**NAMAs Proposal – NAMA Seeking Support for Preparation**

**1.0. Title of Mitigation Action**

## Periodic Vehicle Inspection for Emissions and Roadworthiness

Sector – Transport

Purpose of NAMA –This NAMA is intended to reduce emissions from vehicles, which have a high potential for operations related emissions. This is a policy NAMA, which is important due to the type, age and condition of imported vehicles in Uganda. The NAMA will also target operation and use through the lifecycle of the vehicles. This policy is needed in Uganda because of the high possibility for economic growth and prosperity that will lead to increased vehicle importation and use.

Type of NAMA –InternationallySupported Policy NAMA.

**2.0. Description of Mitigation Action**

**Rationale for NAMA -** The rapidly growing consumption of fossil fuels due to increases in vehicle ownership is changing Uganda’s carbon dioxide trajectory in the transport sector. The growth of vehicles is occurring in a mainly unregulated and unplanned manner. A lack of capacity within government and among potential partners to undertake the required analysis to support development of a sound policy framework further limits progress in this area.

The private sector will continue to play a major role in providing public transport in addition to private modes and commercial goods vehicles. This has implications on the importation of vehicles and emissions that is the rationale for periodic inspection to ensure that vehicles are within the target limits of allowable emissions. This NAMA is justified given the long-term goals of NDP and projected growth of the economy.

This NAMA is one component of the larger NAMA, *Fuel Efficiency in Motor Vehicles.* The larger NAMA would implement a Fuel Efficiency Initiative that includes the development of policies and regulations to promote the use of more efficient vehicles. As such, this vehicle inspection action can be developed as part of the larger Fuel Efficiency Initiative NAMA or undertaken as a discrete NAMA.

As a policy NAMA with a suite of strategies, this NAMA will involve two types of inspection. The Pre-Shipment Inspection (PVOC) done in collaboration with agencies of the exporting countries. The second is the periodic inspection and certification for roadworthiness done in the country. Both inspection points will be based on indicators such as: vehicle age, engine type, fuel capacity, year of manufacture. The PVOC methodology can be utilized by different agencies, both public and private. An annual inspection requirement that certifies vehicles operating in the country is another strategy for this policy NAMA. The NAMA will initially require investment by government and other agencies involved in inspection but will gradually become self-financing since vehicle users will be charged. As part of the suite of strategies, vehicle write-off at inspection is the targeted measure to put highly emitting vehicles off the road. The NAMA will also promote technologies that enable reduction of emissions as vehicles age.

**3.0 National Implementing Agency**

The Ministry of Works and Transport through the Department of Transport Regulation and Quality Assurance will be the lead agency in this NAMA, working with the Department of Energy Efficiency and Conservation of the Ministry of Energy and Mineral Development and

Other important stakeholders include the Ministry of Finance Planning and Economic Development, Uganda Revenue Authority, Uganda National Bureau of Standards, National Planning Authority, Kampala Capital City Authority, Uganda Police, Transport Licensing Board, National Environment Management Authority and Civic Society. Policy support, research and analysis could potentially be supported by the Global Fuel Economy Initiative (GFEI), particularly through the United Nations Environment Programme (UNEP).

The Climate Change Unit (CCU) in the Ministry of Water and Environment would provide overall oversight on emissions monitoring reporting and verification (MRV).

**Proposed activities of the NAMA**

***Geographic coverage*** The NAMA isnational in scope.

***Beneficiaries***

* Car owners
* Inspection service providers

The NAMA will involve initial information gathering and analysis to contribute to the development of the emissions baseline and reference case, and more accurate measurement of GHG emission in the sector and the impact of the NAMA. Data will have to be generated, gathered and updated. It is important to note that this data will have a value beyond the measurement, reporting and verification (MRV) requirements of the NAMA: detailed and reliable data on transport issues is the key for all kinds of transport policies, regulations and strategies, such as road safety and air quality enhancements.

This NAMA will build on the pilot testing by UNBS to establish an accurate emissions baseline related to the Ugandan vehicle stock. The concentration of the exhaust gas from an automobile is measured when the engine is idling, and inserting the probe of a tester into the exhaust pipe to a depth of approximately 60 cm (if this is not feasible, measures to prevent the ingress of air from outside shall be taken before inserting the probe). The UNBS has the capacity to conduct the baseline.

