



MINISTRY OF TRANSPORT

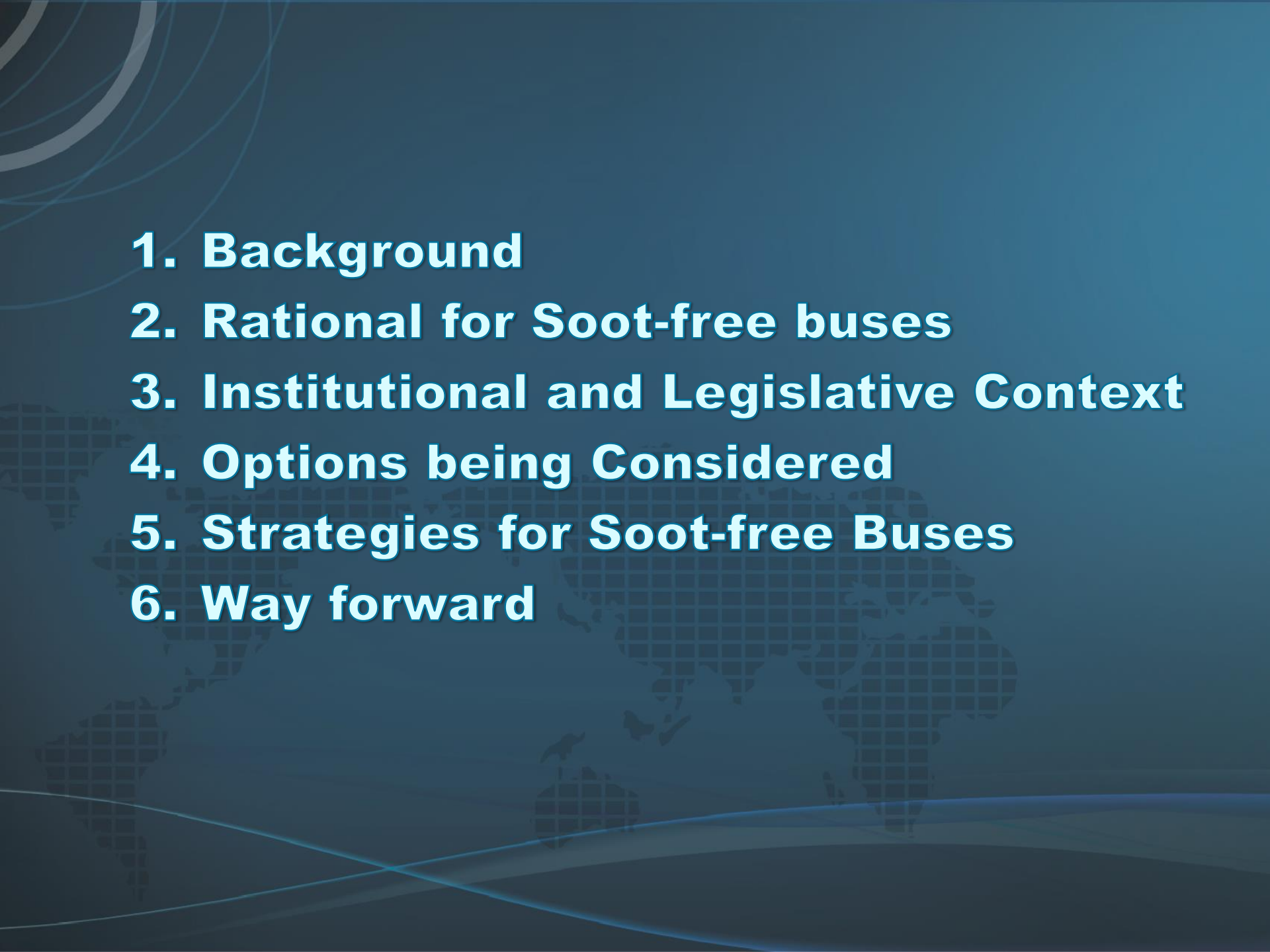
Cleaner Bus Options, Policies, Standards and Roadmap To Cleaner Buses in Accra

Regional Workshop

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- 1. Background**
 - 2. Rational for Soot-free buses**
 - 3. Institutional and Legislative Context**
 - 4. Options being Considered**
 - 5. Strategies for Soot-free Buses**
 - 6. Way forward**



Background



Ghana's Transport Sector is made up of the following modes : air, inland water, maritime, rail and road transport.

