BUSINESS CASE ASSESSMENT

A Study on the Business Cases for E-Mobility (2- and 3-Wheelers) in Two Major Cities (Mbarara and Gulu) in Uganda with a Focus on Gender

Prepared for:

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by:
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Prepared by:

AFRICA E-MOBILITY ALLIANCE

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Acronyms

2W	Two-wheeler
3W	Three-wheeler
AfEMA	Africa E-Mobility Alliance
B2B	Business-to-business
CSOs	Civil Society Organisations
DLG	District local government
E2&3W	Electric two- and three-wheelers
E2W	Electric two-wheeler
E3W	Electric three-wheeler
EV	Electric vehicle
FMCG	Fast-moving consumer goods
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GWED-G	Gulu Women Economic Development and Globalization
ICE	Internal combustion engine
MFC	Motorcycle financing company
NGOs	Non-governmental Organisations
PTPE	Public transport providing entities
SACCO	Savings and Credit Cooperative
STEM	Science, Technology, Engineering, and Mathematics
TCO	Total cost of ownership
UEMA	Uganda Electric Mobility Association
URA	Uganda Revenue Authority
VSLA	Village Savings and Loans Association

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Executive Summary

This study, commissioned by GIZ and conducted by the Africa E-Mobility Alliance (AfEMA), evaluates the business potential for adopting electric two- and three-wheelers in the regional cities of Mbarara and Gulu in Uganda with a focus on gender inclusivity. This project builds on the E-Mobility as a Driver for Change: Towards a Gender Transformative and Just Transition to Electric Mobility project implemented by UNEP and funded by BMZ, and the baseline report published in September 2024. Through surveys, in depth interviews, and stakeholder engagement, the report explores economic viability, barriers, enablers, and the social, environmental, and health impacts of e-mobility. Findings provide comparative insights and actionable recommendations for the advancement of inclusive e-mobility in Gulu and Mbarara cities, including three potential business cases.

The report also highlights the current role women play in Uganda's largely male-dominated transport sector, with over 99% of boda boda riders being men and over 90% of minibus drivers and conductors being men. Women's involvement is dispersed across transport operations, administration, and regulatory roles. Challenges such as cultural biases, safety concerns, and financial constraints limit their participation. However, accessible financing, technician training, and women's networks offer pathways for greater inclusion, particularly in entrepreneurial and technical roles within the e-mobility ecosystem.

The current transition to e-mobility presents an opportunity to ensure that women are not left behind. E-mobility presents significant environmental, health, and economic benefits, including reducing air pollution and CO_2 emissions (with transport accounting for 45% of Uganda's emissions), improving public health, lowering transport costs, and fostering energy independence. Electrification of transport could boost Uganda's electricity demand, job creation, and renewable energy usage. Yet, infrastructure gaps, limited financing, and power outages pose challenges to widespread adoption, particularly outside Kampala.

Our study highlights the potential for electric two-wheelers (E2Ws) and three-wheelers (E3Ws) in Gulu and Mbarara, driven by unique local financial, operational, and infrastructure contexts. Mbarara benefits from a well-established network of financiers like Watu, Yongeza Capital and Mogo, supporting e-mobility adoption. In contrast, Gulu faces challenges with limited financing options and high default rates. Operationally, Mbarara's nascent e-mobility ecosystem, including Spiro's battery-swapping stations, contrasts with Gulu's as of yet inactive market, which requires investment in infrastructure and awareness to stimulate growth.

Infrastructure and terrain influence e-mobility demand in both cities. Mbarara's hilly landscape necessitates more powerful electric vehicles, while Gulu's flatter terrain offers flexibility in vehicle design. Both cities lag in readiness, requiring investments in charging stations and spare parts. Gender inclusion is another critical factor, with both cities hosting women-focused Savings and Community Credit Organizations (SACCOs) like Aciro Ki Nene in Gulu and the Academy of Women Entrepreneurs in Mbarara. Tailored financial literacy, subsidies, and cultural awareness programs can empower women to participate more actively in e-mobility.

To advance e-mobility, local governments should pilot E2Ws in fleets, promote public awareness campaigns, and collaborate with SACCOs and Village Savings and Loans Associations (VSLAs) to ensure gender-inclusive environments. Establishing vocational training programs can also build a skilled workforce for e-mobility maintenance and operations. Private companies are encouraged to expand battery-swapping networks, collaborate with women-led SACCOs, and train women for technical roles to address gender imbalances.

Financing institutions and donor agencies can play a pivotal role by offering microloans, financial literacy training, and capacity-building programs targeting women. Support for women-led initiatives, such as electric two- and three-wheeler (E2&3W) pilot projects, can foster inclusivity and adoption. Collaborative efforts among stakeholders will drive sustainable and equitable growth in Uganda's e-mobility sector while addressing environmental, economic, and social challenges.

Economic analysis reveals there is viability of electric two-wheelers (E2Ws) and electric three-wheelers (E3Ws), with lower operational costs and environmental advantages compared to internal combustion engines and a significant potential for savings. Both cities require targeted investment in infrastructure and awareness to unlock the market's potential, with gender-focused initiatives playing a critical role in achieving inclusivity.

Business cases for E2&3W in Gulu and Mbarara.

City	Business Case	Rationale	Women's roles	Key partnerships
Mbarara	#1: Battery swapping for e-boda bodas	**Large addressable market** of 37,000 boda bodas. Mbarara also has **a high density of boda bodas**. **Low loan default rates**. **Five active motorcycle finance companies** (MFCs)**,** making it easier to find finance partners.	E-boda mechanics and swap station operators.	Motorcycle finance companies for financing motorcycles. E2W companies to retail and maintain the vehicles.
Mbarara *or* Gulu	#2: Local government procurement	**Local government has largest fleets.** Government fleets are not for-profit, and **less price sensitive**. The **high visibility and implicit endorsement** of e-mobility by government would boost the profile of electric vehicles (EVs).	E-boda mechanics and operators.	District Local Government and Ministry of Works and Transport to procure the vehicles. Donor agencies to support a feasibility study.
Gulu	#3: Electric tricycles for agriculture	Gulu has **flat topography**, making it easy to adopt tricycles carrying heavy loads. There are **already over 100 tricycles and tuktuks** in Gulu and have organized themselves into an association. Nearly **90% of the population of Gulu is involved in agriculture**, making this a sector that touches nearly every home and could provide significant demand.	Owners and drivers, through the SACCOs & VSLAs, and trained as e-tricycle mechanics.	Women-led savings groups to own or finance. Farming cooperatives to operate the E3W. Financing companies, to partner to directly finance the uptake of e-tricycles by women. Donor agencies and vocational institutes to build local e-3W maintenance capacity.

1. Introduction

1.1 Purpose of the Report

This report assesses the business case for e-mobility in Mbarara and Gulu, Uganda, with a focus on motorcycles and three-wheelers (3W), interchangeably referred to as boda bodas and tuk tuks respectively, and the potential for gender inclusivity. It examines economic viability, barriers, enablers with a gender lens, and social, environmental, and health impacts. Comparisons of findings with studies conducted in Kampala provide broader insights.

While much of the research on e-mobility and deployment of EVs in Uganda has focused on Kampala, this report focuses on the potential to expand beyond the capital to two major regional cities in Uganda: Gulu in the North, and Mbarara in the Southwest. E-mobility in Uganda is a nascent industry with significant government support and the potential for a range of benefits, including reduced local air pollution, reduced greenhouse gases, improved earnings for operators, and increased economic self-reliance for the country. Regional cities like Gulu and Mbarara have so far not been fully included in the e-mobility transition in Uganda, yet with lower local earnings, could stand to benefit more from this transition. The local characteristics of these cities transportation systems, economies, cultures, and topographies therefore calls for an in-depth analysis and identification of potential business models for e-mobility for these two locations.

1.2 Methodology

AfEMA adopted a collaborative, multi-stakeholder approach, engaging businesses, policy and local leaders, boda boda riders, boda boda associations and civil society (Figure 1). Using boda boda rider surveys and in-depth interviews, the study assessed potential business cases for e-mobility in Gulu and Mbarara, focusing on gender inclusivity. The study evaluated economic viability, adoption barriers, and e-mobility enablers, integrating a gender lens throughout the analysis.

Figure 1. Collaborative approach with inputs from a wide range of stakeholders.

The boda boda survey covered demographics, finances, trips, ownership, and perceptions of electric motorcycles in each city. It also explored attitudes toward women riders and mechanics, and factors shaping the local boda boda ecosystems. In-depth interviews on e-mobility awareness, adoption barriers, local transport landscape, women's roles and challenges women, cultural influences, regulations, business advice and financing were also carried out across both cities. This comprehensive approach provided a nuanced understanding of the potential for e-mobility adoption in these cities.

1.2.1 Data collection and analysis summary

1.2.1.1 Survey Data Collection:

Three trained research assistants in each city conducted surveys using KoboToolbox software. Pilot interviews were used to refine the questionnaire and interview procedure before official survey. A total of 616 surveys (305 in Mbarara and 311 in Gulu) were completed with boda boda riders, who were selected from established stages and randomized roadside stoppages. The final interview guide comprised six major areas:

a) **Demographics:** Gender, age, education, boda boda stage membership, electricity access.
b) **Financial information:** Earnings, expenses, savings, other income sources beyond motorcycle riding and patterns of passenger and delivery trips.
c) **Motorcycle ownership and loans:** Riders ownership over their vehicles and usage of vehicle loans.
d) **Knowledge, and perception of e-mobility:** Factors that could influence e-mobility transition.
e) **Attitudes towards women riders:** Attitudes and perspectives towards women riders.
f) **Attitudes towards women mechanics:** Attitudes and perspectives towards women mechanics.

In-person interviews were conducted at boda boda stages, with questions translated into Runyankole (Mbarara) and Acholi (Gulu).

1.2.1.2 In-Depth interviews

Participants were identified through collaborator engagement and review of relevant publications (e.g., newspapers, online articles). Snowball sampling identified additional participants. A total of 44 in-depth interviews, including 16 in Mbarara, 20 in Gulu, and 8 in Kampala and elsewhere were conducted with local leaders, policymakers, financiers, civil society organizations (CSOs), transport associations, e-mobility companies, and non-governmental organizations (NGOs). Interviews focused on six key themes.

a) **Organizational and sectoral focus:** Roles, operations, and support for the transport sector, including e-mobility involvement.
b) **Gender equity in transport:** Contributions to gender equity and challenges for women.
c) **Cultural and social dynamics:** Impact of local norms on women's roles in transport.
d) **Challenges and opportunities in transport:** Issues in women's participation, sector regulation, and advice for new entrants.
e) **Regional insights:** Unique attributes of Gulu and Mbarara, including challenges, opportunities, and lessons from local initiatives.

Strategic considerations for e-mobility: Any specific advice or considerations for the advice of e-mobility in Gulu and Mbarara or more broadly.

2. Transport in Gulu and Mbarara

2.1 Local Transport Landscape

Transport in Gulu and Mbarara is dominated by petrol-powered boda bodas, with some personal cars, bicycles, minibuses, and more recently three-wheelers. Nearly all transportation is privately owned and operated but government regulated, as is the case throughout Uganda. While the structure and nature of operations is similar to that found in Kampala, there is a significantly higher modal share of boda bodas, due to the lack of minibuses specifically servicing urban areas outside the capital city – instead, most minibuses service inter-urban routes.