UNBS has developed standards for pre-shipment inspection of vehicles (US 845:2008), which will be examined, and elaborated further, if required, according to vehicle type and age and criteria developed for vehicle write off. The current standard for emissions is a concentration level of 4.5%. If exceeded, the vehicle would have to be installed with devices to improve combustion or written off.

The standards will be used to guide periodic inspection of vehicles in the country. Vehicle inspection centres will be established leveraging existing Ministry of Works and transport yards in the countryside. Choices can be made as to whether lead agencies will operate the inspection centres or lease them to private service providers. A feasibility study will be undertaken as part of the NAMA, presenting options. A plan to implement the most feasible option will also be developed. This may include beginning with vehicle inspection in Kampala as a first phase, which will be taken out to the rest of the country as a second phase.

The NAMA also includes the development of an insurance and vehicle write off policy which would be used by vehicle owners to reclaim any value once the vehicle is to be written off. The insurance policy should be developed to enable vehicle owners to replace written off vehicles. This would bring in other stakeholders to participate in the NAMA.

Mass sensitization to the public about the policy will be a key activity that includes an awareness campaign.

The key activities of this NAMA, which will be elaborated in a full proposal, include:

* Development of a baseline and reference case, and analysis of mitigation potential of policy and technology and policy options.
* Continued pilot testing UNBS to establish an accurate emissions baseline related to the Ugandan vehicle stock.
* Development of a national database on vehicle fleet, fuel consumption and efficiency.
* Review of pre-shipment and import regulations for vehicles, and recommendations for policy and regulatory improvement.
* Establishment of a vehicle registration system.
* Feasibility studies and planning of a vehicle inspection and maintenance system, including an insurance and vehicle write-off policy and programme.
* Public information and awareness campaign.

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| --- | --- | --- | --- | --- | --- |
|  | Timeline in years | | | | |
|  | 1 | 2 | 3 | 4 | 5 |
| Build on the pilot testing by UNBS |  |  |  |  |  |
| Development of a baseline of tailpipe emissions |  |  |  |  |  |
| Feasibility studies and planning of a vehicle inspection and maintenance system |  |  |  |  |  |
| Development of an insurance and vehicle write off policy |  |  |  |  |  |
| Examine and elaborate standards for pre-shipment of vehicles |  |  |  |  |  |
| Analysis of mitigation potential of policy and technology options |  |  |  |  |  |
| Increase capacity of vehicle inspection centres |  |  |  |  |  |
| Public information and awareness campaign of insurance and vehicle write off policies |  |  |  |  |  |
| Conduct annual & biennial MRV reporting, monitoring and evaluation |  |  |  |  |  |

**Table 1 Proposed Implementation Plan**

**4.0 Expected Time Frame for the Preparation of Mitigation Action**

12 months

**5.0 Estimated full costs of Preparation**

***5.1 Financial Support***

Grant Funds required: 250,000

***5.2 Capacity Building***

Capacity building is estimated at $ 30,000 and is included in the grant funds

***5.3 Costs of NAMA Implementation***

The NAMA is estimated to cost US$ 3 million, with the actual cost to be determined through the development of a full proposal.

**6. Outcomes of NAMA**

**How the NAMA is transformational:** The Government of Uganda views transport as one of the main priority areas envisioned as the engine for socio-economic development; and the National Transportation Policy and the National Development Plan recognize the important role of the transport sector in the social and economic development of Uganda. This NAMA is intended to transform the transport sector to a low emissions strategy by ensuring the vehicles on the roads of Uganda have lower emissions through periodic inspections.

**Links to National Development Plan:** This NAMA will operationalize the draft Transportation policy that recognizes the importation of old vehicles into the country as a concern for pollution and long-term reduction in value for money. This NAMA will support the goal of improving the stock and quality of economic infrastructure and the goal on sustainable use of the environment and natural resources. The NAMA also relates directly to National Transport Policy and the Non-Motorized Transport Policy both of which have strategies for nationwide improvement of sustainable transportation.

**Links to Climate Change Policy:** The NAMA addresses the main goal of the National Climate Change Policy of 2012 and specifically the objective of integrating climate change in planning, decision making and investments as well as the objective on developing and implementing appropriate climate change mitigation strategies. This NAMA also links with the climate change policy transport sector strategies particularly the promotion of modes of transport that take GHG emission reduction into account and climate resilient transportation infrastructure at the national level.

