

# Global Trend Towards Cleaner Fuels

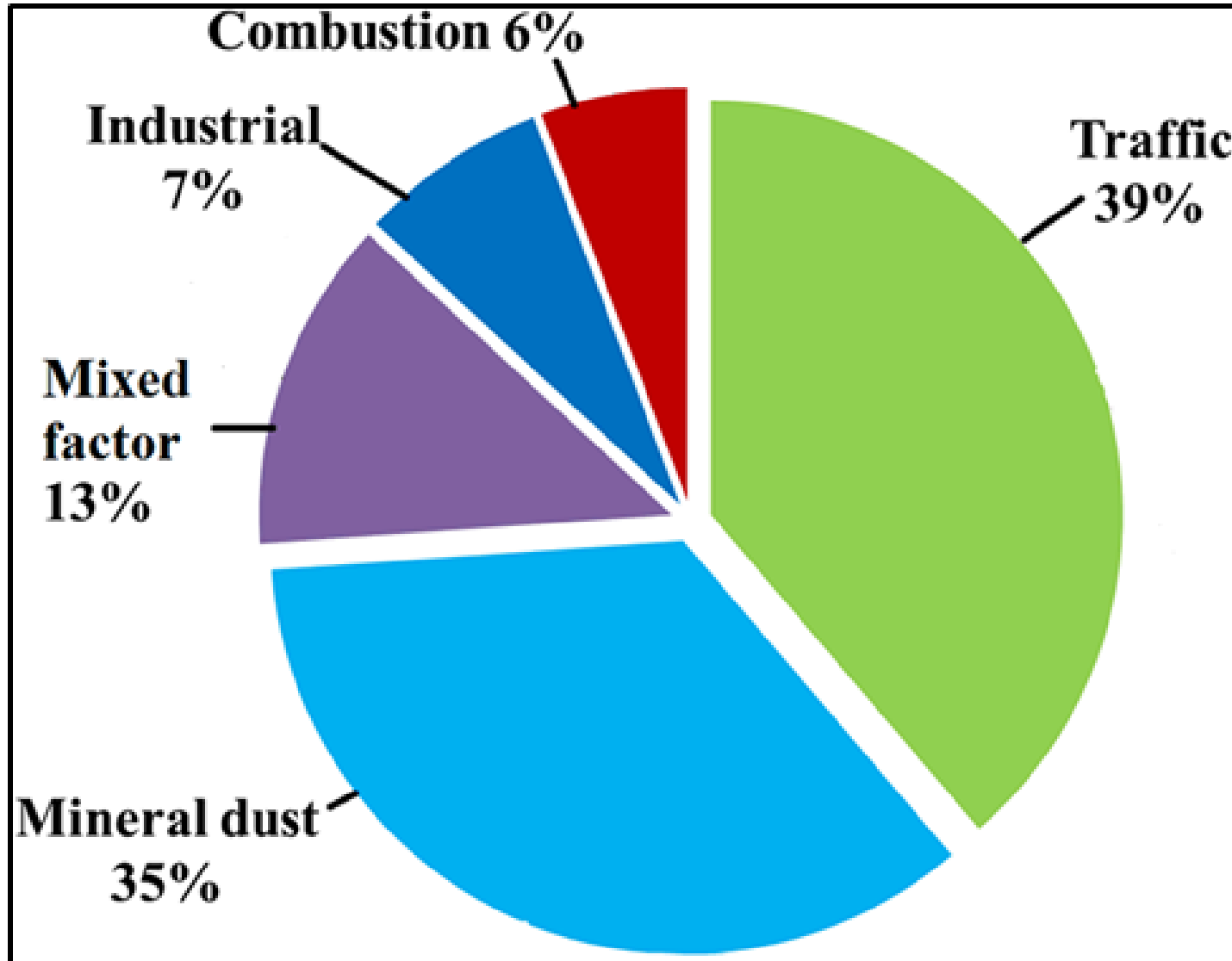






# Transport is main source of PM in cities

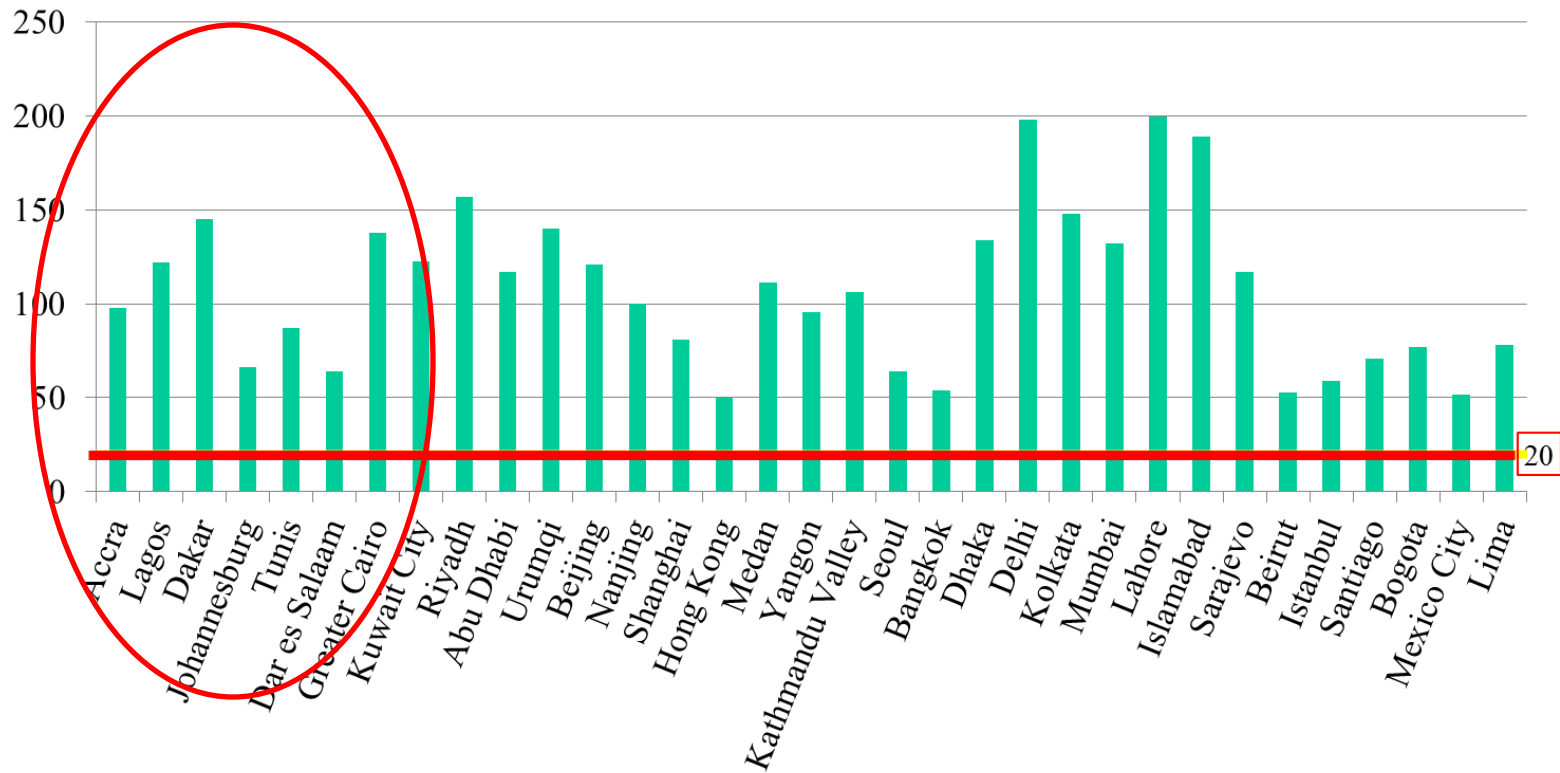
Main Sources of PM in Nairobi







# Annual average PM levels of African cities are well above WHO Guideline



WHO, 2012

— = 20 $\mu\text{g}/\text{m}^3$  WHO PM10 Annual Air Quality Guideline

# The Challenge

Urban buses account for 25% of BC emissions from all passenger and commercial goods transport

- Small particulates (PM10 or PM2.5) estimated to cause over **3.7 million premature deaths** per year worldwide;
- In 2012, diesel PM was officially classified as **carcinogenic** (WHO);
- The smaller part of PM is **black carbon (BC)**, now believed the **second most important climate pollutant**;
- Vehicular emissions, esp diesel vehicles, are responsible for 50-80% of the PM/ BC pollution in cities
- **Exposure highest 300 - 500 meters from roadway**



