

## Sustainable Mobility in Ghana: The case for Light Electric Vehicles adapted to the Local Environment

Peter Dankwa, 30 years old, stands by his 'Okada' motorbike and engages with the [MoNaL](#) (Mobility thought sustainably over the life-cycle) project in conversation at the China Mall located in Tema-Ashaiman, Ghana. Okada is the refers to the practice of using conventional motorbike to ferry passengers from one point to the other for monetary gain. The practice is prominent in neighboring Nigeria and is fast growing in Ghana. He informs us that on a good day he makes between GHS100-120 (EUR7.17- EUR8.61) and would spend GHS60 (EUR4.30) on fuel. This is a far cry from his earnings when fuel prices were better in September last year; he then made GHS100 (EUR 7.17) after purchasing fuel. The preferred motorbikes for Okada are slow moving ones which are better for the safety of customers. He further informs that police harassment has reduced for Okada drivers and riders. Of course, checks for "road worthy" stickers and valid drivers licenses continue. When asked if he would make the switch to an electric bike, he jumped at the suggestion and even suggested battery swapping as the preferred mode as opposed to charging during the day.



©Fred Adjei /Peter Dankwa,  
commercial motorbike user,  
Ghana

His story is exemplary of many Okada riders in Ghana who have a solid use case for last mile transportation but struggle with increasing fuel cost, questions on customer safety and unclear laws regarding the use of motorbikes for commercial vehicles. There is clearly a gap in the market which is ripe for sustainable mobility. Ghana has posted robust pre-pandemic economic growth over the past two decades. GDP per capita grew by an average of 3% over this period. With poverty alleviation programs initiated and continued by successive governments, poverty rates have halved between 1998 and 2016[1]. The economic performance is further supported by the discovery of oil in the Ghanaian sector off the gulf of Guinea which elevated the country to middle income status [2]. Figures from the Ghana Statistical Service indicate a post-independence population growth of 6.7 million in 1960 to 30.8 million in 2022 [3]. However increasing population and economic growth have a direct correlation to increased mobility needs as noted by Ayetor et.al at the Kwame Nkrumah University of Science and Technology [4]. Out of the 72 million vehicles in use in Africa, Ghana accounts for 2.5 million according to their research. Given the rampant traffic congestion in Accra and Tema, alternatives to traditional means of transport need to be found and implemented soon.

From 25-28 September 2022, Mr. Fred Adjei and Mr. Tobias Pflug who are project members of MoNaL, were at the Don Bosco Campus in Ghana. Their main work was to conduct a product clinic which assessed the use case of the Light Electric Vehicles on the Don Bosco campus.



©Don Bosco /Fred Adjei, Tobias Pflug and Don Bosco team who conducted track tests of LEVs in Ghana

The product clinic comprised a focus group survey and discussion, and finally track testing of electric vehicles on the Don Bosco campus. The objective was to assess and illustrate the social acceptance of the LEVs and their sharing system in Ghana. The track tests were to evaluate the suitability of light electric vehicles to Ghanaian conditions and propose adaptations to further enhance their use in similar conditions across the African continent. The tests in the local environment are a part of project activities initiated in 2020 by the Bochum University of Applied Sciences and the

Don Bosco Solar and Renewable Energy Centre. The project: [MoNaL](#) (Mobility thought sustainably over the life-cycle ) aims to create sustainable mobility offers for the countries of sub-Saharan Africa. The effect of the offer is taken into account holistically over the entire life cycle - from the production and design of the vehicles, through the energy supply to the recycling of the vehicles and the energy supply infrastructure -, improved and checked by life cycle analyses.



Figure 5-8: MoNaL and Don Bosco team perform various track test on different environmental conditions

community. Social acceptance is the phenomenon of how societies, communities and people generally adopt things or technologies into their daily lives for the performance of tasks[6]. The

phenomenon of acceptance can be seen practically on the basis of three dimensions: Acceptance subject, acceptance object and acceptance context. Acceptance therefore infers that someone (acceptance subject) accepts something (object of acceptance) within the respective or initial conditions (context of acceptance). In this way, it can be seen that acceptance covers the individual (potential user), the object (device to be accepted), and the context (societal and culture where device will be used). Factors influencing the social acceptance of light electric vehicles in Ghana are shown in the table below following the focus group discussions on the Don Bosco campus. Whiles, it is predictable that cost is a key factor, the revelation for the researchers was the low rank for environmental sustainability in the ranked factors. However, this is a clear reflection of the where the Ghanaian society finds itself at the moment with the global economic downturn.



Figure 9-10: A cross-section of MoNaL and Don Bosco students engaged in focus group discussions on the use of light electric vehicles in Ghana

Whiles the researchers prove the usability of LEVs for the individual, there is a valid case for the nation to pivot to a mobility option powered by renewable energy sources. Numerous economic reasons are listed in the beginning of this article but what is even more prescient is the realization that a dependence on fossil fuel mobility can neither last on an economic level nor an environmental one. Ghana is signatory to a range of environmental conventions not least of which is the Paris Agreement[7]. In its updated Nationally Determined Contributions (NDCs) of November 2021, the country hopes to achieve the following:

- Generate absolute greenhouse gas (GHG) emission reductions of 64 MtCO<sub>2</sub>e.
- Avoid at least 2,900 premature deaths per year from improved air quality.
- Create over one million1 decent and green jobs and
- Benefit cumulatively nearly 38 million people, with the majority being the youth and women.

According to Dr. Ayetor of the Kwame Nkrumah University of Science and Technology, of the 72 million vehicles in use in Africa, Ghana accounts for 2.5 million registered vehicles who in turn contributed to 44% of the country's greenhouse gas emissions in 2016[4]. If the NDCs are to be realized, a transition to a sustainable mobility option is simply unavoidable. The initial introduction of light electric vehicles is achieved; businesses such as Solar Taxi are already implementing business models in Ghana using such vehicles. What remains is the urgent need to policy frameworks and legislation that would enable the nascent business sector and encourage the individual make the change to a sustainable mobility solution.

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