**7.0 Outcomes of NAMA**

**Sector details**

The transport sector in Uganda is predominated by used vehicles of different types and age. The majority of imported vehicles in Uganda are of 10 years or older and these are used as private cars, commercial vehicles and construction vehicles. The age, type and engine capacities determine the emissions from the vehicles because of incomplete combustion of fuels. This can be caused by mechanical conditions but also the type of fuel used in the vehicle. This NAMA is intended to transform the transport sector to a low emissions strategy by ensuring the vehicles on the roads of Uganda have lower emissions through periodic inspection.

Uganda is estimated to have a total of 521,033 vehicles of all types. 40% of these are estimated to be in the Kampala region while the other 60% are spread across the country.[[1]](#footnote-1) Of this total an estimated 75% are imported as used vehicles. But the type and age of vehicles imported will influence future national emissions as the economy continues to grow. In reference to the eight National Development Plan (NDP) goals, the Government is committed to the implementation of the transport policy with active private sector participation. This implies that private sector will play a major role in providing public transport through competitive system. This also has implications on the importation of vehicles which is the rationale for periodic inspection to ensure that vehicles are within the target limits of allowable emissions.

The Ministry of Works and Transport is in the process of re-establishing periodic inspection of vehicles for roadworthiness and in 2011 began sourcing for service providers. In the same vein, the Uganda National Bureau of Standards developed standards (US 845:2008) to guide pre-shipment inspection of vehicles to ensure the quality of imported cars with low emissions and other mechanical conditions important for worthiness. These two institutions already have on going activities related to the proposed NAMA and will require policy support to ensure that activities and programmes adequately address GHG emission reduction goals.

**GHG emissions and sources in the sector**

Mobile combustion is one of the sources of GHG emissions in Uganda. The growth of the transport sector is likely to increase emissions as the use of imported vehicles and fossil fuels continues to dominate the transport sector in the country. Data regarding vehicle importations by type and age is not available to determine baseline emissions from transport, nor has tailpipe testing been undertaken. But based on the 2012 per capita emissions of Kampala, the total annual emissions are *Mt 2,229* from transport.[[2]](#footnote-2) With an estimated 40% of total national vehicles in Kampala region, the estimated emissions from transport amounts to *Mt 4,903*. Global estimates of GHG reduction from improved vehicles are between 14-22%.[[3]](#footnote-3) The emissions will come from continued and increasing amounts of use of fossil fuels of diesel, petrol and oil for the commuter vehicles. This is also based on the 2011-2012 transportation survey and GHG inventory that both forecast increased dominance of motorized transport.[[4]](#footnote-4)

**GHG emissions and sources addressed by the NAMA**

The NAMA will address carbon dioxide emissions produced through the use of light and heavy-duty vehicles. The source of these emissions is automotive gas oil (AGO)/diesel and premium motor spirit (PMS)/petrol. The 2013 Climate Change Policy reports that the transport sector has the highest GHG emissions of all sectors in Uganda, and the growth in vehicle ownership is causing GHG emissions in this sector to increase.[[5]](#footnote-5)

**Emission data sets/emissions information**

The cubic meters of automotive gas oil imported and sold are tracked by the Uganda Bureau of Statistics, with this information available from 2007 to 2011. Factors influencing future emissions include rates of vehicle ownership. The Bureau of Statistics publishes information on newly registered motor vehicles that is collected by the Uganda Roads Authority.

There is very little baseline data. Information gaps include total number of registered vehicles and the types of vehicles (e.g., light-duty, heavy-duty). In addition, there is no study of the tailpipe emissions from vehicles in Uganda. Some pilot testing has been undertaken on several cars, but the data is classified.[[6]](#footnote-6)

Because there is no data on vehicle imports and those still on the road, baseline emissions from vehicles are hard to estimate. It is not possible to separate emissions into different vehicle types such as personal passenger, freight and buses. Data availability on the fuel consumption and energy demand for these different vehicle types is limited in Uganda as fuel sales data is not disaggregated and registration data for all vehicles is incomplete. This results in relatively high uncertainty for the analysis of the GHG emission reduction impact.

However a recent GHG inventory of Kampala estimates the proportion of total national vehicles operating in the Kampala region, and we can use the baseline data for the region to anticipate potential emissions sources from vehicles. The tables below indicate the sources and activity data for Kampala. The fuel economy in the country is the basis of emissions calculation. The table below is indicative of the fuel economy in the city region but without the number of vehicles operating elsewhere in the country, it is hard to estimate emissions.