Ministerial Realignment

Ministry of Transport (Maritime and road transport services)

Ministry of Aviation

Ministry of Railway Development

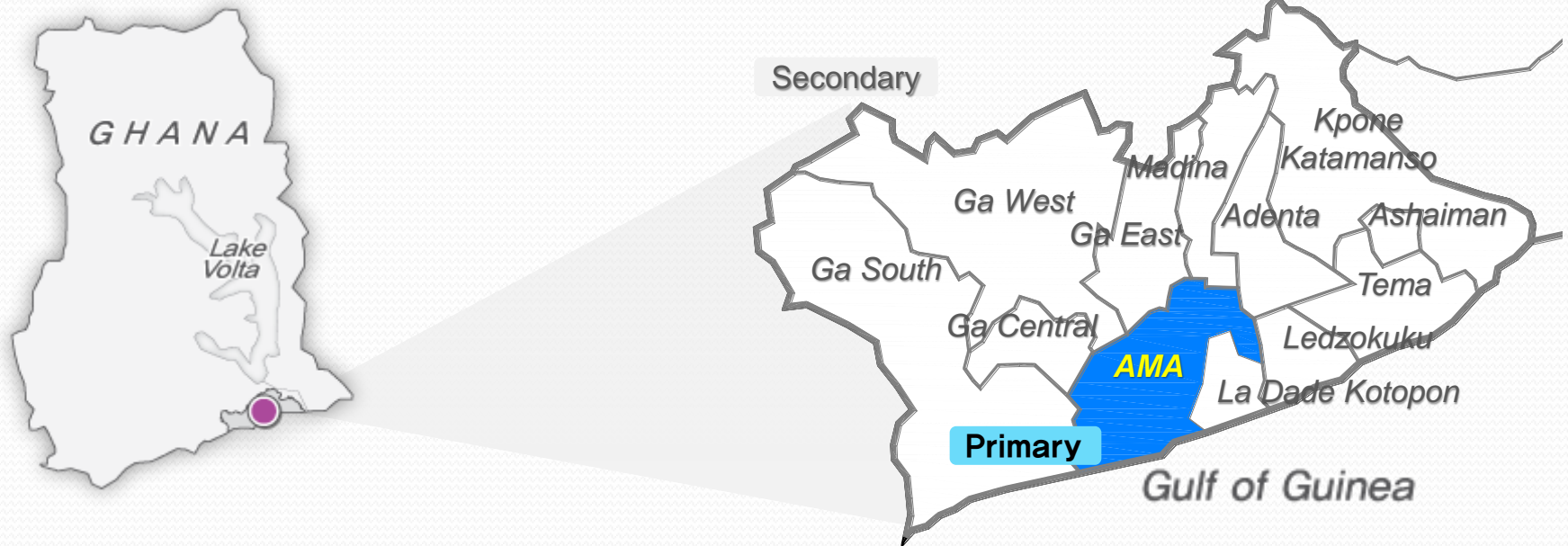
Ministry of Roads & Highways (Road Infrastructure and maintenance)

Road transport is the dominant mode of transport and services are provided largely by private sector operators