## 3.7 million deaths attributed to outdoor air pollution

58,000 in Americas

200,000 in Europe

236,000 deaths in Eastern Mediterranean

176,000 in Africa

2.6 million in South East Asia and Western Pacific



88% in low-middle income countries

455,000 in high-income countries



Over half of world's population lives in urban areas; **only 12% of cities** have air quality measures that meet **WHO standards**



Ground level ozone impacts food security by **reducing crop yields** by up to **50 million tons** each year



**Financial cost** of environmentally related **health risks** are in the range of **5%-10% of GDP**, with air pollution taking the highest toll

# DISEASES DUE TO:

- $O_3$
- PM2.5 AIR POLLUTION



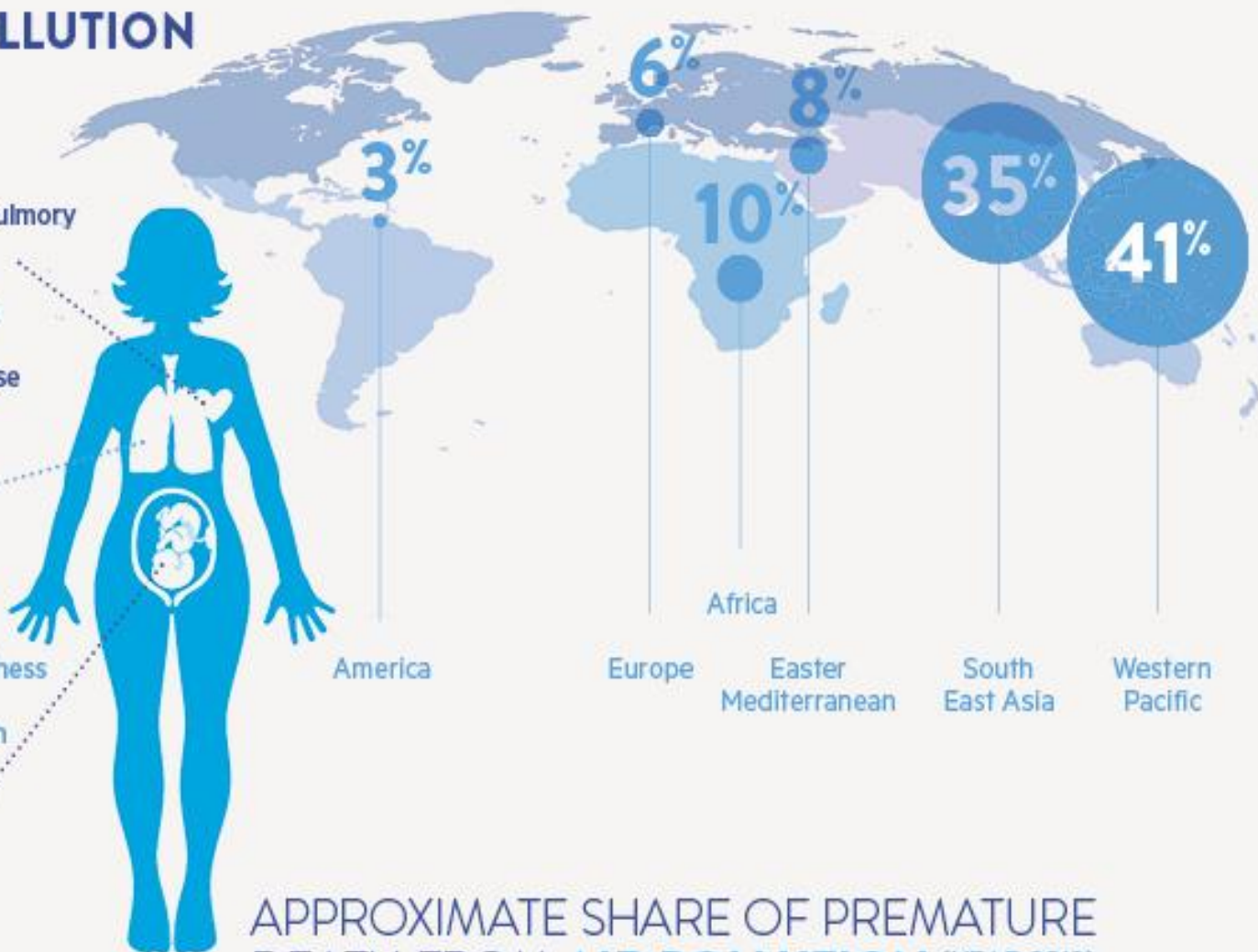
- Chronic obstructive pulmonary disease (COPD)
- Childhood pneumonia
- Ischaemic heart disease
- Stroke



- Asthma
- Breathing problems  
airway inflammation
- Chronic respiratory illness
- Reduced lung function