In Gulu, transport associations exist for boda bodas, tuktuks (passenger and cargo), minibus taxis, heavy good vehicles, and long-distance buses. Gulu East and Gulu West Boda Boda Associations operate at the division levels, regulated by the Gulu District Association at the district level. Riders and motorcycles are registered separately, with a UGX 50,000 fee for each.[1] Stage registration, set locally by committees, requires a one-off fee ranging from UGX 200,000 to UGX 1,000,000, with the association having no influence over stage registration.[2] There is the Gulu Tuktuk Association, claiming 70 active members, as well as a tricycle association called the Gulu Tricycle Riders Association.[3]

Mbarara similarly has two boda boda associations – in this case Mbarara North and Mbarara South - reporting to a district association. Riders pay UGX 50,000 for rider registration and UGX 25,000 for motorcycle registration. Stage registration costs range from UGX 100,000 to UGX 2,000,000, with the association occasionally negotiating for lowered state membership fees on behalf of members.[4] There is no tuktuk association in Mbarara.[5]

Table 1. Total number of bodas, riders and stages (Gulu and Mbarara) as of November 2024. Numbers provided by local associations.

Number	Gulu	Mbarara
Stages	600	936
Riders per stage	15 - 40	40
Estimated total number of bodas	9,000 - 24,000	37,440
Female internal combustion engine (ICE) boda riders	12	7
E-boda fleet	N/A	25

While data from odometers or GPS tracking was not available, local experts and financing companies estimated boda bodas in Gulu cover 100 km / day while those in Mbarara drive 120 km / day. In both cities, local stakeholders described men typically traveling longer distances than women, which is

1 Whenever the owner changes the rider, a new rider is supposed to register himself and, in this case, the motorcycle is not registered again.
2 Interview with Gulu East Boda Boda Association.
3 Interview with Gulu Tuktuk Association.
4 Interview with Mbarara City Boda Boda Operators Association
5 Interview with tricycle driver, Mbarara.

similar to the case of women e-boda riders in Kampala.[6]

2.1.1 Women in transport

The transport sector in Uganda is male dominated, with over 99% of boda boda drivers and more than 90% of minibus drivers and conductors being men.[7] Women in Gulu and Mbarara work at the same boda boda stages as men, unlike Kampala, where a women-only stage exists.[8] However, women have slightly better representation in roles as vehicle owners, mechanics, engineers, office staff, and in leadership positions.

2.1.1.1 Women as transport operators

In Gulu and Mbarara, only a few women work as boda boda riders, and none drive tuk tuks. Mbarara had 7 women riders out of 37,440 whereas Gulu had 12 women riders at the time of this study. There were no women-led or women-only rider associations, though women riders in Mbarara reported planning to establish one. Most female riders did not own their motorcycles, instead renting them from both male and female owners due to financial constraints.[9] In Gulu, more women had adopted motorcycles for private transport, such as shopping, due to more open attitudes towards female riders.[10] Despite rising female employment in Uganda, the transport sector remains difficult for women to enter. Cultural norms and high rates of harassment at home, on the road, and at the stage continue to discourage women from entering the sector. In addition, the requirement to be away from the home all day and demand for work into the night can be a major barrier for women with significant domestic responsibilities.[11]

2.1.1.2 Women swappers

With Spiro as the only e-mobility company in Mbarara and none in Gulu, opportunities for women to work as battery swappers in both cities are limited. As of December 1, 2024, Spiro operated four swap stations in Mbarara, staffed equally by men and women. Women worked the morning shift (6:00 AM to 2:00 PM), and men covered the afternoon shift (2:00 PM to 10:00 PM).[12]

2.1.1.3 Women as entrepreneurs

Gulu and Mbarara have women entrepreneurs in the transport sector as owners of boda bodas and tuk tuks. While no official data exist on the scale of female ownership in both cities, a Kampala survey suggests women own around 11% of rented boda bodas.[13]

2.1.1.4 Women's indirect roles

Women work as vendors around boda boda stages, taxi, and bus parks, making up an estimated 80% of beverage and food sellers. They operate both mobile and permanent restaurants, with mobile vendors earning around UGX 10,000 daily, while those in permanent structures report taking home

6 Interview with Gulu and Mbarara East Boda Boda Association; interview with e-boda company in Kampala.
7 AfEMA and UNEP (2024): Uganda Baseline Report on Gender and E-Mobility. Conducted as part of the "E-Mobility as a Driver for Change: Towards a Gender Transformative and Just Transition to Electric Mobility" project implemented by UNEP and funded by BMZ.
8 Interview with Gulu West Boda Boda Association.
9 Interview Gulu and Mbarara Boda Boda Association.
10 Interview Gulu Boda Boda Association.
11 AfEMA and UNEP (2024): Uganda Baseline Report on Gender and E-Mobility.
12 Interview with Yongeza Capital, December 2024.
13 Lubyanza Quarterly Survey, January 2025.

up to UGX 50,000 after expenses.[14] However, many entrepreneurs are reluctant to disclose earnings due to concerns about potential tax increases.[15]

2.1.1.5 Women as administrators

Women hold administrative roles in transport associations and bus companies, often working as cashiers in firms like HMK, Gateway, Mega, and Larem. At a national level, the Uganda Taxi Operators Forum (UTOF) has 44 male and 3 female administrators[16]. In Mbarara, women are on the board of the local taxi association and take up the position of executive secretary. Women are rarely found in administration in the boda boda sector in either city.

2.1.1.6 Women as transport regulators

Women contribute to transport regulation in both cities, particularly in parking fee collection. In Gulu, private companies Punena General Traders and Stand Hope manage parking for salon cars, trucks, taxis and buses. At Punena, 88% of field agents are women, earning a 10% commission on the UGX 2,000 parking fee, with reported monthly earnings of at least UGX 100,000.[17]

2.1.1.7 Women as technicians and spare parts vendors

No women technicians were identified in Mbarara or Gulu during our study, but interviewees highlighted the potential for women technicians in the sector. Women were present as spare parts vendors, located near boda boda stages to serve riders conveniently. In Gulu, one female vendor runs a family business with her son, a mechanic handling repairs. Riders purchase parts in cash or on credit, though defaults are common – a major risk which can destroy small businesses.[18]

2.1.2 Shifting attitudes towards women in transport

There has been a small but noticeable shift towards acceptance of women's participation in the transportation sector. In Gulu, some women ride privately for market trips, school drop-offs, and commuting, often using their spouse's boda bodas during lunch breaks or early mornings. Despite fewer boda bodas than Mbarara, Gulu has more female riders due to more permissive cultural attitudes, NGO-led bicycle distribution after the 2007 war, and the war's impact, which pushed women into long-distance cycling[19]. As a result, women riding bicycles or motorcycles are a more common sight in Gulu than in Mbarara.

2.2 Key Players in Transport

Stakeholders in the boda boda and tuktuk ecosystems in Gulu and Mbarara includes organizations directly involved in the sector, such as retailers, financiers, and associations, as well as government and civil society.

14 Interview with women entrepreneur, Gulu.
15 Interview with Entrepreneur, New Life Restaurant, Gulu
16 Interviews with Uganda Taxi Operators Forum (UTOF).
17 Interview with field agent, Punena General Traders.
18 Interview with female spare parts vendor, Gulu.
19 Otim, Patrick William. "The 'iron donkey': the social lives of bicycles in northern Uganda, 1903- 2015.", 2023.

Table 2: Key players in transport in Gulu and Mbarara.

	Gulu	Mbarara
Boda boda financiers	Boda Boda Banja, Watu	Boda Boda Banja, Watu, Yongeza Capital, Pure Flow, Mogo, Asaak, Haojue[20]
Boda boda associations	Gulu West Boda Boda Association, Gulu East Boda Boda Association, Gulu District Boda Boda Association	Mbarara South Boda Boda Association, Mbarara North Boda Boda Association, Mbarara City Boda Boda Association
Three-wheeler financiers	Boda Boda Banja, Watu	Boda Boda Banja, Watu
Three-wheeler associations	Gulu Tuktuk Association, Gulu Tricycle Riders Association	*None*
Policymakers	Gulu City Council, Gulu District Council	Mbarara City Council, Mbarara District Council
Local leadership	Gulu Central Market	Mbarara Central Market
Bodaboda SACCOs	*None*	Kyamuhunga Peoples SACCO (KYAPS)
Women SACCOs	Aciro Ki Nene Women's SACCO	Academy of Women Entrepreneurs (AWE) and Alumni SACCO
NGOs / CSOs	Gulu Women's Economic Development and Governance, African Women Rising	HER women, Centre for Women Advocacy and Youth Empowerment (CEWAYE)
Government	Gulu District Local Government (DLG), Gulu City Council	Mbarara District Local Government, Mbarara City Council

2.3 Regulations and Market Entry

Boda boda and tuk tuk operations in Uganda are regulated by the Traffic and Road Safety (Motorcycles and Motorised Tricycles) Regulations, 2016, and the respective amendments passed in 2023. Operators must obtain a PSV license from the Ministry of Works and Transport, requiring a logbook, third-party insurance, inspection report, stage letter, driving license, public transport providers entity (PTPE), and registration payment. Riders must also wear a reflector jacket and fastened helmet. Regulation in Gulu and Mbarara falls under city councils, district governments, and transport associations, with enforcement by police and private firms like Punena Green Traders and Stand Hope in Gulu. However, adherence to the above laws is low across Uganda, with helmet and reflector usage being the most widely followed (Figure 2).

20 Pure Flow is a small local motorcycle financier in Mbarara. Haojue provides their own motorcycle financing in Mbarara.

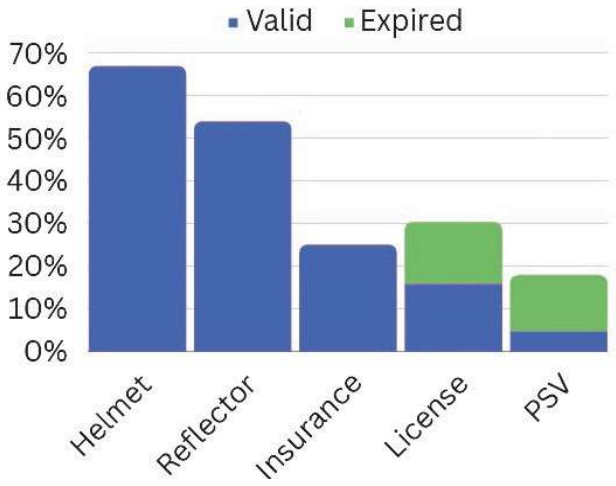

Figure 2: Compliance with legal requirements in Kampala.

2.3.1 Boda Boda

Becoming a boda boda operator in Gulu and Mbarara requires motorcycle and rider registration (Table 2). In Kampala, only about 1% comply fully with all laws, excluding the lesser-known PTPE requirement. Most boda boda riders in Gulu and Mbarara begin with just a motorcycle, a stage, and an association. After registering their motorcycle, they join the association by purchasing 5 shares for UGX 50,000 through the chairman as a one-off payment. Riders independently choose and register with a stage, as associations usually have little influence over stage selection. Stage registration fees typically range from UGX 100,000 ($41) in peri-urban and rural areas to UGX 1,000,000 ($272) in high-traffic downtown locations, such as markets.

2.3.2 Three-wheelers

In Gulu, tuktuk drivers pay UGX 700,000 for association membership and UGX 800,000 for vehicle registration, either upfront or in instalments. obj These funds help the chairman cover monthly council fees. Some passenger tuktuk drivers, previously registered under the taxi association, park in the taxi park and pay UGX 6,000 per day instead of the one-off UGX 1,500,000 required for full tuktuk association membership. In contrast to Gulu, Mbarara has no registered tuktuk association nor official registration charges. Instead, three-wheeler operators find a parking space and if required negotiate a parking fee with the owner of the parking space.

2.4 Challenges for Transport Operators

There are a wide range of challenges facing transport operators in Gulu and Mbarara, including financial and political issues.