■ Spatial Scope

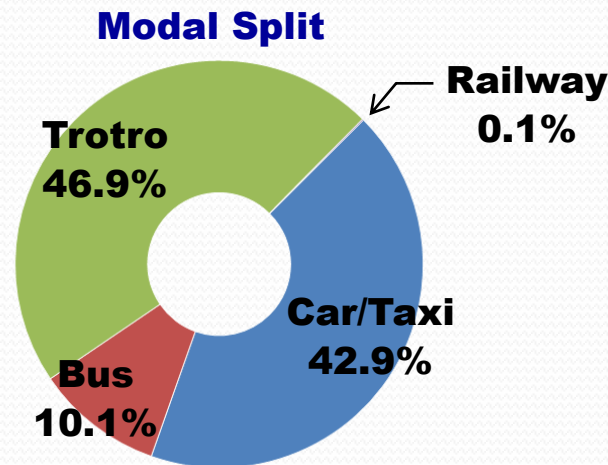
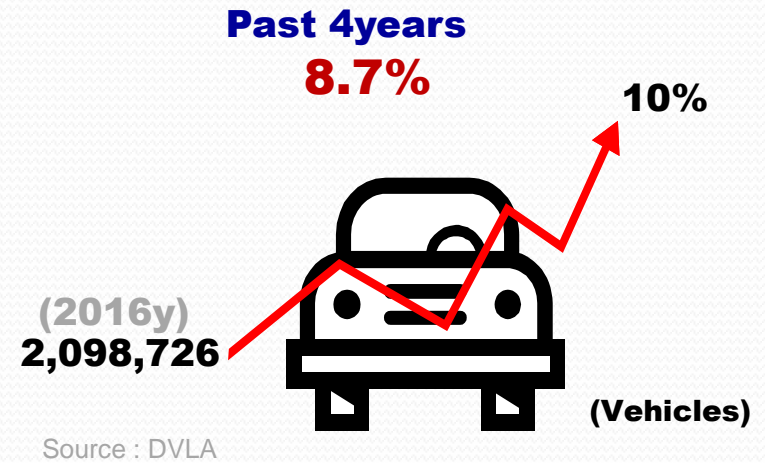
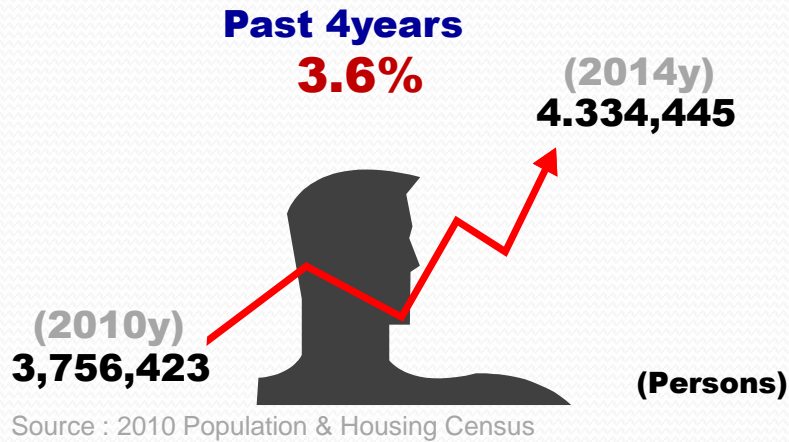
- **12 Administrative districts within GAMA including secondary study area**



- Total population of about 4.0 Million
- Daily visitors between 2.4 to 3.0 million
- Low density development



- Population : 4.33million • Area : 1,494km² • Road : 7,592km
- Vehicles : 1,134,599 • Public transport : MMT(448), Trotro (11,195)



- Inadequate infrastructure to support public transport operations, service quality is poor

- Features of informal transport operators

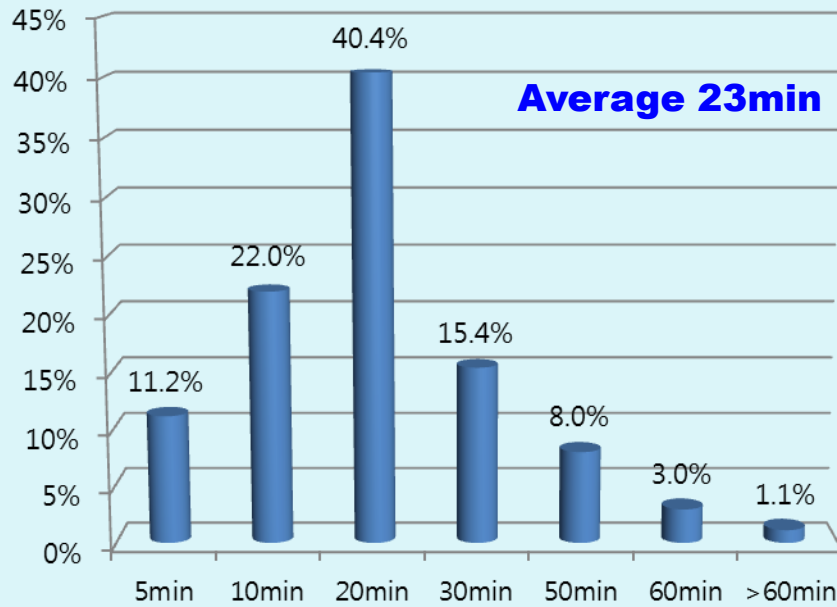
- Ageing vehicle fleet
- Safety concerns
- Carbon
- Air Quality
- Services are controlled by Unions



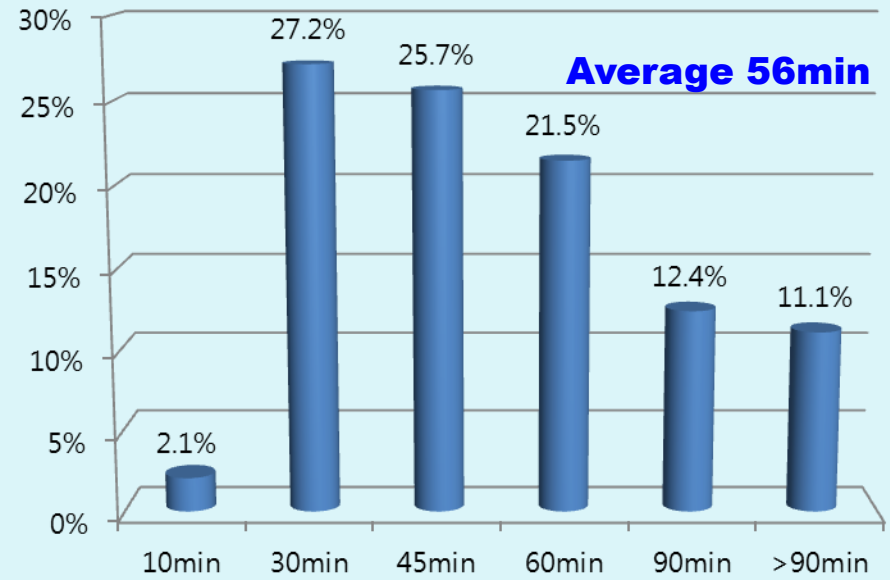


- **Waiting time : 10~20min (40.4%) > 5~10min (22.0%) → avg. 23min**
- **Travel time : 10~30min (27.2%) > 30~45 min (25.7%) → avg. 56min**
- **Total travel time : 104min (23min+56min+25min*)**

■ Waiting time



■ Travel time(In vehicle)



※ Consultancy Service for Urban Transport Project Design Review, 2013, Pre-GAPTE



SUMMARY OF THE CHALLENGES FACING THE SECTOR

- poor and inadequate development of intermodal transfer facilities/infrastructure
- lack of proper enforcement of transport regulations
- Inefficient and awkward relationship between land-use and transport planning and traffic congestion among others.
- Poor state of public transport vehicles resulting from
 - Poor maintenance culture and
 - Ageing fleet
- Emergence of two stroke motorcycle engines in urban areas
- limited road space and bad driver behaviour



■ As is

Main mode : Trotro

315 routes

11,195 trotro

381 terminals

104 min travel time

No priority

■ To be

Mid-term : Big bus

Long-term : Railway + Subway

12 trunk + feeder

2,560 big buses + 3,500 trotro

13 hub + 11 transfer

60 min travel time

Bus priority



Motivation for Soot- Free Buses



- Climate impact, local air pollution, sustainable urban mobility
 - Worsening air quality (EPA monitoring showing consistently high levels of pollutants)
 - Health related impact
 - Growing demand for used vehicles
- Public transport vehicles – Market availabilities of alternative fuel and technology types
- Oil and Gas- Gas reverse, shift to lower ppm sulphur
- Standards for vehicle emission standards
- Conversion of air quality guidelines into standards
- Phasing-out lead in fuels



1. Abidjan Agreement on Air Pollution, 2009
2. Abuja Communiqué on low sulphur fuels, 2016
3. Phased-out of leaded gasoline (petrol), 2003
4. Introduction of age-based tax system for imported vehicles, 2002
5. Introduction of petroleum and pricing deregulation policy, 2005
6. Transport Policy, 2008
7. Fleet renewal policy, 2010
8. Urban Transport Policy, 2008
9. Energy sector policy, 2010
10. Ghana National Climate change policy, 2013
11. Gas master plan, 2015
12. directive on fuel quality, 2016
13. National Environment Policy, 2014



***INSTITUTIONAL AND LEGISLATIVE
CONTEXT***



- Over 80% of imported buses are second-hand with engine technology ranging from Pre-Euro, Euro 0 to Euro III
- No established standards for vehicle import into Ghana
- Age-based restrictions on vehicles (not exceeding 10 years) has not been effective



- Development of Vehicle Emission Standards and testing programme
- Development of standards for public transport vehicles
- EU Directives on vehicle emission standards