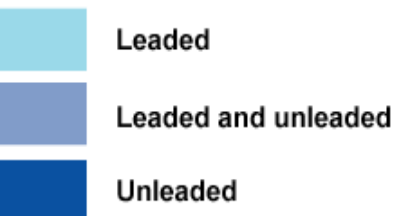
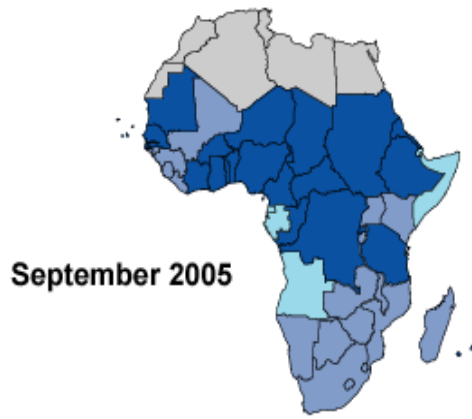
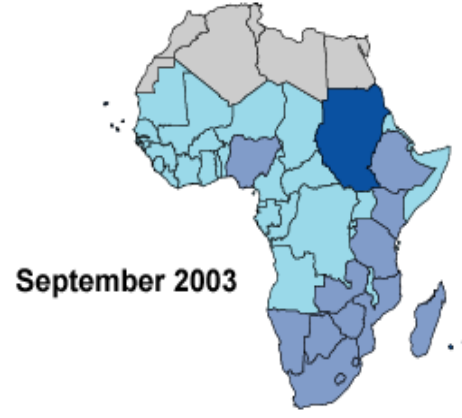
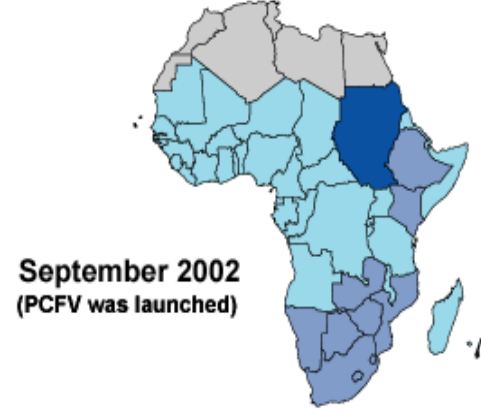
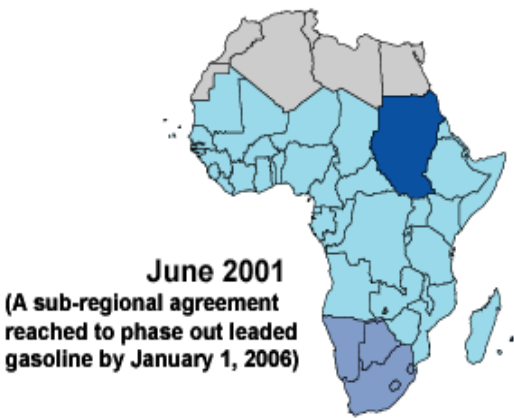
- Low birth weight



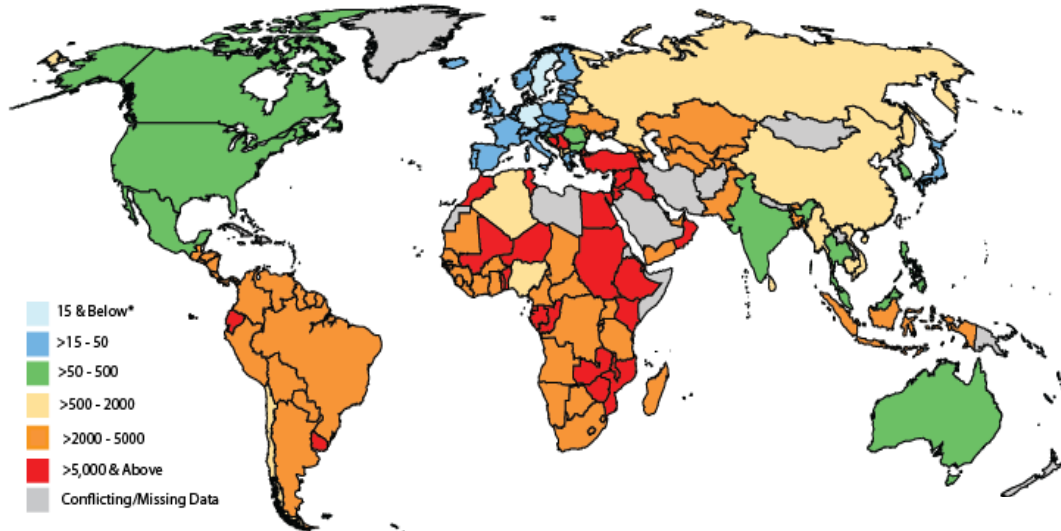
APPROXIMATE SHARE OF PREMATURE DEATH FROM **AIR POLLUTION** (YEAR 2012)



# Progress of leaded petrol phase out in sub-Saharan Africa

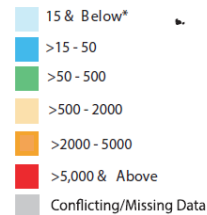
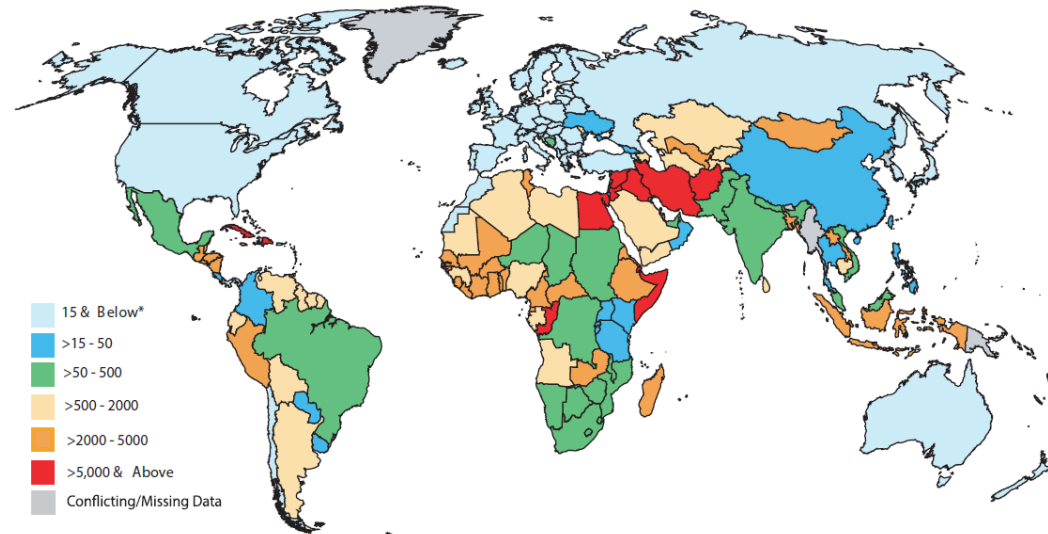






\* Information in parts per million (ppm)

# Diesel Sulphur 2005 and 2016



\* Information in parts per million (ppm)

