VEHICLE EMISSION ENFORCEMENT

BY

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DATE: 01 NOVEMBER 2016

The purpose of emission enforcement

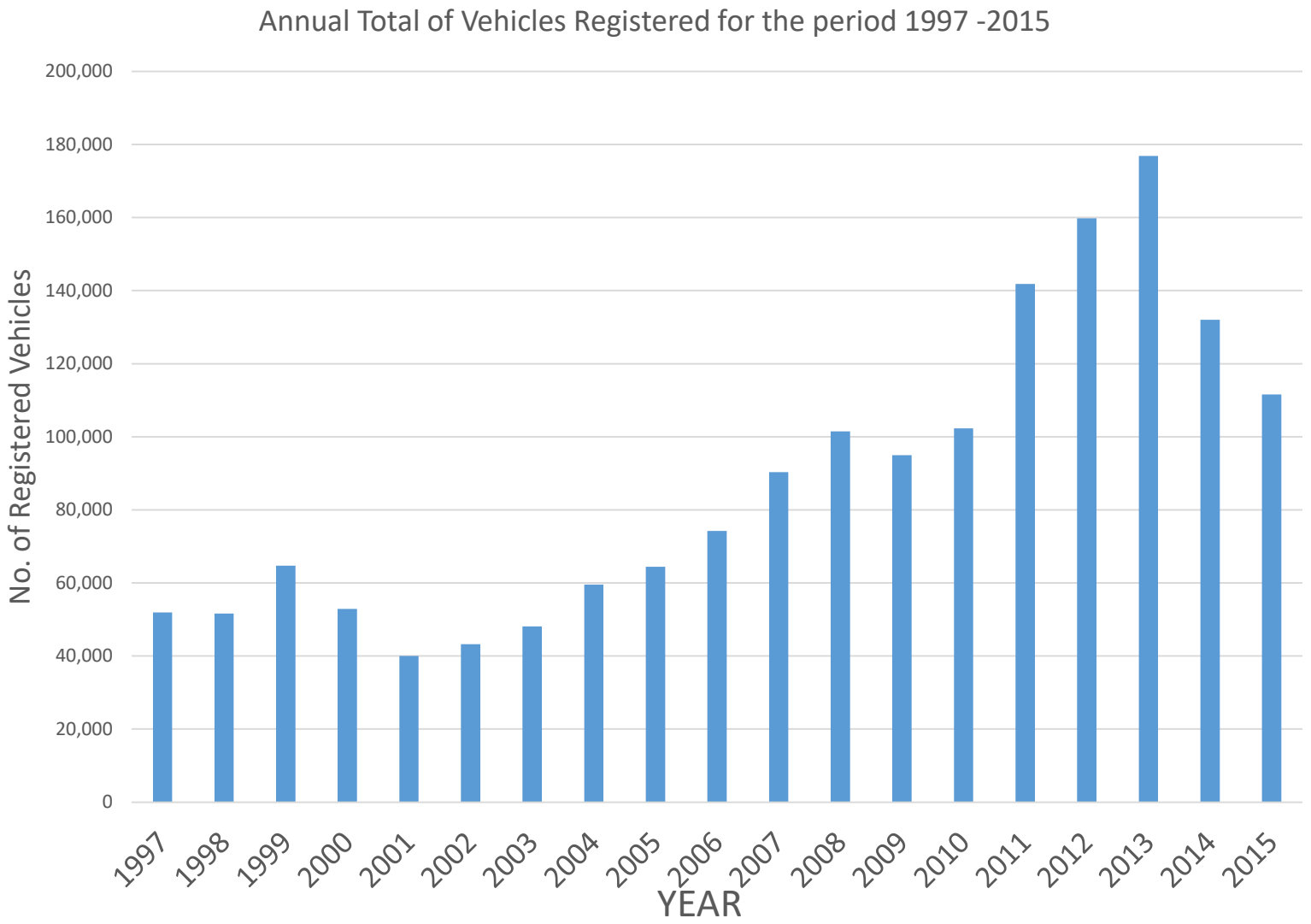
- The purpose of **emission enforcement** is to restore, preserve and improve the quality of air.

