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**INTERNATIONAL CLIMATE INITIATIVE (IKI)**





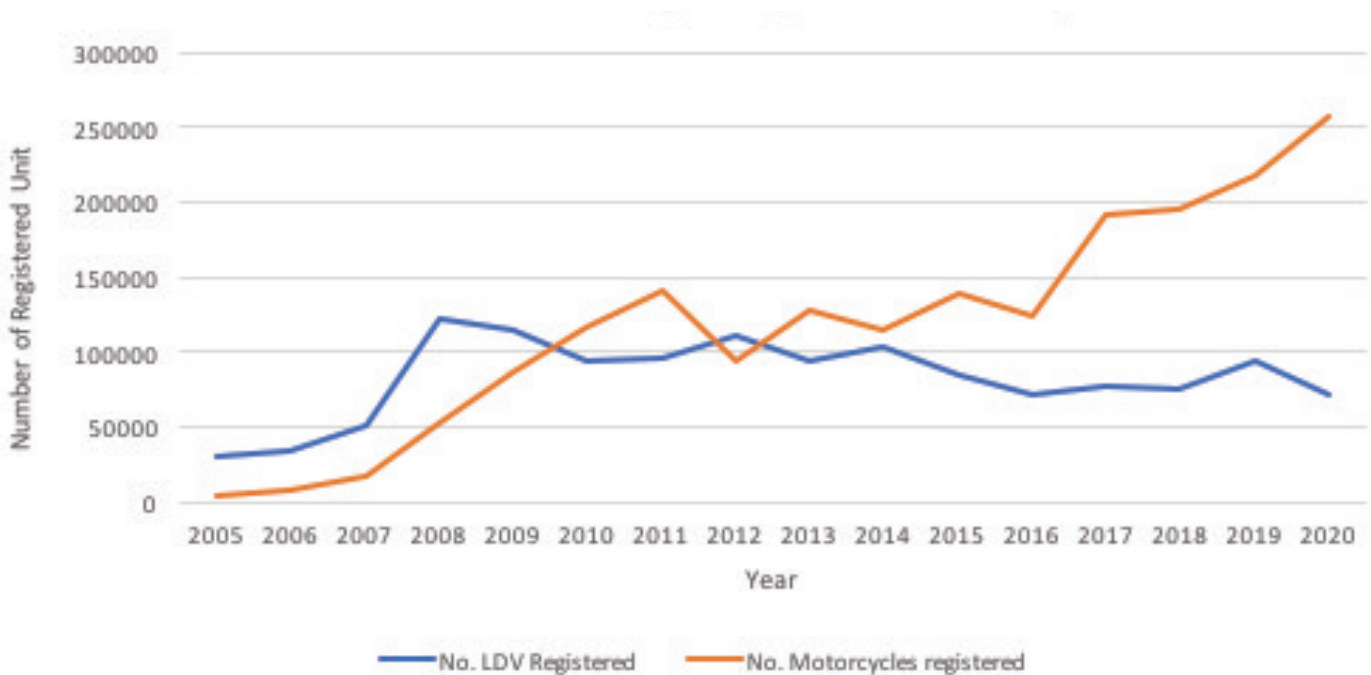
# Background

**Two and three-wheelers are the fastest growing transport mode in many low and middle-income including Kenya where their annual registration constitutes about 46% of all vehicle registrations.**

The year 2007 saw the start of an unprecedented growth in motorcycles in Kenya. The cumulative registrations of 2&3 wheeler motorcycles in that year was just over 9,100. However, by 2017 - just 10 years later - the number had drastically increased to over 500,500.