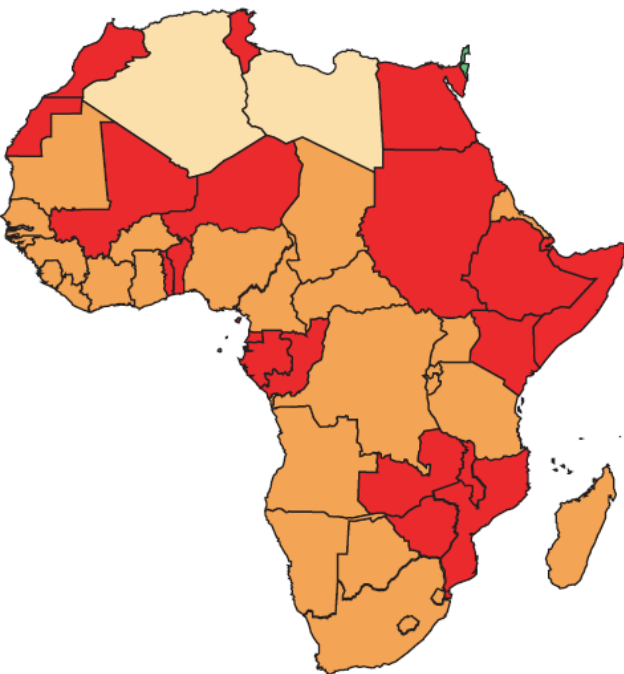
For additional details and comments per country, visit [www.unep.org/transport/pcf/v/](http://www.unep.org/transport/pcf/v/)

- 13 countries at 50 ppm & below
- More countries have lowered sulphur levels
- More cities at 50 ppm

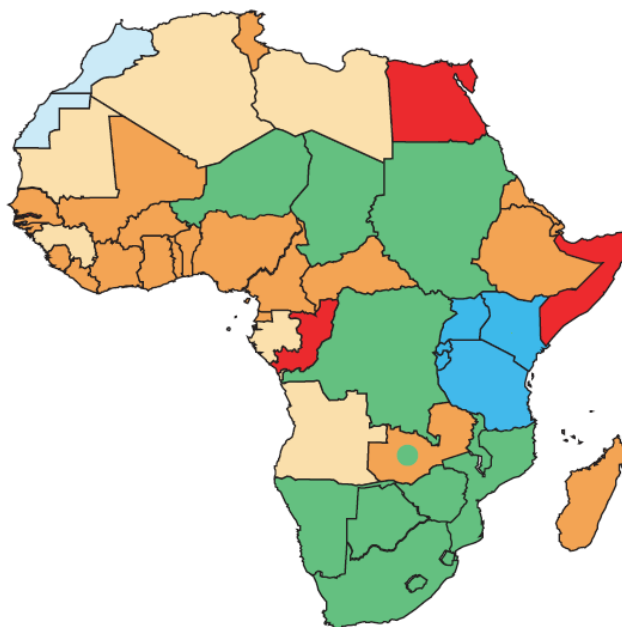


# Progress in Lowering Sulphur in Diesel in Africa

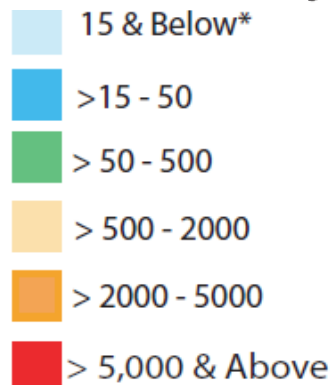
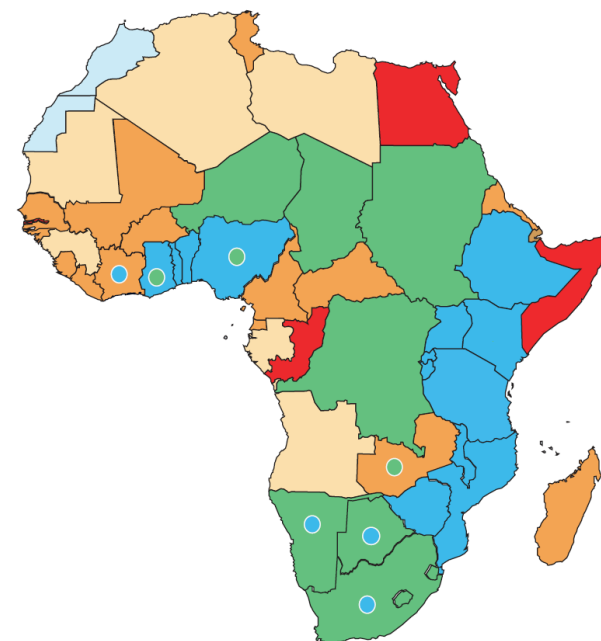
2002