- The requirement provide for the protection of the air from pollutants, as well as, take into account amongst others;
  a) The citizens right of access to clean air;
  b) Reducing and preventing air pollution through the improvement of the quality of automobiles that operate on the road way; and
  c) Improve the health of Ghanaians especially in the urban areas with the high incidence of air pollution due to the increase number of automobiles that ply the roads;

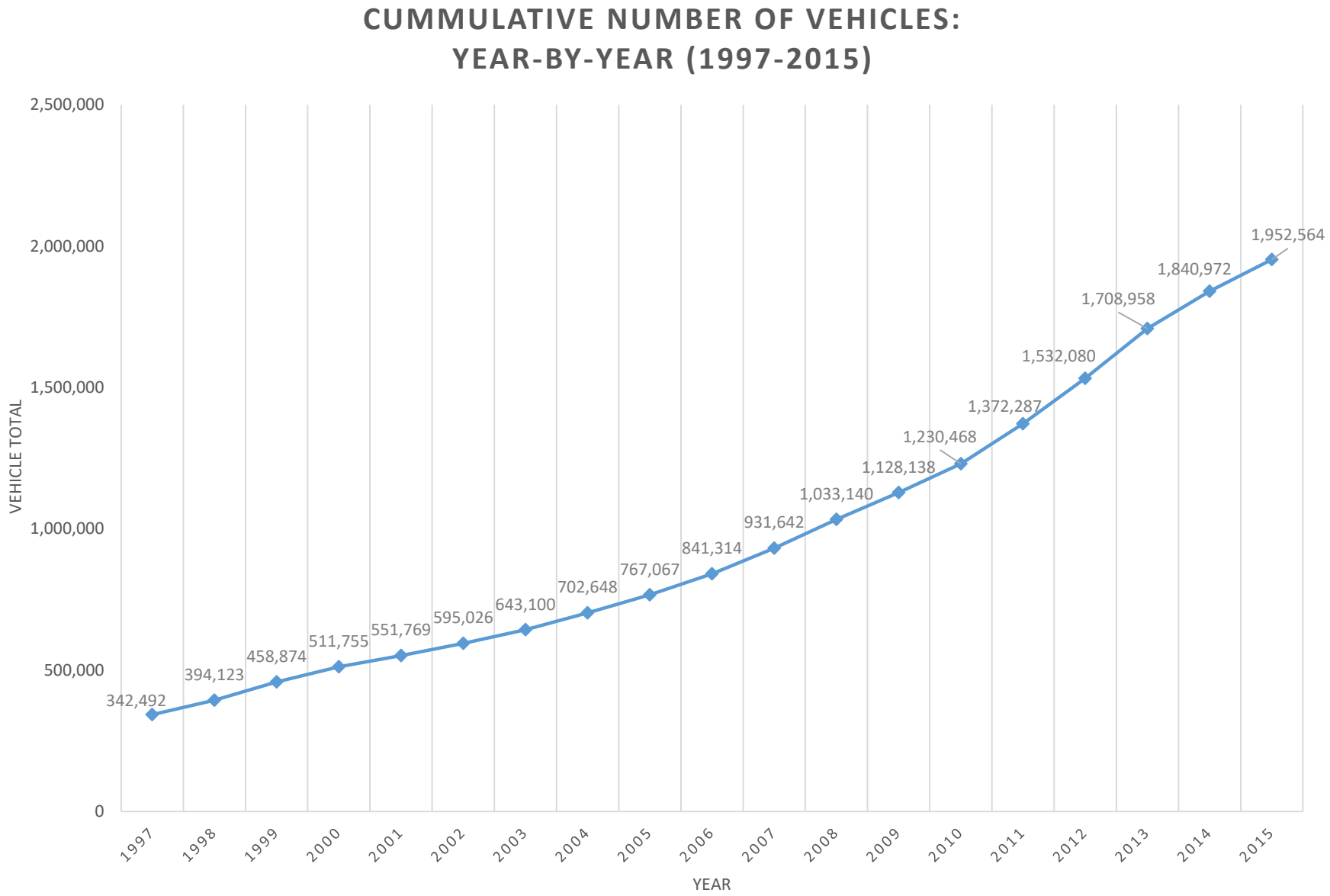
STATISTICAL OVERVIEW OF VEHICLES IN GHANA