**Table 1: 2012 emission data sets / emissions information for Kampala City**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity data** |  |  |  |  |
|  | **Number/ quantity** | **Total Km per year** | **Average Fuel Use per km (litre)** | **Total fuel used (litre)** |
| Bodabodas | 10000 | 13,156,000 | 0.434782609 | 5,720,000 |
| Buses | 157 | 1,378,491 | 0.7 | 898,040 |
| Private cars | 90000 | 198,198,000 | 0.649350649 | 128,700,000 |
| Others in Kampala | 89402 | 371,912,320 | 0.684931507 | 254,734,466 |
| Buses to up country | 340 | 2,068,560 | 0.651465798 | 1,347,596 |
| Taxis | 4500 | 7,534,800 | 0.985915493 | 7,428,676 |
| Railways in boundary | 250000 | 420.8754209 | 0.545454545 | 230 |

*Source:* Lwasa, S. (201*3). 2012* *Greenhouse Gas Emissions Inventory for Kampala City and Metropolitan Region*, UNEP Habitat.

**Estimated emission reductions resulting from the activities**

Estimated Annual Average (MtCO2 / year): Mt 882.5 annually assuming 2012 base year estimated of Kampala city region and adjusted to national vehicle fleet. Global estimates of GHG reduction from improved vehicles are between 14-22%. The NAMA can aim at +10% given the current national vehicle fleet.

**Co-benefits of the NAMA**

The NAMA will result in significant co-benefits, categorized below using the three pillars of sustainable development: economic, social and environmental impacts. Co-benefits will be accounted for using a qualitative assessment, with a full proposal examining what statistics *are readily available to measure and monitor sustainable development impacts.*

***Economic Impacts***

* Household / Business fuel savings – The inspection and maintenance programme may lead to lower vehicle operating costs, but this may be offset by increased expenditure on maintenance and repair.
* Employment creation – Inspection agencies and depending on the method used for certification such as stickers, vehicle write-off and recycling will offer jobs and possibly generate products that private sector can engage in.
* Government Revenue – Proper costing of inspections and certification can ensure programme is self-sustaining or able to generate revenue for the government.

***Social Impacts***

* Improved health – Reduction in number of cases of ill health from diseases related to fuel emission reductions.
* Reduced number of accidents – The inspection and maintenance programme will lead to better maintained and safer vehicles, which implies improved road safety through reduction in vehicle accidents.

***Environmental Impact***

* Improved local air quality – Improving vehicle efficiency is one of the most cost effective interventions to reduce transport-related emissions per kilometre (such as nitrogen dioxide, sulphur oxide, carbon monoxide and particulate matter). It is important to measure these improvements, which reinforces the need for a monitoring system.
* Recycling of steel from written-off cars.

**Measuring, Reporting and Verification**

Estimating the mitigation impact of transport policies and measures is difficult compared to other energy consuming sectors. This stems from the lack of (solid) data of implemented transport policies and the complexity of the transport sector as a system. This complexity can be explained by the high number and diversity of mobile sources that are subject to millions of individual decisions, the high number of stakeholders involved, and the technical challenges related to energy efficiency and alternative fuels.

The data to undertake MRV will be gathered in the initial phase of the project because there is no existing baseline data. The two lead agencies for this NAMA will be charged with managing this data and reporting. The objectives and information requirements for MRV are included in the table 2 below.

The information requirements include a database of the vehicle stock in Uganda by region (vehicle type, make, model, transmission type, weight, production year, registration year, fuel type, engine size, rated fuel economy per model and test cycle basis). A significant sample of vehicles would be tested to determine emissions of greenhouse gases and air pollutants based on a standard test drive cycle.

The reduction in GHG emissions due to the NAMA would be determined by using a CO2e emission factor for transport fuels; applying default values from Chapter 2 of Volume 2, 2006 IPCC Guidelines for Greenhouse Gas Inventories to calculate the CO2 equivalent emissions from CO2, methane and nitrous oxides.