2016

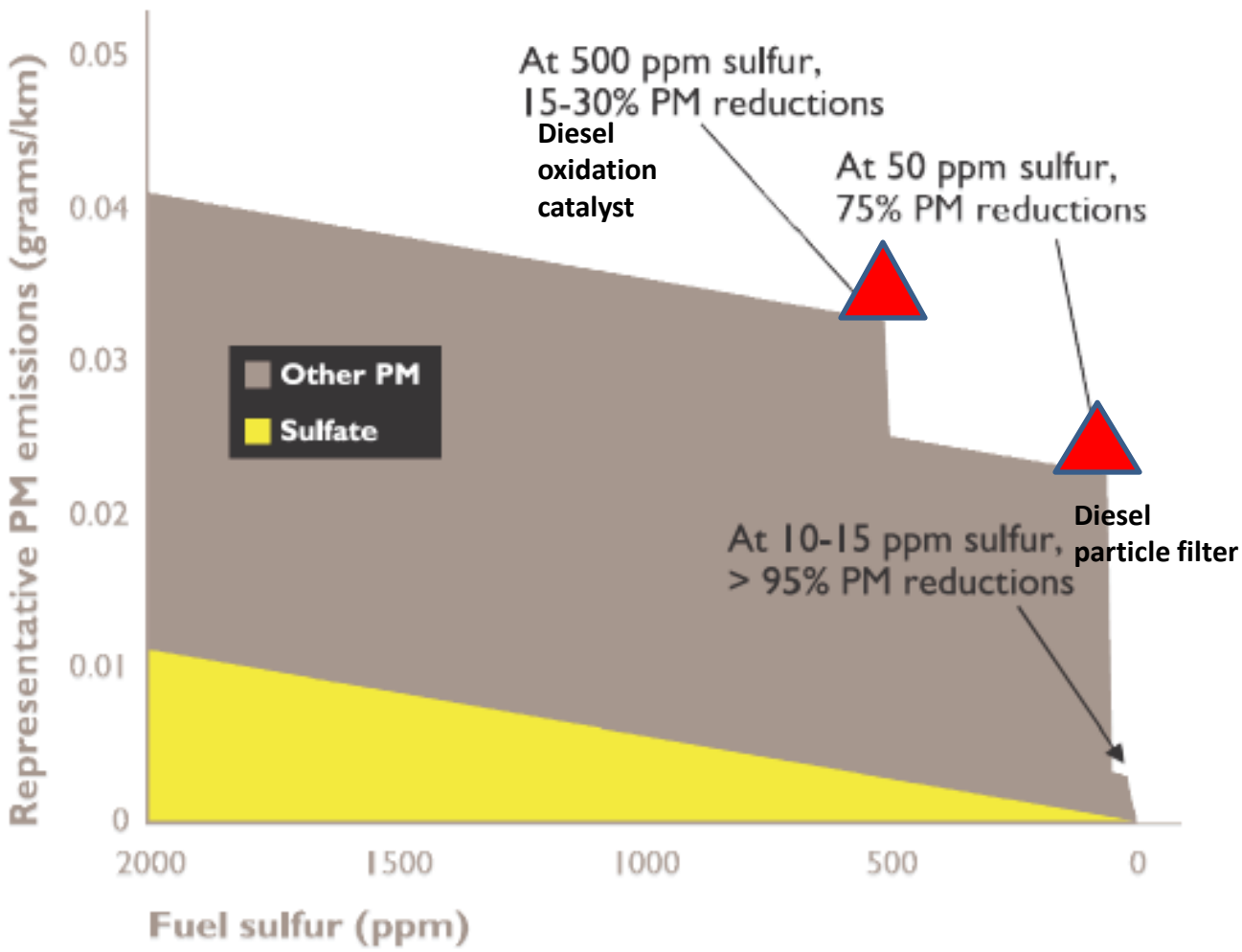


Planned 2017



\* Information in parts per million (ppm)

# Low Sulphur Fuels reduce PM directly, open door to emission controls and advanced technology

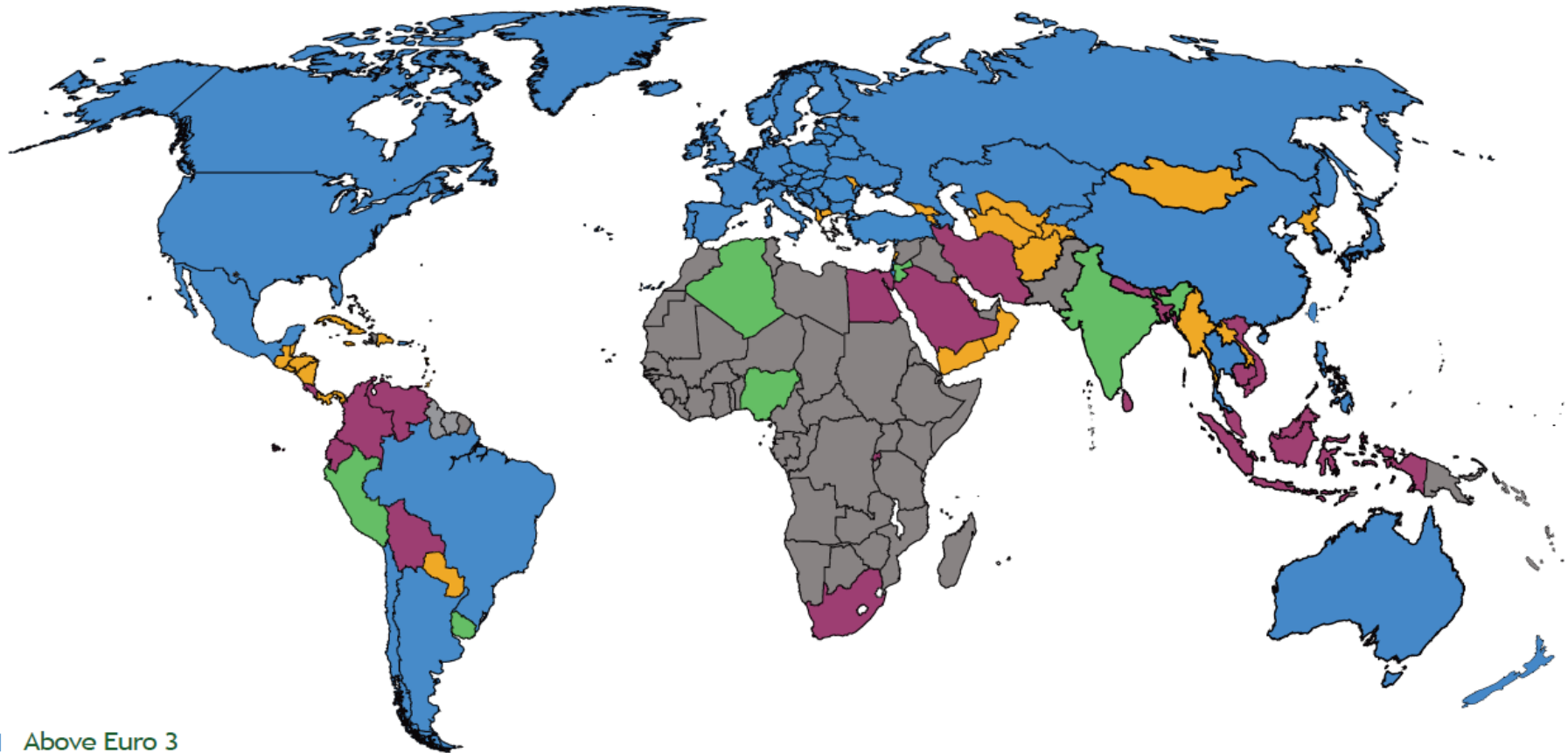


*500 ppm, 50 ppm critical vehicle technology breakpoints for catalysts and filters*



