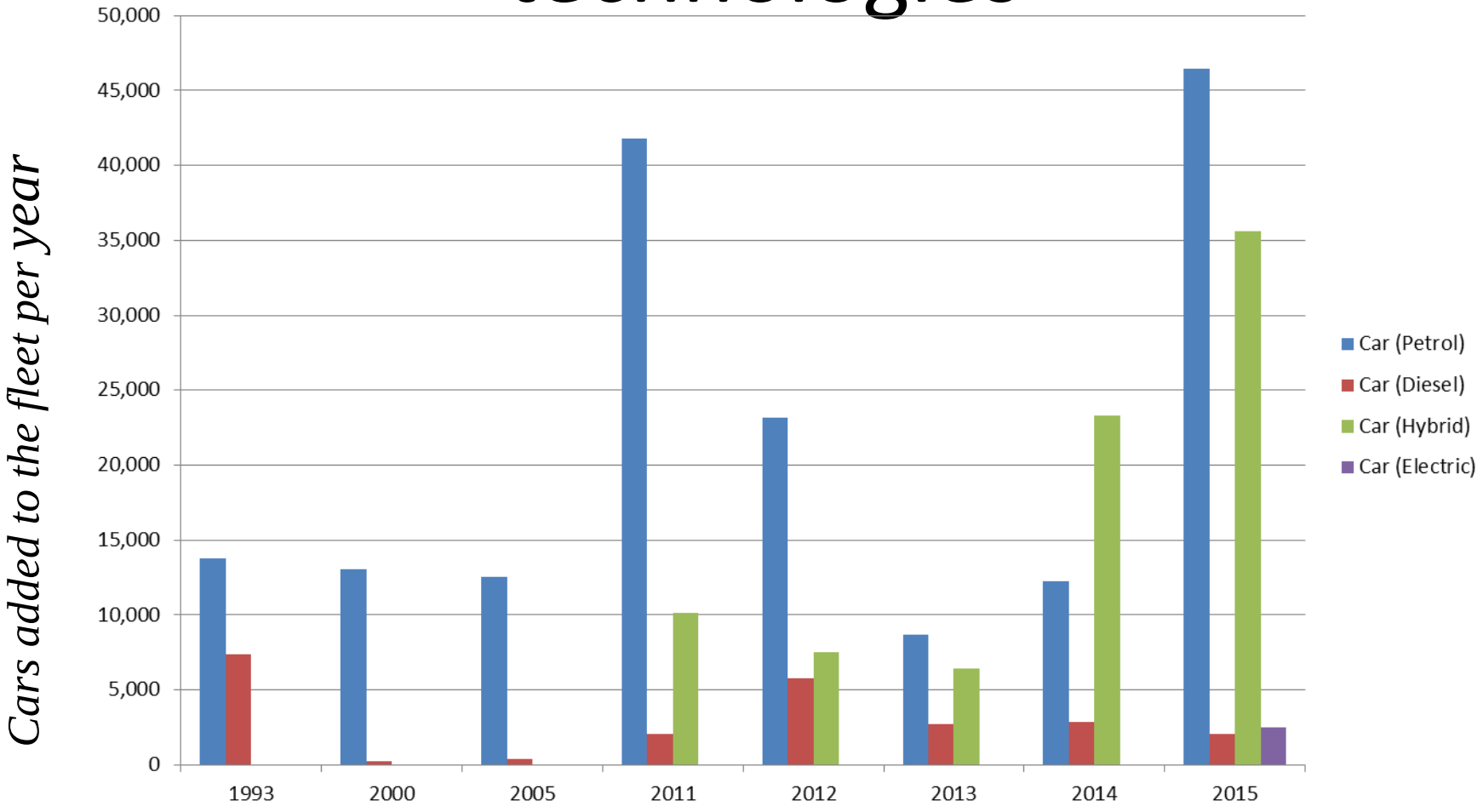


Policy Options

VEHICLE FUEL EFFICIENCY STANDARDS	• Introduce and regularly strengthen mandatory standards • Establish and harmonize testing procedures for fuel efficiency measurement.
FISCAL MEASURES	• Fuel taxes and vehicle taxes to encourage the purchase of more fuel-efficient vehicles. • Infrastructure support and incentive schemes for very fuel-efficient vehicles.
MARKET-BASED APPROACHES	• Voluntary programs such as U.S. SmartWay and other green freight programs
INFORMATION MEASURES	• Vehicle fuel economy labels • Improving vehicle operational efficiency through eco-driving and other measures.