**Proposed MRV framework for Periodic Inspection of Vehicles and Roadworthiness NAMA**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Indicators** | **Emissions factors/Activity data** | **Data Owners & Accessibility** | **Information** | **Institution Responsible for collecting Information** | **Procedure** | **Reporting** | **Verification** | **Leadership** |
| Emission Factors  Activity Data (fleet, stock, fuel) | Fuel efficiency and consumption in motor vehicles  Vehicle type  Engine capacity  Vehicle fleet  Vehicle stock  Type of fuel  Average distance covered per vehicle | MoWT/Medium  MoWT/High  URA/High  MoWT/medium  URA, MoWT, UBOS/Medium  MEMD, MoWT, URA, UBOS/high  MEMD, MoWT, URA, UBOS/high | Number of cars inspected and reported annually to UBOS  Baseline tailpipe emissions  fuel consumption, sales, quality of fuel | MoWT  Fuel companies | Measurement done on a periodic basis by data providers (sometimes in response to requests or for publications) | MoWT aggregates data on a periodic basis (sometimes in response to requests) | QA/QC by GHG INV team;  NEMA to do Environmental Impact Assessments/external regulatory authority (to check emissions profile of energy suppliers) | MoWT |
|  |  |  | Set policy for insurance and vehicle write-off  Vehicle inspection and maintenance programme  maintained vehicle fleet database | MoWT, UNBS  MoWT  MoWT |  |
|  | | | | | | | | |
| **Resources, capacities, staff** | | | statisticians; environmental officers, emission testing gadgets, enforcement officers | | | | | |
| **Long-term costs** | | | National budget allocation that is sufficient for the purpose of data collection, compilation and analysis | | | | | |

**8.0. Supporting Information**

**Policies**

UNBS, 2008, Road vehicles code of practice for inspection and testing of used motor vehicles for roadworthiness

* + - * Energy Policy for Uganda, 2002
* Recognizes the significant potential for energy efficiency in the transport sector
* <http://energyandminerals.go.ug/downloads/EnergyPolicy.pdf>
* Draft Transportation policy
* Recognizes the importation of old vehicles into the country as a concern for pollution and long-term reduction in value for money.
* Uganda National Climate Change Policy, 2013
* Specific strategies for the transport sector include: i) Promote and encourage reduction of greenhouse emissions from the transport sector; and ii) Establish national standards for emissions and implement strict vehicular emissions standards in tandem with measures to gradually phase out old, inefficient motor vehicles, while encouraging the importation of efficient ones.

**Regulations**

* Roadworthiness transportation strategy, 2010, Ministry of Works and Transport
* UNBS standards US 845: 2008 on emissions from vehicles, to guide pre-shipment inspection of vehicles to ensure the quality of imported cars with low emissions and other mechanical
* Pre-Export Verification of Conformity (PVoC) - Section 3(e) of UNBS Act Cap 327 mandates UNBS to “Require certain products to comply with certain standards in manufacture, composition, treatment or performance and to prohibit substandard goods where necessary.” The categories of high-risk goods to be inspected before shipment include: Group III Automotive products and inputs. From the 3rd December 2012 all shipments of products falling under the categories above will have to be accompanied by a *Certificate of Compliance.*

**Current Activities**

* Vehicle inspection strategy by MWT
* Pre-shipment vehicle inspection by UNBS through appointed agencies in Japan and East Africa, including JEIV in Japan, Jabali Kilimanjaro and East African Automobiles.

1. Uganda Bureau of Statistics, 2010. [↑](#footnote-ref-1)
2. Lwasa, S. (2013). *Greenhouse Gas Emissions Inventory for Kampala City and Metropolitan Region*, UNEP Habitat. [↑](#footnote-ref-2)
3. Kahn Ribeiro, S., S. Kobayashi, M. Beuthe, J. Gasca, D. Greene, D. S. Lee, Y. Muromachi, P. J. Newton, S. Plotkin, D. Sperling, R. Wit, P. J. Zhou, (2007). Transport and its infrastructure. In *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge: Cambridge University Press. [↑](#footnote-ref-3)
4. Lwasa, S. (2013). *Greenhouse Gas Emissions Inventory for Kampala City and Metropolitan Region*, UNEP Habitat. [↑](#footnote-ref-4)
5. Republic of Uganda (2013). *Uganda National Climate Change Policy: Final Version for Approval*. Kampala: Ministry of Water and Environment. Pages 32-33. [↑](#footnote-ref-5)
6. Uganda National Bureau of Standards (2013). Personal communication, 13th September. [↑](#footnote-ref-6)