

KAMPALA CLEAN AIR DRIVE

Saving infant lungs in Uganda



Project by



WANYAMA AUTOSAFETY INITIATIVES

Safety | Environment | Sustainability

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Presented by: W. R. Michael - Team leader



Situation Analysis

- ❑ Residents in our capital Kampala are breathing to death courtesy of poor air quality. Children under 5 are affected the most because of heavy uncontrolled exposure to polluted air yet their systems are not fully developed to fight environmental toxins. They breathe faster thus taking in more polluted air than adults and are closer to the ground considering the location of most tailpipes. According to World Health Organization (WHO), more than 90% of the world's children (especially in developing nations) breathe toxic air every day that puts their health and development at serious risk. Tragically, many of them die.
- ❑ Over 60 infants per 1,000 live births die of air pollution related illnesses in Uganda – according to a 2013 study by WHO. These numbers must have surged given a high increase in the levels of air pollution over the past 7 years.
- ❑ A recent report estimated that out of 7,989 air pollution-related deaths registered in Uganda, about 3,141 (mostly children) were due to acute lower respiratory disease, 192 Chorionic Pulmonary diseases, 126 lung cancers, 1,624 Ischemic Heart Disease and 2,905 are stroke-related – source: National Environment Management Authority (NEMA)



Infants exposed to exhaust pollutants

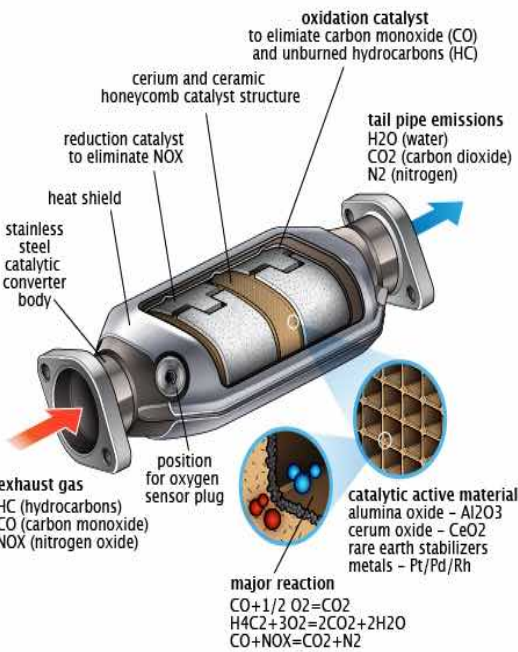
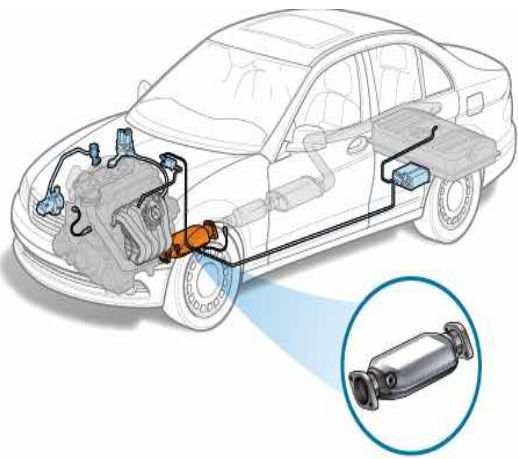
" a little care makes pollution, accidents rare"



- ❑ In Uganda and many other African nations, several studies suggest that transport is the largest driver of air pollution followed by industry and domestic activities largely due to heavy dependence on fossil fuels, biomass and burning of waste in open spaces.
- ❑ The country imports about 70,000 vehicles and 100,000 motorcycles including 3-wheelers annually, all running on fossil fuels – according to the ministry of works and transport. Over 80% of vehicles are used imports.
- ❑ There's no evidence that pre-shipment inspections on used imports are efficient and many of them come with failed emission control systems.
- ❑ We have only seen a temporary improvement in Uganda's air quality during the COVID-19 lockdown when vehicle movement was limited to essential groups like security, health and a few others. Upon re-opening of most businesses, the situation has returned to pre-COVID levels and expected to worsen as most people are striving to recover from economic impacts of the pandemic, amidst increasing infection cases.

Congested, polluted Kampala city (downtown) and a suburb

Our studies find the transport emissions issue in Uganda to be further escalated by the very limited capacity of local technicians (mechanics) in terms of knowledge, skills and necessary equipment to maintain inbuilt emission control systems in automobiles and related equipment. One common dangerous practice is the removal or modification of catalytic converters in vehicles; allowing toxic exhaust gases such as carbon monoxide, oxides of nitrogen, etc. to be expelled direct into the atmosphere without treatment risking public health and contributing to global warming. Mechanics usually do this in effort to fix engine related problems or sometimes maliciously for the platinum content in a catalytic converter, one of the most expensive vehicle components.