2.4.1 Financial Challenges

The most critical and widely cited challenges by transport operators are financial challenges. This includes the costs of registration, fuel, and vehicle costs.

Registration costs for vehicles, drivers, and stage membership are considered high by both boda boda and tuktuk operators, particularly in light of their low earnings.

Table 3: Costs for registration as two- or three-wheeler operator in Gulu and Mbarara.

	Gulu in UGX		Mbarara in UGX	
Costs	**Boda boda**	**Tuktuk**	**Boda boda**	**Tuktuk**
Vehicle registration	50,000	800,000	25,000	0
Driver / rider	50,000	700,000	50,000	0
Stage	100,000 - 1,000,000	N/A	100,000 – 2,000,000	*Negotiated*
Total	**200,000 - 1,100,000**	**1,500,000**	**575,000 - 1,575,000**	**0**

Fuel costs are a major expense for operators. Boda riders in Gulu and Mbarara spend UGX 10,900 and UGX 9,800 daily on fuel, consuming 41% and 35% of their revenues. Tuktuk riders in both cities also report fuel expenses taking about one-third of their income.

Vehicle lease costs are similarly a high proportion of driver's earnings in Gulu and Mbarara. Boda bodas on lease cost 65,000 UGX a week on average in Gulu (38% of earnings), and 71,700 UGX (44% of earnings) in Mbarara. Tuktuk drivers on one of the more common lease programs pay 150,000 UGX a week, or around 42% of their estimated earnings in both cities.

2.4.2 Non-Financial Challenges

Gulu and Mbarara's transport sectors struggle with limited parking, poor road infrastructure, and restricted mobility. Enforcement of existing transport regulations is generally poor, with changes to the law often not communicated to the operators or even policemen. Corruption in the sector is rife: in Kampala, the vast majority of interactions with police are informal, with negotiated fees (bribes) being the norm.

3. E-Mobility in Uganda

3.1 State of the Market

Uganda's e-mobility market is emerging, with at least 14 companies (Table 4) involved in EV design, import, assembly, manufacturing, retail, financing, and charging. Major firms belong to the Uganda Electric Mobility Association (UEMA), which advocates for the industry.

Table 4: Electric vehicle deployment and active companies by segment.

EV Segment	Total (Dec 2024)	Active companies
Bicycles	565	Karaa, eBee, AfricroozE, Reliefline
Motorcycles	3,831[2]	Zembo, Gogo, Spiro, Redvers, Green Hub East Africa, Modjo Energies
Tuktuks & tricycles	~10	Freedom EV, Reliefline, Motorcare
Cars	83	Motorcare, Freedom EV
Buses	27	Kiira Motors, Freedom EV
EV Charging	20+	Altec, Kiira Motors, City Oil, Green Hub East Africa, Yongeza Capital (swap stations)
Financiers	*Resale of the above*	Watu, Mogo, Asaak, Yongeza Capital

3.1.1 Importing, Assembling and Maintenance

Companies in Uganda are currently taking a mix of approaches to local assembly due to a limited local manufacturing base. Some companies import fully-built units (FBUs), others import semi-knocked-down kits (SKDs),[22] and others – particularly e-motorcycle companies – import completely-knocked-down kits (CKDs). There are also a handful of companies focusing on conversion. While importing FBUs and SKDs is faster to get the vehicle on the road, it can be more expensive to ship and faces higher taxation. It is also more commonly found with newer EV brands with limited local spare parts compatibility. Two- and three-wheeler companies see FBU imports as a short-term approach as local assembly is fairly simple for E2&3W. Electric car assembly or manufacturing, however, has much higher capital costs, and no e-car manufacturers reported plans for investing in this.[23]

3.1.2 Maintenance

As E2&3W are a relatively new technology, companies must import spare parts at higher costs and maintain control over vehicle servicing to reduce the likelihood of spoilage by the local maintenance network. This is less convenient for EV users who rely on a limited retailer network instead of widespread local mechanics. In order

> "[Maintenance] is worsened by limited information on where to get the spare parts, EVs themselves, or mechanics [to work on them]." ***Electric boda rider in Mbarara***

21 By November 2024, Spiro reported having 1,000, Gogo had 1,980, Zembo had 794, and Green Hub East Africa had 35.
22 AfEMA and UNEP (2024): Uganda Baseline Report on Gender and E-Mobility.
23 Interviews with e-mobility companies.

to increase convenience and reduce the cost of spares, e-motorcycle companies tend to focus on designs with locally available spare parts.

3.1.2 Retailing and Financing

Retailing of electric vehicles in Uganda is generally limited to showrooms, for cars and buses, and a combination of showrooms and MFC offices for two- and three-wheelers. Retailing is typically done by the same importing companies, who offer limited financing and instead today focus on selling to MFCs. This improves the financial outlook for importing companies, freeing up capital to place more E2&3W orders, and allowing both the importers and MFCs to focus on their primary business.

3.1.3 Charging and Swapping

Electric cars and buses rely on a mix of public, institutional, and home chargers, while most two-wheelers in Uganda depend on battery swap stations managed by the same company that retailed them. This means, for example, that Zembo motorcycles can only use Zembo swap stations, or the same for Gogo. The only exception to this is that Spiro has partnered with Yongeza Capital for the latter to set up and operate swap stations on behalf of Spiro – but still so far exclusively swapping Spiro batteries. In addition, E2Ws sold by Green Hub East Africa, Redvers, and Modjo Electric can all be charged at home or at one of the few public charging stations. E3W have yet to operate in Kampala, with the exception of Wasoko's brief pilot using Gayam e-tricycles which were charged centrally, discussed in further detail later in this report.[24]

3.2 Two-Wheeler Market

While exact numbers are hard to come by, motorcycle sales in Uganda were 121,116 in 2021/22 financial year and 230,980 in 2022/23, indicating a robust market. Around 1.4 million motorcycles were believed to be in Uganda as of September 2024.[25] The dominant brand, the Indian brand Bajaj, has recently seen increasing competition from Chinese brand Haojue. Outside of Kampala, cheaper Chinese brands such as Senke can be found more commonly, particularly in hilly areas.

3.2.1 Electric Two-Wheeler Market

Electric two-wheelers in Uganda are primarily sold to boda boda riders, with some sold to personal users and corporate fleets. Most e-boda companies can be found in Kampala, due to the high number of boda bodas in Kampala (estimated at 350,000), higher rider earnings, the presence of asset finance partners, and access to government offices.

Zembo, Gogo, and Spiro are the largest e-motorcycle companies, each having sold 700-2,000 motorcycles and operating over 120 swap stations in Greater Kampala, Busoga, and Ankole regions as of December 2024. All 3 companies primarily operate in Greater Kampala, with Zembo additionally stretching to Masaka, Gogo across most of Central Region, and Spiro stretching to Mbarara.

The motorcycle battery swap model has been key to e-mobility adoption in Uganda. Initially piloted by Gogoro in Taiwan, it is now used by Uganda's largest e-boda companies (Gogo, Zembo, and Spiro) addressing key adoption barriers, as detailed in Table 5 below. Spiro is unique in also offering at-home charging.

24 https://www.appsafrica.com/sokowatch-launches-east-africas-first-commercial-electric-tuk-tuks/
25 Uganda Electric Mobility Association: Steering the E-Mobility Transition in Uganda. 2024.

Table 5: Trade-offs in battery swapping and owner charging models

	Battery swap model	Owner charging
Battery ownership & responsibility	Battery swap company	Motorcycle owner
Upfront cost	Roughly 5,000,000 UGX	Roughly 11,000,000 UGX[26]
Range limitation	Swapped in 2-3 minutes.	Charging requires 2-5 hours.
Battery range implications	Smaller (70-110 km) as the battery can be swapped between trips.	Larger (150-200) km to allow all-day operations
Recharging cost	~20% cheaper than fuel	~70% cheaper than fuel

The battery swap model offers clear benefits like no wait time for charging, lower upfront costs, and no concerns about battery replacement. However, some riders prefer owning their batteries for the flexibility to charge at home or on the road to destinations outside the city. Additionally, the capital costs for establishing a battery swap network are a significant financial burden for e-mobility companies.

3.2.2 Implications for E2W Swap Companies

The battery swap model has significant impacts on companies' business models, who must invest simultaneously into vehicle stock and battery stock.

a) **High vehicle / battery usage:** To shorten the payback period on battery stock, batteries need to be used intensively, ideally 1-2 cycle lives per day.[27] Battery swap companies finance their stock through a mix of debt and equity, and longer loan durations increase financing costs, which may be passed on to riders. Thus, sufficient battery utilisation, which is a factor of daily km driven by riders, is necessary to ensure a reasonable payback period.

b) **Reasonable swap station density:** To ensure convenience and prevent riders from rejecting trips, swap companies should establish sufficient stations in both the town and its outskirts. While swap networks range from 25 to 60 stations within Kampala, their relative paucity – compared to ICE fuel stations – remains the primary complaint of many riders.

c) **High boda adoption.** There is therefore a need to have a reasonable number of electric boda adopters so as to avoid under-utilized and wasted investment. This aligns with the first two points of high battery usage and swap station density.

d) **Need for mobile money:** E-mobility, particularly battery swapping, relies on mobile money for three reasons. First, it enables precise payment based on energy usage, avoiding issues with small change. For example, if a full swap costs 5,000 shillings and the rider returns a 23% charged battery, they pay 3,850 shillings. Yet riders tend not to have change at the 50 shilling or even 100-shilling level, so rounding would feel unfair to the rider. Second, mobile money

26 Previous price of a Bodawerk electric motorcycle, with battery.
27 A cycle life is a complete charge and discharge cycle.

ensures accountability and reduces financial leakage at swap stations. Finally, automated battery swap stations, like Spiro's, require mobile money for transactions, as there is no swap station attendant to collect cash.

3.3 Three-Wheeler Market

The three-wheeler market in Uganda is significantly smaller than the two-wheeler market, with 2,885 registered in 2022 and 9,882 three-wheelers in total on the road.[28] Three-wheelers in Uganda include passenger three-wheelers, commonly referred to as tuktuks, and cargo three-wheelers, referred to as tricycles or cargo tuktuks. The main brands of tuktuks are Indian-made Bajaj and TVS, with nearly all being 3+1 single bench tuktuks. They are imported by Nish Auto and Yuvraj International. A new Bajaj RE tuktuk costs 13.5 million UGX ($3,646) but can be leased through Boda Banja for a downpayment of 1.5 million UGX ($405) and weekly payments of 150,000 UGX ($40) for two years.[29] Tricycles are mainly Zongshen and Simba Sumo, costing between 8 million to 12 million UGX ($2,160 to $3,241) for new models and 3.5 million to 6 million UGX ($945 to $1,620) for used ones, and are available in Kampala, Gulu, and Mbarara. Financing options for three-wheelers are limited, with Boda Banja as the primary financier for tuktuks and local microfinance for tricycles.

3.3.1 Electric Three-Wheeler Market

There are three electric three-wheeler providers identified currently in Uganda: Harakka, FreedomEV, and Motorcare. The first two are selling lead-acid vehicles with relatively small batteries and low motor power. Harakka, for example, is selling a container rickshaw with 1.5 kW nominal motor power, and a battery of 6.5 kWh (Fig 3).[30] Motorcare is piloting lithium-ion cargo three-wheelers, with plans to expand to passenger three-wheelers.[31]

Regionally, there are several E3W providers that could enter the market. In Tanzania, the most advanced market for E3W in the region, electric passenger three-wheelers are provided by Tri, Elico, and Sescom. Cargo three-wheelers in Tanzania, however, are all lead-acid vehicles supplied by a range of Chinese companies, most prominently Sinoray and KingLion. In Kenya, Biliti Electric, Auto-Truck, Car & General, and Solutions Africa are all selling electric passenger three-wheelers.