The surge in motorcycle numbers followed a government decision to zero-rate taxation for imported 2 wheelers below 250cc in 2008. This move was a strategy to spur job creation for the youth in the transport sector. The table below on new vehicle registrations per year shows this growth in light duty vehicles and motorcycles (2&3 wheelers) in the country

Figure 1: New LDVs and Motorcycle Registrations in Kenya (Source: KNBS)



UNEP has over the years - through the Global Fuel Economy Initiative (GFEI <https://www.globalfuelconomy.org/>) partnered with the Energy and Petroleum Regulatory Authority (EPRA) and the University of Nairobi to analyze vehicles imported into the country, including 2&3 wheeler motorcycles. This information, or baseline assessment and trends, has been critical to inform stakeholders on strategies towards cleaner and efficient vehicles, and impacts of switching 2&3 wheelers to electric modes.

Some of the findings of these studies and recommendations are included in this brochure. Below is an estimate of the projected growth of in 2&3 wheeler motorcycles in the country by 2030.

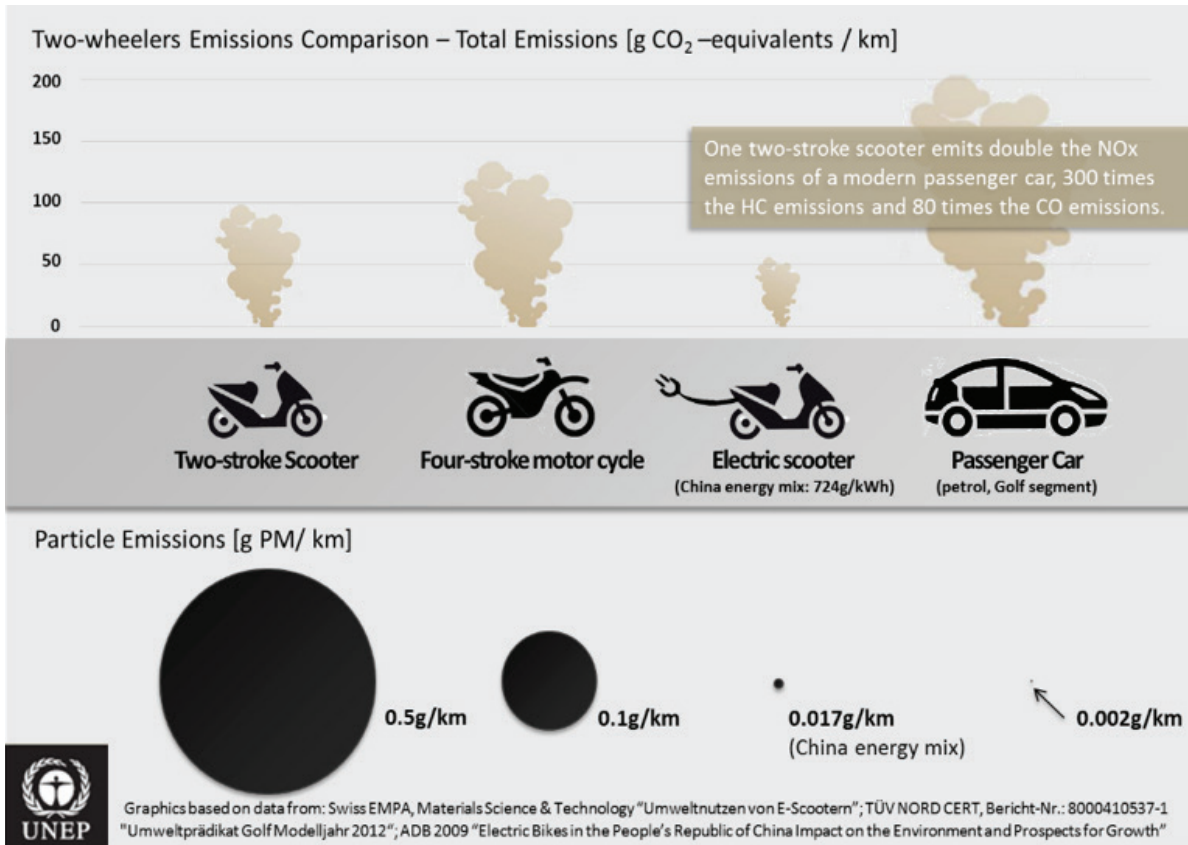
**Figure 2: Motorcycle Registrations Projections**



