Soot-Free Urban Bus Fleets in Lagos – Opportunities and Challenges

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The Mega City

- Lagos is the most populous city in Africa – over 20 million inhabitants
- Bigger in population than 23 countries in Africa – Benin Rep., Mali, Botswana etc.
- Hub of nation’s economic, commercial and industrial activities.
- Contributes 20% of Nigeria’s GDP
- Larger economy than Ivory coast, Ghana, Madagascar etc.
- 45% of nation’s skilled manpower reside in the city.
Chronic traffic congestion

- Inadequate transport infrastructure
- Uneven urban growth and development
- Inadequate regulatory public transport framework
- Limited alternatives to vehicular transportation
- Lack of sufficient high capacity vehicles for public transport

Contributes to Air & Noise pollution in Lagos
Demand for trips in Lagos Metropolitan Area by all modes (including walking) was ~22million per day.

Walk trips accounted for 40% of total trips in Metropolitan Lagos.

About 97% of all transit in Lagos are done by road.

Source: LAMATA Strategic Transport Master Plan
Environmental Impact

Nigeria

- In 2011, Nigeria had the fourth highest \( \text{CO}_2 \) emission from fuel combustion in Africa after South Africa, Egypt and Algeria respectively.

- The transport sector, with a 45% share, was the largest contributor to a nationwide \( \text{CO}_2 \) emission from fuel combustion of 52.8 million tonnes that year.

**Total \( \text{CO}_2 \) emissions from fuel combustion by sectors**

- \( \text{Electricity and heat production} \)
- \( \text{Transport} \)
- \( \text{Manufacturing & Construction} \)
- \( \text{Other sectors} \)
- \( \text{Other energy industry own use} \)

Source: IEA
Lagos

The Lagos Air Quality Monitoring Study (2007-2009) revealed that vehicles contribute approximately 43% to the total level of air pollution in Lagos.

Over a quarter of the transport sector contribution to CO₂ emissions in Nigeria comes from Lagos alone.

The emission factors for many Nigerian vehicles are close to the Euro 2 Standards, which is 3 to 4 times greater than European values.
Daily Average CO₂ Emissions in Lagos

Below is a breakdown of emissions per vehicle category:

*HD – Heavy Duty; MD – Medium Duty; LD – Light Duty; PC – Passenger Car; P&D – Petrol and Diesel*

Source: LAMATA GHG Emissions Handbook
However, in actual terms, the emission per passenger is lower for vehicles with high occupancy rates (e.g. – Buses)

Daily Average CO₂ Emissions in Lagos

**Daily Average CO₂ Emissions per Passenger by Vehicle Category (Passenger Carbon footprint)**

- HD Truck
- MD Truck
- LD Truck
- BRT Bus
- Rail
- Coaster Bus
- Danfo (Minibus)
- Taxi
- PC Diesel
- PC P&D
- PC Petrol
- Motorcycle

*HD – Heavy Duty; MD – Medium Duty; LD – Light Duty; PC – Passenger Car; P&D – Petrol and Diesel*

Source: LAMATA GHG Emissions Handbook
CO$_2$ Emissions in Lagos

By the year 2032, CO$_2$ emissions by the transport sector in Lagos are estimated to exceed 15 Million tonnes per annum if measures are not put in place to curtail it.

Without Implementing Strategic Transport Master Plan (STMP)

Source: LAMATA GHG Emissions Handbook
The **Big Moves** in Lagos towards a Sustainable Urban Transport System

- Develop a fully integrated mass rapid transit system to cover activity centers identified Strategic Transport Master Plan (STMP) of the mega city region
  - **Six** Rail Lines
  - **16** BRT Routes
  - Key road projects
- Introduce a common ticketing system to aid integration of public transport modes.
- Develop the waterways transport network to integrate with Rail and BRT.
- Develop a ring road around Metropolitan Lagos to take pressure away from the mainland.
- Use of ITS technology to optimize the transport network.
CO₂ Emissions in Lagos

- Execution of projects within the STMP will result in an emission level less than 8 Million tonnes per annum, which represents over 50% reduction in emissions from the 2032BAU level.

**Without** Strategic Transport Master Plan (STMP)

**With** Strategic Transport Master Plan (STMP)

Source: LAMATA GHG Emissions Handbook; *BAU – Business As Usual; *STMP – Strategic Transport Master Plan
Financing/Working with Manufacturers

- Lagos State government commenced discussions with Nigerian Independent Petroleum Company (NIPCO) on conversion of some diesel buses to CNG.
- Only about 5000 vehicles use CNG as fuel in Nigeria since the inception of the project in 2009.
- CNG buses is already in use at Benin city, Edo State of Nigeria.
- LAMATA is proposing five CNG buses on its BRT corridor for test run. Only about 500 vehicles run on CNG in Lagos.
Key barriers and challenges to date

- Nigeria is a gas-rich country, usage of CNG will help reduce Governments’ dependence on the importation of refined products.
- However, use of CNG powered buses is still at infancy in the country.
- Lack of political will to support investment in the use of CNG to power vehicles.
- The moderate achievement in this regard is from few private investors.
Key barriers and challenges to date

- The cost of conversion and availability of gas are some of the major challenges of this scheme.
- Cost of conversion to become CNG compatible cost between $1000 and $1,500.
Next Steps

- It is believed that a policy direction from the Central government could accelerate use of CNG to power vehicles in Nigeria.
- Advocacy from UNEP and groups such as this to create awareness that CNG powered vehicles as economical, safer, flexible and eco-friendly
Thank You