# Vehicle Emissions Standards

December 2016



- Above Euro 3
- Euro 3
- Below Euro 3
- No Policy
- Unknown

# Stringent vehicle emission standards can reduce pollution by over 85%



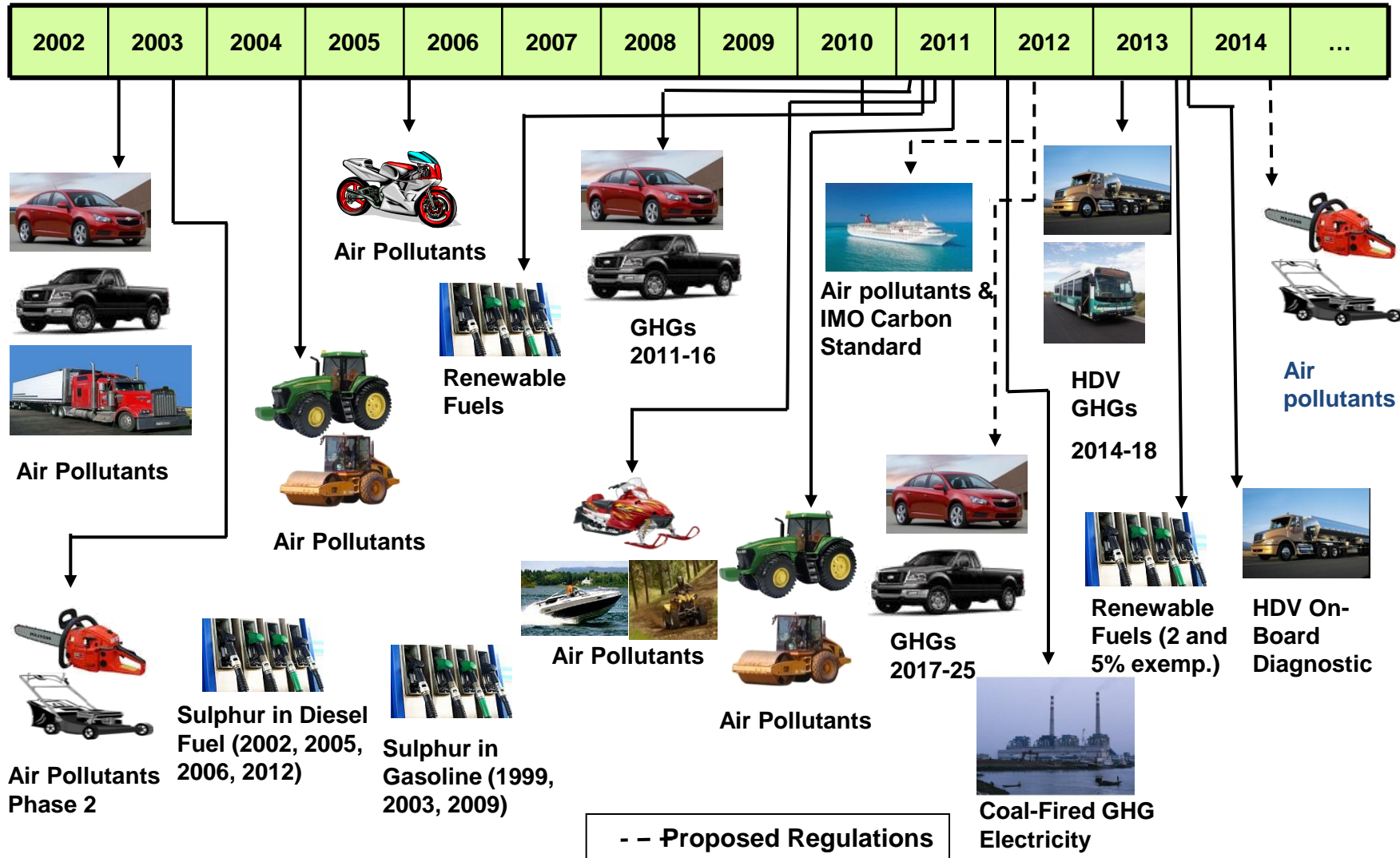
No retrofit system  
**Uncontrolled Diesel Exhaust**  
(Level 1)  
  
Old technology  
Little black carbon removal  
Little ultrafine PM removal  
Does not remove lube oil ash

Retrofitted with  
**Diesel Oxidation Catalyst (DOC)**  
(Level 1)  
  
Old technology  
Little black carbon removal  
Little ultrafine PM removal  
Does not remove lube oil ash

Retrofitted with  
**Partial Filter**  
(Level 2)  
  
Little black carbon removal  
Little ultrafine PM removal  
Does not remove lube oil ash

Retrofitted with  
**Diesel Particulate Filter (DPF)**  
(Level 3)  
  
New Technology  
Used on all new trucks since 2007  
>85% black carbon removal  
>85% ultrafine removal  
>85% lube oil ash removal

# Systems Approach: Canadian Vehicles and Fuel Quality Regulation





# Paris drives old cars off its streets

Life | Fri Jul 1, 2016 8:33am



Paris banned old, exhaust-belching cars from its streets on Friday in a war on air pollution that environmentalists hope will also drive dirty vehicles from the centers of other European cities.

Air pollution, in large part caused by fine particulate fuel emissions, **kills 48,000 people each year in France, some 400,000 in Europe.**

Any car registered before Jan. 1, 1997, will be barred from the city's streets from Monday to Friday, from 8 a.m. to 8 p.m.

Paris Mayor Anne Hidalgo says the ban could be extended in 2020 to all combustion-engine cars more than nine years old.

**Norway is planning to ban petrol- and diesel-fueled cars from 2025**  
Every year, around **23,500 Britons** die prematurely from **inhaling NOx** emissions such as nitrogen dioxide (NO<sub>2</sub>) particles, emitted by diesel engines. Another **29,000 die** from inhaling sooty particulate matter, from both diesel and petrol engines

**New Delhi:** Deliveries at night only; charged US\$11 on light commercial vehicles and US\$20 on large trucks; Proposing banning diesel vehicles older than 10 years; expected to have the world's highest number of premature deaths due to air pollution by **2025 with nearly 32,000 fatalities**

## India court approves 'pollution toll' to clean up New Delhi

NEW DELHI, Friday

Diesel-guzzling trucks and commercial vehicles in India will soon have to pay a surcharge for entering New Delhi, after the country's top court today approved a trial plan to improve the capital's notoriously filthy air.

Successive Delhi governments have been criticised for failing to curb pollution from industry and chronic traffic in the city of 17 million, ranked as having the world's worst air quality by the World Health Organisation.

Acting on a petitioner's plea, the Supreme Court approved an extra charge of 700 rupees (\$11) on light commercial vehicles and 1,300 rupees on large trucks entering Delhi.

The court is scheduled to pass an official order on Monday on the surcharge, which it said would apply for four months on an "experimental basis", with no start date yet specified.

Oil tankers, passenger buses, ambulances and trucks carrying some food will not have to pay up, the court added.

Many environmental activists welcomed the toll,

saying it would help to clear the capital's polluted air before winter starts, when quality deteriorates.

But campaign group Greenpeace India called the move a "temporary solution" that focused on diverting pollution rather than reducing it.

"Even if the trucks don't enter the capital, they are still polluting other parts of the country," campaigner Nandikesh Sivalingam said in a statement to AFP.

**\$11**

**Additional amount light commercial vehicles will be charged on entering city**

"Air pollution is no longer a Delhi issue, it's a national issue."

Banned from the city during the day, thousands of trucks pour into Delhi every night, adding to the toxic cocktail of smog, according to the Delhi-based Centre for Science and Environment).

The independent centre says about 52,000 commercial vehicles enter the city daily — more than double government estimates. (AFP)