- Vehicle fleet in Ghana

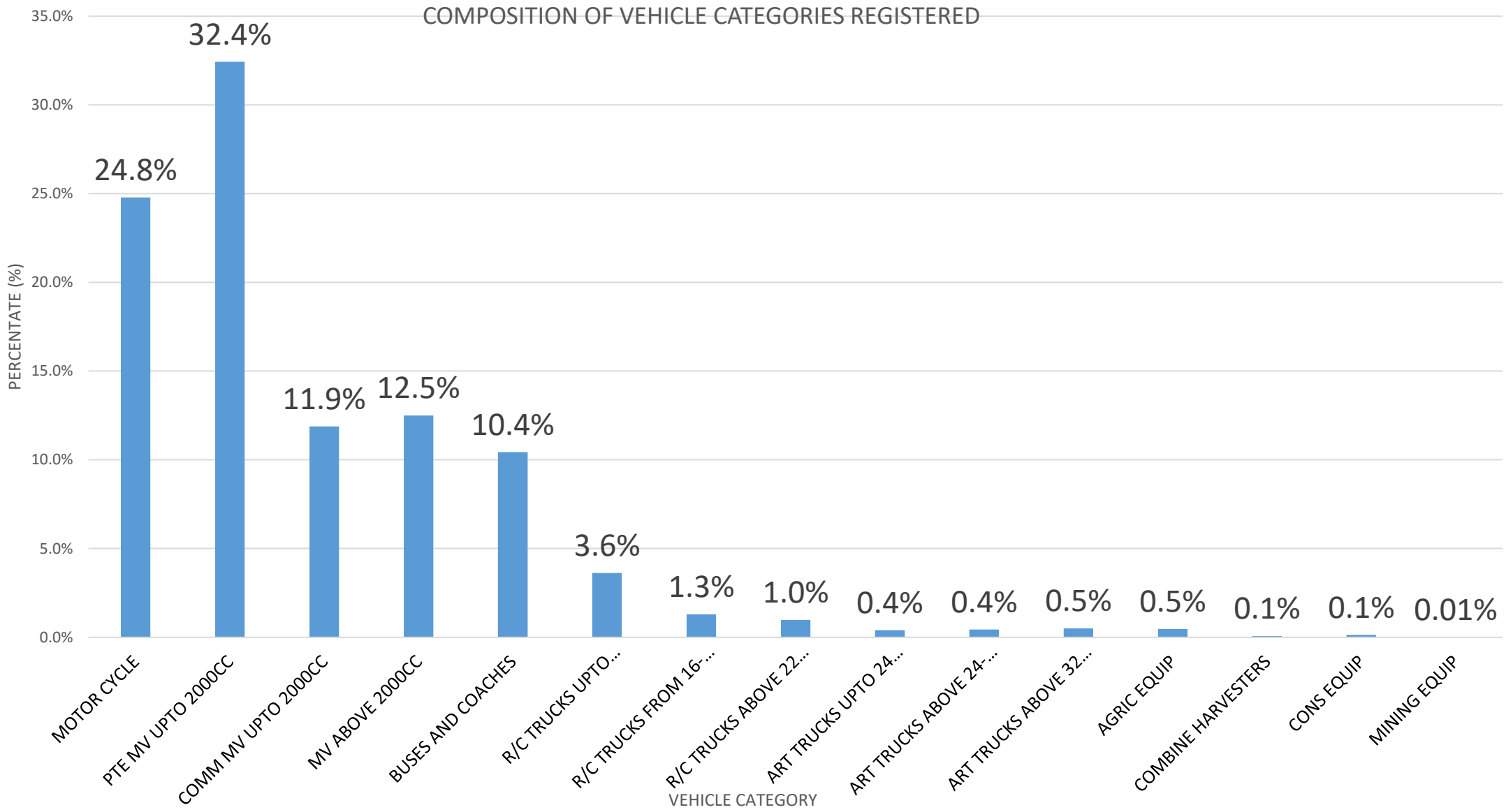
YEAR	VEHICLES REGISTERED WITHIN THE YEAR
1997	51,893
1998	51,631
1999	64,751
2000	52,881
2001	40,014
2002	43,257
2003	48,074
2004	59,548
2005	64,419
2006	74,247
2007	90,328
2008	101,498
2009	94,998
2010	102,330
2011	141,819
2012	159,793
2013	176,878
2014	132,014
2015	111,592