Technology Class	Year of Implementation
Conventional Engines	< 1992
Euro I	1992-1994
Euro II	<1996 or 1997
Euro III	>2000
Euro IV	>2005 or 2006
Euro V	2011 or 2013
Euro VI	2014 or 2015

***Almost all public transport vehicles ranges from conventional to Euro III**



OPTIONS BEING CONSIDERED



- Fuels for public transport fleet in Ghana
 - Diesel (90% excluding taxis)
 - Petrol
- Alternative fuels and availability
- Global growing demand for alternative fuel buses
 - Bio-gas
 - Bio-diesel
 - Hydrogen
 - Bio-waste
 - Compressed Natural Gas (CNG)
 - Liquefied Petroleum Gas (LPG)
- Available energy in Ghana
 - Compressed Natural Gas (CNG)
 - Liquefied Petroleum Gas (LPG)



FACTORS INFLUENCING THE SOOT- FREE BUSES

Vehicle Technology

Operational Performance

Infrastructure Requirement

Cost



Vehicle Technology: Conventional Diesel buses (From Euro IV and above in line with plans to reduce sulphur content to a maximum of 50ppm)

Operational Performance

- widespread coverage of garages
- inadequate and lack of technical expertise
- High range on full tank capacity
- Higher route flexibility

Infrastructure Requirement

- widespread fuel filling and service stations in Ghana Operating environment adapted for diesel buses

Cost: US\$150,000- 250,000



Vehicle Technology: Compressed Natural Gas Buses

Operational Performance

- Low range and dependent on tank capacity
- Flexibility of the route is dependent on available fuel dispensing points

Infrastructure Requirement

- Requires specific fuel dispensing infrastructure (Re-gasification unit, mother stations, daughter stations, tube trailers for the transfer of gas to daughter stations).

Cost: US\$200,000- 350,000



Vehicle Technology: Hybrid Diesel buses

Operational Performance

- Flexible routes
- High maintenance cost
- Lack of technical expertise to maintain the vehicles

Infrastructure Requirement

- widespread fuel filling and service stations in Ghana Operating environment suitable for hybrid diesel buses

Cost: US\$150,000- 250,000



Vehicle Technology: Electric Buses

Operational Performance

- Limited range per charge
- High cost of replacement of batteries
- High maintenance cost
- lack of technical expertise

Infrastructure Requirement

- Require special charging points which are currently not available

Cost: Not yet determined



Strategies to soot-free public transport

Vision for cleaner bus in Ghana: All high occupancy and medium size buses for public transport service provision in urban areas are emission free by 2030



STRATEGIES

- Prioritize the development of vehicle emissions standards in line with available fuel standards
- Ensure that all new vehicles in use within Ghana meet the minimum requirements of Euro Engine IV standard.
- facilitate the development and implementation of vehicle standards for public transport service provision
- Investments in low-carbon public transport
- Promote public awareness and secure their commitment to soot-free bus fleet
- accelerate the implementation of fleet renewal policy



STRATEGIES

- Promote investment in the Compressed Natural Gas (CNG) fueling Infrastructure
- Target Diesel Vehicles and encourage the conversion of buses to CNG compatible vehicles in order to minimize CO, NO_x
- Introduction of stringent fuel regulations that require maximum Diesel sulfur content of 50ppm in line with the Abidjan Agreement on Air Pollution (2009) and the ECOWAS Communique (2016)
- Facilitate technical and policy exchange among MDAs and MMDAs to promote a shift to soot-free engines for all categories of vehicles both new and second hand-vehicles import.



STRATEGIES

- Promote and prioritize High Occupancy Vehicle (HOV) dedicated lanes in urban areas
- Promote the implementation of mass transport system in Ghana
- Support the identification of soot-free engine technologies and the fuels that enable them
- Accelerate the transition of diesel urban bus fleets towards soot-free engine technologies



WAY FORWARD

- Accelerate the implementation of the Environmental Fiscal Reform Policy
- Introduce alternative fuel technology such as CNG in the on-going Bus Rapid Transit(BRT) in the Accra metropolis.
- Provide technical and financial support for retrofitting existing diesel engines to run on CNG.
- Government already seeking financial arrangement to introduce CNG technology into the public transport system
- Build related infrastructure for CNG station at major routes to support CNG buses



Thank you for your attention