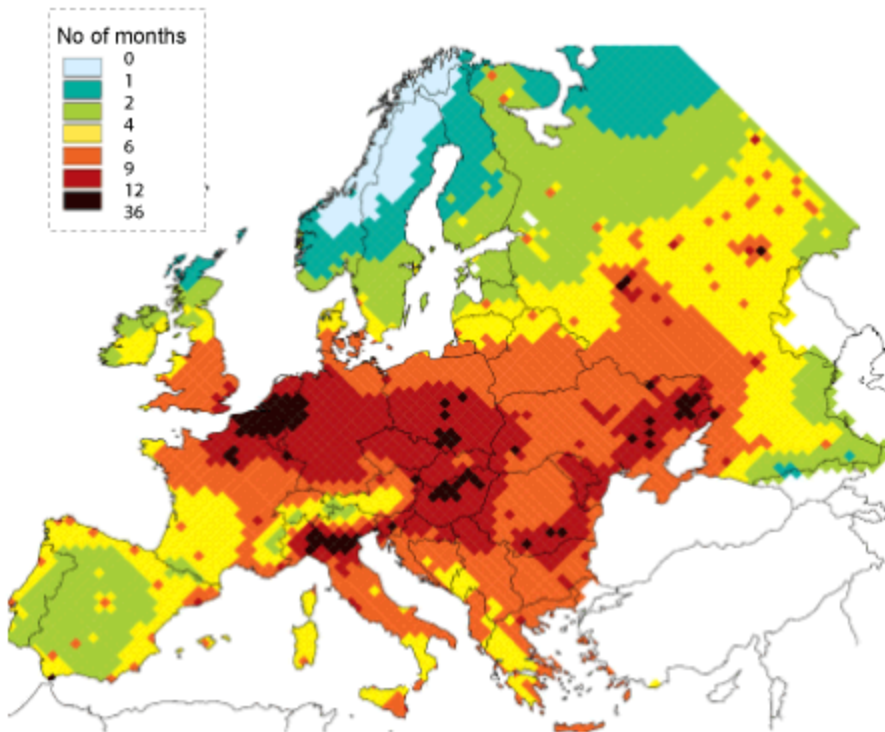


# EU Vehicle Emission standards/ Diesel fuel requirements

Year	Standard	Specification
1994	Euro 1	Maximum sulphur limit of 0.2% (wt.) = 2,000 ppm for all gas oils, including diesel fuel. Minimum cetane number was 49.
1996	Euro 2	A maximum sulphur limit of 0.05% (wt.) = 500 ppm for diesel fuel.
2000	Euro 3	A maximum sulphur limit of 0.035% (wt.) = 350 ppm and cetane number of 51 for diesel fuel.
2005	Euro 4	A maximum sulphur limit of 0.005% (wt.) = 50 ppm for diesel fuel. "Sulphur-free" 10 ppm sulphur diesel fuel must be available for highway vehicles.
2009	Euro 5	A maximum sulphur limit of 0.001% (wt.) = 10 ppm ("sulphur-free") for diesel fuel for highway and nonroad vehicles

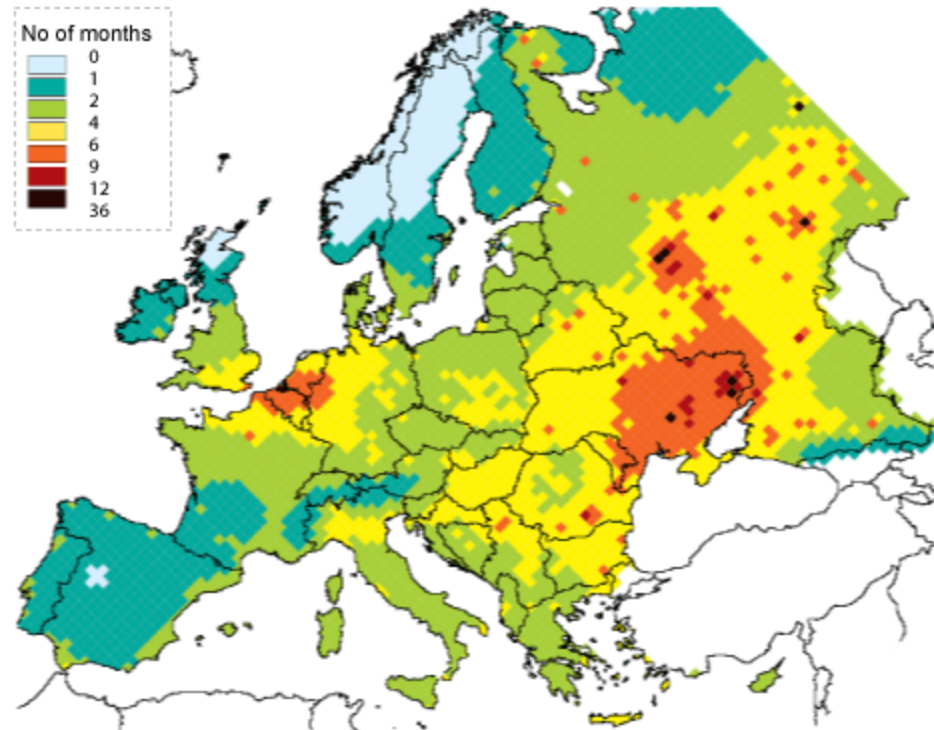
# Progress in PM reductions in Europe 2000 - 2020

→ Reduction in life expectancy due to exposure to PM 2,5  
Year 2000



SOURCE: Clean Air for Europe Programme / [www.environment.no](http://www.environment.no)

→ Reduction in life expectancy due to exposure to PM 2,5  
Year 2020

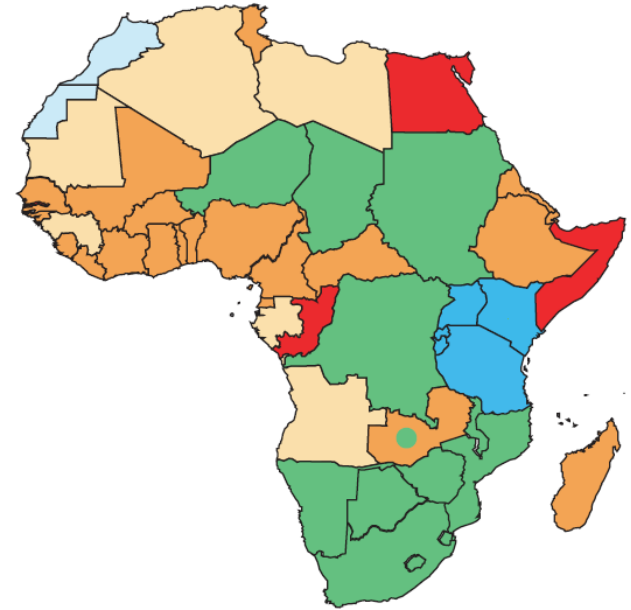


SOURCE: Clean Air for Europe Programme / [www.environment.no](http://www.environment.no)



# Support to West Africa/ECOWAS

- No country has low sulphur fuels – 50 ppm even at city level in ECOWAS region
- Nigeria has Euro 2 vehicle emission standards
- Collaborating with the Economic Community of West African States (ECOWAS)
- Regional workshop held in May 2015 with 11 countries participating
- Participants called for political will by all member states to adopt to low sulphur fuels with ECOWAS to lead fuel harmonization process