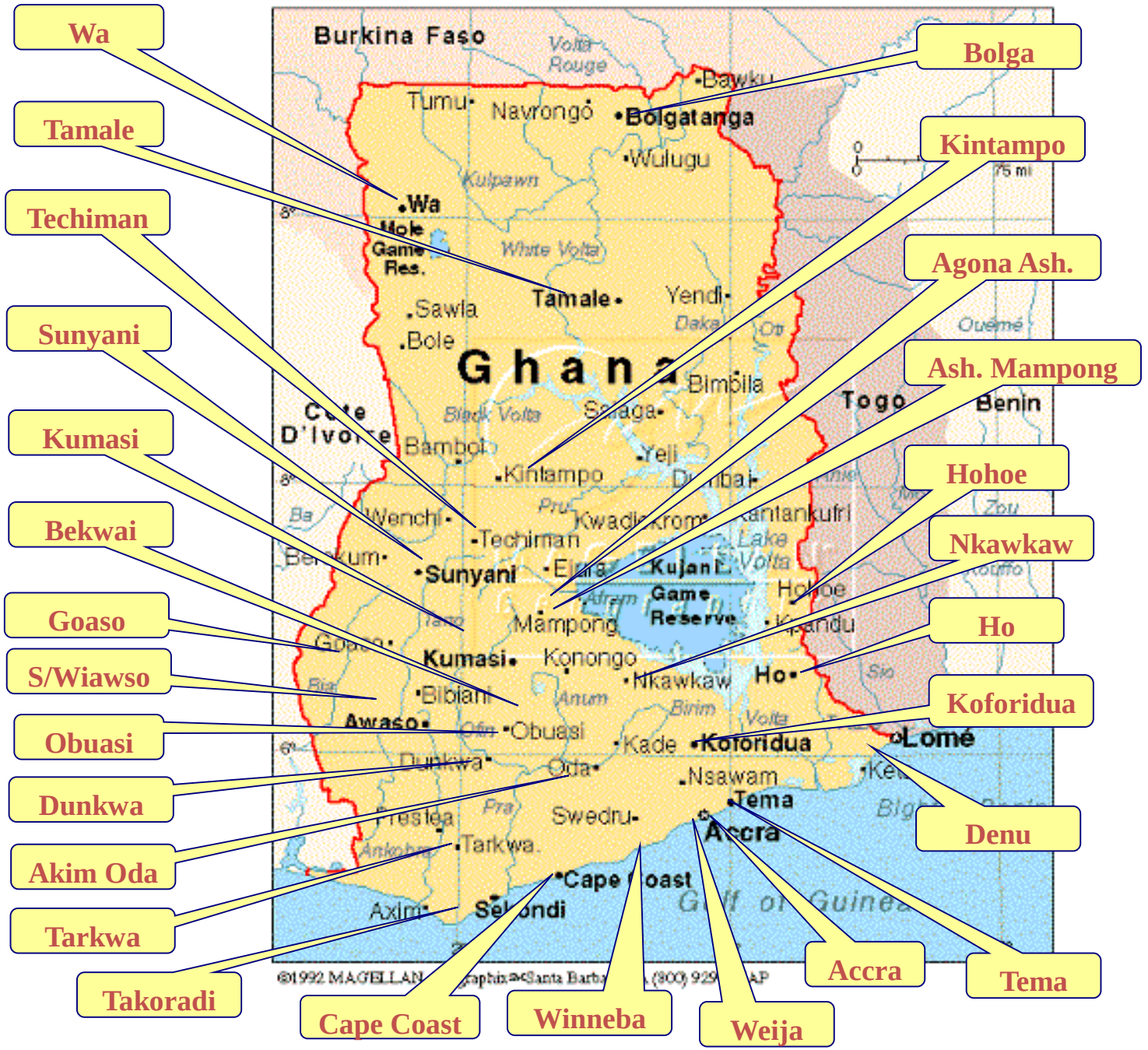
YEAR	VEHICLES IN GHANA
1997	342,492
1998	394,123
1999	458,874
2000	511,755
2001	551,769
2002	595,026
2003	643,100
2004	702,648
2005	767,067
2006	841,314
2007	931,642
2008	1,033,140
2009	1,128,138
2010	1,230,468
2011	1,372,287
2012	1,532,080
2013	1,708,958
2014	1,840,972
2015	1,952,564



VEHICLE FLEET COMPOSITION



DVLA LOCATIONS



Vehicle inspection stations in Ghana (October 2016)

DVLA STATIONS	**26**
AUTHORIZED PRIVATE TEST STATIONS	**10**

The current situation in Ghana

1) Transport Regulation on Vehicle Emissions

- **No person shall drive a motor vehicle which emits exhaust fumes in such quantities as to be a hazard or annoyance to road users or pedestrians.** (Regulation # 33, L.I. 952, Road Traffic Regulations, 1974)

Comments on L.I.

- The existing regulation is subjective
  - –base on excessive visible smoke.
- It leaves much to the discretion of who is doing the inspection.
- It is not quantitative; not measureable.
- The inspection program is intended to separate vehicle with excessive emission from relatively clean vehicles.

The current situation in Ghana (cont'd)

2. The law allows the importation of used vehicles that cannot pass emission test in the country of origin. The country has become a dumping ground of high emitting vehicles;

The regulation only discourages the importation of vehicles older than 10 years by imposing an overage penalty.

COMMODITY DESCRIPTION	IMPORT DUTY	VAT	OVERAGE PENALTY
New vehicles	5%	12.5%	0%
Of age not more than 10years	5%	12.5%	0%
Of age more than 10years but not more than 12years	5%	12.5%	2.5%
of age more than 12 years but not more than 15years	5%	12.5%	10%
of age more than 15years but not more than 20years	5%	12.5%	15%
Of age more than 20years	5%	12.5%	50%


ITSUBISHI


OLIVER 100
MULTI-COMPONENT GAS ANALYSER
TOPSINTEC
0
0.00
0.20
2.37

Principal pollutants of concern include:

- Hydrocarbons
- Carbon monoxide (CO)
- NOx
- Particulate matter
- Sulfur oxide (SOx)
- Volatile organic compounds (VOCs)

- In the absence of emission performance standards the current emission tests conducted during vehicle inspection are for advisory purpose and for data compilation.