28 Uganda Revenue Authority; Uganda Bureau of Statistics.
29 This works out to an effective interest rate of 13.4%. From an interview with Boda Boda Banja sales executive in Gulu, October 2024.
30 From WhatsApp conversation with Harakka Mobility, December 2024. Assuming a 48V motor, as is standard with lead-acid 2&3W.
31 Interview with Motorcare, Dec 2024.

Figure 3: Advertisement for Harakka's electric cargo three-wheeler retailed in Uganda.

3.3.2 Implications for Electric Three-Wheeler Retailers

E3W adoption in Gulu and Mbarara is shaped by several factors.

Differences in topography will affect minimum motor power. The hilly terrain in Mbarara requires higher-powered EVs, unlike relatively flat Gulu. Current ICE three-wheeler operators in Mbarara cite this as a major challenge, so E3W retailers must ensure their vehicles are suitable for the region

> "The way some tuktuk are made, they are weak. They lack the power to move the steep, hilly roads and it is one reason people do not want to hire us to deliver their parcels." ***Tricycle Driver, Mbarara***

Additional opportunities in regional cities. In Kampala, three-wheelers are limited by traffic and competition with taxis. Regional cities including Gulu and Mbarara may have additional success in growing the three-wheeler fleet due to the lack of traffic and taxis.

An assessment of available home and public charging is necessary: E3W require access to electricity at home, workplaces, or public charging stations. Since public charging stations for e-tuktuks are not yet available in Uganda, retailers must ensure E3Ws can be charged at home or at public locations like markets or major taxi stages.[32]

32 Most e-tuktuk models cannot use the EV chargers built for cars and buses, but instead can use just a standard electricity outlet.

Transportation demand: Interviews showed similar demands for three-wheeler services in Gulu and Mbarara. Tuktuks tend to handle personal and shared passenger transport, along with some goods delivery, while tricycles mainly transport construction materials, shop restocks, and other medium-sized goods too large for boda bodas but not requiring a truck. However, tricycles sometimes also transport groups of people.

3.4 Environmental, Health, and Social Impact

The transition to electric mobility in African cities like Kampala, Mbarara, and Gulu brings substantial environmental, health, and social benefits.

3.4.1 Environmental Impact

Reducing tailpipe emissions in transport offers significant climate benefits, with the sector contributing 23% of global CO2 emissions and 45% in Uganda.[33] EVs decrease fossil fuel usage, a major emitter of greenhouse gas emissions. Unlike petrol, locally produced electricity is over 95% clean, supporting the power sector and encouraging infrastructure expansion.[34]

3.4.2 Health

Transitioning to e-mobility delivers cleaner air, which reduces respiratory and cardiovascular diseases by limiting exposure to pollutants produced by ICE vehicles.[35] Improved air quality lowers the risk of asthma, bronchitis, heart attacks, and strokes, while supporting immune health and overall quality of life. Reduced noise pollution from EVs quieter motors has also been shown to improve mental health. This lower noise level helps alleviate stress, sleep disturbances, and cardiovascular issues caused by chronic exposure to loud traffic noise.[36]

3.4.3 Social Impact

The EV industry creates green jobs in engineering, manufacturing, battery swapping, charging infrastructure, and maintenance. Electric vehicles tend to lower energy and maintenance costs for operators and can pass on these savings to passengers.

EVs eliminate dependence on imported petrol, which currently makes up $2 billion of Uganda's $5.15 billion trade deficit.[37] In the long run, this will have major macroeconomic benefits and increase economic self-reliance.

E-mobility will also increase consumption of clean Ugandan electricity. Converting the entire fleet of motorcycles, cars, and buses could create an annual demand of 6,784 GWh, surpassing Uganda's 2023 total electricity generation by 110%.

33 IPCC, editor. Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. Cambridge: Cambridge University Press; 2022. p. 93–174. Available from: https://www.cambridge.org/core/books/global-warming-of-15c/mitigation-pathways-compatible-with-15c-in-the-con- text-of-sustainable-development/051AC891C0952E62DEF2510593BC1C10. Uganda CO2 Emissions - Worldometer. https://www.worldometers.info/co2-emissions/uganda-co2-emissions/

34 Sarah Helen Rüdenauer. 2023. The Ugandan energy sector – Renewables' enormous potential is yet to deliver. https://energytransition.org/2023/09/the-ugandan-energy-sector-renewables-enor- mous-potential-is-yet-to-deliver/

35 Schraufnagel et al. 2019. Health Benefits of Air Pollution Reduction. ATS journals. https://doi.org/10.1513/AnnalsATS.201907-538CME

36 Tsoi et al. 2023. The co-benefits of electric mobility in reducing traffic noise and chemical air pollu- tion: Insights from a transit-oriented city. https://doi.org/10.1016/j.envint.2023.108116

37 UEMA Sector Position Paper.

4. Operator business cases in Gulu and Mbarara

4.1 Boda bodas

Demand for motorcycles in Uganda is dominated by boda bodas, with a smaller share of corporate fleets and personal motorcycles.[38] The boda boda market in Uganda is largely unregulated, with minimal entry barriers. Most riders start with just a motorcycle, often without a stage, app, or driver's license.[39]

4.1.1 Ownership in the boda boda sector

Owning a motorcycle is key to economic independence and increased profits for boda boda riders. Motorcycles are typically acquired through one of four means:

a) **Renting a used motorcycle:** This usually requires no upfront cost and weekly payments tends to be around 70,000 UGX a week in Kampala. This is the most common way to start in the sector.
b) **Leasing a new motorcycle** from a financing company which requires a deposit of 400,000 to 800,000 UGX. Weekly payments range from 85,000 UGX for a 24-month lease to 120,000 UGX for a 12-month lease, the most common terms in Gulu and Mbarara[40].
c) **Leasing a used motorcycle** with a loan from friends, family, or elsewhere. Upfront payments and instalments are negotiated but tend to be somewhere between rental and leasing costs.
d) **Purchasing a used or new motorcycle** with saved funds or with friends/family support.

The Government's recent introduction of digital license plates is expected to increase the price of new motorcycles by 700,000 UGX ($191), a roughly 15% increase.

4.1.2 Current boda boda business

Boda boda riders earn money by transporting goods or passengers, but face high daily costs, including energy, motorcycle payments, and maintenance. The average trip price in Kampala is 3,968 UGX ($1.08), more than double that of Gulu (1,694 UGX, or $0.46) or Mbarara (1,607 UGX, or $0.44), though riders have slightly higher trips per day in Gulu and Mbarara than in Kampala. Maintenance costs vary hugely week to week but generally rise as the motorcycle ages. Those who own their motorcycles outright are more profitable than those still paying for a lease.

38 A recent, unpublished survey by Tom Courtright found that personal motorcycle usage is increasing significantly in Kampala - but only among men.
39 Lubyanza Quarterly Reports.
40 Lubyanza Quarterly Report, January 2024.

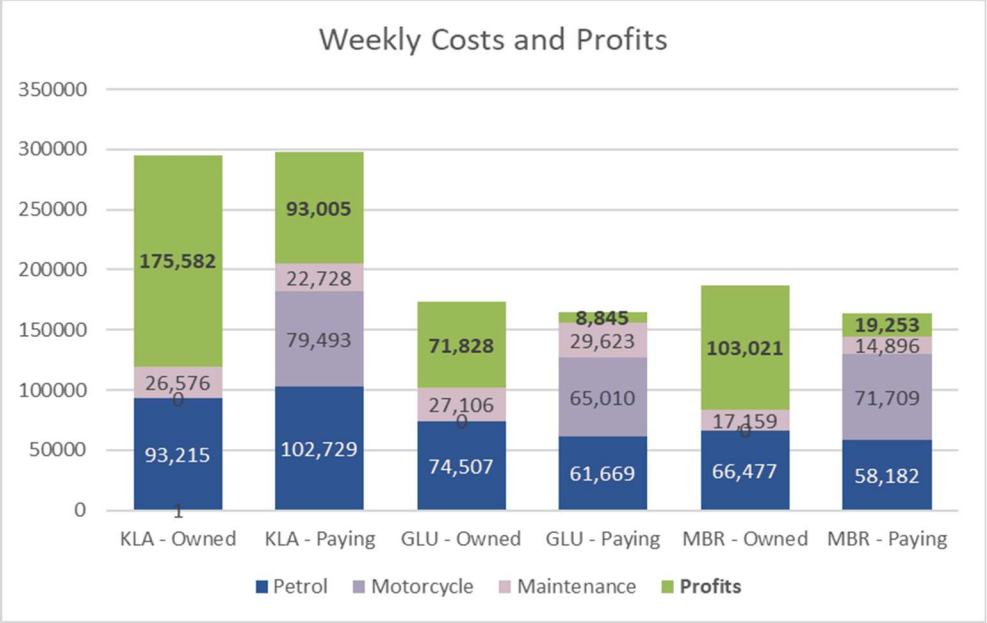

Figure 4: Weekly costs and profits for ICE boda riders in Kampala, Gulu, and Mbarara.

In Kampala, the average weekly earnings are just under 300,000 UGX ($81), while in Gulu and Mbarara, riders earn 171,420 UGX ($46) and 178,338 UGX ($48) respectively. Despite 40% lower earnings in these regional cities, motorcycle costs are only 18% lower, and petrol expenditure is 20% lower in Gulu and Mbarara. This means riders who own their motorcycles take home about 72,000 UGX per week in Gulu and 103,000 UGX in Mbarara, compared to 175,000 UGX in Kampala (Figure 4). Perhaps most importantly, riders renting or paying off motorcycle loans in Gulu and Mbarara earn much less, averaging 8,845 UGX ($2.41) in Gulu and 19,253 UGX ($5.25) in Mbarara per week – barely profitable.

What this means is that riders often look for other sources of income (Figure 5). 45% of riders in Gulu and 55% of riders in Mbarara report having alternative sources of income.

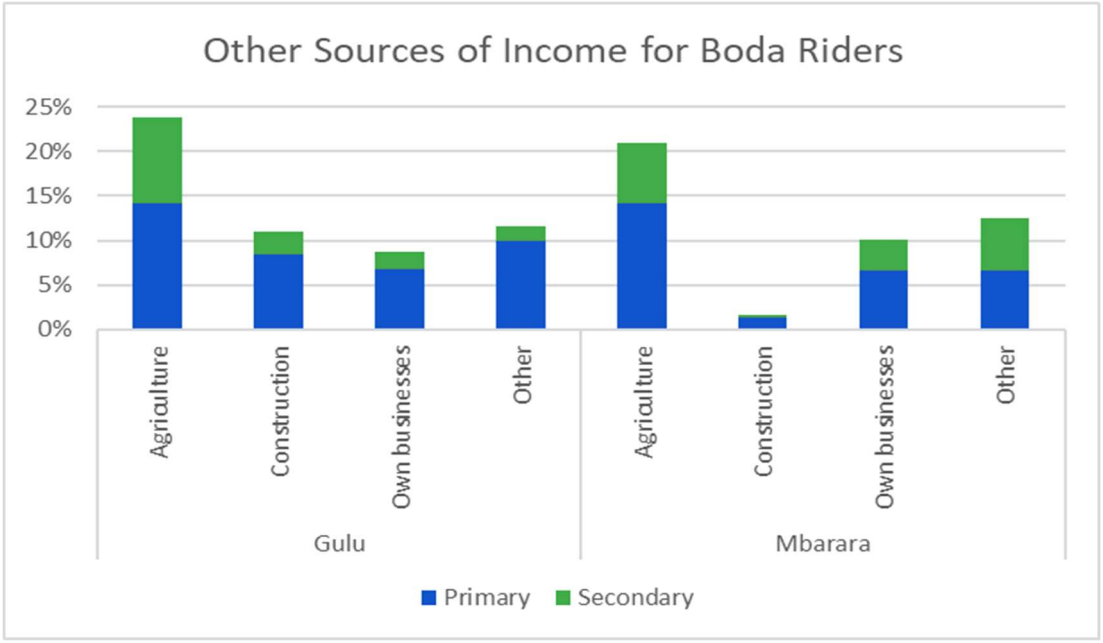

Figure 5: Sources of additional income for boda riders in Gulu and Mbarara.

