MOTORIZED ROAD TRANSPORT AND ITS IMPLICATIONS ON CARBON DIOXIDE (CO_2) EMISSION STANDARDS

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ABSTRACT

Global warming experienced on the earth in the last few decades has been attributed to greenhouse effect caused by accelerated CO_2 emissions from the burning of fossil fuels. This study determined and described the current impact of motorized road transport system on the environment in terms of total CO_2 emissions in Kisumu City using observation and direct measurement with a view of reducing the amount of CO_2 liberated by motorized road transport using Systems Theory, Clean Development Mechanism and the Kinetic Theory of Gases. The objectives of the study were to analyze the transport policies and regulations and assess their implications on $C0_2$ mitigation, to examine the correlation between transport pooling and $C0_2$ emission, to analyze the correlation between the total $C0_2$ emission from motorized road transport and the atmospheric CO_2 concentration and to examine the participatory planning strategy for low carbon emitting urban road transport system. $C0_2$ emission was characterized by the amount of diesel or petrol burnt by Public Service Vehicles, Motor Cycles and Tricycles during transportation of passengers and goods within Kisumu City boundary using United States Environmental Protection Agency (EPA) and National Environment Management Authority-Kenya (NEMA) standards. The amount of fuel burnt was determined by the distance travelled by the vehicles, motorcycles and Tricycles within the city bus park using observations and interviews. This study particularly sought to quantify C02 emission and propose strategies to reduce the emission of $C0_2$ into the atmosphere as a result of burning fossil fuel. The study was conceived as a result of the increasing global warming caused by increased CO_2 emissions. This study was conducted through survey research design and it employed simple random sampling to gel data from the Vehicles, Motorcycles and Tricycles within Kisumu Bus Park in Kisumu City. The sample was derived from all the Vehicles, Motorcycles and Tricycles registered as operating within Kisumu Bus Park and registered by the Kisumu City Revenue Department and the Kisumu Bus Park Management. This was monitored using both manual and digital traffic counter device at both peak and off-peak seasons to get the correct population. The study used digital $C0_2$ meter, questionnaires, interviews and documents analyses as the main tools for collecting data. The study targeted regularly and well serviced vehicles. Interviews were conducted on drivers and key informants. The average $C0_2$ emission from Vehicles, Motorcycles and Tricycles was calculated using mass balance. Atmospheric $C0_2$ concentration was measured using digital $C0_2$ meter. Content analysis was used for objective (i). Pearson Product Moment Correlation analysis was used for objectives (ii) and (iii). Stakeholder analysis was used for objective (iv). The two hypotheses were tested with t-test. The data was edited, coded and tabulated for presentation. SWOT Analysis showed a local policy gap in $C0_2$ emission thresholds. Pearson Product Moment Correlation Coefficient showed a correlation of -0.434 between the seating capacity and the volume of $C0_2$ liberated by the PSV per passenger

kilometer. Pearson Product Moment Correlation shows a correlation of +0.888489 between the volumes of $C0_2$ emitted from PSVs and cycles and the atmospheric concentration of$C0_2$ in ppmv at the Kisumu Bus Park. Calculated t = l5.2799 showed that there was a significant relationship between the number of motorized road transport emitters and the atmospheric $C0_2$ concentration measured within the bus park. Calculated t = 11 .9351 showed that there was a significant relationship between the total C02 emission calculated from motorized road transport and the atmospheric C02 concentration measured within the bus park. The study recommended that the government should invest heavily in the public transport sector by enacting laws and policies aimed at discouraging the importation and use of low seating capacity vehicles and invest in the high seating capacity vehicles.