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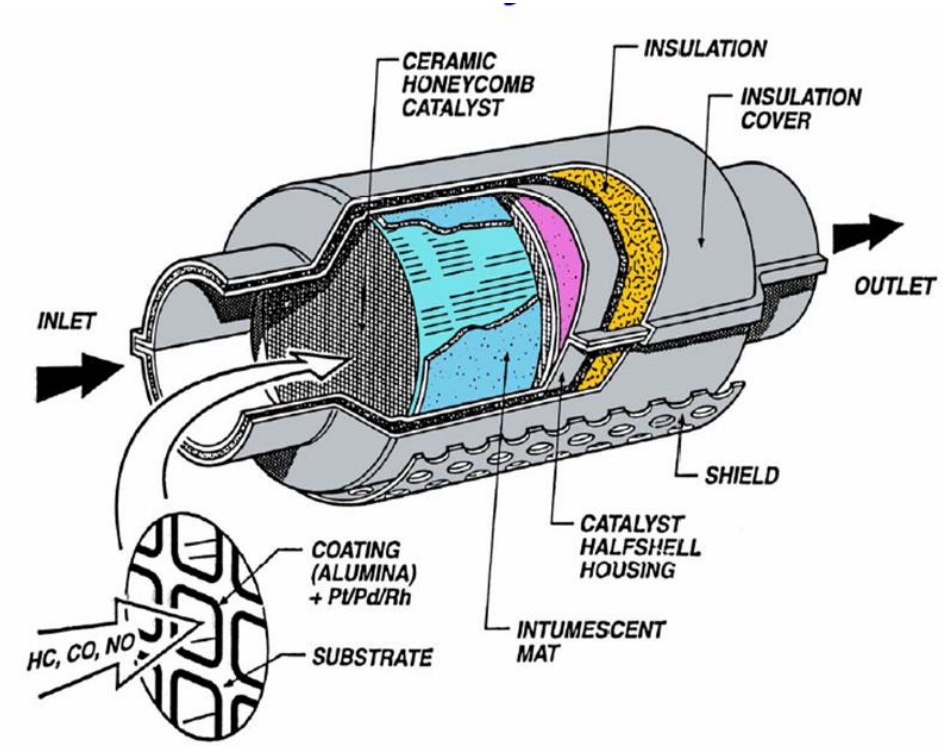
- The emission test result is not a criteria for adjudging roadworthiness of vehicles (so long as there is no excessive or visible smoke).

Vehicle Emissions Control Technology

- Secondary Air injection
- Exhaust gas recirculation
- Catalytic converter
- Evaporative emissions control

Catalytic converter



- Due to rapidly expanding wealth and business opportunities, the number of oil companies and cars on Ghana's roads is rapidly growing, creating an ongoing pollution problem.

Policy-making level

Policy-makers must grapple with an array of questions:

- What institutional design can best accomplish the goals of testing?
- What emission standards should apply, and what testing procedures should be used?
- How can government ensure a high level of compliance with testing standards?

Policy-making level (contd)

How can government ensure that the following key resources are in sufficient supply?

- **Financial resources**—for typically a multi-million dollar undertaking
- **Institutional capacity**—especially in the vehicle service sector
- **Political support**—critical for the testing program to survive

Basic institutional design questions:

- Who does the testing and where?
- What tasks are best done by the public sector and what tasks are best done by the private sector?
- How oversight is best accomplished, holding public and private actors responsible for carrying out their tasks?
- What coordination and management issues are likely to arise among different levels of government and between ministries, and how can they best be addressed?
- Should one launch comprehensive emission testing program for all vehicles?

Applicable standards

- What should be the appropriate emissions standards that **in-use vehicles** should meet and the test procedures for measuring those emissions?

Applicable standards (contd)

- What standards should apply to various vehicle types (e.g., trucks, buses, taxis, personal cars, motorcycles)?
- Should standards vary by age of vehicle or type of engine (e.g., diesel, 4-stroke gasoline, 2-stroke gasoline)?

Applicable standards (contd)

- Should testing be done in a quick, low-cost way with the engine idling, or with a longer, higher-cost but more reliable procedure involving placing the vehicle on a dynamometer (or treadmill)?

Applicable standards (contd)

- Many of these questions are highly technical in nature but also involve critical policy questions such as:

Applicable standards (contd)

- How many vehicles are likely to fail the test?
- How will this affect public acceptance of the testing program?
- How expensive is the test procedure? Can the costs be recovered by inspection fees? Or are subsidies needed?