On the downside, motorcycles are a significant contributor to harmful air pollutants including small particulate matter (PM) as well as increased pedestrian injuries and fatalities. Some of the health impacts of PM emissions from vehicles and motorcycles are coughs; eye, nose and throat irritation; allergies; reduced lung capacity and fatigue; increased risk of cardiovascular diseases, resulting in heart attacks and premature deaths.



The illustration shows that PM emissions from a two-stroke motorcycle are over ten times those of an electric one, per kilometre travelled.

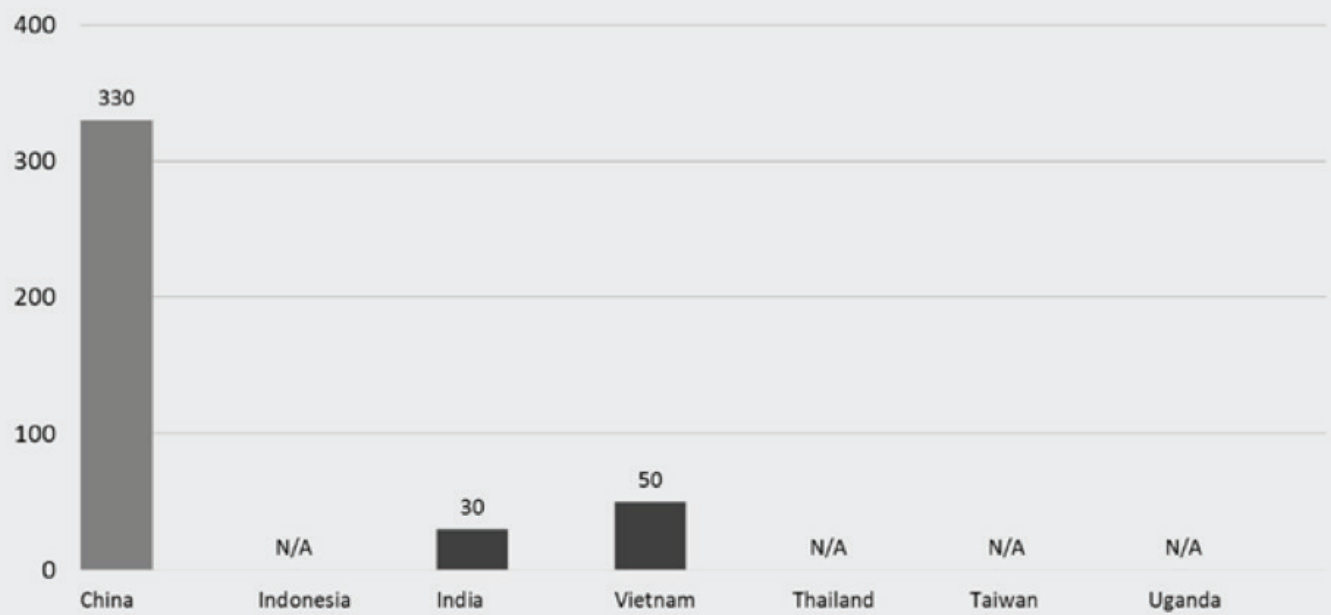


Motorcycles are also a major source of carbon dioxide emissions as shown above. Hence measures to reduce urban air pollution and climate change mitigation will need to include shifting to low emission motorcycles, preferably through switching to electric modes. Today, there are about 500 million electric 2&3 wheeler motorcycles, mainly in China, India, and other Asian countries.

Since most of the 2&3 wheelers imported into the country originate from these countries and the technology is already readily available, incentives to promote the import and/or local assembly or manufacture of electric 2&3 wheelers will support reduce harmful emissions, create green jobs and link with locally available clean energy.