In terms of competitive pricing, boda bodas in Gulu and Mbarara are priced lower than in Kampala, with weekly lease rates for a new Boxer Bajaj 100 averaging 80,000 UGX in Gulu and 84,000 UGX in Mbarara, compared to 123,000 UGX in Kampala (Figure 6). However, financing companies report either the same rates nationwide or a small differential of around 7,000 UGX per week[41]. There are three possible reasons for this discrepancy. First, some financiers use risk profiles to decide on the distribution of down payment and weekly payments - riskier loans require higher down payments and consequently lower weekly payments. As regional cities, Gulu in particular, have higher risk, they also have lower weekly payments. Second, more riders in Gulu and Mbarara could be using loans from SACCOs, local banks, and family and friends, the latter two of which tend to have lower rates than motorcycle financing companies. Finally, some motorcycle retailers reportedly charge lower rates in regional cities.

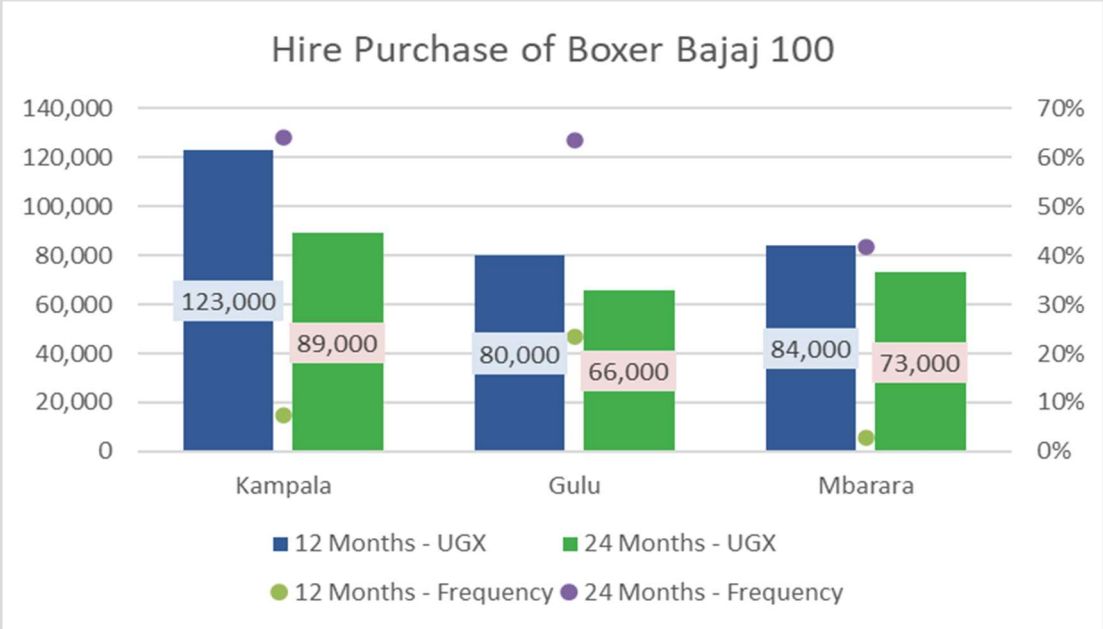

Figure 6: Average current weekly payments for motorcycles on hire purchase in Uganda.

During this study, all financiers reported much higher default rates in Gulu than in Mbarara, with a 20% repossession rate in Gulu compared to only 3% in Mbarara. As a result, Mogo and Asaak closed their Gulu offices, and Boda Boda Banja stopped selling new motorcycles there.[42] Gulu's high loan default rates are also seen in the solar home system industry, with companies attributing them to the war and the free distribution of goods after it.[43]

4.1.3 EV Boda Business in Mbarara and Gulu

There was only one e-mobility operator servicing a handful of e-boda riders in Mbarara and no e-bodas in Gulu as of December 2024. Success of e-mobility in these cities will depend on these key factors identified:

a) **High daily distances** are key to operating profitable battery swap networks. E-bodas and their battery swap networks in Gulu and Mbarara need to handle daily distances of approximately

41 Interviews with financing companies, December 2024.
42 Interview with financing company, Gulu, October 2024.
43 Interview with former CEO of the Uganda Solar Energy Association (USEA).

100 km and 120 km, respectively.[44]

b) **Competitive pricing** is necessary to sell in Gulu and Mbarara. E-motorcycle companies in Kampala offer competitive prices, and this can be replicated in Gulu and Mbarara. For example, Mogo sells the Zembo Thunder e-motorcycle for 4.3 M UGX, while the Bajaj Boxer 100 is priced at 5.3 M UGX.

c) **Sufficient local demand** is critical in terms of a) the absolute number of motorcycles and b) the density of the motorcycles in the area. The absolute number of motorcycles represents the market size, while motorcycle density determines the viability of swap stations. Gulu's density is 270 motorcycles per km², 23% lower than Kampala's 350/km² but still substantial. Mbarara, however, has double Kampala's density, making it an even more attractive market for e-boda companies as more e-bodas can be serviced by fewer swap stations.

Table 6: Boda boda fleets and motorcycle density in Kampala, Gulu, and Mbarara.

	Motorcycle fleet (#)	Area (km2)	Density (# / km2)
GKMA	*350,000*[45]	*1,000*	*350*
Gulu	16,500[46]	61[47]	270
Mbarara	37,440	51.5[48]	726

MFC presence in both Gulu and Mbarara is another necessary ingredient to enable e-boda purchases. Mbarara has five major motorcycle financiers while Gulu has only two.

Table 7: MFC presence in Gulu and Mbarara, as of December 2024.

Financier	Watu	Mogo	Asaak	Boda Banja	Tugende
Gulu	Present	Absent	Absent	Used Only	Absent
Mbarara	Present	Present	Present	Present	Present

4.2 Motorcycle fleets

Fleets offer potential for electric vehicle adoption through government and corporate procurement, creating demand for local suppliers and promoting e-mobility in Uganda. However, fleets represent a small share of the country's 2&3W markets. Corporate fleets are mostly concentrated in Kampala, used by businesses like Cafe Javas, DHL, and G4S.[49]

The government owns the most substantial vehicle fleet, including 34,942 motorcycles as of August 2024 mainly used by agencies like police, health, and agriculture. Government fleets in Mbarara

44 Interview #2 in Mbarara, boda boda association. Interview #8 in Mbarara, financier.

45 These estimates are used by SafeBoda and other key players in Kampala, and are used here: https://www.ap.org/news-highlights/spotlights/2024/in-ugandas-chaotic-capital-boda-boda-motorcycle- taxis-are-a-source-of-life-and-death/

46 For Gulu, a midpoint range between 9,000 and 24,000 was taken.

47 https://www.gef.or.jp/20club/E/gulu.htm

48 https://unhabitat.org/sites/default/files/download-manager-files/Mbarara%20Municipality%20Urban%20Profile%20%20Uganda.pdf

49 https://medium.com/lubyanza/old-goods-new-movements-6151ff3661a3

and Gulu present a good electrification opportunity given their larger numbers and non-profit nature compared to corporate fleets, which are unlikely to be attractive market for e-boda companies in Uganda due to their small size and low daily kilometres.

4.3 Three-wheelers in Mbarara and Gulu.

Tuktuks and tricycles offer both special hire and shared services in Gulu, Mbarara, and Kampala. Despite the small market, tuktuk drivers earn about 60,000 UGX ($16.30) daily in both cities, more than double boda boda riders earnings.[50] Cargo three-wheelers make fewer trips but charge higher rates, ranging from 5,000 to 20,000 UGX per delivery in Gulu.[51] However, a financier in Mbarara reported high return rates, with six out of ten tuktuks returned due to mechanical issues and payment defaults. In Gulu, two tuktuks sold to women were later rented out to male drivers.

4.3.1 Electric three-wheeler business

The following factors shape the business case for electric three-wheelers:

a) **Existing demand for three-wheelers:** The current demand for personal and shared passenger transport, along with some goods delivery including soft drinks, beer, shop restocks, and other medium-sized goods too large provides an opportunity of E3W.
b) **Availability of financiers:** E3W operators could acquire vehicles through loans, rentals, or as part of cargo delivery fleets. Loans would primarily be obtained from Boda Boda Banja and Watu.
c) **Lack of stiff competition compared to Kampala:** Gulu and Mbarara lack stiff competition for tuktuks like in Kampala where there is intense competition in the taxi space for shared transport, and inability to cut through traffic (compared to bodas). E3W would likely thrive in both cities.
d) **Cheaper energy cost:** Electricity is significantly cheaper - 700 UGX per kWh, compared to around 5,000 UGX per liter of petrol. Assuming a mid-range daily distance of 80 kilometers and an E3W at the same price point as their ICE 3W counterpart, this means that E3W drivers could make daily operational savings of roughly 14,448 UGX ($3.94).[52]
e) **Gulu's flat terrain** would allow E3W to operate with ease (Figure 7), whereas Mbarara's steeper slopes pose greater challenges

50 Interview #5 in Gulu, a tuktuk driver; and interview #4 in Mbarara, a tricycle driver.
51 Interview #4 in Mbarara
52 Comparative of advertised range of Harakka cargo E3W and Zongshen cargo ICE3W.

Figure 7: ICE passenger tuktuks in Gulu City

Overall, electrifying individual three-wheelers in Uganda depends on sufficient revenue, electricity access, daily distance driven, and local topography. Cargo 3Ws are often fleet owned, limiting individual adoption, while passenger tuktuks present a stronger opportunity as no swap stations are needed.

4.4 Fleet Business Models for E3W

Cargo three-wheeler fleets in Uganda primarily serve fast-moving consumer goods (FMCG) logistics, including companies like Jumia, Jibu, Kikubo Online, and Wasoko, and smaller shops, as well as garbage collection. However, fleet sizes are generally small, especially in regional cities. For instance, Jibu operates with just one cargo tuktuk per franchisee in Gulu and two in Mbarara.

There are three fleet models for cargo three-wheelers:

a) **Vertically integrated fleets** (e.g., Wasoko, Kikubo Online), where companies own the vehicles, employ drivers, and handle maintenance.
b) **Third-party logistics** (e.g., Jumia), which contracts local firms that own fleets.
c) **Gig-based models** (e.g., Zogo, formerly Jumia's contractor), where independent workers source their own vehicles.

4.4.1 Electrifying Three-Wheeler Fleets

Key factors for E3W adoption in logistics hinge upon the same broad factors as for other EV subsegments: **1) favourable total cost of ownership (TCO), 2) vehicle suitability, and 3) locally available spare parts.**[53]

- **TCO advantage:** Lower operational costs, mainly due to cheaper electricity and no swap-related expenses, make E3Ws viable if their capital cost remains comparable to ICE

53 Interview with Jibu in Kampala, December 2024.

counterparts. High daily distances (80–100 km) are crucial for cost savings.