IMPLEMENTATION OF VEHICLE EMISSION CONTROL

The process of implementing emission control in the country requires a chain of activities. i.e,

- **Baseline study** (determine the pollution landscape)
- **Fuel Quality** (exiting/fixed)
- **Emission performance standards** (established, introduced depending on fuel quality)
- **Legal aspects** (Transport Policies, Vehicle Laws, Regulations,)
- **Funding**
- **Public Awareness / education**
- **Professional technical training**
- **Assigning roles and responsibilities** (EPA, GSA, NPA, GRA(Customs), MoT(DVLA), Police, Judiciary, Media, etc)
- **Systems and structures** (testing facilities, data/communication network)
- **Compliance and Enforcement**
- **Technical Services** (garages, parts dealers)
- **Monitoring**

International examples of compliance and enforcement program

Japan

Interim standards were introduced on January 1, 1975 and again for 1976. The final set of standards were introduced for 1978

- While the standards were introduced they were not made immediately mandatory, instead tax breaks were offered for cars which passed them.
- In 1992, several measures had to be taken to control NOx from in-use vehicles, including enforcing emission standards for specified vehicle categories.
- The regulation was amended in June 2001 to tighten the existing NOx requirements and to add PM control provisions.

International examples

Japan (cont'd)

In 2001 new emission standards are retroactively applied to older vehicles already on the road. Vehicle owners have two methods to comply:

1) Replace old vehicles with newer, cleaner models
2) Retrofit old vehicles with approved NOx and PM control devices

- Vehicles have a grace period, between 8 and 12 years from the initial registration, to comply. The grace period depends on the vehicle type, as follows:
    - Light commercial vehicles (GVW ≤ 2500 kg): 8 years
    - Heavy commercial vehicles (GVW > 2500 kg): 9 years
    - Micro buses (11-29 seats): 10 years
    - Large buses (≥ 30 seats): 12 years
    - Special vehicles (based on a cargo truck or bus): 10 years
    - Diesel passenger cars: 9 years