An analysis of the electricity demand projection for electric 2&3 wheelers in Kenya showed that a complete transition of the entire 1.5 million units ICE fleet to electric would result in a daily charging requirement of about 300MW which would be met comfortably by the excess generation capacity of 566MW as at December 2017. Coupled with the fact that the power generation is 93% renewable, introduction of electric mobility would provide significant CO<sub>2</sub> emissions reduction in the transport sector.

### Extrapolated Electric Two-wheelers Fleet in 2020 [million units]



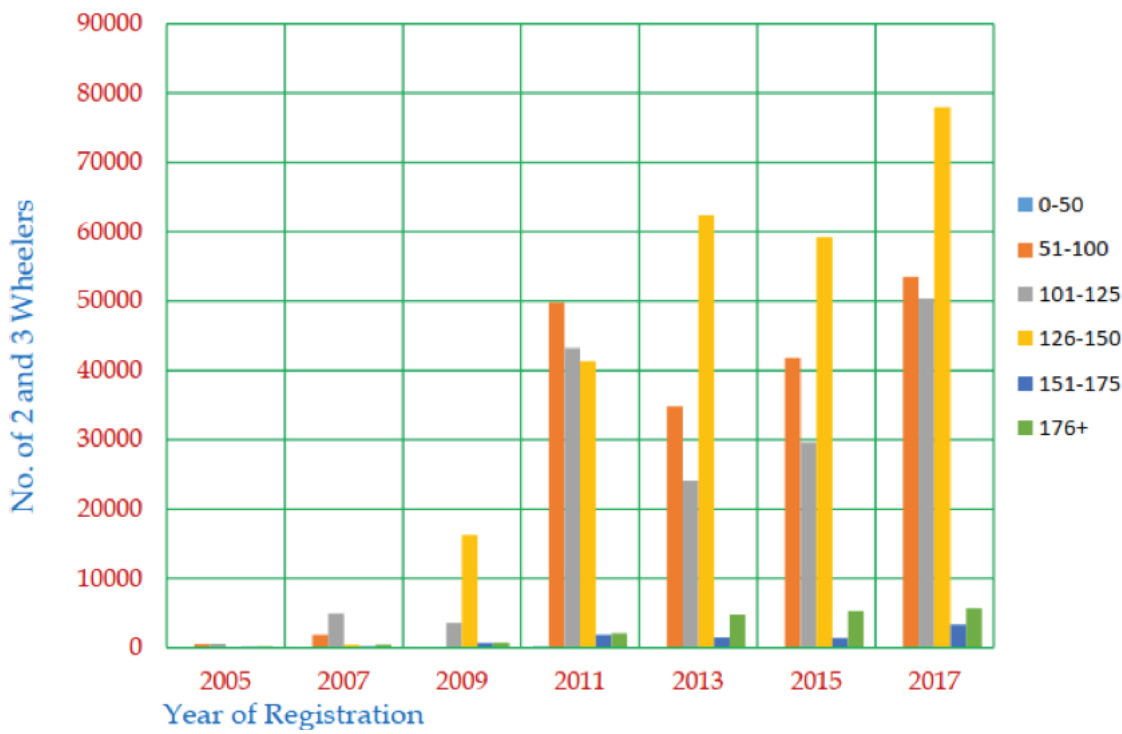
Graphics based on data from: Asia Development Bank, International Council of Clean Transport (Meszler, 2007), International Nickel Study Group, United Nations Environment Programme-Department of Management Engineering

In the country, the study by the University of Nairobi found that there was a preference for motorcycles with an engine capacity between 101-200cc as about 69% of registered motorcycles between 2005 and 2017 were in this category as shown in the table and figure below.