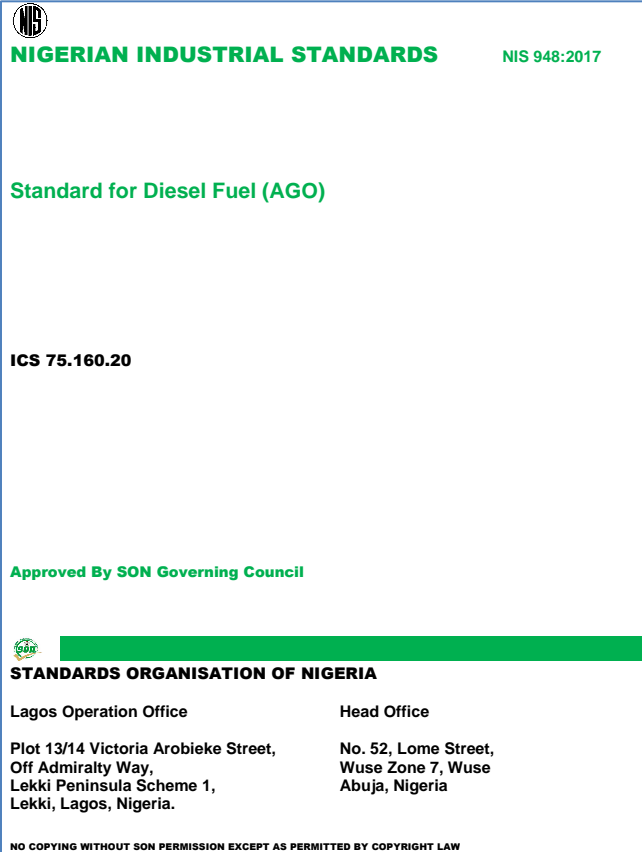
# Follow-up Sub-regional workshop


- A follow up sub-regional for Nigeria and neighboring countries was held in June 2016 - Nigeria, Ghana, Togo, Benin and Cote d'Ivoire, and ECOWAS
- Participants recommended actions at regional level and national level:
  - Technical meetings to develop a regional strategy
  - Regional cooperation, collaboration and information sharing
  - Importation of 50 ppm diesel
  - Refinery upgrading



# High Level Ministers Meeting

- Sub-regional Ministerial follow up meeting held 1 December 2016
- The high level ministerial meeting was hosted by the Nigeria Federal Minister of Environment Hon. Mrs. Amina L. Mohamed
- Nigeria, Ghana, Togo, Benin and Cote d'Ivoire, and ECOWAS recommended the introduction of low sulphur diesel – 50 ppm diesel fuel standards by 1 July 2017
- Refineries would be granted waivers to upgrade their facilities to produce low sulphur fuels by 2020
- 50ppm diesel standards already prepared in Ghana and Nigeria (adopted)
- National low sulphur fuels meetings planned in Togo and Benin in June 2017




 **NIGERIAN INDUSTRIAL STANDARDS** NIS 948:2017

Standard for Diesel Fuel (AGO)

ICS 75.160.20

Approved By SON Governing Council

 **STANDARDS ORGANISATION OF NIGERIA**

Lagos Operation Office	Head Office
Plot 13/14 Victoria Arobieke Street, Off Admiralty Way, Lekki Peninsula Scheme 1, Lekki, Lagos, Nigeria.	No. 52, Lome Street, Wuse Zone 7, Wuse Abuja, Nigeria

NO COPYING WITHOUT SON PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



# Next steps to sustainable transport



Cleaner fuels & vehicles (50ppm/Euro 4 vehicles emission standards)

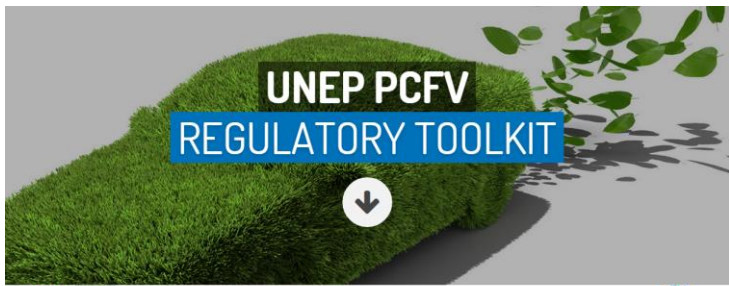
Clean soot free buses esp for BRT (Euro IV and above)



Cleaner, more fuel economy vehicles

NMT policies and infrastructure





# UNEP PCFV REGULATORY TOOLKIT

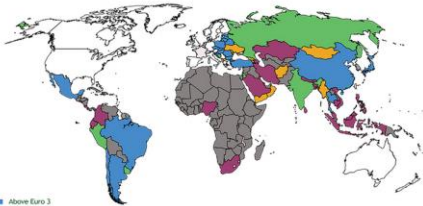


## INTRODUCTION



The Partnership for Clean Fuels and Vehicles (PCFV) has been working with developing and transitional countries to reduce vehicular air pollution through the promotion of cleaner fuels and vehicles. This regulatory toolkit is part of that ongoing campaign and is meant to introduce the need for a systems approach to vehicle emission reduction. A systems approach matches fuels and vehicle improvements - to move towards tighter vehicle emissions regulations.

This toolkit will support developing and transitional countries to introduce 50 ppm and below sulfur fuels; produce or import lower emitting and more efficient vehicle technologies; establish vehicle emissions control roadmaps; and ultimately improve air quality and human health in these countries. The toolkit will show by examples how to build a regulatory strategy, establish enabling legislation and regulatory standards, and set up enforcement mechanisms. The toolkit will also use specific case examples to illustrate how countries can integrate cleaner fuels and vehicles emission standards. While many developing and transitional countries - through the PCFV support - have adopted targets and roadmaps to introduce lower sulfur fuels, after completing the phase-out of leaded gasoline, most countries are yet to introduce vehicle emission standards as shown in the map below.



Clean Fuels and Vehicles Reports  
[Executive Summary](#) [Download Full Report](#)

### STRUCTURE OF THE TOOLKIT

This toolkit guides policy makers in developing countries towards the development of a regulatory framework to address vehicle emissions and fuel quality, including technical and policy background and case studies of existing regulatory approaches.

This toolkit:

- First summarizes the impact of fuel sulfur content on vehicle emissions and assesses the implications for the phase-in of tighter new vehicle standards.
- The second part then looks at why countries are moving towards very low sulfur levels in fuels and the impact of sulfur on advanced vehicle pollution control technologies.
- A set of tools that can be used to move towards cleaner fuels and vehicles regulations are also provided.
- The last section summarizes the approaches

[www.unep.org/transport](http://www.unep.org/transport)

CLIMATE & CLEAN AIR COALITION  
TRANSFORMING ENERGY FROM CLIMATE POLLUTANTS

LANGUAGES \* Follow Us [f](#) [t](#) [in](#)

ABOUT US PARTNERS INITIATIVES SCIENCE & RESOURCES EVENTS NEWS & MEDIA

HOW TO JOIN

CCAC welcomes moves by Obama Administration for public and private efforts to reduce HFCs

**PARTNER** 16 October, 2015

Chile's INDC commits to ambitious climate reductions, including SLCPs, by 2030

**PARTNER** 30 September, 2015

California Announces Cuts to Short-Lived Climate Pollutants at CCAC and UNEP-hosted Meeting in New York

**PARTNER** 25 September, 2015

CCAC side event "The contribution of short-lived climate pollutants to the Post-2015 Development Agenda"

**SCIENCE** 21 September, 2015

Road to Paris: Coalition's contributions to COP21

**PARTNER** 31 July, 2015

<http://ccacoalition.org/en/initiatives/diesel>

# Thank you