- **Fit for purpose:** Uganda's E3W market is still nascent. However, the fact that two of the three companies with plans for E3W sales in Uganda plan to bring vehicles with motors no greater than 1.5 kW (which would be half the power of the smaller, lighter motorcycles on the road in Uganda today) and lead acid batteries (which tend to have limited range) is not encouraging.
- **Spare parts availability:** Since Uganda's dominant three-wheeler brands (Zongshen, Simba) do not produce E3Ws, parts are scarce. Local sourcing and bulk spare part imports are essential for fleet operators.

Case study of Wasoko

Uganda's first E3W pilot launched in 2020 by Wasoko (formerly Sokowatch), a business-to-business (B2B) FMCG logistics company. Wasoko deployed five Gayam Motor Works electric cargo three-wheelers in Kampala, featuring 10 kWh lithium-ion batteries and 7.5 kW peak power to handle hills. These vehicles covered up to 100 km daily, carrying up to 600 kg of goods at a time, with charging done at Wasoko's warehouses. Challenges included registration delays due to lack of Uganda Revenue Authority (URA) guidance and spare parts scarcity, making repairs costly and slow. The pilot lasted less than a year, mainly due to Wasoko's shift from fleet ownership to contracting local fleet operators. Despite this, Wasoko remains interested in electric fleets.[54]

Figure 8: Wasoko e-tuktuks in Kampala in 2020. Photo credit: Disrupt Africa.

54 Interview with Co-CEO of Wasoko & MaxAB.

5. Barriers and Opportunities

The E2&3W sector shows immense potential in Uganda. However, recognizing and addressing the barriers to adoption is essential to implement effective interventions to promote uptake.

5.1 Opportunities and barriers for E2&3W

5.1.1 Electric Two-Wheelers

5.1.1.1 Barriers to E2W adoption

Numerous barriers hinder the transition to electric two-wheelers in Gulu and Mbarara. These include:

Charging and swapping infrastructure is essential for the adoption of E2&3Ws, ensuring operational reliability, reducing downtime, and addressing range anxiety. It enables E2&3Ws to cover longer distances, particularly in cities like Mbarara with limited infrastructure, while fostering confidence among riders. As of December 2024, Mbarara only had four battery swapping stations, while Gulu was yet to have its first. Riders highlighted the availability of battery swapping stations as the biggest factor influencing their willingness to transition to e-bodas.

Power outages are already challenging riders in Mbarara. Outages hinder e-boda adoption by disrupting reliable charging, causing downtime, and reducing earnings, making them less competitive with traditional motorcycles. Addressing stable power supply issues through grid improvements and decentralized charging is essential for increasing uptake.

> "On days when power goes off, say during night, we find no batteries to swap in the morning." ***Electric boda rider in Mbarara***

Lack of familiarity with e-mobility is dampening rider interest in the sector. E2W are relatively new in cities outside Kampala, leading to hesitancy among riders to invest in untested technology without assurance of operational or financial benefits. Gulu doesn't have any E2W whereas Mbarara has only 25. While many riders had heard about E2W, most didn't know their benefits.

> "I always get to [boda boda] stages and people wonder what my bike is. Most people do not know about EVs. Because I am an upcoming aspirant, I take time and explain to them. They usually have many questions. I wish I could get a platform on radio, TV and markets. Bicycle riders always ask me for my e-bike and they try it out." ***Electric boda rider in Mbarara***

Limited availability of spare parts and trained mechanics could lead to prolonged downtimes for E2&3W drivers, reducing reliability and efficiency. This lack of support will likely deter adoption, especially in cities like Gulu and Mbarara, where electric vehicle maintenance networks remain

underdeveloped. Investing in local repair capacity and supply chains is critical to overcoming these barriers and encouraging broader E2&3W use.

Poor road conditions in both cities, characterized by potholes, uneven surfaces, and unpaved roads, can accelerate damage to electrical components like batteries and motors, reducing vehicle lifespan and increasing maintenance costs. Therefore, investing in improved road infrastructure is crucial for supporting the widespread use of e-bodas in the cities.

High default rates in Gulu will also make it difficult for E2&3W companies to engage with their usual MFC partners to sell new E2&3W in the city. However, this does not seem to be a challenge in Mbarara.

5.1.1.2 Opportunities

Despite these challenges, there are several factors that can accelerate the transition to electric motorcycles in Gulu and Mbarara.

a) **Government support:** Over the past two years, the Government of Uganda has passed a series of incentives to make electric vehicles more affordable, with mostly positive results. Key steps include VAT exemptions for suppliers of electric motorcycles, locally manufactured vehicles, charging stations, and batteries, along with a 10-year income tax break for e-mobility companies to boost innovation and investment.[55] The National E-Mobility Strategy published in June 2024 has expansive plans and proposed incentives. To expand infrastructure, the government is partnering with the private sector to establish over 3,500 public charging stations and over 10,000 fast chargers in Uganda to make one available in every 50km radius by 2040.[56] The E-Mobility Strategy also sets ambitious targets for full e-mobility adoption in public transport and motorcycles by 2030 and passenger vehicle sales.

b) **Awareness of e-bodas is growing among riders** as highlighted by our data, where 98% and 88% of riders in Mbarara and Gulu respectively were aware of their existence. Notably, 64% in Mbarara and 78% in Gulu expressed willingness to switch to electric motorcycles (Figure 9).

55 Steering the E-Mobility Transition in Uganda, UEMA, October 2024.
56 Trendtype. 2024. The Ugandan government unveils plans for a national electric vehicle charging network. The Ugandan government unveils plans for a national electric vehicle charging network - Trendtype

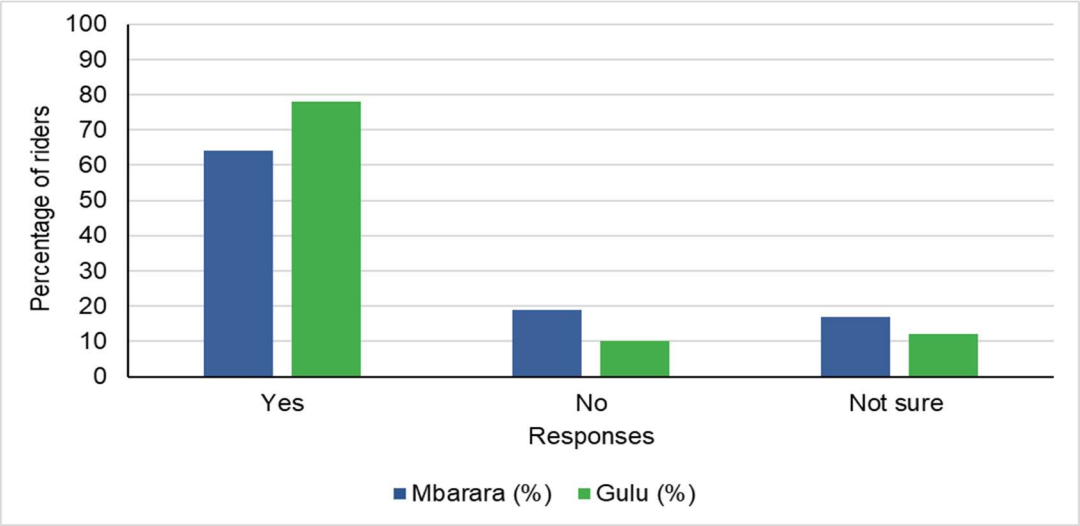

Figure 9: Riders who were willing to consider switching to electric motorcycles

c) **Existing two-wheeler (2W) financing companies** like Watu, Boda Boda Banja, Mogo, Asaak, and Yongeza Capital offer loans for riders to access boda bodas, including electric models, which would otherwise be unaffordable. Reduced upfront costs for e-bodas, such as UGX 500,000 offered by Mogo in Kampala, make ownership more accessible for riders. Institutions like Post Bank, Kyamuhunga Peoples SACCO, and women-focused SACCOs can expand EV loans, especially targeting women entrepreneurs. These financing options not only help build credit history but also stimulate local economic growth by increasing affordability and creating jobs in related sectors.

d) **Steadily growing transport demand** in Gulu and Mbarara as in other cities in Uganda presents a strong opportunity for e-mobility, creating a reliable market for E2W. The diverse business landscape, including traders, farmers, local government, and NGOs, offers untapped regional demand for E2W services. There is also a potential for government procurement of E2W, as they have the largest local fleet.

e) **Lower energy costs** offer savings for boda boda riders. In Kampala, e-boda riders save around 21% on fueling costs, as electricity is cheaper than petrol, and have lower maintenance expenses due to fewer parts and no oil changes.[57] These savings boost riders' incomes while supporting a cleaner environment. The majority of petrol riders underscored cost saving as a major factor in their potential decision to switch to E2W (Figure 10).

57 Lubyanza Quarterly Report, Q3 2024.

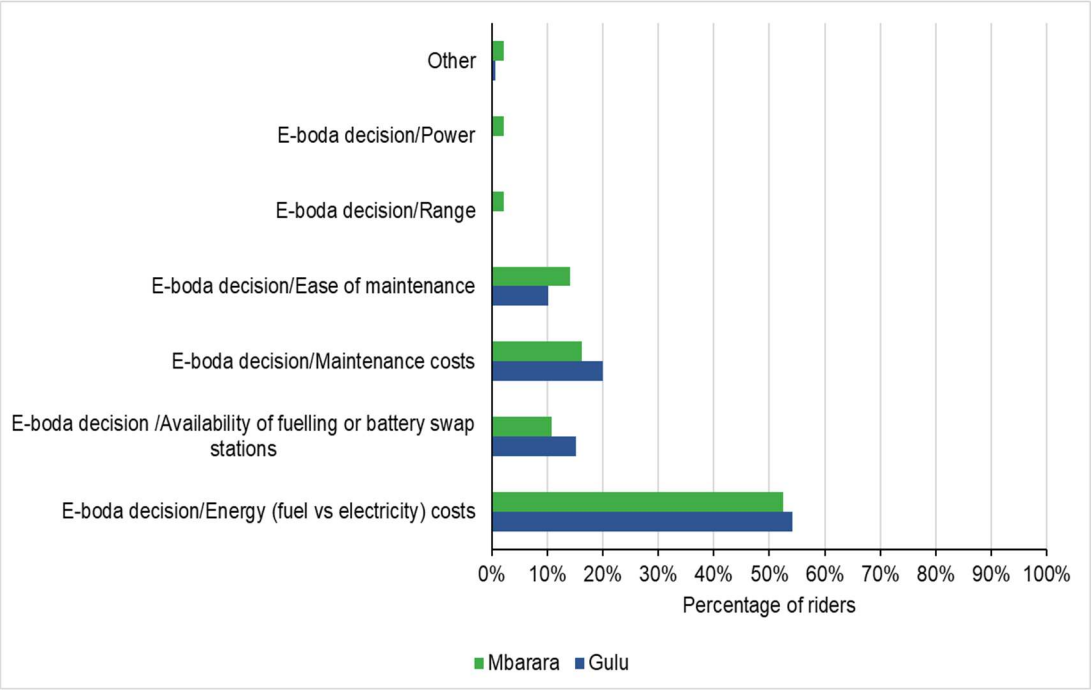

Figure 10: Factors that would motivate petrol riders to switch to an electric motorcycle

6) Existing boda boda stages provide ideal locations for e-mobility sensitization and battery swapping. With 92% of riders in Gulu and 91% in Mbarara belonging to a stage, these high-traffic hubs are a key location for operators to share information and try new models, as well as charge their motorcycles or swap their batteries.