**Table 1: Registration by Rating Category (2005-2017)**

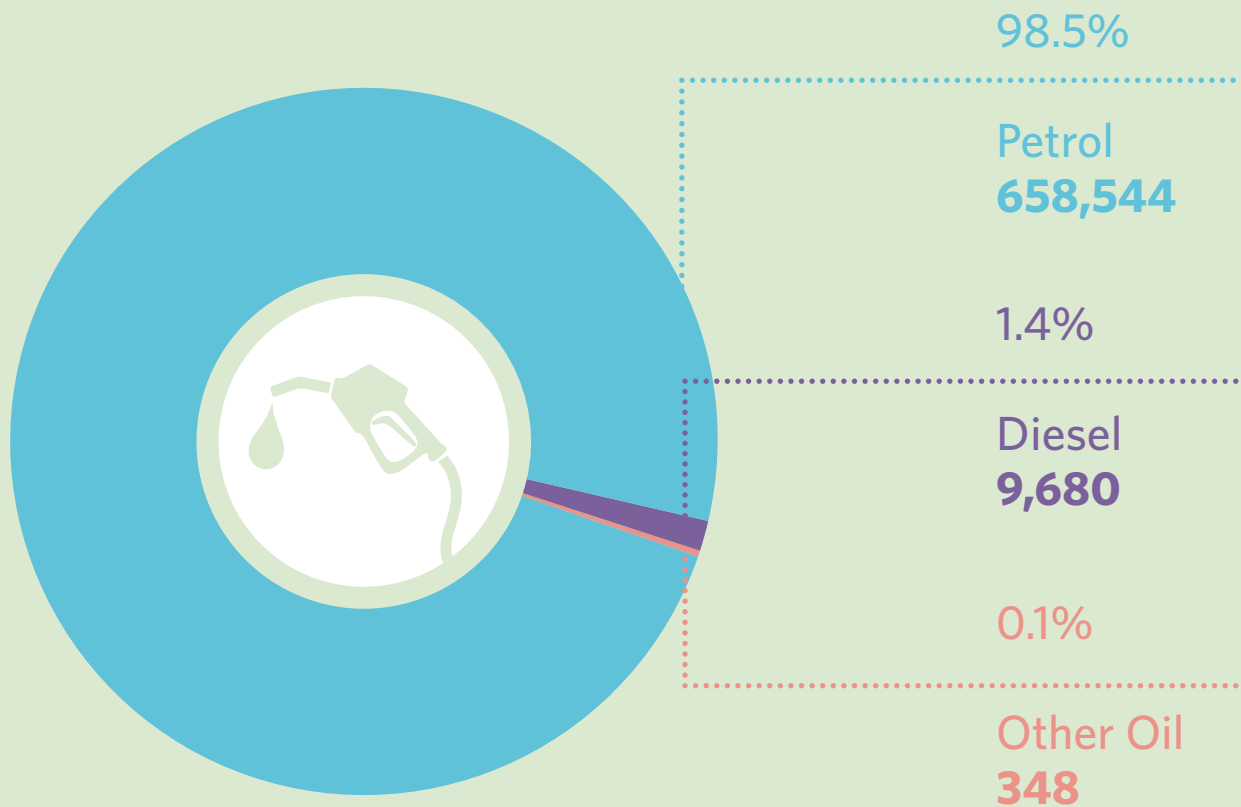
Year of Registration	0-100cc	101-200cc	201-500cc	501+cc
2005	560	1,023	84	28
2007	1,891	5,906	173	44
2009	8	20,684	633	38
2011	50,040	86,983	1,414	113
2013	34,838	89,607	3,068	132
2015	41,856	92,315	3,115	169
2017	53,502	134,748	2,548	103
<b>Grand Total</b>	<b>182,695</b> (29.2%)	<b>431,266</b> (68.9%)	<b>11,035</b> (1.8%)	<b>627</b> (0.1%)

Figure 3: Registration by Rating Category (2005-2017)



The Kenyan market is predominately a 2 wheelers market, with 246,705 units imported in 2020 compared to 3 wheelers at only 5,896 units. The bulk of the 2&3 wheelers also consuming petrol fuel as shown below.