International examples

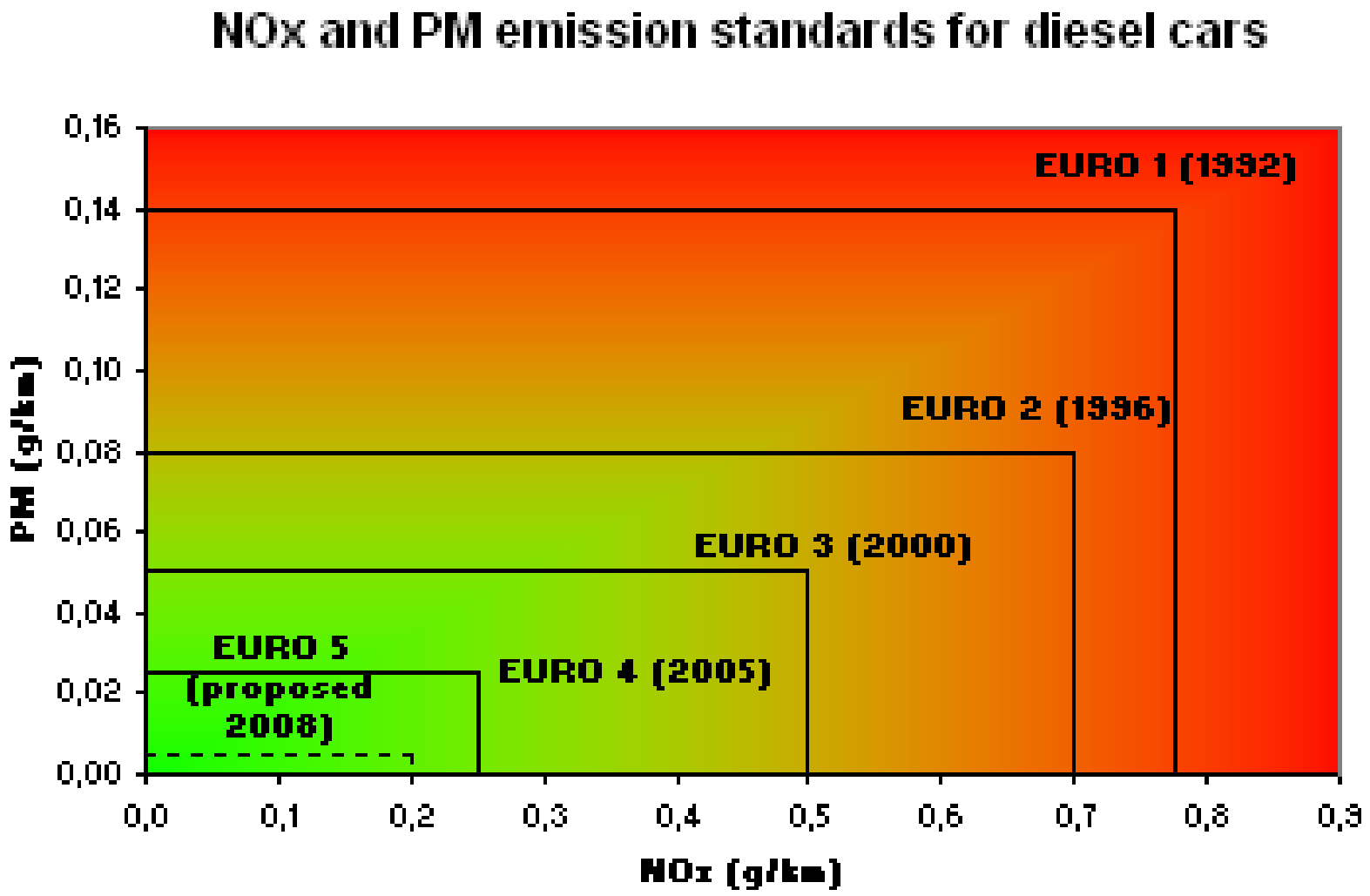
Israel

- Since January 2012 vehicles which do not comply with Euro 6 emission values are not allowed to be imported to Israel.

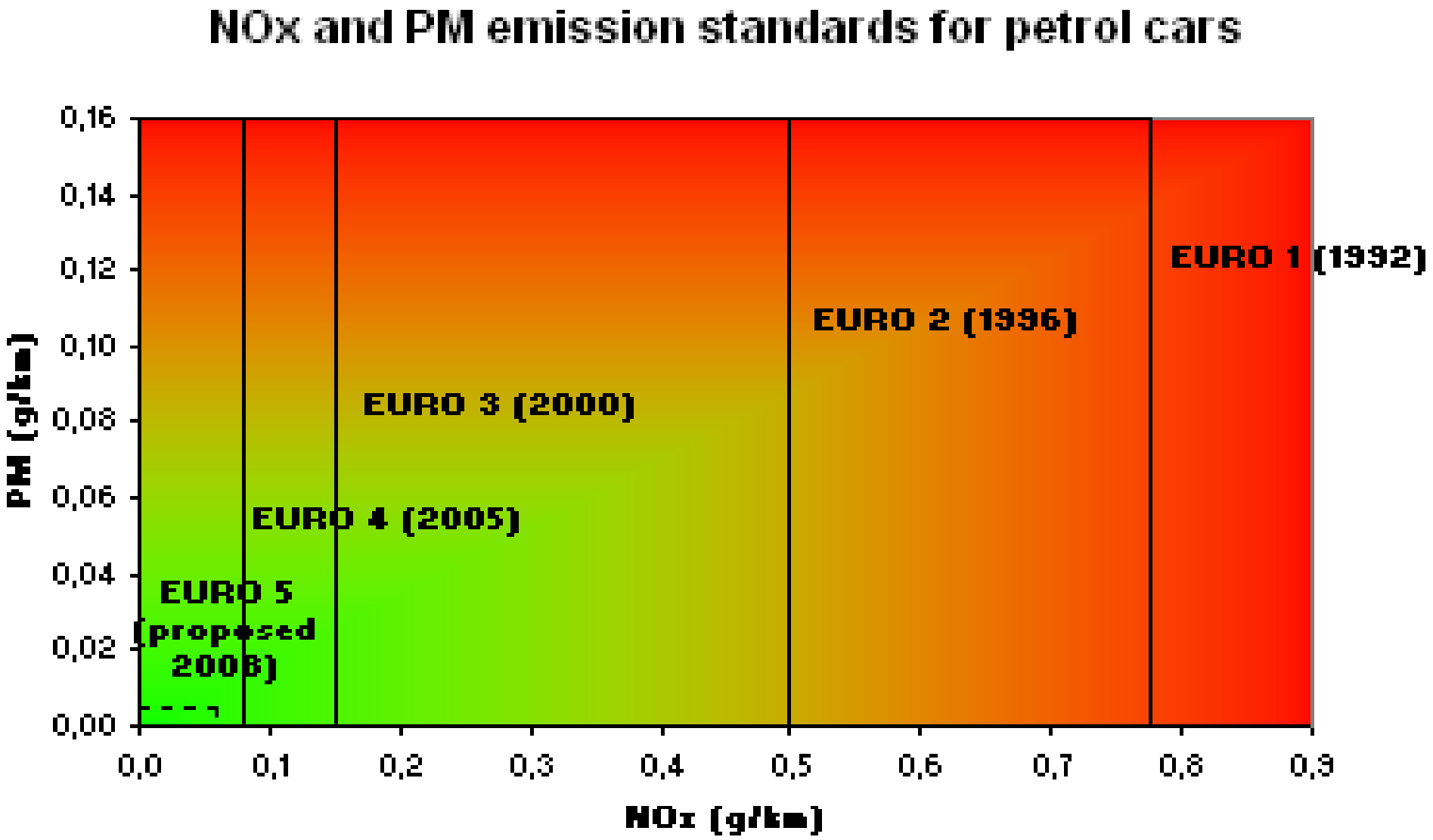
International examples

European Community

Simplified chart showing the progression of European emission standards for *Diesel* cars.



Simplified chart showing the progression of European emission standards for *Petrol* cars. Note that until Euro 5, there were no PM limits.



European emission standards

- Non-compliant vehicles cannot be sold in the EU, but new standards do not apply to vehicles already on the roads.
- No use of specific technologies is mandated to meet the standards, though available technology is considered when setting the standards.
- New models introduced must meet current or planned standards, but minor lifecycle model revisions may continue to be offered with pre-compliant engines.

International examples

CHINA

China's vehicle emission standard compliance and enforcement program currently consists of three main elements:

- New vehicle type approvals;
- Conformity of Production (COP) testing; and,
- I/M (Inspection/Maintenance) programs.

International examples

CHINA (cont'd)

The law requires that

1. emissions from all motor vehicles must not exceed the regulated limits,
2. prohibits any entity from producing, selling or importing vehicles that do not comply with emissions standards, and
3. prohibits vehicles that fail to meet in-use emission standards from operating on the road.

International examples

CHINA (cont'd)

If non-conforming vehicles are discovered, those vehicles can be confiscated, and fines may be levied up to the value of the confiscated products.

All confiscated, non-conforming vehicles can be destroyed.

- Vehicles can only be registered if they have a yellow/green emission sticker.
- A nationwide labeling program according to a unified format and categorization specified by MEP starting from October 2009.

CHINA (cont'd)

Mandatory Scrappage

- to maintain vehicle safety,
- reduce emissions from old vehicles and
- promote advanced technology development in China's automobile industry.

Vehicle Scrappage Standards (2000 version)

Vehicle Type	Service Limits	Remark
Light-duty passenger cars	(9 seats and below) 500,000 km (or 15 years)	Whichever limit occurs first
Taxis	500,000 km (or 8 years)	
Buses (10 seats and up)	500,000 km (or 10 years)	
Light-duty trucks	400,000 km (or 10 years)	
Heavy-duty trucks	500,000 km (or 10 years)	

If a vehicle can still pass inspection when it reaches its service limit, however, its service life can be prolonged.

Challenges on the field (real-world examples)

1. Vehicles not displaying an inspection sticker
2. Vehicles belching smoke despite displaying an inspection sticker
3. Absence of police or other authorities paying attention to inspection stickers or smoke belching vehicles
4. Test facilities that pass virtually all vehicles regardless of their emissions
5. Inspection test lanes that are clearly in disrepair

Challenges in the field (real-world examples) ,contd

6. Inspection test equipment that is not functioning or not calibrated properly
7. Inspection facility staff who are incapable of performing their duties (e.g. test lane drivers)
8. Inspection staff who view their job as helping drivers pass the inspection test by manipulating the vehicle or the test
9. Inspection staff who take bribes and issue stickers
10. Absence of any oversight of, or quality assurance procedures for, test facilities

The Fundamental Challenges in vehicle testing

- Typically, vehicle testing program requires massive behavioral change
  - among thousands (or up to millions) of drivers;
  - among those who test and repair vehicles; and,
  - among those who manage, oversee, and enforce such programs.
  - Drivers must restrain their instincts to cheat on tests and/or offer bribes to pass inspection.

THE WAY FORWARD

- Strengthen and ensure compliance and enforcement

Recommendations

- Set and enforce emission standards for **imported used** vehicles
- Set and enforce appropriate emissions standards for **in-use vehicles**
- Use the **phase-in** approach
- Operate **test-only** centers

Methods to enforce the vehicle emissions inspection program

1) **Vehicle Registration Sticker Enforcement**
   - pass the vehicle emissions inspection as part of the requirement for renewal of roadworthiness.

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3) **Targeted On-Road Inspections (Remote Sensing)**
   - to target high-emitting vehicles
   - validation tool to inspect vehicles exiting from inspection

Methods to enforce the vehicle emissions inspection program

Methods to enforce the vehicle emissions inspection program

Sufficient warning (18 months min.) needs to be given to new vehicle importers and dealers of an impending legislation change to allow re-establishment of model specifications for the country.

THE WAY FORWARD

- Engaged in a major program to establish a centralized inspection database, to which all testing facilities will eventually be networked, allowing for much more comprehensive management and quality assurance.

The vehicle service industry must have

- sufficient equipment to properly repair vehicles.
- adequate training to ensure mechanics and technicians are sufficiently skilled,
- sufficient lead time to properly equip itself.

Thank You