5.1.2 Three-Wheelers

5.1.2.1 Barriers for E3W adoption

a) **Lack of charging infrastructure** and home electricity access in Gulu and Mbarara will be a challenge to early adopters. Most E3W in East Africa are charged rather than using battery swapping, and are reliant on a combination of home charging, public chargers, and informal public charging (such as at sockets in small shops).[58]

b) **Unclear HS code and taxation** of E3W in Uganda can lead to delays in registration and subsequently delayed in release of the E3Ws. In Kenya and Tanzania, the tax authorities report using HS code 8703.80.10, which is for electric four-wheeled vehicles.[59] In Uganda, Wasoko's early pilot faced challenges at customs, who had no clear HS code to apply, resulting in wasted time and resources during the import process.

c) **Limited access to spare parts** which increases downtime for electric three-wheelers, reduces reliability, discourages adoption, and raises operating costs due to reliance on imports or makeshift repairs. It also encourages the use of substandard parts, risking mechanical failures and compromising safety. Three-wheelers face much more limited spare parts landscapes than motorcycles, due to their much smaller market share in Uganda.

58 Interview with East African E3W provider.
59 Interview with East African E3W provider.

d) **Stiff competition** from boda bodas for trips with one or two passengers. Boda bodas are more agile and familiar to local operators, and can be cheaper for individual trips.

e) **Challenging topography** in Mbarara. The steep, hilly roads in Mbarara require high-powered 3W, which will come at greater cost.

f) **Slow adoption** of three wheelers in general, driven by a lack of local familiarity and limited maintenance networks. In Mbarara, 6 out of 10 tuk-tuks were returned due to mechanical issues or non-payment by riders.

g) **Poor road infrastructure challenges** such as potholes, uneven surfaces, and muddy or unpaved areas limit tuk-tuk access to certain regions, hindering last-mile connectivity and increasing safety risks, such as accidents and breakdowns, endangering drivers, passengers, and cargo. Critically, it also increases maintenance costs and leads to shorter vehicle lifespans.

5.1.2.2 Opportunities for E3W adoption

a. **Existing 2&3W financiers** could accelerate adoption by providing financing for E3W. This would lower upfront costs for acquisition and improve uptake.

b. **Gap in medium-sized logistics and delivery** opens a door for cargo three-wheelers. Currently, boda bodas in Gulu and Mbarara can carry up to 150kg, while trucks' lowest costs are often around 20,000 to 30,000 UGX. Cargo tuktuks are more versatile, serving for small-scale logistics and shop restocking, filling the gap between boda bodas and small trucks.

c. **Gap in shared transport services** in Gulu and Mbarara, creating an opportunity for tuktuks providing shared passenger transport at a cheaper cost than boda bodas. Without taxis operating within the city, passenger three-wheelers have a major opportunity to provide cheaper transport services for city residents.

d. **Protection from poor weather** is provided by three-wheelers, shielding passengers from sun and rain alike. This is particularly appreciated by families and the elderly, or on days of extreme weather.

> *"Tuktuk is an "all-weather" model of transport unlike tricycles and boda bodas that cannot be used by passengers during heavy rainfall and strong sunshine."* **Tuktuk rider at Gulu main market.**

e. **Rapid urban growth** in Gulu and Mbarara is increasing overall demand for transport modes. This presents a strong opportunity for creating a reliable market for E3W, which can transport multiple people at lower per-person costs than boda bodas.

f. **Dependence on agriculture** is high in Uganda, with the population of Gulu having nearly double the reliance on agriculture as Mbarara.[60] Electric tricycles are particularly fit for moving medium-sized loads of agricultural goods to market, as demonstrated by Mobility for Africa, an E3W company operating in rural Zimbabwe.

60 National Population and Housing Survey, 2024.

5.2 Barriers and Opportunities for Women in E-Mobility

5.2.1 Barriers to women's participation in Gulu and Mbarara

a. **Gender stereotypes** remain widespread in Gulu and Mbarara. Women face social bias are often viewed and treated as less capable in operating motorcycles or tuk-tuks for commercial purposes. This bias needs to be addressed to encourage women to participate in e-mobility, and to prevent society from discouraging them.

b. Women in Gulu and Mbarara face **sexual harassment and physical assault** in informal transport, making the work unsafe.[61] In Gulu, women working with boda boda riders report harassment from defaulting customers when collecting payments. A restaurant owner facing this challenge decided to limit credit to one meal per rider.[62] Similar issues of harassment and insecurity affect women in Kampala's transport sector, threatening their safety and livelihoods.

c. **Cultural and social expectations** in Gulu and Mbarara pressure women to prioritise domestic duties over professional ambitions. The cultural norms emphasize domestic roles for women, making motorcycle riding unconventional and often stigmatized. Economic necessity has pushed some women into roles like owning and/or riding boda bodas, but this is met with mixed reactions by the local community.

d. **The lack of supportive infrastructure**, such as safe public restrooms and childcare, limits women's participation in transport in Gulu and Mbarara.[63] Unlike men, who often urinate in public, women have no such options, leading to inconvenience and health issues including UTIs.

e. **Underrepresentation in leadership** in the sector due to entrenched traditional gender norms and limited access to resources means there are few female role models or mentors in the industry. This is more pronounced in Gulu and Mbarara where societal expectations often confine women to domestic roles. The landscape in Kampala is relatively more progressive, with women beginning to gain visibility as riders, and have a women-only stage, unlike either Gulu or Mbarara.[64] However, women riders still face significant discrimination.

f. **Lack of women's participation in science, technology, engineering and mathematics** (STEM) significantly reduces women's opportunities in Uganda's emerging electric mobility sector. Only around 20% of engineering students are women, resulting in a similar dearth of women working in engineering and other fields critical for e-mobility.[65] This underrepresentation is compounded by cultural biases.

61 UNEP Gender Baseline in Uganda.
62 Interview with spare parts vendor, Gulu; Interview with restaurant owner, Gulu.
63 Interview with Gulu East City Boda Boda Association.
64 Women Raising for Africa. 2024. Women thriving in boda boda business. Women thriving in boda boda business - Women Rising for Africa
65 "Tracer Study of Engineering Graduates in Uganda," Uganda National Council for Science and Technology, 2016. Retrieved from https://www.uncst.go.ug/manage/files/downloads/Tracer%20Study%20Report%202016.pdf

g. **Limited access to financing** hindered by cultural and systemic barriers, which frame women's loan-taking as irresponsible, compared to more favorable impressions of men's usage of loans. Additionally, the requirement for male guarantors or co-signers, male family ownership of assets, income inequality, and limited property ownership reduce women's purchasing power and their ability to secure loans.

h. **Vulnerability to theft** is heightened for women, especially when working alone or at night. Programs like Women Rising for Africa's "Women on Wheels" provide specialized training for women in electric motorcycle operations, including self-defense, but such initiatives remain scarce and often lack follow-up.[66]

5.2.2 Opportunities for women's participation:

Society is progressively recognising women as capable mechanics and riders. This is highlighted by the majority of interviewed riders in both Gulu and Mbarara reporting being comfortable working alongside female motorcycle riders (Figure 11). A slight majority of boda boda riders in both cities also report believing women are as capable as men in repairing motorcycles.

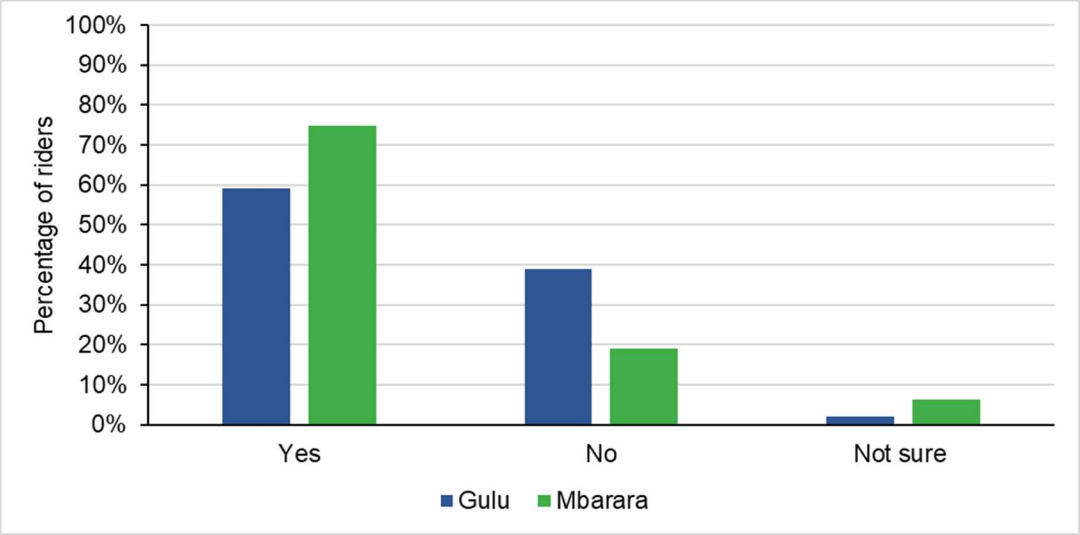

Figure 11: Percentage of riders who would feel comfortable working with women riders.

Local NGOs and savings groups support women's empowerment. In Gulu, the Gulu Women Economic Development and Globalization (GWED-G) supports 108 women-led and 200 Gulu-based groups; promotes gender-sensitive transport policies; and encourages savings to purchase boda bodas. In Mbarara, the Academy of Women Entrepreneurs and Alumni AWE SACCO unites graduates of the Academy for Women Entrepreneurs, offering loans at 2% monthly interest to support members' businesses.

Women's growing business groups and networks in Gulu and Mbarara are fostering collaboration, mentorship, and mutual support among women entrepreneurs. Women also often own vehicles for rental, including two, three, and four-wheelers, in both cities. In Gulu, some women are both owners and riders of their boda bodas. These networks can serve as platforms to encourage more women to

66 Women Raising in Africa. Empowering Women in Uganda with "Women on Wheels". Empowering Women in Uganda with "Women on Wheels" - Women Rising for Africa

enter the e-mobility sector, share best practices, and access new business opportunities. These can provide a good platform for introducing E2&3Ws and deliver additional benefits to women owners.

Availability of financiers like Watu, Mogo, and Asaak make it more feasible for women to purchase or lease vehicles. This lowers the entry barriers for women entrepreneurs in the sector. Additionally, women, either as individuals or through SACCOs, could play a crucial role in financing clean technologies by purchasing vehicles to rent or lease, further driving the transition to cleaner transportation solutions, while benefiting women entrepreneurs.

Cultural shift toward women's economic empowerment, where women are increasingly seen as contributors to household and community income. This shift opens doors for more women to consider entrepreneurial ventures in e-mobility.

5.3 Business Cases for E-Mobility in Gulu and Mbarara

There are several business cases for E2&3W in Mbarara and Gulu, shaped by unique local factors. The nuances of demand, infrastructure, and socioeconomic conditions create distinct opportunities and challenges in each city. In general, there are more opportunities for E2W in Mbarara and more opportunities for E3W in Gulu. There are three business cases, identified by number:

#1 Battery swapping for bodas in Mbarara
#2 Local procurement of e-motorcycles in Gulu or Mbarara
#3 E-tricycles for agricultural goods in Gulu

5.3.1 Battery swapping for bodas

5.3.1.1 Description and Rationale

This would be an expansion of the existing battery swap model into Mbarara, with no major modifications. Women can be trained as e-boda mechanics and swap station operators, to be employed by the battery swapping motorcycle companies.

Rationale:

Mbarara has a **large addressable market** of 37,000 boda bodas, around twice as many boda bodas as Gulu.

Mbarara also has **double the boda boda density** of Gulu, higher even than Kampala, ensuring higher utilization of battery swap stations.

Mbarara has low **loan default rates** compared to Gulu and even Kampala, making this a lower-risk approach.