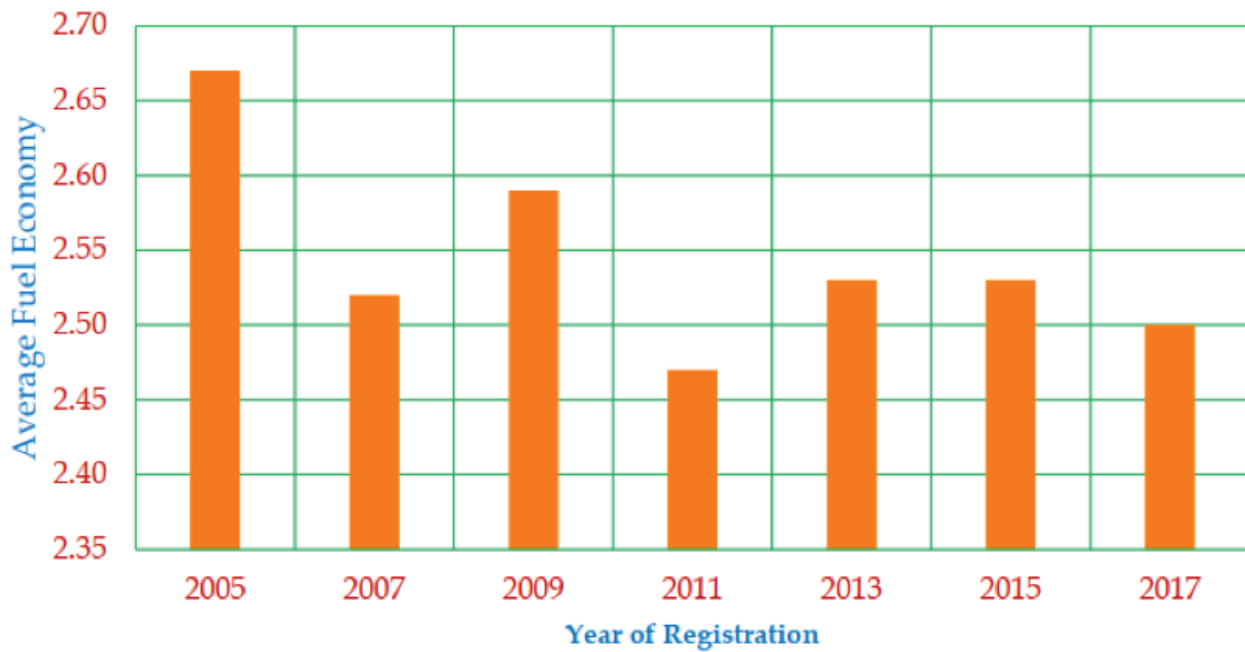
### Fuel Consumption by Type for 2&3 Wheelers