catalytic converter function – image courtesy: clearmechanic.com

Modified or deleted catalytic converter by some African mechanics

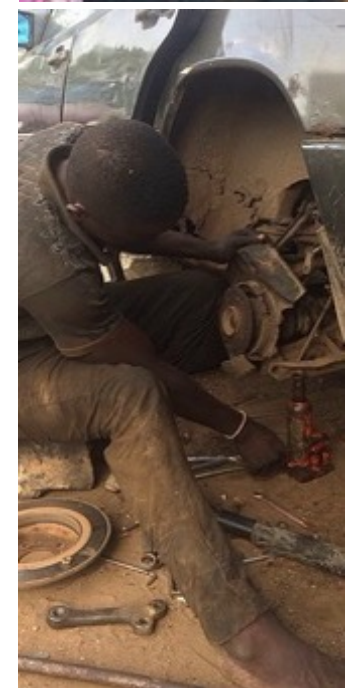
- ❑ Our findings estimate that out of every 10 vehicles on Ugandan roads that have been operating locally for the past 10 years, only 3 of them still have functional emission control measures. This is only considering light cars and trucks but for public transportation buses and heavy trucks matters are probably worse because even the 15 year old restriction on used vehicles does not apply to them. That's all courtesy of the failure of local mechanics to carry out maintenance in sustainable manners. We've seen some ignorant and malicious mechanics go a bad step further by using used oil to do oil changes in motorcycles; making them the worst polluters.
- ❑ The general public's attitude towards environmental safety is low, leading to longer delays in maintenance.



Mechanic activities that involve tampering with emission control systems in Kampala



Results are usually increased exhaust emissions that worsen with heavy congestion



- ❑ Several other dangerous activities like excessive engine idling, spray painting in open space, etc. are carried out in motor garages yet government authorities do not regulate them besides issuing operational licenses. It's common to find a motor garage next to a pre-school or children's hospital in close proximity and everybody acts like its normal.
- ❑ There's no data on the total number of mechanics in the country but an estimated 50,000 mostly youths operate within the Kampala metropolitan area alone. Beyond 85% of them never attained any professional training, learning their trade mainly from makeshift motor garages of relatives and village-mates. Some have ended up good mechanics, but the majority have no skills beyond bolting a nut.
- ❑ They are key stakeholders in Africa's transport emissions; unfortunately the current standards and policies do not account for them; leaving gaps in government action plans to mitigate the issue. They are the kind tending to the largest number of automobiles because the few equipped and organized garages are too expensive for the average motorist especially those in public transport and cargo businesses.
- ❑ Uganda has about 2million vehicles including motorcycles.

Limited capacity mechanic activities



Fake tyres are common



Unburnt fuels due to fake components



Ugandan vehicles never retire

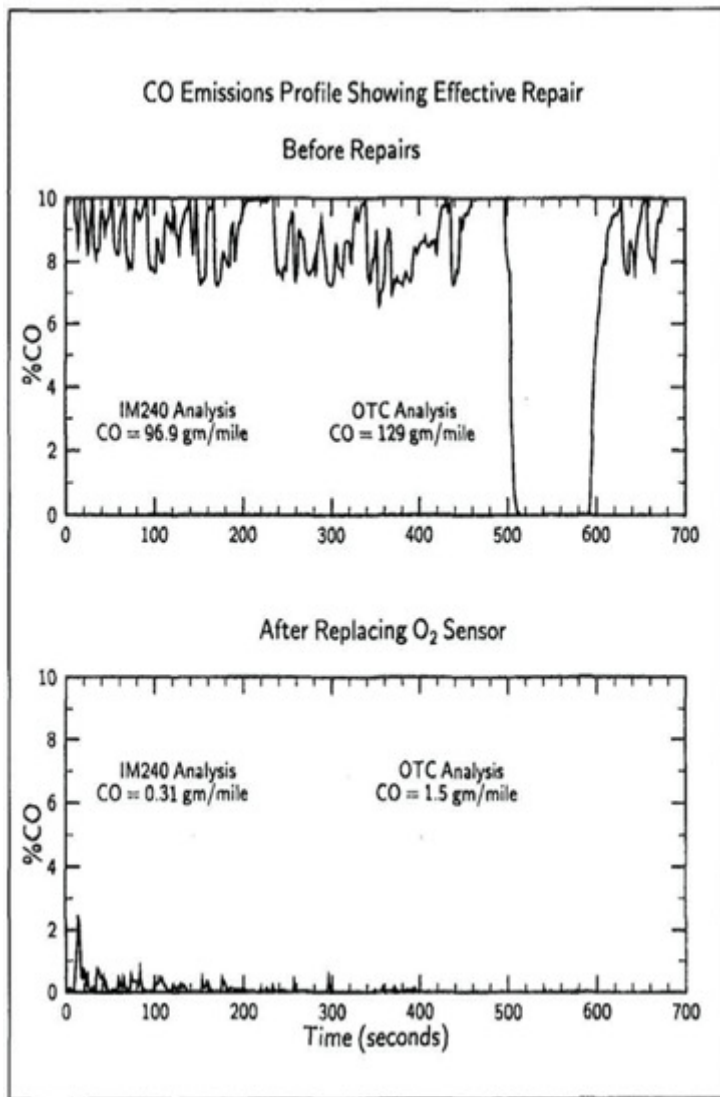
- ❑ Another factor to note is the heavy presence of counterfeit automotive parts and consumables on the local market that facilitate an increase in both exhaust and non-exhaust emissions. Examples include fake brake pads, tyres, spark plugs, etc.
- ❑ Uganda has no policy on end of life for vehicles and no active enforcement on mandatory periodic inspections; this has made very old vehicles to keep active in poor and dangerous states. Some old trucks get modified into recovery trucks – basically moving disasters.
- ❑ Motorists do not practice eco-friendly driving due to lack of awareness and matters get worse with congestion.
- ❑ Adulterated/poor quality fuels are still being used in many parts of the country