Mbarara has **more active MFCs** than Gulu, making it easier to find partners to help finance and sell the motorcycles to boda boda riders.

Partners:

Motorcycle-financing companies, to finance the motorcycles.

Battery swapping companies, such as Gogo, Spiro, or Zembo, to operate battery swap stations.

Donor agencies in partnership with **vocational institutions** to train women as e-motorcycle technicians.

Customer segment: The general boda boda population.

Vehicle type: **Motorcycles.** Any of the battery swapping motorcycle companies could participate, including Gogo, Spiro, and Zembo.

5.3.1.2 Risk Assessment

Risk	Mitigation	Likelihood	Impact
Insufficient daily energy usage. E-boda boda riders drive less than 80 km / day or consume less than 3.5 kWh a day, lengthening the payback period on battery stock.	Focusing on selling to high-performing boda boda riders, as identified by vehicle financiers	Medium	High
Electricity grid instability. Local electricity grid experiences significant outages, negatively impacting availability of fully charged batteries and worsening customer experience.	This could be mitigated with an assessment of the local grid to inform station placement, and investment in solar PV.	High	Low
Uncompetitive pricing. E-motorcycles and battery swap prices were to rise, making them much less attractive in comparison to ICE.	This could be mitigated by working with UEMA to lobby national government to ensure the VAT exemption for e-motorcycles in law is being operationalized.	Low	Medium
Lack of financing partners. If financing partners were unwilling to provide financing for e-motorcycles in Mbarara, slowing market entry altogether.	This could be mitigated with a thorough pitch to motorcycle financiers on the available market in the city.	Low	Medium

5.3.2 Local procurement of electric motorcycles

5.3.2.1 Description and Rationale

Local government offices in either Gulu or Mbarara to procure new e-motorcycles for their fleets, which could be either (1) sold with their batteries for office charging or (2) partner with the entry of battery swap companies. Women can be trained as e-boda mechanics, to be employed by the local government offices, and women government workers can be trained to use the e-motorcycles.

Rationale: Fleets for district local government and regional offices of national institutions like the police are the **largest fleets in regional cities,** with around 150 motorcycles owned by DLGs in each.

Government fleets are not for-profit, and **less price sensitive**.

The **high visibility** and implicit endorsement of e-mobility by government would boost the profile of EVs and lead to additional interest by the general population.

Partners: **District Local Government** and **Ministry of Works and Transport** to procure the vehicles and operate them.

Donor agencies to support a feasibility study to increase the likelihood of success of such a program.

Customer segment: Government institutions.

Vehicle type: **Motorcycles.** If the battery-swapping approach is taken, Zembo, Spiro, or Gogo would be appropriate. If the local government offices prefer to own their batteries, Gogo, Spiro, or Green Hub East Africa would be potential partners.

5.3.2.2 Risk Assessment

Risk	Mitigation	Likelihood	Impact
Insufficient operational usage. Motorcycles are underutilized, and fleet owners see less operational savings.	Conduct a brief feasibility study to focus on high-utilization departments.	Medium	Low
Lack of local maintenance knowledge. Local maintenance capacity is insufficient, and e-motorcycles suffer extended breakdowns.	Train local fleet maintenance department and conduct regular checkups on the vehicles.	Medium	Medium
Delayed procurement process. Procurement is delayed by budgetary or unforeseen local politics.	District Local Government to use the quotation method to simplify purchases of under 400 million UGX.	High	Medium

5.3.3 E-tricycles for agricultural goods

5.3.3.1 Description and Rationale

Electric cargo tricycles would be purchased by women-led savings groups, agricultural cooperatives, or market associations, to be used for agricultural logistics. Charging stations to be set up at Gulu Market, and/or any cooperative hub. Women could be owners and drivers, through the SACCOs & VSLAs, and trained as e-tricycle mechanics.

Rationale: Gulu has **flat topography**, making it easy to adopt tricycles carrying heavy loads.

There are **already over 100 tricycles and tuktuks in Gulu** and have organized themselves into an association.

Nearly **90% of the population of Gulu is involved in agriculture**, making this a sector that touches nearly every home and could provide significant demand. [67]

Partners:

Women-led savings groups, such as Aciro Ki Nene Women's SACCO, or others in partnership with GWED-G.

Farming cooperatives, such as the Gulu Agricultural Development Corporation, Gulu Dairy Women's Cooperative, or Gulu Avocado Farmers' Cooperative.

Financing companies, such as Watu, Mogo, or Asaak, who could also partner to directly finance the uptake of e-tricycles by women.

Donor agencies in partnership with **vocational institutes**, such as Daniel Comboni Vocational Institute or Gulu Community Vocational School, to build local e-3W maintenance capacity.

Customer segment: **Women-led savings groups, farming cooperatives** and **market associations**.

Vehicle type: **Tricycles.**

5.3.3.2 Risk assessment for the e-tuktuks

Risk	Mitigation	Likelihood	Impact
Electricity grid instability. Local electricity grid experiences significant outages, reducing availability of charging infrastructure.	Assessment of the local grid to inform station placement, and investment in solar PV.	High	Medium
Lack of appropriate tricycles. No affordable and quality tricycles are locally available.	Compile a list of potential sources or use existing databases.[68] Pilot several different available models to assess their fit for the local market.	Medium	High
Lack of locally available mechanics. E-tricycles suffer breakdowns as a result of limited local capacity to maintain the vehicles.	Train women mechanics to maintain the e-tricycles. Conduct regular checkups.	Low	Medium
Poor local road infrastructure. Results in increase maintenance costs and downtime.	Plan for routes on better roads and last-mile delivery to reduce wear-and-tear on the vehicles.	High	Medium

67 National Population and Housing Census 2024.

68 UNEP, "Global Emerging Market Overview for Electric Two and Three wheelers," January 2024. https://www.unep.org/resources/report/global-emerging-market-overview-electric-two-and-three-wheelers

6. Recommendations

The following recommendations are aimed at increasing the likelihood of success for each of the business cases, identified by their number.

Table 8: Recommendations for business cases for E2W and E3W in Mbarara and Gulu

Actor	Business Case	Recommendation	Impact
District Local Government	#2	• Pilot procurement of E2W for government motorcycles fleets	• Create local demand for E2W sales • Create visibility of E2W
District Local Government	#2	• Set targets for electrification of local fleets, e.g. 50% of the city council motorcycle fleet to be electric by 2028.	• Signal commitment to vehicle electrification
City Council	#1, #2, #3	• Work with existing boda boda and tuktuk associations in Mbarara and Gulu to facilitate a safe working environment for women riders by addressing harassment.	• Encourage more women in the transport sector. • Reduce harassment in general in the transport sector.
City Council	#3	• Create additional parking spaces in Gulu for tuktuks, with dedicated parking spaces for E3W at the Gulu market	• Create incentives for E3W adoption in Gulu
Ministry of Finance, Planning, and Economic Development	#1, #2, #3	• Offer stable tax incentives for E2W and E3W e.g incentives to companies importing lithium ion batteries and lithium-ion battery cells	• Stable tax incentives make EVs more accessible and affordable thus increasing adoption
Ministry of Trade, Industry and Cooperatives	#1, #2, #3	• Establish standards and guidelines for EV operation and maintenance	• Safety, durability and regulatory compliance whilst minimising risk
MoWT and MEMD	#3	• Invest in charging infrastructure for E3W in Gulu, at markets and other central locations	• Infrastructure will ease the introduction of E3W

Ministry of Education and Sports	#1, #2, #3	• Integrate EV curricula at vocational schools and tertiary institutions across Uganda.	• To create a modern EV workforce specialized along the e-mobility value chain
Ministry of Local Government	#2	• Require the creation of local government EV procurement policies	• To ensure local leadership and participation in the adoption of EVs
E2W, E3W providers	#1	• Hire and train women technicians for repairs and maintenance for E2W and E3W. • Ensure at least 50% of technicians trained are women with long-term plans for placement and/or retention. • Hire women as swap station operators.	• Training ensures efficient maintenance and repair of EVs. • Placement and retention programs ensure women stay in the sector.
	#2	• Train women mechanics to maintain government fleet	• Reduce downtime; increase women's representation in sector.
	#1, #2, #3	• Work with NGOs and international donors to conduct public outreach about e-mobility in Gulu and Mbarara (as part of program implementation)	• Increased awareness and knowledge on benefits of E2W and E2W • Accelerated project implementation
E3W providers	#3	• Ensure E3W retailed in Uganda are sufficiently powered for local topography and load demands.	• Boost confidence in the sector with products fit for the market.
	#3	• Work with women led VSLAs & SACCOs to introduce E3W in Gulu.	• Increase in number of women owning and operating E3W

Finance entities (Watu, Mogo, Asaak, Tugende, etc)	#3	• Create targeted financing options (e.g., microloans, subsidies) for women to purchase or lease electric three-wheelers. The loans can be coordinated through existing women SACCOs in Gulu.	• Increased affordability of E3W
	#1	• Work closely with e-mobility companies and riders to provide upfront financing in Mbarara (new E2W).	• Increased affordability of E2W
	#1	• Offer financial literacy training to E2&3W riders and entrepreneurs to help them manage credit and expand their businesses.	• Increased financial discipline which could reduce defaults
Donor agencies (GIZ, EU, UNEP, USAID, Power Africa, FCDO etc)	#1, #3	• Conduct public sensitization about e-mobility in coordination with UEMA and companies in each city	• Increased knowledge about benefits of e-mobility
	#2	• Fund feasibility study of local government procurement of E2W in each Gulu and Mbarara	• Increase the likelihood of success of a local government E2W procurement program
	#1, #2, #3	• Partner with e-mobility companies and local vocational institutions to train E3W technicians in Gulu and E2W technicians in Mbarara	• Increased availability of local skilled workforce in the e-mobility sector • Increase number of women in e-mobility • Build local e-mobility capacity
	#3	• Subsidize or provide concessional capital to women-led VSLAs in Gulu to purchase and maintain E3W	• Increased number of women owners, mechanics, drivers and encourage E3W uptake upcountry

Appendix

Interviews

Africa

- Tri (Tanzania)
- Wasoko (Egypt / pan-African)

Kampala

- Motorcare Uganda
- Jibu Inc
- DHL
- Zembo
- Bodawerk
- Spiro

Gulu

- Gulu Central Market
- Aciro ki nene women's SACCO, Gulu Central Market
- Gulu Women Economic Development and Globalization (GWED-G)
- African Women Rising
- Watu
- Boda Boda Banja
- Gulu District Local Government
- Female motorcycle rider
- Gulu Tuktuk Association
- Gulu West Bodaboda Association
- Gulu East Bodaboda Association
- Tuktuk driver-owner
- Tricycle driver
- Punena General Traders
- New Life Restaurant
- Mobile restaurant
- Spare parts vendor
- Post Bank
- BRAC Uganda
- Equity Bank

Mbarara

- Centre for Women Advocacy and Empowerment UG (CEWAYE)
- HER Working Women
- Mbarara District Local Government
- Mbarara Municipality Boda Boda Association
- Mbarara city (North) Taxi Association
- Watu
- Boda Boda Banja

- ICE Bajaj Boxer rider, Victor stage, B-Plus Hotel
- ICE Bajaj Boxer rider at Ruti Stage
- EV Spiro Ekon rider
- EV Spiro Ekon rider
- Tricycle driver
- Post bank
- Academy of Women Entrepreneurs Alumni SACCO
- Kyamuhanga Peoples SACCO
- Yongeza Capital

This report is prepared under the authority of the contract signed between the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Africa E-Mobility Alliance (AfEMA) for a Study on the Business Cases for E-Mobility (2- and 3-Wheelers) in two Major Cities (Mbarara and Gulu) in Uganda with a focus on Gender.