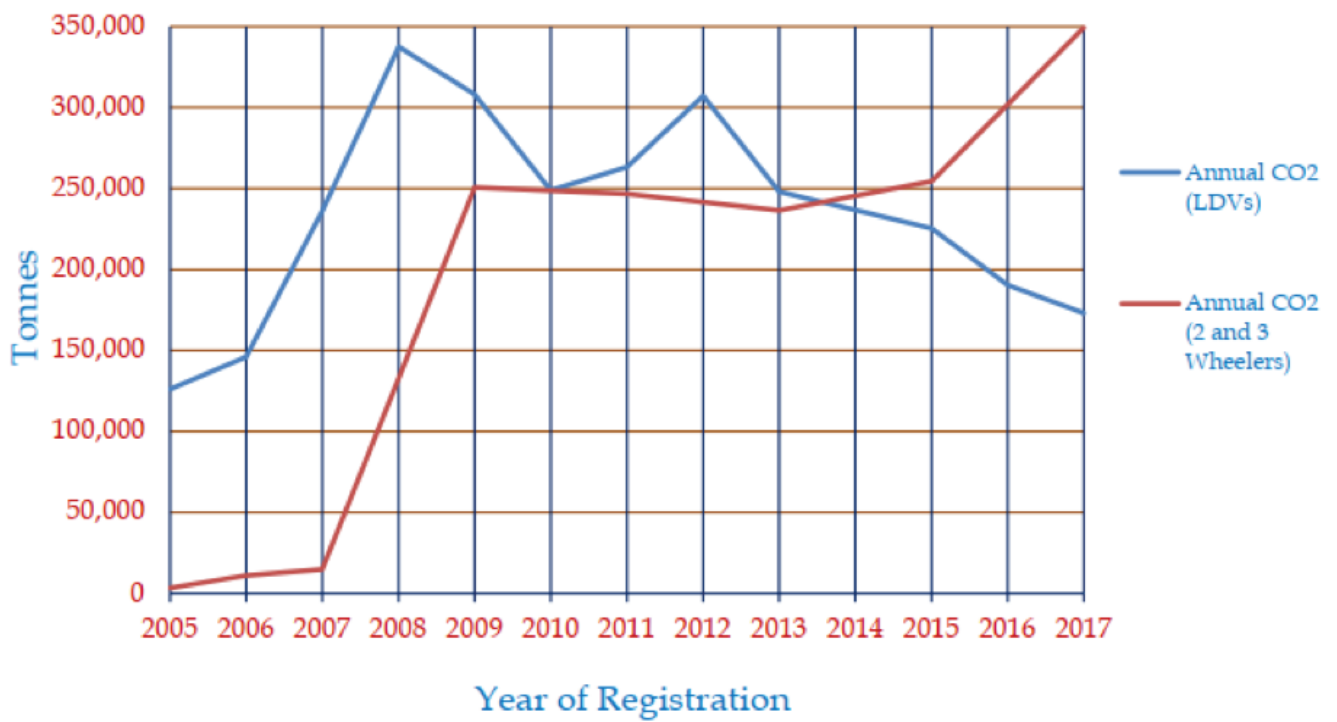
While there has been a gradually improved in the average fuel economy of 2&3 wheelers has from 2.57L/100km in 2005 to 2.47L/100Km in 2017, a complete switch to electric modes would be more beneficial for the operators and the country.

Figure 4: Fuel Economy by Year of Registration (2005-2017)



From mid-2013, it was estimated that annual CO2 emissions from 2&3 wheelers have surpassed those from LDVs as shown below

Figure 5: Annual CO2 Comparison (2005-2017)





# Demonstration Project

**The electric 2-wheeler demonstration for Kenya is supported by the BMU-IKI project "Integrating electric 2 & 3-wheelers into existing urban transport systems in developing countries" as part of UNEP's Global Electric Mobility Programme.**

It is a 6-country project implemented in Kenya, Ethiopia, Philippines, Thailand, Uganda and Vietnam. The aim is to inform decisionmakers and other stakeholders on policy, technical, economic and financial barriers and opportunities to the uptake of electric mobility.

In addition, 50 electric 2 wheelers were donated by TAILG to run demonstrations for different use cases between April 2021 and April 2022.