source : ICCT

Sri Lanka: Demand response for technologies



European Union

- 12% of total CO_2 emissions from transport
- mandatory emission reduction targets for new cars
- average for all new cars is 130 grams of CO2 per kilometre (g/km) by 2015 and 95g/km by 2021
- reductions of 18% and 40% compared to 2007 -158.7g/km
- fuel consumption, the 2015 target is 5.6 l/100 km of petrol or 4.9 l/100 km of diesel. The 2021 target to 4.1 l/100 km of petrol or 3.6 l/100 km of diesel

Chile

- Adopted a mandatory fuel economy labelling scheme from February 2013 becoming the first Latin American country to adopt such a scheme

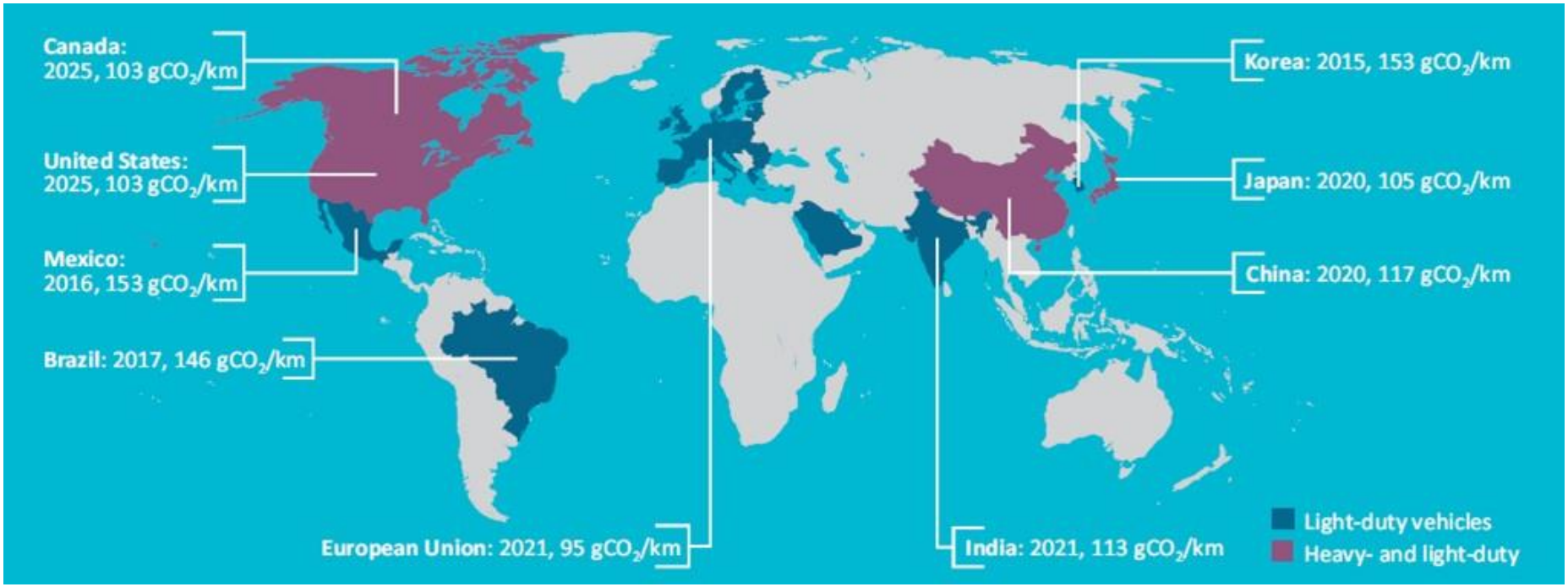
- In September 2014 adopted a taxation scheme that puts a tax on less efficient and polluting vehicles, based on CO2 and NOx ratings
- In 2015 was adopting a scheme to provide subsidies for cleaner and more efficient taxis based on the fuel economy labeling scheme, with the aim to replace the 60,000 taxi fleet over the next 8 years

Mauritius

- Vehicle CO2-based tax introduced 2011
- Adopted a feebate scheme in 2011 that puts a fee/rebate on cars above/below 158 CO2g/km
- 2013 amended to 150 CO2g/km
- Scheme resulted to an improvement of fuel economy from 7l/100km in 2005 to 5.8l/100km in 2014
- 50 % excise duty waived on electric and hybrid cars and Registration fee also reduced by 50%
- From 2009 to 2014, the number of hybrid and electric cars has increased from 43 to 1824 and from 0 to 8 respectively

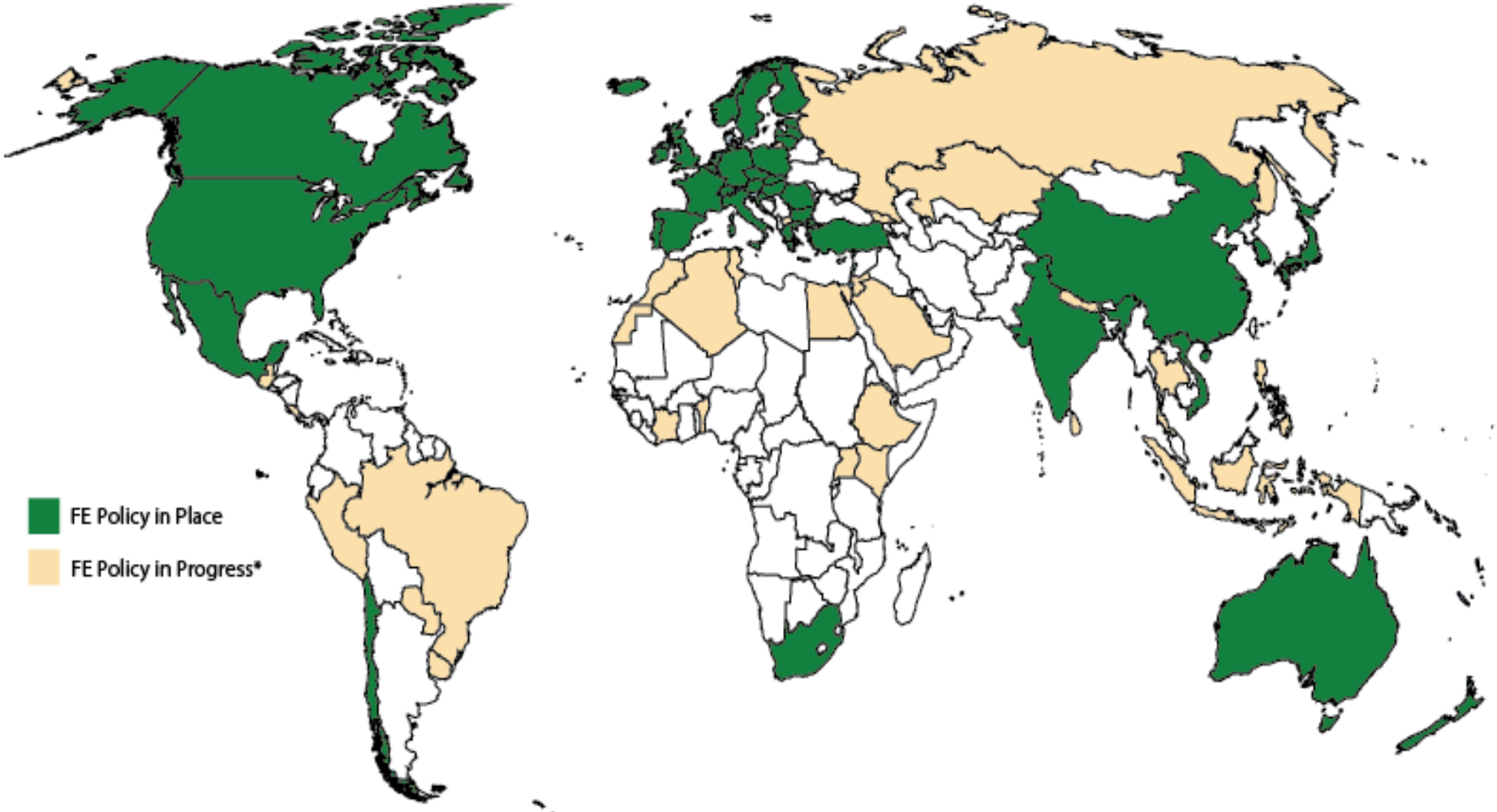
2016 feebate abolished and moved to taxation system with additional incentives to electric vehicles

Countries are at various points in developing fuel economy policies



Note: light vehicle fuel economy values normalized or NEDC test cycle
Source: IEA ETP 2015 and ICCT

Global Progress on Fuel Economy Policy (2016)



* GFEI is involved in supporting all these countries except in Brasil
January 2016 - For more information visit www.globalfueleconomy.org

Global Fuel Economy Initiative (GFEI)

Next steps

Introduction

Instruments

Case Studies

Resources

Global View

Instruments

- ***Regulatory***
  - ***Standards***
- ***Economic***
  - ***Feebate***
  - ***Registration Tax***
- ***Information***
  - ***Labeling***

Regulatory policies
+ National Standards
• Import Restrictions
• Technology Mandates
Economic instruments
Traffic control measures
Information
Technology

Case Studies

- ***Europe***
- ***North America***
- ***Africa***
- ***Latin America***
- ***Asia***
- ***Middle East***

Case Studies
+ Europe
+ North America
+ Africa
• South Africa
• Kenya
• Mauritius
+ Latin America
+ Middle East West Asia
+ Asia Pacific

Resources

- ***Baseline***
- ***Finance***
- ***FE Resources***

Global View

http://www.unep.org/transport/gfei/autotool/

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SADC Low Sulphur Diesel Roadmap

- 15 countries
- Regional workshop held ion **7-8 July 2015 with 13 countries** participating to develop a low sulphur strategy
- Angola, Botswana, Democratic Republic of Congo, Lesotho, **Malawi**, Mauritius, **Mozambique**, Seychelles, South Africa, Tanzania, **Zambia**, **Zimbabwe**, and Swaziland
- Sub-regional workshop already held in Botswana in August 2016 and this one in Mozambique in Nov 2016
- National Activities: Mozambique, South Africa , Zimbabwe, Malawi and Botswana, Mauritius

SADC Recommendations

1. Governments in **refining countries** to facilitate decision on **capital investment** for refinery upgrade;
2. Governments to engage stakeholders to review **storage and handling infrastructure** at receiving ports to avoid negative impacts of fuel comingling;
3. Governments to **secure the quality of low sulphur fuels** by:
    a. Reviewing logistics to segregate fuels; and
    b. **Implement fuel quality enforcement and monitoring regime**;
4. There are on-going national initiatives such as formation of **task teams** to address low sulphur fuels and these should be supported to facilitate quick action towards low sulphur fuels;
5. Countries to carry out inventory of light and heavy duty vehicles to ascertain number, age, technology to support cleaner fuels and vehicles policy development;
6. Governments to support **research studies on cost-benefit analysis** especially on health benefits in the sub-region to help decision making towards lower sulphur fuels;
7. There is need for **enhanced sensitisation** of stakeholders including government and the public on the benefits of low sulphur fuels with support from continental bodies such as UNEP, AMCEN etc., to implement this a communication strategy is needed;
8. Countries to **review pricing of cleaner low sulphur fuels** to promote their use, particularly in countries that have both 500 ppm and 50 ppm diesel fuel;

SADC Recommendations cont.

9. Countries support the harmonisation of low sulphur fuel standards within the sub-region particularly among countries that have joint import/supply facilities;

10. Countries support sub-regional harmonisation of minimum vehicle standards;

11. There is need to form **multi-sectoral committees** bringing together the health, energy, transport, environment and finance sectors to promote low sulphur fuels and cleaner vehicles at national and regional levels;

12. The proposed timeframe for low sulphur diesel fuels by importing countries is:

- **a. 50 ppm by January 2016; and**
- **b. 10-15 ppm by 2020;**

13. The proposed timeframe for low sulphur diesel fuels for **refining countries is 50 ppm by 2020**;

14. Governments to support cleaner transport solutions including cleaner vehicles, cleaner alternative fuels, efficient public transport and non-motorised transport including through **Public Private Partnership**; and

15. There is need for **capacity building** support on transport emissions strategies and while also benchmarking with other countries.

SACU sub-regional meeting

- A sub regional workshop held on 4-5 August 2016 in Gaborone, Botswana to discuss fuel standards harmonization in **the Southern African Customs Union (SACU) region**
- Botswana, Mozambique and South Africa and the SADC Secretariat
- The sub-regional workshop aimed at bringing together the **SACU countries that get their petroleum product supplies from South Africa**
- It was noted that there already existed a collaborative effort between the SACU Member States and that an **Interstate Oil Committee (IOC)** had been formed
- Participants further proposed a move to **50 ppm diesel fuels by 2020 and 10 ppm by 2025**
- SADC countries time frame to low sulphur will vary eg, importers of oil products, like Mozambique and Zimbabwe will have shorter periods to low sulphur than those with refineries like South Africa, Zambia and Angola.