The Solution (Our Approach)

We believe tackling air pollution from an African point of view makes a positive difference



“ a little care makes pollution, accidents rare”



Second-by-second %CO emissions traces before(a) and after(b) repairs on a Mercedes 190E 2.6L - Credit: Paul L. Guenther and colleagues.

- ❑ We focus on reducing emissions from transport but also from industry and domestic activities. Primary target groups are local mechanics, motorists and industrialists and the aim is to enhance and maintain the integrity of emissions control systems that are capable of capturing the most harmful pollutants in the short-term while we seek to move away from fossil fuels in the medium term.
- ❑ The goal is to achieve better combustion, enhance tailpipe emission control, promote use of cleaner fuels and cut non-exhaust emissions from automobiles and garages plus other related places.
- ❑ Reducing infant exposure to transport-related air pollution is a key objective in this project. We identify and prioritize working with garages and factories located near pre-schools, hospitals and slum areas.
- ❑ Considering industry; we engage local factories and small businesses to identify different machinery in particular those that utilize fossil fuels like heavy duty diesel-powered generators as the basis of our interaction. Steam boilers are of interest too.
- ❑ Air pollution being a major element driving climate change, the connection between public and environmental health is always highlighted to the target groups under sensitization.

Our community engagement activities include but not limited to:

- ❑ Guiding the general public on how to access and interpreted available air pollution data in their communities using portable air quality sensors and cloud-based platforms like Makerere University's AIRQO project.
- ❑ Helping technicians with limited capacity understand emissions associated with their lines of work while building their capacity towards sustainability through free training workshops.
- ❑ Conducting free diagnostic inspection on vehicles owned by schools or other child-related services and recommend essential actions to minimize children's exposure to polluted air.
- ❑ Raising awareness to mechanics and traders and motorists about counterfeit automotive parts and consumables that could potentially increase emissions.
- ❑ Sensitizing motorists to understand eco-friendly driving like reducing engine idle-time, carpooling, etc.
- ❑ In partnership with other nonprofits , we aim to engage policy makers and lobby for of clean air policies, like pushing for a ban on location of high emissions businesses like motor garages near any hospital or pre-school; among others.
- ❑ Engaging local factories to identify different emission sources within their operations and offer technical assistance to counter emissions without necessarily having to acquire new equipment; where applicable.



Other (related) projects we are running include but not limited to:

- Research and development on conversion of some light vehicles, motorcycles and outboard engines from running on fossil fuels to electric.*
- Improving waste lubricant management in transport related activities like vehicle maintenance*
- Research and development plus innovation on clean energy systems for Africa.*
- Community actions on road safety improvement from a technical stand point*

Engagements with mechanic communities and students.

Expected Outcomes

- ❑ Many infant lives will be saved and early childhood development enhanced.
- ❑ Improved air quality for all and a step towards saving our planet.
- ❑ Ugandans will gain awareness and begin to embrace sustainable transport options
- ❑ Over 20,000 local mechanics will have their knowledge and skills improved, thus improving their livelihoods.
- ❑ The replicability and applicability of the project in other similarly challenged nations will take it beyond Uganda.
- ❑ Policy makers will fix gaps and account for all stakeholders while formulating future policies and regulations.
- ❑ The attitude of many Ugandans towards environmental safety will be highly improved.

Challenges

- ❑ Being a startup nonprofit addressing some of the most pressing societal issues from a relatively new approach, finding support is difficult. Resource constraints happen to be the biggest challenge because we need specialized equipment in some of our critical activities.
- ❑ Our expected sources of funding include grants, individual donations and income from a few technical services to be offered by the nonprofit for sustainability but the pandemic has badly slowed us down. We haven't received any grant yet, only a few personal donations and individual contributions helped push us towards the end of last year.

Ugandan government has action plans to reduce transport emissions like the annual inspection of vehicles (albeit enforcement hasn't been effective yet after 3 years of its introduction); supporting a local electric vehicle assembly plant to produce buses, Bus Rapid Transit (BRT) for greater Kampala, etc. All interventions are much appreciated but most are slow-moving solutions while some have gaps. Supporting projects like ours beyond mere recognition would greatly supplement efforts by government. We work at grassroots level. For instance, the annual inspection of vehicles system received criticism from the general public and some legislators partly because little or no awareness was raised to the public to understand its significance prior introduction. We really needed it for improved safety and environmental health.

THANK YOU!!!