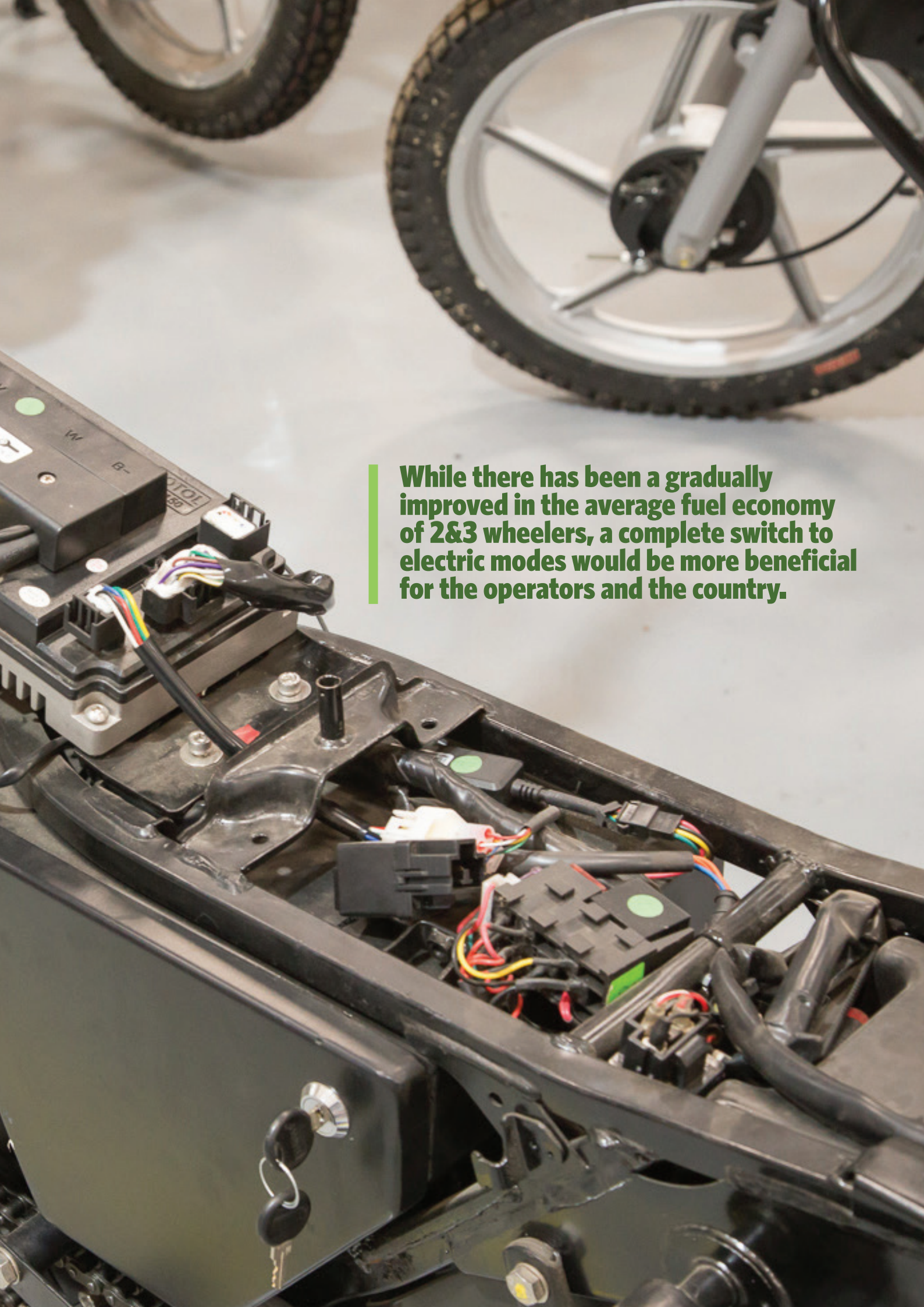
The motorcycles were donated to 4 partners as follows: **Karura Forest** an urban forest conservatoire to be by forest scouts to patrol the urban forest for illegal loggers; **Kenya Power & Lighting Co.** a government owned utility company to be used by riders for meters reading for billing purposes; **Kisumu County** administration, a sub national government in the Western part of Kenya to be used by the county inspectorate to carry out administrative duties within the different sub counties; and **Powerhive**, an energy company working with boda boda operators in Kisii County for use by boda boda operators.











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The GFEI is supported by:

